Epidemiology and Prevention of CV Disease

Increasing prevalence of metabolic syndrome in a Chinese elderly population: 2001–2010

Miao Liu1,2, Jianhua Wang1,2, Bin Jiang, Dongling Sun1, Lei Wu1,2, Shanlan Yang1,2, Yiyan Wang3, Xiaoying Li4, Yao He1,2,5
1 Institute of Geriatrics, Chinese PLA General Hospital
2 Beijing Key Laboratory of Aging and Geriatrics, Chinese PLA General Hospital
3 Department of Chinese Traditional Medicine and Acupuncture, Chinese PLA General Hospital
4 Department of Geriatric Cardiology, Chinese PLA General Hospital
5 State Key Laboratory of Kidney Disease, Chinese PLA General Hospital

Objective The information on the changes of prevalence of metabolic syndrome (MetS) in China is limited. Our objective was to assess a 10-year change of the prevalence of MetS in a Chinese elderly population between 2001 and 2010.

Methods We conducted two cross-sectional surveys in a representative sample of elderly population aged 60 to 95 years in Beijing in 2001 and 2010 respectively. MetS was defined according to the 2009 harmonizing definition.

Result A total of 2,334 participants (943 male, 1,391 female) in 2001 and 2,102 participants (848 male, 1,254 female) in 2010 completed the survey. The prevalence of MetS was 50.4% (95% CI: 48.4%–52.4%) in 2001 and 58.1% (95% CI: 56.0%–60.2%) in 2010. The absolute change of prevalence of MetS was 7.7% over the 10-year period (P < 0.001). The syndrome was more common in female than male in both survey years. Among the five components, hypertriglyceridemia and low HDL-C had increased most, with an increase of 14.8% (from 29.4% to 44.2%) and 9.9% (from 28.3% to 38.2%) respectively. The adjusted ORs of MetS for CHD, stroke and CVD were 1.67 (95% CI: 1.39–1.99), 1.50 (1.19–1.88) and 1.70 (95% CI: 1.43–2.01) in 2001, and were 1.74 (95% CI: 1.40–2.17), 1.25 (95% CI: 0.95–1.63) and 1.52 (95% CI: 1.25–1.86) respectively in 2010.

Conclusion The prevalence of MetS is high and increasing rapidly in this Chinese elderly population. Participants with Mets and its individual components are at significantly elevated ORs for CHD, stroke and CVD. Urgent public health actions are needed to control MetS and its components, especially for dislipidemia.

Effect of different body mass index and waist circumference on arterial elasticity in prehypertensive patients

Hongbin Song1,2, Zhendong Liu1, Fanghong Lu1, Yutao Diao1
1 Center of Cardiovascular Disease Prevention and Treatment, Institute of Basic Medicine, Shandong Academy of Medical Sciences, Jinan, Shandong 250062, China
2 School of Medicine and Life Sciences, University of Jinan—Shandong Academy of Medical Sciences, Jinan, Shandong 250062, China

Objective To investigate the effect of different body mass index (BMI) and waist circumference on arterial elasticity in prehypertensive patients.

Methods The basic information was collected in a total of 776 prehypertensive patients. According to BMI and waist circumference level, all subjects were divided into four groups, namely, normal BMI and normal waist circumference group (I group, n = 194 cases), normal BMI and elevated waist circumference group (II group, n = 195 cases), elevated BMI and normal waist circumference group (III group, n = 196 cases), elevated BMI and elevated waist circumference group (IV group, n = 191 cases). Brachial ankle pulse wave velocity (baPWV) and ankle-brachial blood pressure index (ABI) were observed in all patients. Arterial stiffness index (AI) was calculated using the blood lipid of all hypertension patients.

Result baPWV (212.0 ± 263) and AI (3.35 ± 0.87) in IV group were significantly higher than I group (P < 0.01), II group and III group (P < 0.05). ABI (0.72 ± 0.15) in IV group were significantly lower than I group (P < 0.01), II group and III group (P < 0.05). There were no statistical differences between II group and III group in ABI and AI (P > 0.05). Result of 2 × 2 factorial analysis showed that there was a distinctive and synergistic effect between excessive BMI and elevated waist circumference on arterial stiffness.

Conclusion Arterial elasticity function was apparent damaged in prehypertensive patients with abdominal obesity. Elevated BMI and elevated waist circumference had interaction and synergistic effect on the damage of arterial elasticity function.

The study of association between PAI-1 gene and blood stasis syndrome in premature coronary heart disease of Hunan nation population.

Jie Li, Lingli Chen, Zhaokai Yuan, Wengxin Yu, Zhixi Hu, Yueyun Qu, Xiangping Huang
Hunan College of TCM, Changsha, 410208

Background To investigate whether PAI-1 gene increased the risk of Heart Blood Stasis Syndrome (HBSS) in coronary heart disease (CHD) pedigrees, haplotype-based haplotype relative risk (HHRR) and transmission disequilibrium test (TDT) were used.

Methods Forty CHD pedigrees with at least one CHD patient in the first degree relatives of probands and ten pedigrees without CHD were collected during Oct. 2003 to Dec. 2012, of which premature CHD pedigrees with HBSS, parental genotype known of which were 25 and 18 respectively. PAI-1 genotype was measured by PCR-VNTR technique. HHRR and TDT were used.

Results There were no significant difference in genotype distribution and allele frequencies between patients and parents in premature coronary heart disease pedigrees (including pedigrees with HBSS and pedigrees without HBSS) (P > 0.05), which illustrated that both of genotype and allele of PAI-1 gene did not deviate from Hardy-Weinberg equilibrium in premature coronary heart disease. But the cases' number of premature CHD pedigrees with HBSS whose CA repeat copy number N < 20 was significantly higher than the number of non-BSS. In the method based on haplotype HHRR analysis method for 28 core pedigrees information to calculate the relevance between CHD and blood stasis PAI-1 allele CA18 and non-BSS PAI-1 allele CA20. In which 14 (W) CA18 gene transferred, 3 (Y) did not delivery among PAI-1 (2N) alleles of blood stasis pedigrees; 22 (X) transferred, 33 (Z) did not among...
Validation and utility of the Framingham general cardiovascular disease risk score for predicting 10-year cardiovascular events in an Inner Mongolian population: a prospective cohort study

Hao Peng1, Qishua Zeng2, Shuhai Han1, Maoli Bu1, Yonghong Zhang2
1 Department of Epidemiology, School of Public Health, Medical College of Soochow University, Suzhou, China
2 Department of neurology, the First Peoples’ Hospital of Horgon District, Tongliao, China

Background The Framingham general cardiovascular disease (CVD) risk score (FGCRS) is a widely-studied tool to identify individual with a high risk of global CVD, but the homogeneous nature of the Framingham population prevents simple extrapolation to other populations. We aimed to examine and recalibrate the FGCRS in an Inner Mongolian population, China.

Methods A randomly-derived, population-based, prospective cohort of 2 583 community participants free of CVD were followed up for new CVD events from 2002 to 2012. CVD events were defined as a composite of coronary heart disease (coronary death, myocardial infarction, coronary insufficiency, and angina), cerebrovascular events (including ischemic stroke, hemorrhagic stroke, and transient ischemic attack), peripheral artery disease (intermittent claudication), and heart failure. Information about CVD events on follow-up was obtained with the aid of medical histories, physical examinations at the study clinic, hospitalization records and communication with community physicians. According to the Framingham formulation, a 10-year risk of CVD was estimated for every participant. We compared the predicted and observed incidence of CVD events within each decile of calculated CVD risk scores based on the FGCRS. Recalibration was computed referring to the Result of comparison between observed and predicted risk of CVD. We accessed discrimination on the basis of C statistics and examined whether the prediction of incident CVD events on the basis of the FGCRS improved after reclassification on the basis of recalibrated FGCRS using the net reclassification improvement and integrated discrimination improvement. Attributable risk proportion was calculated to estimate the effectiveness of use of the FGCRS by using COX proportional hazard model with 0 – 5 percent category as a reference.

Conclusion The CA18 alleles of PAI-1 Gene is associated with HBSS in CHD pedigrees. Indicating that the CA18 alleles of PAI-1 Gene may be linked with the susceptibility location of HBSS in CHD of Han Han nation population.

Validation and utility of the Framingham general cardiovascular disease risk score for predicting 10-year cardiovascular events in an inner Mongolian population: a prospective cohort study

Hao Peng1, Qishua Zeng2, Shuhai Han1, Maoli Bu1, Yonghong Zhang2
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Validation and utility of the Framingham general cardiovascular disease risk score for predicting 10-year cardiovascular events in an inner Mongolian population: a prospective cohort study

Hao Peng1, Qishua Zeng2, Shuhai Han1, Maoli Bu1, Yonghong Zhang2
1 Department of Epidemiology, School of Public Health, Medical College of Soochow University, Suzhou, China
2 Department of neurology, the First Peoples’ Hospital of Horgon District, Tongliao, China

Is human urotensin II associated with essential hypertension independently of nitric oxide?

A 1:1 matched case–control study

Hao Peng1, Mingzhi Zhang1, Xiaoqin Cai2, Yingxian Sun3, Yongdong Zhang1
1 Department of Epidemiology, School of Public Health, Medical College of Soochow University, Suzhou, China
2 Department of Diagnostic Center, Chinese Medicine Hospital of Kunshan, Suzhou, China
3 Department of Cardiology, the First Affiliated Hospital of China Medical University, Shenyang, China

Background Human urotensin II is the most potent vasoconstrictor identified to data. However, association between urotensin II and hypertension has been controversial and whether the association is independent of endothelial function is unclear. Here, we studied the association under adjustment for serum nitric oxide in hypertensive and normotensive human subjects.

Methods 197 newly diagnosed hypertensive patients without antihypertensive medication and 197 age- and sex-matched normotensive controls were recruited from the same community. Plasma urotensin II, serum nitric oxide and other traditional biomarkers including blood lipids, fasting plasma glucose and serum uric acid were examined for all participants. Correlations of urotensin II with blood pressure and nitric oxide were examined by using Pearson correlation analysis. Association between urotensin II and hypertension was evaluated by multivariate conditional logistic regression analysis. In addition to controlling for nitric oxide in multiple models, sub-group analysis was further performed in nitric oxide level-matched pairs of subjects to eliminate the
potential influence of nitric oxide on vascular action of urotensin II.

**Result** Hypertensive patients had higher plasma urotensin II [median (interquartile range): 9.32 (7.86 – 11.52) ng/mL vs 8.52 (7.07 – 10.41) ng/mL] and lower serum nitric oxide [19.19 (2.55 – 38.48) μmol/L vs 23.83 (11.97 – 43.40) μmol/L] than normotensive controls. Urotensin II positively correlated with systolic blood pressure (r = 0.169, P < 0.001), diastolic blood pressure (r = 0.113, P = 0.024) while negatively correlated with serum nitric oxide (r = -0.112, P = 0.027). Conditional logistic regression analysis showed that with per unit increment of urotensin II, risk of hypertension increased 8% (OR, 1.08; 95% CI, 1.02 – 1.15), and after adjustment for potential covariates, risk of hypertension was still increased despite the insignificance (OR, 1.05; 95% CI, 0.98 – 1.12). When participants were categorized into quartiles of urotensin II, ORs of hypertension for upper quartiles were calculated with the lowest quartile as a reference. In the univariate analysis, the OR of hypertension for subjects in the highest 25th percentile of the distribution of UII had 2.85 times the OR of hypertension than did individuals in the lowest 25th percentile (OR, 2.85; 95% CI, 1.52 – 5.34). In multivariate regression analysis, subjects in the highest quartile of urotensin II were more likely to have hypertension than those in the lowest quartile (OR, 2.33; 95% CI, 1.10 – 4.93). ORs of hypertension positively increased with UII level (P for trend = 0.046). Conditional logistic regression analysis in 106 pairs of serum nitric oxide level-matched cases and controls showed that both before and after adjustment for cigarette smoking, alcohol consumption, family history of hypertension, body mass index, total cholesterol, triglycerides, serum uric acid and FPG, OR of hypertension significantly and positively increased with UII level (all P values for trend < 0.05). After multivariate adjustment, individuals in the highest 25th percentile of the distribution of UII were still more likely to have hypertension than those in the lowest 25th percentile (OR, 3.15; 95% CI, 1.13 – 8.78).

**Conclusion** Human urotensin II is markedly associated with essential hypertension and the association is independent of nitric oxide. Our Result suggest that urotensin II may have an etiological role in hypertension.

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**Association of peroxisome proliferator– activated receptor gene – gene interactions and the lipoprotein**

Huijian Xie1, Zhirong Guo1, Ming Wu1, Qiu Chen1, Mengmeng Liu1, Bo Hai1

1 Department of Epidemiology, School of Public Health, Medical College of Soochow University, China
2 Center for Disease Control of JiangSu Province, NanJing, JiangSu, China

**Objective** To examine the association between 20 single-nucleotide polymorphisms (SNPs) in the peroxisome proliferator-activated receptor (PPARs) and the level of lipoprotein-a [Lp (a)], as well as to investigate if there is gene – gene interaction among the SNPs on level of Lp (a).

**Methods** Subjects were sampled from cohort population of Prevention of Multiple Metabolic Disorders and Metabolic Syndrome Study, which was an urban community survey study conducted in Jiangsu Province, China. In total, 644 subjects (234 men and 410 women) were selected in random, and no individuals were consanguineous. Ten SNPs in PPARA (rs135539, rs4253778, rs1800206), PPARD (rs2016520, rs9794) and PPARG (rs10865710, rs1805192, rs709158, rs3856806, rs4684847) were genotyped and analyzed. SNPStats program was used to examine the association between the SNPs and Lp (a). Gene-gene interactions were explored with generalized multifactor dimensionality reduction (GMDR) method.

**Result** The frequencies of all genotypes obeyed the law of Hardy-Weinberg equilibrium. It was showed that there was association of genotypes of variants in rs1800206 with the level of Lp (a), after adjustment for gender, age, smoking, alcohol, waist circumference, blood glucose, total cholesterol, triglycerides, and physical activity: Lp (a) was significantly higher in the individuals with mutant (LV+VV) comparing to those with wideotype (LL) (P = 0.0009). Mean difference was 44.26 mg/L, and 95% CI was 18.23 – 70.30. The associations of other 9 SNPs in PPARs with Lp (a) were not significantly whether the covariates were adjusted or not. Pairwise LD analysis among SNPs was conducted, and all D’ was less than 0.75. After gender, age, smoking, alcohol, waist circumference, blood glucose, total cholesterol, triglycerides, and physical activity were adjusted, gene-gene interaction among rs1800206, rs135539 in PPARA and rs10865710, rs1805192, rs4684847 in PPARG on Lp (a) level were significant (P = 0.001), in which prediction accuracy was 0.6848 and cross-validation consistency was 10/10.

**Conclusion** It was suggested that rs1800206 was associated with a higher level of Lp (a). In addition, a gene-gene interaction on Lp (a) level was identified among rs1800206, rs135539, rs10865710, rs1805192, rs4684847.

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**Prediabetes and short term outcomes in nondiabetic patients after acute ST–elevation myocardial infarction**

Li Tian, Jun Zhu, Lisheng Liu, Yan Liang, Jiaodong Li, Yamin Yang

State Key Laboratory of Cardiovascular Disease, Emergency and Critical Care Centre of Cardiovascular Department, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

**Objective** Prediabetes state is defined as the time period before the development of symptomatic diabetes. Limited evidence is available for evaluating the correlation between prediabetes and short term outcomes in nondiabetic patients with ST segment elevation myocardial infarction (STEMI).

**Methods** 4,787 nondiabetic patients after STEMI with typical chest pain onset within 12 hours were enrolled. 7 and 30 day follow-ups from admission to hospitals were performed. According to new ADA criteria, the study population was stratified into three groups: normal (HbA1c ≤ 5.6%, n = 2,378), prediabetes (HbA1c 5.7 – 6.4%, n = 1,490) and newly diagnosed diabetes (HbA1c ≥ 6.5%, n = 919). The primary outcomes of our study were all-cause mortality and Major Adverse Cardiac Events (MACE) at 7 day and 30 day.

**Result** The proportions of prediabetes and newly diagnosed were 31.1% and 19.2%. Rates of 7-day and 30-day mortality and MACE were similar among different HbA1c groups. Multivariable Cox regression analysis showed that compared with patients with normal glucose metabolism, prediabetes (HR, 1.003; 95% CI, 0.865 – 1.165) and newly diagnosed diabetes (HR, 0.887; 95% CI, 0.739 – 1.064) did not correlate with short term MACE. However, base glucose was the independent predictor for short term MACE (HR, 1.031; 95% CI, 1.017 – 1.046).

**Conclusion** Nondiabetic patients after STEMI had higher incidence of latent DM. Newly diagnosed DM and prediabetes were not correlated with short term outcomes in nondiabetic patients with STEMI, yet admission glucose level was the independent predictor for short term MACE. To reduce the incidence of short term MACE after STEMI, more attention should be paid to control high level of glucose.
Lifestyle of employees in urban China has changed thoroughly along with the social and economic development. As a result, employees are more exposed to health risk factors. In May 2011, the National Center of Cardiovascular Diseases (NCCD) of China launched an employee cardiovascular disease management program at some corporations in Beijing. Through adopting up-to-date technologies and developing self-owned patent management information system and technology tools, this program, named “Healthy Heart, New Life”, piloted an integrated solution for employee cardiovascular disease management in social community. The Result proved that puzzled difficulties in health management among employees, such as individualized health education, knowing blood pressure for all, knowing cardiovascular risks for all, and monitoring blood pressures through self-aids practice, etc, were well resolved in this pilot program and good effects were gained.

Discussion and conclusion

Haplotypic analyses of Pro12Ala and C1431T variants associated with essential hypertension

Mengmeng Liu1, Zhirong Guo2, Ming Wu3, Qiu Chen4, Zhengyuan Zhou4, Wenshu Luo4

1 Department of Epidemiology, School of Public Health, Soochow University, Suzhou, JiangSu, China, 215123.
2 Center for Disease Control of JiangSu Province, NanJing, JiangSu, China, 210009.
3 Department of Radiation Biology, Soochow University, Suzhou, JiangSu, China, 215123.
4 Center for Disease Control of ChangShu City, ChangShu, JiangSu, China, 215500.

Objective

The peroxisome proliferator-activated receptor gamma (PPARG) is one of the ligand-activated transcription factors in the nuclear hormone receptor superfamily which have metabolic effects but also exert anti-inflammatory action. In addition, the potential use of PPARG activators for cardiovascular protection associated with anti-hypertensive treatment for high blood pressure will be proposed. Some

Types of atrial fibrillation and one year outcomes in patients with nonvalvular atrial fibrillation

Li Tian, Jun Zhu, Han Zhang, Xinghui Shao, Yan Liang, Jiantong Li, Yamin Yang

State Key Laboratory of Cardiovascular Disease, Emergency and Critical Care Centre of Cardiovascular Department, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

Objective

Atrial Fibrillation (AF) increases the risk of incident stroke and systemic embolism. But different types of AF and one year outcomes in patients with nonvalvular AF were not validated.

Methods

1 697 patients with nonvalvular AF were enrolled. One year follow-up from admission to hospitals were performed. According to types of AF, the study population was stratified into three groups: group I (Persistent AF), group II (Paroxysmal AF) and group III (Permanent AF). The primary outcome of our study was stroke or Non-CNS systemic embolism. The primary safety outcome was major hemorrhage. Secondary outcome was all cause of death.

Result

Our Result indicated that rates of the primary outcome were consistent (P = 0.08) among group I (9.1%), group II (6.2%) and group III (9.4%); The rates of all cause of death were different (P < 0.001) among group I (12.2%), group II (9.1%) and group III (20.9%). The rates of major hemorrhage were consistent (P = 0.41) among group I (1.5%), group II (1.1%) and group III (0.7%). After adjusting the baseline characteristics, logistic regression analysis indicated that compared with persistent AF, paroxysmal AF (Odds Ratio: 1.913; 95% CI: 0.902 – 1.076, P = 0.006) and permanent AF (Odds Ratio: 0.851; 95% CI: 0.550 – 1.317, P = 0.469) were not associated with one year stroke or Non-CNS systemic embolism. However, compared with persistent AF, permanent AF (Odds Ratio: 1.913; 95% CI: 1.260 – 2.904, P = 0.002) was associated with all cause of death.

Conclusion

AF, whatever the types, confers the similar risk of incident stroke and Non-CNS systemic embolism to patients with nonvalvular AF. However, patients with permanent AF confront higher incidence of all cause of death.
researchers have even considered PPARG a new target for the treatment of hypertension. The objective of this study was to investigate the association of Pro12Ala and C1431T polymorphisms of PPARG2 and their haplotypes with susceptibility to essential hypertension (EH).

**Method** Participants were recruited within the framework of the Prevention of Multiple Metabolic Disorders and MS in Jiangsu Province cohort population survey conducted from 1999 to 2007 in the urban community of Jiangsu province of China. 820 subjects (270 males, 550 females) were selected by simple stochastic sampling method and no individuals were related. The PPARG Pro12Ala and C1431T polymorphisms were genotyped by TaqMan probes method and analyzed by single-nucleotide polymorphism haplotype analysis. The Logistic regression model was used to examine the association of Pro12Ala and C1431T polymorphisms with EH and the SNPStats software was used to analysis haplotypes.

**Result** The polymorphism allele frequencies of Pro12Ala and C1431T in this study were 26.5% and 29.2%, respectively. After adjustment for sex, age, smoking status and BMI as covariates, carriers of the 12Ala allele (PA + AA) of Pro12Ala (dominant model) was at a decreased risk of EH (OR = 0.70, 95% CI: 0.52 – 0.89, P = 0.02). Carriers of Ala/Ala homozygous or Pro/Ala heterozygous (codominant model) were also reduced the EH risk, but did not reach the statistically significant (OR = 0.58, 95% CI: 0.33 – 1.02, P = 0.05 and OR = 0.74, 95% CI: 0.54 – 1.01, P = 0.05, respectively). There was no difference noted related to the 1431T allele of C1431T under the dominant model or codominant model (P = 0.59, P = 0.67, respectively). Compared to the most common haplotype Pro-C, we found that haplotype 4 (Ala-T) was associated with a statistically significantly decreased risk of EH after adjustment for sex, age, smoking status and BMI (OR = 0.62, 95% CI: 0.41 – 0.85, P = 0.02). The estimated frequency of haplotype composed of the 12Ala and 1431T haplotype (4) was 9.54%.

**Conclusion** This study suggested that the Pro12Ala polymorphism was associated with EH and haplotype analysis showed for the first time that the Ala-T haplotype may be a genetic marker of EH.

Evidence on association between peroxisome proliferator-activated receptor delta and essential hypertension in Chinese–Han population

Zhengyuan Zhou
Center for Disease Control of Chang Shu City, Chang Shu, JiangSu, China, 215500.

**Objective** PPARD (Peroxisome proliferator-activated receptor delta), is expressed in many tissues and stimulates fatty acid oxidation. Beyond these major roles, PPARD also have been shown to play a role in other biological processes, including the regulation of inflammatory and oxidative pathways. The aim of this study was to investigate the association between the PPARD gene variants and essential hypertension (EH) in an Chinese–Han population.

**Methods** Two polymorphisms were detected: +294T/C in exon 4, and C2806G in exon 9. The frequencies of the rare alleles were 30.4% and 22.1% in a population-based group of 820 subjects (270 males, 550 females). Individual polymorphism and haplotype data were available for analysis.

**Result** Carriers of the C allele of +294T > C and the G allele of C2806G were at a decreased risk of essential hypertension (OR: 0.77, 95% CI: 0.63 – 0.95, P < 0.01 and OR: 0.66, 95% CI: 0.53 – 0.82, P < 0.0001, respectively). In comparison with the most common haplotype, haplotype 2 (C-C) which consist of the +294C and 2806C alleles and haplotype 3 (T-G) which consist of the +294T and 2806G alleles, were associated with a statistically significantly decreased risk of essential hypertension (OR: 0.77, 95% CI: 0.63 – 0.93, P = 0.0065 and OR: 0.66, 95% CI: 0.53 – 0.83, P = 0.0004, respectively). In addition, haplotype 2 and 3 were also associated with lower SBP and DBP values than the common haplotype, with a decrease of 1.82 mm Hg for haplotype 2 (95% CI: -3.56 – -0.08, P = 0.04) and 2.93 mm Hg for haplotype 3 (95% CI: -4.81 – -1.05, P = 0.0023) being recorded for SBP, while decreases of 1.25 mm Hg for haplotype 2 (95% CI: -2.14 – -0.35, P = 0.0066) and 1.34 mm Hg for haplotype 3 (95% CI: -2.35 – -0.33, P = 0.0092) were recorded for DBP.

**Conclusion** These Result may help to clarify the role of the PPARD gene variants in EH, and this evaluation of the polymorphisms and haplotypes of this gene furthers their characterization as genetic factors indicating a decreased risk for EH. Detection of these haplotypes may be useful for predicting genetic risk of EH.

Goal attainments and their discrepancies for LDL cholesterol and apolipoprotein B in over 2 000 Chinese hospitalized patients with known coronary artery disease or type 2 diabetes mellitus

Yongming He, Xujie Cheng, Xiangjun Yang, Xin Zhao
Division of Cardiology, the First affiliated Hospital of Soochow University

**Background** LDL-C is primary treatment target for patients with dislipidemia. The apo B, an emerging biomarker for cardiovascular risk prediction, appears to be superior to the LDL-C. However, little is known about goal attainments and their discrepancies for LDL-C and apo B in Chinese patients with known coronary artery disease or type 2 diabetes mellitus.

**Methods** 2 172 hospitalized patients with known coronary artery disease or DM, aged > 27 years of old, were enrolled. The success rates for apo B and LDL-C goal attainments were evaluated and compared by categorization and by sex.

**Result** When the success rates for apo B were compared with the ones for LDL-C, the apo B goal attainment rates were all higher than the LDL-Cs across all categorizations, with the statistically significant differences seen in all patients, CAD alone and DM alone (P = 0.000), but not in coexistence of CAD and DM (P = 0.190). The trend toward higher success rates for LDL-C and apo B goal attainments in men than in women are noteworthy across all categorizations although only in all patients and in DM alone patients were the statistically significant differences found (P < 0.01).

**Conclusion** The LDL-C lags behind the apo B in goal attainments in Chinese patients. Whether these discrepancies are associated with the occurrence differences for CAD and for stroke between the East Asia and the Western countries warrants further study.
Relation between hypertension and heavy drinking on the risk of stroke in Mongolian adults of Inner Mongolia, China

Lingyan Tang, Tian Xu, Yingxian Sun, Yonghong Zhang
1 Department of epidemiology, School of Public Health, Medical College of Soochow University, Suzhou, China
2 Department of Cardiology, the First Affiliated Hospital of China Medical University, Shenyang, Liaoning Province, China

Background Hypertension is a big challenge in public health and one of the most important risk factors of cardiovascular diseases. No study has specifically evaluated the combined effects of hypertension and heavy drinking on the risk of stroke in a minority of China.

Methods A prospective cohort study from 2003 to 2012 was conducted among 2,530 people aged 20 years and older from Inner Mongolia, China. We categorized the participants into four subgroups according to blood pressure and drinking status (non-hypertension/nondrinkers, non-hypertension/drinkers, hypertension/nondrinkers and hypertension/drinkers). Age–gender adjusted and multivariate-adjusted hazard ratios (HRs) for the incidence of stroke due to the combination of hypertension and alcohol consumption were calculated and compared with non-hypertension/nondrinkers.

Result The cumulative incidence rate of stroke among four subgroups were 1.5%, 2.8%, 7.4% and 12.5%, respectively (P < 0.001). The multivariate-adjusted HRs (95% confidential intervals) of subgroups were 1.03% (0.476–2.229), 2.644 (1.452–4.816) and 2.901 (1.556–5.410), respectively.

Conclusion These findings suggest that hypertension is an independent risk factor of stroke in Inner Mongolians. Hypertensives with heavy drinking were at the highest risk of stroke in the population, suggesting that hypertension and heavy drinking have a synergistic effect on stroke incidence.

Alcohol consumption and risk of stroke and coronary heart disease in Eastern Asian men: a meta-analysis of prospective cohort studies

Pinming Liu, Gang Liu, Shailendrasing Dosicah, Guiyi Yuan, Jingfeng Wang
Department of Cardiology, Sun Yat-Sen Memorial Hospital, The Second Affiliated Hospital of Sun Yat-Sen University, Guangzhou 510120, China

Objective To assess the dose-response relationship between alcohol consumption and risk of stroke, coronary heart disease (CHD) morbidity, mortality and all-cause mortality among Eastern Asian men.

Methods Potential prospective cohort studies were retrieved by searching Pubmed (1966 – 2012), OVID (1980 – 2012), Embase (1980 – 2012) and ISI Web of knowledge (1986 – 2012) using Medical Subject Headings alcohol drinking, ethanol, stroke, cerebrovascular disease, coronary heart (or artery) disease, myocardial infarction, mortality, etc., and Koreans, Japanese or Chinese. From the relevant retrieved reports, 21 prospective cohort studies met the criteria and were included in the study. Information on study design, participant characteristics, level of alcohol consumption, CHD outcome, control for potential confounding factors and risk estimates was abstracted using a standardised protocol. For each study, relative risks (RR) and 95% CI were extracted and pooled with either a fixed effect model or random effect model according to the result of the test of heterogeneity.

Result The study focused on male subjects, ranging from 1,322 to 108,461 people among the 21 cohort studies. Compared with non-drinkers, the RRs on ischemic stroke for those who drank alcohol ≤ 20, 21 – 40, 41 – 60, > 60 g/d were 0.85 (0.78 – 0.93, P = 0.0002), 0.94 (0.79 – 1.11, P = 0.46), 1.08 (0.86 – 1.37, P = 0.50), and 1.24 (0.96 – 1.59, P = 0.10), respectively. Similarly, the RRs on haemorrhagic stroke were 0.92 (0.75 – 1.12, P = 0.46), 1.11 (0.96 – 1.28, P = 0.17), 1.20 (0.92 – 1.56, P = 0.18), 1.74 (1.32 – 2.28, P < 0.0001); the RRs on CHD morbidity were 0.65 (0.34 – 1.23, P = 0.18), 0.48 (0.26 – 0.87; P = 0.02), 0.46 (0.32 – 0.67; P < 0.01) and 0.48 (0.29 – 0.78; P < 0.01), respectively. RRs on CHD mortality were 0.98 (0.73 – 1.31; P = 0.87), 0.68 (0.58 – 0.79; P < 0.01), 0.64 (0.43 – 0.96; P = 0.03), 0.75 (0.54 – 1.03; P = 0.08); and on all-cause mortality, were 0.83 (0.75 – 0.91, P = 0.0001), 0.93 (0.87 – 0.99, P = 0.03), 1.01 (0.95 – 1.07, P = 0.86), 1.32 (1.29 – 1.36, P < 0.01).

Conclusion In Eastern Asian men, light alcohol consumption (≤ 20 g/d) was associated with decreased risk of ischemic stroke; whereas, heavy alcohol intake was associated with increased risk of stroke, particularly haemorrhagic stroke and all-cause mortality; and moderate alcohol consumption (21 – 60 g/d) was associated with decreased risk of CHD morbidity and mortality.

One-year cardiovascular event rates in Chinese patients with atherothrombotic disease

Jingang Yang, Yuejin Yang, Honggui Gu, Wei Li, Dayi Hu
1 Cardiovascular Institute and Fuwai Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing 100037, China
2 Department of Cardiology, Peking Union People’s Hospital, Beijing 100730, China

Objective We sought to assess the risk profile, management and subsequent 1-year cardiovascular (CV) event rates in Chinese patients with coronary artery disease (CAD), stroke, peripheral artery disease (PAD), or with two or more cardiovascular risk factors.

Method From Oct. 2004 to Jan. 2005, 3,732 Chinese patients with either atherosclerotic arterial disease (n = 2,689) or at least 2 risk factors for atherothrombosis (n = 734) were sequentially enrolled. Outcomes of interest included CV death, myocardial infarction (MI), stroke and hospitalization for atherothrombotic events. Event rates were adjusted for age and sex using the corrected group prognosis method in the Cox proportional hazards model.

Result During a mean follow-up time of 13.6 ± 1.5 months, 309 participants (8.3%) were lost. Overall, the all cause death rate was 8.6% (294 deaths), with CV deaths accounting for 41.2% (121 deaths; 3.5% overall). CV death was 1.2% for patients with multiple risk factors only, and 3.7% for patients with CAD, 4.1% for patients with stroke, and 5.1% for patients with PAD. For the end point of CV death/MI/stroke/hospitalization for atherothrombotic events, the highest event rate occurred among patients with 3 vascular disease locations (31.8%), followed by those with 2 (25.9%), 1 location (20.8%) and those with risk factors only (13.2%, P < 0.001). Medication was more intense in CAD patients compared with other patients. The lowest levels of statin and antithrombotic treatment occurred within the PAD-only group. A large percentage of patients did not reach the therapeutic target values specified in current guidelines.

Conclusion In Chinese patients with established atherosclerotic arterial disease, those with PAD (6.3%) had higher CV mortality than...
those with CAD (4.2%) and stroke (5.0%), and a substantial increase in cardiovascular event rates with increasing numbers of affected arterial beds. Our study suggests a need to improve detection and consequent management of multi-site atherosclerotic arterial disease.

Evaluation of arterial stiffness and related risk factors in healthy examination subjects
Jinbo Liu, Hongwei Zhao, Lihong Li, Qiushuang Zhang, Yingyan Zhou, Hongyu Wang
Department of Vascular Medicine, Peking University Shougang Hospital, Beijing 100144, China.

Objective To investigate the possible risk factors involving pulse wave velocity (PWV) in healthy people.

Methods 323 subjects from Shougang Corporation examination center were enrolled into our study. They were divided into two groups: PWV < 9 (n = 37) group and PWV ≥ 9 (n = 286) group. Carotid-femoral pulse wave velocity (CFPWV) was detected by the Compuscan apparatus.

Result The incidence of hypertension was significantly higher in PWV ≥ 9 group. The levels of systolic blood pressure (SBP), diastolic blood pressure (DBP), pulse pressure (PP), triglycerides (TG) were significantly higher in PWV ≥ 9 group than in control group (141.2 ± 19.9 vs 129.0 ± 18.8 mm Hg, P < 0.001; 88.4 ± 11.1 vs 82.1 ± 10.8 mm Hg, P = 0.001; 52.8 ± 12.9 vs 46.8 ± 10.6 mm Hg, P = 0.002; 2.13 ± 1.64 vs 1.19 ± 0.73 mmol/L, P < 0.001). High-density lipoprotein cholesterol (HDL-C) was higher in PWV ≥ 9 group. The levels of systolic blood pressure (SBP), diastolic blood pressure (DBP), pulse pressure (PP), triglycerides (TG) were significantly correlated with in PWV ≥ 9 group. PWV was positively correlated with age, SBP, DBP, PP, glucose, HbaA1c, uric acid, TG in the entire study group (r = 0.124, 0.307, 0.259, 0.255, 0.187, 0.340, 0.169, 0.278, respectively, all P < 0.05). There was negative correlation between PWV and HDL-C in the entire group (r = -0.283, P < 0.001). Multivariate analysis showed that SBP, HbaA1c were significant independent associating factors of PWV in all subjects (β = 0.314, P = 0.003; β = 0.307, P = 0.003).

Conclusion The levels of SBP, DBP, PP, TG were significantly higher in PWV ≥ 9 group than in control group. HDL-C might play an important role in the development of arterial stiffness. More studies should be investigated in future.

Prevalence of difficult-to-control hypertension among hospital and community treated hypertensive patients in China
Ling Gong1,2, Yahui Lin1,2, Lei Jia1, Kai Sun2, Jingzhou Chen2, Ruitai Hui1
1 Department of Cardiology, Cardiovascular Institute & FuWai Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College
2 Sino-German Laboratory for Molecular Medicine, Cardiovascular Institute & FuWai Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, 167 Bei Li Shi Lu, Beijing 100037, China.

Objective The prevalence of difficult-to-control hypertension (DCH) in China is unknown. Uncover the burden and basic characteristics of DCH may help improving blood pressure control.

Methods Treated hypertensive patients were analyzed. Using data from an institutional based retrospective medical records collection (N = 6 597, from year 2006 to 2008) and two community based prospective studies in Xinyang County from 2005 to 2006 (N = 2 629) in the middle region of China and Hongxionglong Reclamation Region in 2009 (N = 574) in the southeast part of China, treated hypertension patients were classified DCH if there blood pressure still above goal (≥ 140/90 mm Hg in common or ≥ 130/80 mm Hg for those with diabetes and chronic kidney disease) after prescribed 3 antihypertensive drugs (including a diuretic) or ≥ 4 drugs regardless of blood pressure.

Result Among in-hospital treated hypertension patients, 13.4% met the criteria of DCH, the corresponding rates were 23.7% in Xinyang community and 38.7% in Hongxinlong community, respectively. As age increased from 40 – 50 years to ≥ 70 years, rates of DCH increased from 9.1% to 17.8% in hospital, 18.8% to 28.8% in Xinyang and 32.3% to 46.7% in Hongxinlong. Body mass index was significantly higher in DCH patients (26.9 kg/m² in Xinyang and 27.8 kg/m² in Hongxinlong) vs in non-DCH treated patients (26.1 kg/m² in Xinyang and 26.4 kg/m² in Hongxinlong, both P < 0.001, not analyzed in hospital data). Association of other characteristics (uric acid, blood lipid, smoke, drink) and comorbidities with DCH varied in different regions. In-hospital DCH patients were more likely to have chronic kidney disease, coronary artery disease, diabetes mellitus and heart failure. Orthostatic hypotension (only detected in Xinyang) was more common in DCH patients compared with in controlled hypertension (≤ 3 drugs) patients.

Conclusion DCH was not rare in China, and the rates and characteristics varied in different region. Rising body mass index was a relatively consistent and adjustable risk factor of DCH. Causing of DCH and its diversity could be further studied.

The effect of homocysteine level on the control rate of blood pressure in hypertensive cases
Quanyong Xiang1, Jianfeng Liu2, Xianglin Liu3, Surong Lu3, Yan Xu1, Meizhi Du1
1 Jiangsu Province Center for Disease Control and Prevention, Nanjing 210009
2 School of Public Health, Nantong University, Nantong, Jiangsu Province
3 School of Public Health, South East University, Nanjing
4 Peixian County Center for Disease Control and Prevention, Xuzhou, Jiangsu Province

Objective To explore the effects of homocysteine (Hcy) level on the control rate of blood pressure in hypertension cases, and to provide theoretical evidences for formulation the measure about the hypertension prevention, and to elevate the control rate of blood pressure in hypertension cases.

Methods According to geographic location and population distribution, 6 villages in 3 towns were randomly selected from 11 towns, which were the provincial standardized management areas for hypertension cases in Peixian County, Xuzhou City, Jiangsu Province, used stratified random sampling method. High blood pressure was screened in the residents over 18 years old, and the target investigative subjects were recruited according to the screening Result. 1 802 hypertension subjects were selected according to the recruited standard after screening. At last, 1 798 eligible hypertension cases which had integrated information after questionnaire investigation, medical examination, and some relative biochemistry test (included Hcy test) were analyzed in our study. Then, community doctors, who accepted the training of hypertension standardized management and get the certification, managed these hypertension patients according to unified management scheme. One year later, the control rate of blood pressure was calculated by the last time measured Result of blood pressure level (SBP ≥ 10 µmol/L group (higher Hcy group) and < 10 µmol/L group (lower Hcy group), and the control rate of blood pressure was compared
between these two groups. Meanwhile, hypertension cases were also divided into four groups according to Hcy interquartile range, the control rates of blood pressure were compared among these four groups. Other related risk factors were explored with logistic regression analysis.

**Result** Averaged age of 1798 hypertension cases was 58.15 ± 7.97 years, including 789 men and 1009 women, account for 43.91% (778/1772) and 56.09% (994/1772) respectively. After one year follow-up, averaged age was 58.16 ± 7.94 years, including 778 men and 994 women, account for 43.91% (778/1772) and 56.09% (994/1772) respectively. Total control rate of blood pressure was 50.56% (896/1772), 50.00% (389/778) in male, 51.01% (507/994) in female, and there was no significant difference between gender in the control rate ($c^2 = 0.177, P = 0.674$). The control rate of blood pressure in lower Hcy group (61.54%) was significant higher than that in higher Hcy group (49.41%) ($c^2 = 7.335, P = 0.007$). The control rate of blood pressure were 55.97%, 51.99%, 47.53%, and 46.98% respectively according to the groups of Hcy interquartile range, and the Result of trend chi-square test showed that there was significant difference ($c^2 = 8.602, P = 0.003$), which indicated that the control rate of blood pressure was decreased with Hcy level increasing. Result of muti-factors logistic regression analysis showed that the control rate of blood pressure in non-hyperhomocysteinemia group exceeded 71.6% than that in hyperhomocysteinemia group (OR = 1.716, 95% CI 1.223 – 2.408), when the age, sex, smoking, drinking, and relative biochemical test Result were adjusted.

**Conclusion** As an important risk factors of cardiovascular prognosis in hypertension cases, higher level of Hcy could significantly affect the control rate of blood pressure, hyperhomocysteinemia might be an important risk factor which affect the control rate of blood pressure in our country.

### The cut-off value of waist-to-height ratio for detecting the level of central obesity in Chinese adult population

Yaguang Peng, Ying Li, Liancheng Zhao  
Chinese Academy of Medical Sciences and Peking Union Medical College, Fuwei Hospital, State Key Laboratory of Cardiovascular Disease

**Objective** To explore the cut-off value of waist-to-height ratio (WHtR) for detecting the level of central obesity and predicting cardiovascular disease risks in Chinese adult population.

**Methods** A total of 30,630 participants aged 35 – 59 years in China were surveyed for cardiovascular diseases risk factors in two independent cross-sectional studies that carried out in 1992 – 1994 and 1998, respectively. Sensitivity, specificity and Youden’s index for hypertension, abnormal glucose, high serum TC, low serum HDL-C and clustering of risk factors ($\geq$ 2 risks above individually) were calculated to evaluate the efficacy population cut-off point of WHtR. The cut-off point value for central obesity was depended on the point of WHtR with the highest Youden’s index. The cut-off point value for severe central obesity was fixed on the point whose specificity of the point was gathered more than 90%. And the cut-off point value to indicate low weight was determined by the percentile distribution of WHtR, at which the 5th percentile (P5) of point, both in male and female population. Based on the principle of convenient and practical for use, the cut-off values of WHtR for the level of central obesity were determined.

**Result** The cut-off values of WHtR for central obesity were 0.49 in males and 0.50 in females, and for severe central obesity were 0.54 and 0.57 for men and women, respectively. Additionally, the cut-off points of WHtR for each of the 4 cardiovascular risk factors to evaluate the severity separately ranged from 0.54 to 0.55 in male, and ranged from 0.57 to 0.58 in female. The P5 of WHtR, which was the point values of WHtR to indicate low body weight, was 0.40 in both male and female population.

**Conclusion** The optimal cut-off value of WHtR for defining central obesity, low body weight and severe central obesity should be recommended as 0.50, 0.40 and 0.57, respectively. For Chinese adults, WHtR at 0.40 – 0.49 as ‘normal’, 0.50 – 0.57 as ‘central obesity’, ≥ 0.57 as ‘sever central obesity’ and < 0.40 as ‘Low body weight’.

### Survival of Chinese patients with pulmonary arterial hypertension in the modern management era

Rui Zhang, Lizhi Dai, Weiping Xie, Zaixin Yu, Bingxiang Wu, Lei Pan, Ping Yuan, Xin Jiang, Jing He, Marc Humbert, Zhicheng Jing, Jingmin Liu  
Department of Pulmonary Circulation, Shanghai Pulmonary Hospital, Tongji University School of Medicine

**Background** In a previous study of Chinese patients with idiopathic pulmonary arterial hypertension (IPAH) in the non-targeted therapy era, we reported 1- and 3-year survival estimates of only 68% and 39%, respectively. However, it is not yet known whether the survival of patients with PAH is improved in the modern management era.

**Method** A retrospective cohort study was undertaken in 276 consecutive newly diagnosed “incident” patients with IPAH and connective tissue disease-associated pulmonary arterial hypertension (CTDPAH) referred between 2007 and 2009. Baseline characteristics and survival in two groups were compared.

**Result** 1- and 3-year survival estimates were 92.1% and 75.1%, respectively, in patients with IPAH, and 85.4% and 53.6%, respectively, in patients with CTDPAH. Patients with CTDPAH had a significantly lower mean pulmonary artery pressure, more pericardial effusion, and more severe impairment of the diffusion capacity of the lung for carbon monoxide (DLCO) than patients with IPAH. A diagnosis of CTDPAH, WHO functional class III or IV, DLCO < 80% of predicted, and the presence of pericardial effusion were independent predictors of mortality. The 1- and 3-year survival of male patients were 93.5% and 77.5%, respectively, in those with IPAH, and 71.1% and 47.4%, respectively, in those with CTDPAH.

**Conclusion** The survival of patients with PAH has been improved in China in the modern management era, despite the high costs of treatment and financial constraints. However, the survival of patients with CTDPAH is inferior to that of patients with IPAH. Our study also indicates poorer survival in male CTDPAH patients.
Risk factors associated with mortality in the surgical treatment of 563 patients with the simple total anomalous pulmonary venous connection

Dianyuan Li, Jiawei Qu, Jun Yan, Qiang Wang, Shoujun Li, Zhongdong Hua, Xin Wu
Department of Cardiac Surgery, Cardiovascular Institute and Fu Wai Hospital, CAMS and PUMC, Beijing 100037, China

Objective To analyse the surgical Result and the risk factors of mortality of patients with total anomalous pulmonary venous connection.

Methods A total of 563 patients with surgically corrected TAPVC from Oct. 1996 to Sep. 2012 admitted to our hospital were enrolled in this study. Patients only with VSD, ASD and PDA were included. Data reviewed include age, weight, anatomic type, operative data et al.

Result The median age and weight at repaire was 4.45 years old and 12.3 kg. The TAPVC anatomy was supracardiac in 277 (49.2%), cardiac in 231 (41%), infracardiac in 17 (3%), and mixed in 38 patients (6.8%). Overall in-hospital surgical mortality for simple TAPVC was 6% (34/563). Mortality was 11.1% (30/270) from 1996 to 2007, and 1.4% (4/293) from 2008 to 2012. The number of in-hospital deaths was 34, consisting of supracardiac in 15, cardiac in 12, infracardiac in 1, and mixed in 6 patients. The causes of death were respiratory failure (18 patients), serious low cardiac output syndrome (9 patients), sudden cardiac arrest (3 patients), toxic shock syndrome (1 patient) and MODS (3 patients). There was a significant decrease in mortality when comparing 1996 to 2007 with 2007 to 2012 (P < 0.01). Significant risk factors for mortality were young age (P < 0.01), low weight (P < 0.01), long CPB time (P = 0.002), long OCCLD time (P = 0.002) and cardiac connectin type (P < 0.01).

Conclusion Operative Result of TAPVC have dramatically improved in the past 16 years. However patients having young age, low weight, long CPB time, long OCCLD time increased operative mortality. Specific subtypes still experience significant mortality.

Efficacy of folic acid supplementation alone on endothelial function and plasma homocysteine concentration in coronary artery disease: a meta–analysis of randomized controlled trials

Xin Yi, Dingsheng Jiang, Xiaoyan Li, Xuejun Jiang
Department of Cardiology, Renmin Hospital of Wuhan University

Background Experimental and epidemiological evidences have shown that combined therapy of folic acid is an effective agent for improving endothelial function and lowering plasma homocysteine concentration in cardiovascular disease. However, the efficacy of folic acid supplementation alone on endothelial function and plasma homocysteine concentration in coronary artery disease (CAD) has not been well established.

Objective Our purpose is to conduct an updated meta-analysis of relevant randomized controlled trials (RCTs) to estimate the effect of folic acid supplementation alone on endothelial function and plasma homocysteine concentration in patients with CAD.

Methods An extensive search of PubMed was used to identify RCTs comparing folic acid and placebo therapy. Mean difference (MD) with 95% confidence interval (CI) was performed as a measure of the association between folic acid supplementation and endothelial function/
Red cell distribution width as a prognostic marker in eisenmenger syndrome

Tao Yang1, Yiming Sun1, Qing Gu1, Weiwei Zeng1, Xinhai Ni1, Zhisheng Liu1, Changming Xiong1, Jianguo He2
1 State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College
2 Department of Cardiology, First Affiliated Hospital of Soochow University
3 Department of Cardiology, The First Affiliated Hospital of JIAN University

Objective Previous studies have found independent relationship between red cell distribution width (RDW) and prognosis in patients with pulmonary hypertension of mixed aetiologies and idiopathic pulmonary arterial hypertension (PAH). We designed this study to investigate the significance of RDW in predicting survival in patients with Eisenmenger Syndrome (ES).

Method We retrospectively reviewed the clinic records and collected the baseline data of patients newly diagnosed as ES in our hospital during the period from January 2005 to October 2009. The follow-up data were collected periodically by a specifically designed network database until December 31st, 2012. The end point was all-cause death.

Result A total of 109 patients with ES were included. During a median follow-up time of 4.2 (IQR 3.7 – 5.0) years, 21 patients (19.3%) died. Baseline RDW of non-survivals were higher than survivors (16.9% ± 4.4% vs 14.3% ± 2.3%, P = 0.015), and RDW had significant correlations with arterial oxygen saturation (r = -0.408, Pr = -0.399, Pr = 0.224, P = 0.019) and total pulmonary pressure (TPR) (r = 0.438, PThe 1-, 3- and 5 year survival rates of the total 109 patients were 94%, 87% and 78%, respectively. Kaplan-Meier analysis showed that patients with RDW ≥ 14.4% had a lower survival rate (P = 0.001) than patients with RDW < 78%, respectively. Kaplan-Meier analysis showed that patients with RDW ≥ 14.4% had a lower survival rate (P = 0.015) than patients with RDW < 78%, respectively.

Conclusion The paper showed that air pollution was a risk factor for cardiovascular and cerebrovascular disease mortality in Tianjin. Our study supported the possibility that acute pathogenetic processes in the cardiovascular and cerebrovascular disease could be induced by the air pollution. Our study also provided important information to develop air pollution control for cardiovascular and cerebrovascular disease mortality prevention, in order to decrease the burden of it.

Pre-hospital delay in acute myocardial infarction: an clinical characteristics analysis of 1 004 patients in 3 years in an emergency center in Beijing

Yaguang Peng1, Lufen Guo2
1 Chinese Academy of Medical Sciences and Peking Union Medical College, Fuwai Hospital, State Key Laboratory of Cardiovascular Disease
2 Emergency Center of Beijing Anzhen Hospital, Capital Medical University

Objective To explore the clinical characteristics, the pre-hospital delay, the treatment and prognosis of patients with acute myocardial infarction (AMI) in 3 years in an emergency center in Beijing.

Methods 1 004 patients with AMI in Emergency Ward and Emergency Intensive Care Unit (EICU) of Beijing Anzhen Hospital form Mar. 2004 to Mar. 2007 were collected by retrospective analysis method. All the cases were diagnosed with clinical symptom, electrocardiogram, dynamic myocardial enzyme monitor and percutaneous coronary angiography. The information of all patients were collected by a self-designed clinical report form, including age, gender, occupation, education, height, body weight; symptom, onset-time, visiting-time, transportation mode, smoking history, disease history (hypertension, diabetes, stroke, coronary artery disease), heart rate and blood pressure in-hospital, onset place and treatment. Per-hospital delay time (PDT) was defined as the difference between the onset-time and visiting-time of the AMI patient and was measured in hours. All cases were divided into 3 groups by their visiting date, according to the date documented from the hospital, those were group A (Mar. 2004 to Mar. 2005), group B (Mar. 2005 to Mar. 2006) and group C (Mar. 2006 to Mar. 2007). Then, clinical characteristics, pre-hospital delay, treatment and prognosis were all compared by groups.

Result Totally 1 004 AMI patients (761 males, 75.8% and 243 females, 24.2%, with average age 60.9 ± 12.8 years old) were presented to the hospital. There were significant differences in history of stroke, coronary artery disease and smoking among 3 groups (P > 0.05). PCI treatment indicated an increased trend year by year (group A 32.3%, group B 63.4%, group C 64.5%, P > 0.05).

Conclusion More and more AMI patients were benefited from reperfusion therapy recently, but shorten pre-hospital delay still should be the important strategy to get better prognosis from early reperfusion therapy.

VARIABILITY OF SELF-MEASURED BLOOD PRESSURE AT HOME ASSOCIATED WITH CAROTID ARTERY STIFFNESS AND MICROALBUMINURIA IN MASKED HYPERTENSIVES

Zhendong Liu, Fanghong Lu, Yingxin Zhao, Yutao Diao, Hua Zhang, Hongbin Song, Zaiwen Qi, Jianchao Xu
Cardiovascular-Cerebrovascular Control and Research Center, Shandong Academy of Medical Sciences

Objective To explore the association between variability of self-measured blood pressure at home and carotid artery stiffness and microalbuminuria in masked hypertensive patients.

Methods One hundred and thirteen participants, who took part in the health examination in health examination center, were divided into three groups, namely, normotension group, masked hypertension group, and hypertension group base on office blood pressure measurement and self-measured blood pressure at home. All of the subjects were performed carotid intima-media thickness, stiffness index β, and microalbuminuria detection.

Result Official systolic blood pressure, self-measured systolic blood pressure at home, self-measured diastolic blood pressure at home, variability of self-measured systolic blood pressure at home, and variability of self-measured diastolic blood pressure at home in masked hypertension group were significantly higher compared with normotension group (P < 0.05). Carotid intima-media thickness was (1.41 ± 0.26) mm, stiffness index β was 1.58 ± 0.10, and microalbuminuria was (11.88 ± 3.62) mg/L in masked hypertension group, respectively. They were significantly higher than in normotension group (P < 0.05). Result of Pearson correlation and multiple linear regression analysis
shown, that carotid intima-media thickness, stiffness index $\beta$, and microalbuminuria were significant positively correlated with variability of self-measured systolic blood pressure at home ($r = 0.761$, 0.587, and 0.554, all $P < 0.05$, respectively) and variability of self-measured diastolic blood pressure at home ($r = 0.609$, 0.329, and 0.368, all $P < 0.05$, respectively). And variability of self-measured systolic blood pressure at home was a independent risk factor of carotid intima-media thickness, stiffness index $\beta$, and microalbuminuria.

**Conclusion** Variability of self-measured blood pressure at home was elevated, and correlated with carotid artery stiffness and microalbuminuria in masked hypertensive patients.

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**Relation of C−reactive protein and white blood cell count with in−hospital death among patients with acute myocardial infarction**

Ke Wang, Yonghong Zhang
Department of Epidemiology, School of Public Health, Medical College of Soochow University

**Objective** To explore the association between C-reactive protein (CRP), white blood cell (WBC) count and in-hospital death among patients with acute myocardial infarction (AMI).

**Methods** A total of 843 AMI patients consecutively admitted to hospital in the Second Affiliated Hospital of Soochow University from Jan. 1998 to Oct. 2010 were selected as study subjects. Data of demographic characteristics, lifestyle, admission blood pressure, clinical laboratory tests and medical history were collected from all subjects. Multivariate logistic regression analysis and Kaplan-Meier survival curve were used to estimate the association between CRP and WBC count and in-hospital death among AMI patients.

**Result** In the logistic regression analysis, after adjustment for multiple factors, the risk of in-hospital death was significantly increased ($P < 0.05$) with increased CRP level and WBC count. Compared to lowest quartile of CRP and WBC, odds ratio (95% CI) of death associated with highest quartiles of CRP and WBC were 1.821 (0.923 – 3.594) and 4.489 (2.140 – 9.419), respectively. The Result of Kaplan-Meier survival curve analysis, the Risk of high hsCRP in PIH group was 2.03 fold (95% CI 1.43 – 4.24), and after further adjustment for index before delivery, the risk of high hsCRP in PIH group was 2.46 fold (95% CI 1.43 – 4.24), and after further adjustment for index during healthy examination, the risk of high hsCRP in PIH group was 2.03 fold (95% CI 1.30 – 3.15).

**Conclusion** PIH is an independent risk factor for perpetual high hsCRP.

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**2−year follow−up study in patients with acute myocardial infarction: an analysis of 424 cases**

Na Jia, Dan Lu, Qing He
Beijing Hospital, Beijing 100730, China

**Objective** We sought to investigate in-hospital, 1-year and 2-year mortality in AMI patients and analysis the association of risk factors and mortality.

**Methods** 424 AMI patients were selected. Mortality was obtained by means of case inquiry, phone call and Hospital Information System.

**Result** In-hospital, 1-year and 2-year mortality were 4.2%, 14.4% and 17.5% individually. After Logistic regression analysis, heart dysfunction was related to in-hospital, 1-year and 2-year mortality of AMI. The OR (95% CI) were 7.66 (2.35 – 25.00), 5.94 (3.32 – 15.21), 4.83 (1.94 – 12.01) individually. Age was related to 1-year and 2-year mortality. Respiratory failure and gastrointestinal bleeding were related to in-hospital mortality in AMI patients.

**Conclusion** Heart dysfunction may be the independent risk factor of in-hospital, 1-year and 2-year mortality in AMI patients. Pneumonia, respiratory failure, gastrointestinal bleeding, tumor and renal dysfunction maybe increase the risk of mortality in AMI patients.

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**Perpetual impact of pregnancy−induced hypertension on high sensitivity C−reactive protein**

Yueqiu Sun1, Chunpeng Ji2, Haiyan Zhao1, Jianqing Niu1, Yan Dong1, Yurui Du1, Shouling Wu1
1 Gynecology and Obstetrics, department of Cardiology, KaiLuan General Hospital
2 Hebei University
3 Linsi Hospital of the Medical Group of Kailuan
4 Huadu Medical cosmetic surgery clinics of Tangshan

**Objective** To investigate the perpetual impact of pregnancy-induced hypertension (PIH) on high sensitivity C-reactive protein (hsCRP).

**Methods** 512 cases of PIH were identified and matched with 512 controls. The hsCRP levels at the time of the healthy examination were compared between two groups.

**Result** Levels of hsCRP during healthy examination were significantly higher in PIH group than in control group. The concentration of hsCRP in PIH group and control group were 0.70 (0.23 – 2.06) mg/L, 0.60 (0.201.28) mg/L, respectively. After adjustment for the index before delivery and, the risk of high hsCRP in PIH group was 2.46 fold (95% CI 1.43 – 4.24), and after further adjustment for index during healthy examination, the risk of high hsCRP in PIH group was 2.03 fold (95% CI 1.30 – 3.15).

**Conclusion** PIH is an independent risk factor for perpetual high hsCRP.

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A common NOS1AP genetic polymorphism is associated with QTc interval and mortality in chronic heart failure in a Chinese Han case−control population

Xiaoyan Liu, Na Liu, Cuihong Hou, Xuhua Chen, Jianmin Chu, Jieliin Pu, Shu Zhang
State Key Laboratory of Cardiovascular Disease, Arrhythmia Diagnosis and Treatment Center, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing

**Backgrounds** Several independent population-based studies have demonstrated that variants in NOS1AP are associated with cardiac repolarization and sudden cardiac death (SCD). The objective of the current study was to investigate whether SNPs previously reported in NOS1AP were related to both QTc interval and 4-year mortality in chronic heart failure (CHF) in a Chinese Han case-control study.

**Methods** A total of 1428 patients with CHF and 480 control subjects were genotyped and the correlations between these SNPs and the current study was to investigate whether SNPs previously reported in NOS1AP are related to both QTc interval and mortality in chronic heart failure (CHF) in a Chinese Han case-control study.

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Genetic variation in the ATP2B1 gene is associated with arterial stiffness in Chinese hypertensive population

Jian Jia, Haixia Ding, Chen Men, Lina Mao, Keming Yang, Yiyang Zhan
The First Affiliated Hospital with Nanjing Medical University

Objective Recent progress in GWAS has increased the number of known genetic susceptibility loci for arterial stiffness and hypertension. It remains unclear, however, whether the new single nucleotide polymorphisms (SNPs) that confer susceptibility to high blood pressure were also associated with arterial stiffness. The study investigated whether the eight new single nucleotide polymorphisms (SNPs) that confer susceptibility to high blood pressure were also associated with arterial stiffness through evaluation of brachial-ankle pulse wave velocity (ba-PWV) and ankle-brachial index (ABI).

Methods Patients (n = 121) with essential hypertension from Jiangyin of China were enrolled in this study. Genotyped at the following SNPs: ATP2B1 rs2681472, ATP2B1 rs2681492, PLCD3 rs12946454, CYP2J2 rs11105354, c10orf117 rs1530440, ZNF652 rs16948048, FGF5 rs16998073, PLEKHA7 rs381815. The SNPs were genotyped using the Multiplex SNaPshot technique. Arterial stiffness was evaluated by measuring brachial-ankle pulse wave velocity (ba-PWV) and ankle-brachial index (ABI).

Result The frequencies of genotypes were in accordance with the Hardy-Weinberg equilibrium. In our study, ATP2B1 rs2681472 showed significant association with arterial stiffness. There was no evidence for an association with arterial stiffness for the other seven genetic loci. We found that ba-PWV and ABI differed significantly by genotype in ATP2B1 rs2681472 (all \( P < 0.05 \)). The patients with the T allele compared with the CC genotype, showed greater ba-PWV and ABI (\( P < 0.05 \)). The other SNPs were not significantly associated with ba-PWV and ABI. Stepwise multiple regression analysis was performed to investigate the major factors that influenced the ba-PWV. The independent variables were age, gender, WHR, BMI, heart rate, systolic blood pressure and genotype. The dependent variable was ba-PWV and ABI respectively. Multiple regression analysis showed that rs2681472 in ATP2B1 gene was a significant predictor of ba-PWV and ABI.

Conclusion This study indicates that hypertensive individuals carrying the T allele of ATP2B1 rs2681472 are predisposed to stiffer arteries. The hypertensive individuals with the T allele should be considered at high risk for cardiovascular disease.
An 11-year analysis of bibliographical trends at the circulation, 2000–2010
Xun Yuan, Yida Tang, Wenyao Wang, Zhinan Lu, Yuejin Yang
State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China

Objective Bibliometric analysis acting as an efficient way to measure the quality by using of mathematical techniques to investigate journals is accepted universally. The Circulation is the top-ranked journals in cardiovascular diseases and plays an important role in representation of the hottest topics and research trends in this field. The current study was conducted as the definitive bibliometric analysis of the journal at a length of 11 years from 2000 to 2010.

Methods Articles data for the current study was obtained from the official website of Circulation journal affiliated to the American Heart Association (http://circ.ahajournals.org). Historical data on journal performance, such as the impact factors, citable items, total citations received, was extracted from the JCR® and MedSCI®. All articles were classified according to their categories or subjects by scanning the title, abstract, and keywords artificially. All statistical calculations in current study were performed using the EXCEL® 2010 package (©Microsoft Corporation) and SPSS® version 19.0 (©IBM company).

Result A total of 11 645 articles were published in the 11-year period from 2000 to 2010, of which research articles comprised the vast majority (56.07%). The Clinical Investigations and Reports is twice the number than Basic Science Reports, counting 39.3% vs 16.77%. Correspondence (9.6%) was the most common type. And this followed by Editorials (8.45%), Images in Cardiovascular Medicine (8.39%), Brief Rapid Communications (3.24%), Corrections (2.65%), Cardiovascular News (2.23%), European Perspectives in Cardiology (1.89%), Circulation Electronic Pages (1.42%), Issue Highlights (1.33%), Clinical Su mmaries (1.12%), AHA Scientific Statement (1.10%), etc. In the research articles, the proportion of the clinic investigate and basic research maintained stably compared to the total items. Focused on the research articles, the rank of subjects followed Coronary Heart Disease (12.58%), Arrhythmia/Electrophysiology (11.97%), Heart Failure (11.40%), Molecular Cardiology (9.89%), Vascular Biology (9.87%), Epidemiology (7.10%), Imaging (6.90%), Interventional Cardiology (6.13%), Hypertension (3.38%), Valvular Heart Disease (2.62%), etc. The impact factor enjoyed a gradually increase during the 11 years and twice the number than Basic Science Reports, counting 39.3% vs 16.77%. Correspondence (9.6%) was the most common type. And this followed by Editorials (8.45%), Images in Cardiovascular Medicine (8.39%), Brief Rapid Communications (3.24%), Corrections (2.65%), Cardiovascular News (2.23%), European Perspectives in Cardiology (1.89%), Circulation Electronic Pages (1.42%), Issue Highlights (1.33%), Clinical Summaries (1.12%), AHA Scientific Statement (1.10%), etc. In the research articles, the proportion of the clinic investigate and basic research maintained stably compared to the total items. Focused on the research articles, the rank of subjects followed Coronary Heart Disease (12.58%), Arrhythmia/Electrophysiology (11.97%), Heart Failure (11.40%), Molecular Cardiology (9.89%), Vascular Biology (9.87%), Epidemiology (7.10%), Imaging (6.90%), Interventional Cardiology (6.13%), Hypertension (3.38%), Valvular Heart Disease (2.62%), etc. The impact factor enjoyed a gradually increase during the 11 years and rose to 14.429 by the year of 2010.

Conclusion This journal prefer the newly founds which derived from or would have application to clinic practice than laboratory experiments. The doubling of items quantity of Correspondence and Editorials demonstrated that editors were apt to introduce present concept and propose for broadly discussion on one hand; and readers took part in the interaction enthusiastically on the other hand. The Coronary Heart Disease, Arrhythmia/Electrophysiology and Heart Failure, all of which might have high prevalence and mortality ranked first three amounts of articles yearly and overall in that period.

Prevalence and associated risk factors for stroke among middle-aged population of China: a multiple-center cardiovascular epidemiological study
Rui Guo, Zengwu Wang, Linfeng Zhang, Zuo Chen, Xin Wang, Min Guo, Ye Tian, Lan Shao, Manli Zhu
State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Disease, CAMS & PUMC, Beijing 100037, China

Objective To evaluate the prevalence of and risk factors for stroke...
Methods Data was collected from a cross-sectional survey on risk factors of cardiovascular diseases conducted in 2009 – 2010. There were about 1000 participants each from 12 different research populations including southern and northern, urban and rural in different parts of China, with international standardized examination and measurement. Half of the subjects were men and half were women, aged from 35 to 64 years old. Descriptive statistics and logistic regression models were used in the analysis.

Result After excluding those participants with missing values for age, 11623 subjects were eventually included in the study. The overall prevalence of stroke in the study population was 1.5%. Among the stroke patients, 69.8% were male, 66.3% had ischemic stroke, and 21.9% were hemorrhagic ones. Significant risk factors for all strokes were: age, male, hypertension, diabetes, sedentary behavior, cigarette smoking and hypercholesterolemia (P < 0.05 for all). These risk factors were all significant for ischemic stroke, whereas male, hypertension, sedentary behavior, hypercholesterolemia were significant risk factors for hemorrhagic stroke. Tea drinking (OR 0.629, P = 0.011), moderate alcohol drinking (OR 0.355, P = 0.0002) might provide protection against stroke. In those patients with high blood pressure, 33.1% took anti-hypertensive medications regularly, only 9.3% had their blood pressure controlled at 140/90 mm Hg. 29.5% of diabetic patients took hypoglycemic drugs or insulin therapy regularly. 18.8% of patients with hypercholesterolemia took lipid-lowering drugs within two weeks of the study.

Conclusion Targeted interventions that reduce blood pressure, serum cholesterol and promote physical activity, could considerably lighten the stroke burden.

Rui Guo, Zengwu Wang, Linfeng Zhang, Zuo Chen, Xin Wang, Min Guo, Ye Tian, Lan Shao, Manlu Zhu
State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Disease, CAMS & PUMC, Beijing 100037, China

Objective This study aimed to estimate the current hypertension prevalence, awareness, treatment, control and associated risk factors among middle-aged populations in China.

Methods Data was collected from a cross-sectional survey on risk factors of cardiovascular diseases conducted in 2009 – 2010. There were about 1000 participants each from 12 different research populations including southern and northern, urban and rural in different parts of China, with international standardized examination and measurement. Half of the subjects were men and half were women, aged from 35 to 64 years old. Out of them, there were 11691 participants were analyzed. Abdominal obesity was defined as waist circumference > 85 cm in men and > 80 cm in women.

Result The crude prevalence of hypertension in the study population was 37.6% (41.1% in male, 34.6% in female), and the prevalence showed a rising trend with increasing age (P for trend < 0.001). Overall, hypertension prevalence was higher in northerners than southerners (40.8% vs 33.2%, P < 0.001), and lower in successive Educational attainment groups. Among all the hypertensive patients recognized in the study, 46.6% were aware of their high blood pressure, 33.1% took anti-hypertensive drugs regularly, but only 9.3% of hypertensive patients had their blood pressure controlled at 140/90 mm Hg. For those who received treatment, only 28.0% were adequately controlled. Compared with male patients, female patients had a higher treatment rate (38.3% vs. 27.9%, P < 0.001), and controlled their blood pressure more effectively (11.2% in men vs. 7.3%, P < 0.001). Logistic regression analysis showed that age, residential region, educational attainment, physical activity, alcohol drinking, tea drinking, abdominal obesity, diabetes, apoB/apoAI ratio, serum UA (Uric Acid) levels were independently associated with hypertension.

Conclusion Hypertension is highly prevalent and poorly awareness and controlled in the study population. It is urgent to take effective actions to change this status.

Characteristics of coronary lesions in hypertensive patients with coronary artery disease
Jiajie Mei, Peng Qu
Department of Cardiology, the Second Hospital of Dalian Medical University, Dalian 116027, China

Objective The main purpose is to compare the degree of coronary artery changes in CHD patients with or without hypertension, and analyze bifurcation lesion in CHD patients with hypertension.

Methods A retrospective cohort study was conducted on 7894 CHD patients were enrolled. SYNTAX score system was used to assess the severity of coronary artery disease status. The incidence of bifurcation disease, total number of bifurcation lesion, Bifurcation Score and Bifurcation Ratio were compared.

Result An increase in SYNTAX score, the total number of bifurcation lesions, Bifurcation Score and Bifurcation ratio was observed in hypertension group. Age, history of DM, TC, history of smoking and history of hypertension were independent predictors of the SYNTAX score. A positive correlation was found between bifurcation ratio and history of hypertension.

Conclusion The patients with hypertension have more severity of coronary artery lesion and higher ratio of coronary bifurcation lesions.

The optimal intervals for long-term blood pressure screening and the associated risk factors of intervals in a Chinese population
Lihua Zhang, Qishuan Tao, Xiancheng Liu, Shuang Hu, Jing Li, Li Xi, Xiuzhong Shi, Yuhong Zhao, Xianwen Shang, Jiongyi Li, Qing Wang, Lixin Jiang, Ying Yang
1 State Key Laboratory of Cardiovascular Disease, China Oxford Centre for International Health Research, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College
2 Department of Epidemiology and Bio-statistics, School of Public Health, Peking University Health Science Center
3 Qing Dao Fu Wai Hospitals

Objective To estimate the optimal intervals for long-term BP monitoring and the related risk factors.

Methods A retrospective cohort study was conducted on 7894 participants without antihypertensive medication at baseline from Jan. 2005 to Dec. 2010. Participants underwent annual health check-
The 12-year trend of cardiovascular disease risk factors prevalence, awareness, treatment and control in a China urban community population

Lihua Zhang, Quishan Tao, Xiancheng Liu, Shuang Hu, Jing Li, Xiuzhong Shi, Xi Li, Yuhong Zhao, Xianwen Shang, Jiongyi Li, Qing Wang, Lixin Jiang, Ying Yang
1 State Key Laboratory of Cardiovascular Disease, China Oxford Centre for International Health Research, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, Peoples Republic of China
2 Department of Epidemiology and Bio-statistics, School of Public Health, Peking University Health Science Center, Beijing, China
3 Qingdao Fuwai Hospital, Qingdao, China

Objective To examine the long-term trend of prevalence and control statuses of five CVD risk factors, which includes hypertension, hypercholesterolemia, diabetes, obesity and smoking in a China community population.

Methods A retrospective study was conducted by using a 12-year (2000 – 2011) health checkup data from a large community-based Chinese population in Qingdao city of China. A total of 159,027 annually health checkup records of adults 25 – 64 years were included in this study. The study subjects attended health checkup for chronic diseases and an epidemiological survey for disease Related risk factors. The rates of each year were age-adjusted using the China 2000 Population Survey study. Data on cardiovascular disease related risk factors were collected. The true long-term changes in BP were determined by the signal-noise-ratio (SNR) - the Ratios between long-term (‘Signal’) variances and short-term variances (‘Noise’) of systolic blood pressure (SBP) given the number years of check-up. The optimal intervals for long-term BP check-up were detected by the minimal ‘Signal’ variances and short-term variances (‘Noise’) of systolic blood pressure, the mean systolic blood pressure decrease was 1.4 mm Hg per year; the mean diastolic blood pressure decrease was 0.6 mm Hg. For total cholesterol level, the mean decrease was 0.02 mmol/L per year. For the fasting glucose level, the mean increase was 0.02 mmol/L.

The validity of optimal intervals was evaluated by the true positive rate to the noise ratio (SNR) - the Ratios between long-term (‘Signal’) variances and short-term variances (‘Noise’) of systolic blood pressure, the mean systolic blood pressure decrease was 1.4 mm Hg per year; the mean diastolic blood pressure decrease was 0.6 mm Hg. For total cholesterol level, the mean decrease was 0.02 mmol/L per year. For the fasting glucose level, the mean increase was 0.02 mmol/L.

The age-adjusted prevalence of five CVD risk factors had a non-linear trend of slowly decreasing, though the speed was not promising. However the decreasing trend could be reversed by the population is aging, which still lead the problem of CVDs out of control in the coming decade in China.

Investigation of the cardiovascular risk factors by 10-year risk estimation of ischemic cardiovascular disease (ICVD) in Kazak population in Xinjiang province of China

Xiang Ma, Xue Bai, Ding Huang, Zixiang Yu, Fen Liu, Bangdang Chen, Yitong Ma
Department of Coronary Heart Disease First Affiliated Hospital of Xinjiang Medical University

Objective To investigate into the status of primary risk factors of cardiovascular disease in Kazak population in Ili of Xinjiang Province.

Methods In total, the participants aged ≥ 35 years and living for more than five years in Ili were selected with Stratified Random Sampling and investigated with epidemiological Methods. All the participants were interviewed by trained and certified observers under a structured questionnaire. FPG, blood lipids, BMI, and BP of all sampled population were measured. The risk of CVD in people aged from 35 to 59 was evaluated by the Methods and tools of 10-Year Risk Estimation of Ischemic Cardiovascular Disease in Chinese.

Result A total of 1,126 Kazak subjects (443 males and 683 females) from Ili of Xinjiang Province were enrolled. The mean values of SBP, BMI, triglycerides, TC, HDL and LDL cholesterol in male group were significantly higher than those of female group (P < 0.01), but there were no significant differences between the two groups in the level of age (45.54 ± 6.93 vs 44.75 ± 6.67, P = 0.056). The mean value (%) of 10-year morbid risk of each age group in men group was higher than that of corresponding age group in women group (P < 0.05) in younger than 50 years but no difference in over 50 years old groups (P > 0.05).

There were 94.8% males and 95.6% females whose 10-year absolute risk of ICVD was less than 10% (P = 0.536) and 5.19% males and 4.39% females higher than 10% (P = 0.536). The relationship between cardiovascular risk factors and mean levels of 10-year morbid risk are listed as follows. There are significant difference in levels of SBP, TC, and BMI between low-risk and high-risk, moderate-risk groups (P < 0.05), with the exception of FBP (P = 0.354). The detection rate of smoking is higher in high-risk group (P < 0.05). The cardiovascular risk factors are more common in moderate-risk and high-risk populations than low-risk groups.

Conclusion The prediction models and simplified tools for estimating 10-year-risk of ICVD in Chinese can predict satisfactorily the occurrence of cardiovascular disease in Kazak population in Ili of Xinjiang Province.
Epidemiological survey of smoking in Han, Uyghur, and Kazakh population in adults of Xinjiang province

Xiang Ma, Xue Bai, Zixiang Yu, Wen Cao, Fen Liu, Bangdang Chen, Yitong Ma
Department of Coronary Heart Disease First Affiliated Hospital of Xinjiang Medical University

Objective An epidemiological survey of smoking in Han, Uyghur, and Kazakh populations in adults of Xinjiang Province of China.

Methods Four-stage selected random samples aged 35 and over were used to analyze the status of smoking in different nationalities, ages, and sexes in Xinjiang Province. The selection was done from six localities (i.e., Urumqi, Kelamayi, Fu kang, Turfan Basin, He Tian, and Yi Li), twenty-three municipalities, and five autonomous counties of Xinjiang Province from 2007 to 2010. A total of 13 375 people were surveyed.

Result We investigated gender, age, height, weight, education level, occupation, smoking history, and drinking history among Han, Uyghur, and Kazakh populations and found they were statistically different ($\chi^2 = 46.122, P < 0.05; \chi^2 = 113.133, P < 0.05; \chi^2 = 225.727, P < 0.05; \chi^2 = 136.254, P < 0.05; \chi^2 = 2681.0, P < 0.05; \chi^2 = 6340.0, P < 0.05; \chi^2 = 342.3, P < 0.05; \chi^2 = 180.2, P < 0.05$). In general, the smoking prevalence was 28.6%, with male and female prevalence of 54.9% and 5.8% respectively ($\chi^2 = 29.714, P < 0.05$). The differences among Uyghur, Han, and Kazak populations had statistical significance ($\chi^2 = 4251, P < 0.05$). Likewise, the prevalence was 31.3% in Han, 18.8% in Uyghur, and 35.1% in Kazakh populations respectively. The rates were different among different nationalities ($\chi^2 = 342.3, P < 0.05$) with the highest being in the Kazakh population. The smoking prevalence in 35 – 44 age-grouped population reached its peak values ($\chi^2 = 29.714, P < 0.05$). With increase in the level of education, smoking prevalence showed a rising trend. The bachelor’s degree and above reached its peak value ($\chi^2 = 361.0, P < 0.05$). Smoking rates among Uyghur, Han, and Kazakh populations in different education levels were statistically different ($\chi^2 = 80.953, P > 0.05; \chi^2 = 214.4, P < 0.05; \chi^2 = 21.638, P < 0.05$). Smoking prevalence of different marital status was distinct and that of unmarried was the highest ($\chi^2 = 119.3, P < 0.05$). The differences among Uyghur, Han, and Kazakh populations had statistical significance ($\chi^2 = 53.902, P > 0.05; \chi^2 = 68.265, P < 0.05; \chi^2 = 14.793, P < 0.05$).

Conclusion Smoking prevalence status is pretty serious in Xinjiang Province.

The impact on direct medical economic burden from nosocomial infection in congenital heart disease patients

He Li, Jian Zhuang, Meiling Shi, Mulan Deng, Xiaixing Jiang, Jimei Chen, Shaoyi Zheng, Yifeng Cai
Guangdong Cardiovascular Institute, Guangdong General Hospital, Guangdong Academy of Medical Sciences, Guangzhou 510080, China

Objective To explore the impact of nosocomial infection on the direct medical economic burden (DMEB) in the operated patients with congenital heart diseases (CHDs), including the atrial septal defect (ASD) and ventricular septal defect (VSD) patients.

Methods With a retrospective study, the 10 014 (mean age was 11.38 ± 13.22 years, male 5 437, female 4 577) CHD cases hospitalized by cardio-surgery or interventional therapy in the year 1998 – 2008 were investigated on the DMEB (including what had expended on examination cost, medicine cost, operation cost, nursing cost, and so on). Of them the 6 880 ventricular septal defect (VSD) cases and 3134 atrial septal defect (ASD) cases were investigated. The data management was finished with Epidata (3.2). All the statistical procedures were finished with SAS 9.2, with the mean ± standard deviation (mean ± SD) for the data central tendency estimation, t-test (satisfied with equal variance and normal distribution) and t'-test (not satisfied with equal variance or normal distribution) for the two means significant difference test, the covariance analysis and stratified analysis were applied for the controlling of confounding factors (age, sex).

Result General nosocomial infection rate was 4.24%. The DMEB mean in nosocomial infection group was significantly higher than that in non-nosocomial infection group ($52 499 ± 27 744$ vs $32 864 ± 14 655, t = 14.50, P < 0.0001$), the relative increase rate in the DMEB mean was 59.75%. With the covariance analysis for age adjusted, the DMEB adjusted mean in nosocomial infection group was still significantly higher than that in non-nosocomial infection group ($53 137 ± 754$ vs $32 841 ± 157, t = 26.32, P < 0.0001$), the relative increase rate in the DMEB adjusted mean was 61.80%. With the sex stratified analysis and age covariance analysis for the sex and age adjusted, the DMEB adjusted mean in male nosocomial infection group was still significantly higher than that in male non-nosocomial infection group ($54 085 ± 959$ vs $32 853 ± 221, t = 21.55, P < 0.0001$), the relative increase rate in the DMEB adjusted mean was 64.63%. The DMEB adjusted mean in female nosocomial infection group was still significantly higher than that in female non-nosocomial infection group ($51 377 ± 1 237$ vs $32 831 ± 222, t' = 14.74, P < 0.0001$), the relative increase rate in the DMEB adjusted mean was 56.49%.

Conclusion The nosocomial infection is still a great risk factor in the increase of CHD patients DMEB. So controlling nosocomial infection is the important guarantee for the DMEB reduction.

Factors associated with smoking cessation among middle-aged male smokers of China: a multiple center cardiovascular epidemiological study

Jingjing Feng, Zengwu Wang, Linfeng Zhang, Zuo Chen, Xin Wang, Min Guo, Ye Tian, Lan Shao, Manlu Zhu
State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Disease, Peking Union Medical College & Chinese Academy of Medical Sciences, Beijing, China, 100037

Objective To examine the factors associated with smoking cessation among middle-aged Chinese.

Methods Data from a cross-sectional survey on risk factors of cardiovascular disease, which were conducted in 2009 – 2010, with international standardized examination, measurement and interviewer-administered questionnaires. There were about 1000 participants each from 12 different research populations including southern and northern, urban and rural in different parts of China. Half of the subjects were men and half were women; their ages ranged from 35 to 64 years. Out of them, there were 2683 male smokers were analyzed. Current smokers were defined as persons who reported smoking at least 400 cigarettes in their lifetime and smoked cigarettes in recent one month. Former smokers were defined as persons who had smoked before but did not smoke in recent one month.

Result A total of 5 344 men participated in the study. The mean...
 Objective To assess the effect of habitual tea consumption on hypertension in the middle-aged men in China.

 Methods Data were collected from a cross-sectional survey on risk factors of cardiovascular disease, which was conducted in 2009 – 2010. There were about 1,000 participants each from 12 different research populations including southern and northern, urban and rural in different parts of China, with international standardized examination and measurement. Half of the subjects were men and half were women; their ages ranged from 35 to 64 years. This study was to assess the effect of habitual tea consumption on hypertension in men among the participants. Tea drinking was defined by the frequency of consumption at least 3 times each week.

 Result Out of all, 2,868 participants (61.6%) were habitual tea drinkers. There was a strong inverse correlation between tea drinking and hypertension after adjusting other risk factors of hypertension (P < 0.001). The odds ratio (OR) of hypertension was 0.76 (95% CI: 0.67 – 0.87) for subjects who drank tea compared to those who did not. Compared with non-habitual tea drinkers, the association for tea consumption between 1 – 10 gram per day and hypertension was statistically significant with an OR value of 0.69 (CI: 0.60 – 0.81).

 However, when the amount of tea consumption was more than 20 gram per day, tea drinkers were at higher risk of hypertension than non-habitual tea drinkers (OR = 1.48, CI: 1.14 – 1.91). The risk of developing hypertension decreased by 44% for those who drank flower tea compared with those who drank other tea. Subjects who drank tea for 1 – 9 years had a lower risk of hypertension (OR = 0.67, CI: 0.50 – 0.90) compared to those who did not.

 Conclusion Tea drinking was independently associated with prevalence of hypertension, which might play a role in the prevention of the disease. But the amount of tea consumption was not the more the better. It is worthy to further study.

The effect of habitual tea consumption on hypertension among middle-aged men of China: a multiple center cardiovascular epidemiological study

Guoju Li, Zengwu Wang, Linfeng Zhang, Zuo Chen, Xin Wang, Min Guo, Ye Tian, Lan Shao, Manli Zhu

State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Disease, Peking Union Medical College & Chinese Academy of Medical Sciences, Beijing, China, 100037

Objective The finding also have implications for future surveys on the quitting process among Chinese.

Epidemiology and Prevention of CV Disease

Result Of all, 2868 participants (61.6%) were habitual tea drinkers. There was a strong inverse correlation between tea drinking and hypertension after adjusting other risk factors of hypertension (P < 0.001). The odds ratio (OR) of hypertension was 0.76 [95% confidence interval (CI): 0.67 – 0.87] for subjects who drank tea compared to those who did not. Compared with non-habitual tea drinkers, the association for tea consumption between 1 – 10 gram per day and hypertension was statistically significant with an OR value of 0.69 (CI: 0.60 – 0.81).

However, when the amount of tea consumption was more than 20 gram per day, tea drinkers were at higher risk of hypertension than non-habitual tea drinkers (OR = 1.48, CI: 1.14 – 1.91). The risk of developing hypertension decreased by 44% for those who drank flower tea compared with those who drank other tea. Subjects who drank tea for 1 – 9 years had a lower risk of hypertension (OR = 0.67, CI: 0.50 – 0.90) compared to those who did not.

Conclusion Tea drinking was independently associated with prevalence of hypertension, which might play a role in the prevention of the disease. But the amount of tea consumption was not the more the better. It is worthy to further study.

2-year clinical outcomes of everolimus-eluting stent as compared to paclitaxel stent in patients undergoing percutaneous coronary interventions. A meta-analysis of randomized clinical trials

Yaohua Huang, Yang Wang, Wei Li

Medical Research & Biometrics Center, State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

Objective Our purpose was to perform a meta-analysis of randomized controlled trials evaluating safety and efficacy in 2-year of everolimus-eluting stents (EES) compared with paclitaxel-eluting stents (PES), in patients undergoing percutaneous coronary intervention (PCI).

Methods We undertook a literature search using Medline, EMBASE, the Cochrane Central Register of Controlled Trials, proceedings of international conference, scientific session abstracts and relevant websites, until May 2013. Information about study design, inclusion and exclusion criteria, baseline characteristics, sample size and 2-year follow up clinical events were extracted from final literatures. Included studies comprised randomized trials evaluating EES vs PES, with patients undergoing PCI, at 2-year follow up.

Result We identified 4 randomized controlled trials comparing EES vs PES in 6,722 patients with 2-year follow up clinical events. At 2-year follow up, patients receiving EES, as compared to PES, experienced significantly lower myocardial infarction events (OR = 0.56; 95% CI: 0.43 – 0.72, P < 0.0001) and ischemia driven target lesion revascularization (OR = 0.57; 95% CI: 0.45 – 0.71, P < 0.0001), but without difference in mortality (OR = 0.85; 95% CI: 0.63 – 1.16, P = 0.32) and cardiac mortality (OR = 0.91; 95% CI: 0.59 – 1.41, P = 0.68). A trend towards lower 2-year target lesion failure event rates in favor of EES compared to PES was found (OR = 0.63; 95% CI: 0.53 – 0.75, P < 0.0001).

Conclusion At 2-year follow up, patients treated with EES have lower rates of myocardial infarction, ischemia driven target lesion revascularization and target lesion failure events comparing to PES. However, there are no significant differences in rates of mortality and cardiac mortality. Our study suggested that EES can reduce more clinical events at 2-year follow up with respect to PES.
Accuracy of the automated oscillography electronic device in measuring blood pressure in children
Yi Zhang1,2, Yi Cheng1,2, Qian Wang2, Yuan Jiang2, Weili Yan1
1 Department of Clinical Epidemiology, Children's Hospital of Fudan University, Shanghai 201102, China
2 Department of Epidemiology & Statistics, School of Public Health, Xinjiang Medical University, Urumqi, Xinjiang, China 830011

Objective Mercury sphygmomanometer auscultation method (MSA) was common instrument to measure blood pressure (BP), while the automated oscillography electronic measurement (OSC) devices become common for home BP monitoring. The objective of this study was to assess the accuracy of OSC in Chinese children and adolescents compared with the BP readings by using the standard MSA.

Methods A total of 679 adolescents aged between 7 and 17 years participated in the study. The participants were from Shanghai city, a field of 2013 national annual student fitness and health survey, evenly composed of boys and girls. The automated Omron HEM-7012 monitor and MSA, were used to measure three times respectively on the same subject and two instruments were used in turns. BP of two devices were recorded and compared. Z-score of BP value by OSC were derived and MSA, were used to measure three times respectively on the same subject and two instruments were used in turns. BP of two devices were recorded and compared. Z-score of BP value by OSC were derived for systolic blood pressure (SBP) and diastrolic blood pressure (DBP) separately for boys and girls by age and height percentiles using the GAMLSS of LMS equations method. Diagnosis value of OSC was analyzed by using receiver operating characteristic (ROC) compared with hypertension status diagnosed based on MSA according to the current national recommendation.

Result A total of 667 subjects aged between 7 and 18 years participated in the study. The proportion of male was 54.5%, Gender distribution was not balanced in each age group. The mean SBP by MSA were higher than one by OSC. DBP was just the opposite. There was statistically significant difference with regard to BP values between the two devices (for SBP, t = 12.56, P < 0.001; for DBP, t = 7.89, P = 0.0001). In total, 90% students had difference of SBP and DBP within 15 mm Hg, 75% had difference within 10 mm Hg. Only 44% and 45.5% subjects with difference within 5 mm Hg measured by two devices. After the adjustment of gender and age, the partial correlation coefficients between OSC and MSA, were 0.773 for SBP and 0.407 for DBP (P < 0.01). ROC analysis showed that AUCs of SBP and DBP were 0.628 (95% CI: 0.586 – 0.669) and 0.691 (95% CI: 0.651 – 0.731), respectively.

Conclusion The measurement Result of comparing OSC and MSA are consistent with other results. From the result of ROC analysis, diagnosis value of OSC is less satisfying and can not take place of MSA for diagnosis hypertension. Future studies are expected to explore how to efficiently use the two devices in combination for screen and diagnose hypertension.

Impact of arterial stiffness on cerebrocardiac vascular prognosis
Zijun Yan, Ruiyan Zhan, Jinli Zuo, Shaoli Chu
Ruijin Hospital, Shanghai Jiaotong University School of Medicine, Shanghai 200025, China

Objective To assess the impact of multiple noninvasive arterial stiffness indexes on cerebrocardiac vascular prognosis.

Methods 198 patients with risk factors of CAD underwent four noninvasive tests of arterial stiffness at least two times and were divided into increased arterial stiffness group and control group, by augmentation index (Aix@75) increased or not during follow-up. Major adverse cardiac and cerebral events were compared between two groups.

Result During follow-up, the rate of primary and all end point events were significantly higher in increased arterial stiffness group.
Multivariate Cox regression analysis revealed that increasing Aix@75, common carotid atherosclerotic plaque, multivessel CAD and cerebral vascular disease history were independent predictors of prognosis of vascular diseases. Kaplan-Meier curve revealed the greater the increase in Aix, the worse prognosis.

**Conclusion** The result indicated a high value of noninvasive arterial stiffness tests in evaluating prognosis.

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**The atrial fibrillation registry in China: baseline characteristics and patient management**

Han Zhang, Yanmin Yang, Jun Zhu, Xinghui Shao, Juan Wang, Li Tian, Bi Huang
Emergency and Intensive Care Center, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, China

**Background** To describe patient characteristics, risk factors, comorbidities, management strategy, and control of Chinese atrial fibrillation (AF) patients in the emergency department (ED) daily practice.

**Methods** We conducted a prospective, observational registry of patients with AF/flutter in China. Participants were enrolled in the ED. Baseline characteristics were collected and follow-up was planned at 1 year.

**Result** Of the 2 016 Chinese patients from 19 sites, 54.8% were women. 618 (30.7%) had paroxysmal, 452 (22.4%) had persistent, and 945 (46.9%) had permanent AF. The most common comorbidity was hypertension (55.5%), followed by coronary artery disease (41.8%), heart failure (37.4%) and current smoking (21.5%). The prevalence of comorbidities, such as heart failure, valvular heart disease, and history of stroke or transient ischemic attack, increased as AF progressed, as well as the mean CHADS2 score. In patients with non-valvular AF, 110 (12.7%) of those with CHADS2 ≥ 2 were prescribed with oral anticoagulants (OACs), while 119 (15.6%) of those with CHADS2 < 2 received. In 324 patients with valvular AF qualified for OACs, 134 (41.4%) actually used. In the meta-analysis, the pooled RRs (95% CI) in the highest category of SSBs consumption in relation to risk of CHD and stroke. The suggestive not conclusive findings warrant future researches.

**Conclusion** Result from our meta-analysis indicate that higher consumption of SSBs is associated with increased risk of CHD and decreased risk of hemorrhagic stroke, but not for total stroke or ischemic stroke. The suggestive not conclusive findings warrant future researches.

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**Cardiovascular diseases risk profiles among hypertensive patients with obstructive sleep apnea–hypopnea syndrome from Xinjiang, China**

Xiaoguang Yao, Nanfang Li, Abulikem Suofeiya, Delian Zhang, Guijuan Chang
The Center of Hypertension of the People's Hospital of Xinjiang Uygur Autonomous Region

**Objective** Obstructive sleep apnea hypopnea syndrome (OSAHS) is a risk factor for several cardiovascular conditions. It is essential to know the major cardiovascular risk factors (CRFs) of OSAHS during a clinical evaluation.

**Methods** This is a retrospective study enrolling 1 666 in-patients with hypertension that underwent polysomnogram. The anthropometric data, the early onset CVD family history, cigarette smoking, the blood pressure, the fasting serum glucose, lipid profiles and hs-CRP levels were evaluated and compared between OSAHS group and non-OSAHS group.

**Result** Of 1 666 patients with hypertension, 1 307 were detected to be combined with OSAHS. The percentage of smoking, dyslipidemia, hyperglycemia, elevated hs-CRP level and obesity indicated increasing trend with severity of OSAHS. With the severity of OSAHS, the number of CRFs in one individual increased greatly. Multivariate logistic regression analysis showed that the BMI (OR = 1.21; 95% CI: 1.16 – 1.26), systolic blood pressure (OR = 1.01; 95% CI: 1.00 – 1.02), total cholesterol (OR = 1.15; 95% CI: 1.02 – 1.36), age (OR = 1.07; 95% CI: 1.05 – 1.09) were significantly risk factors to OSAHS, while being female may be a protective factor with OR = 0.41.

**Conclusion** In the present study, the mostly found cardiovascular profile of hypertensive patients with OSAHS was obesity and plasma total cholesterol, as well as the unmodifiable factors of age and sex, the severer of OSAHS, the more CRFs clustered.

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**Sugar sweetened beverages consumption and risk of coronary heart disease and stroke: a meta–analysis of prospective studies**

Chen Huang, Yu Tian, Jianfeng Huang
State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing

**Objective** We performed a meta-analysis to summarize the evidence with respect to the associations between Sugar sweetened beverages (SSBs) consumption and the risk of CHD and stroke.

**Methods** We searched for articles published up to Feb. 2013 through PubMed, EMBASE and Cochrane Library Database and reviewed reference list of the retrieved articles. Prospective studies with reported relative risks (RRs) with 95% confidence intervals (CIs) of CHD or stroke for different categories of SSBs consumption were included. Fixed- and random-effects models were used to evaluate the associations by comparing the highest and lowest categories of SSBs consumption in relation to risk of CHD and stroke.

**Result** Five prospective studies with 7 396 CHD cases and 6 501 stroke cases (3 403 ischemic stroke cases and 1 595 hemorrhagic stroke cases, explicitly) among 301 209 participants were included in the meta-analysis. The pooled RRs (95% CI) in the highest category of SSBs consumption in comparison with the lowest category of SSBs were 1.17 (1.07 – 1.28) for CHD and 1.04 (0.93 – 1.17) for total stroke. Additionally, a one-serving per day increase in SSB consumption was associated with a 15% increased risk of CHD. For stroke subtype, a modest but significant inverse association between SSBs consumption and hemorrhagic stroke was observed with pooled RR (95% CI) of 0.78 (0.63 – 0.98). No statistically significant association was observed for ischemic stroke (RR: 1.15, 95% CI: 0.82 – 1.61).

**Conclusion** Result from our meta-analysis indicate that higher consumption of SSBs is associated with increased risk of CHD and decreased risk of hemorrhagic stroke, but not for total stroke or ischemic stroke. The suggestive not conclusive findings warrant future researches.
A novel statistical method for comparing effectiveness of two treatments—simulated randomized controlled trials

Weili Yan, Shaoke Chen, Yi Cheng, Chongfan Zhang
Department of Clinical Epidemiology, Children’s Hospital of Fudan University, 399 Wanyuan Road, Shanghai 200112, P.R. China

Objective To develop a new statistical method for comparing effectiveness of two treatments based on regularly collected treatment data.

Methods The rationale of the method is described as following: subjects with same health condition but received 2 different treatments respectively were performed simulated randomization into two arms for 100 times, the outcome variables were compared by using student-t tests for continuous variables and chi-square tests for categorical variables. Crossovers that were defined as subjects with contradictory assigned treatment by the simulated randomization with the actually received treatments were excluded from comparisons of means. The ratio of the frequency of rejected-H0 hypothesis tests to the frequency of not-reject-H0 hypothesis tests, called ODDs, and 95% CI were used to judge the overall hypothesis testing, and effect size estimations were computed based on the mean of 100 mean differences and 95% CI. The theoretical distribution of ODDs and its 95% CI, and the confounding effect were analyzed in simulated datasets with various between-group mean differences and statistical power (ranging from 0.5 to 0.85) with varied sample sizes (n = 50, 100, 500, and 1000). STATA 11.0 was used for programing. The performance of RCTs was compared with bootstrap based on a real RCT dataset with 3 outcome variables.

Result The ODDs and 95% CI were perfectly and linearly correlated with the between-group mean differences and statistical power, by difference sample size. The probability of loss of balance of confounding was below 5% for equal and unequal sample size of two arms after excluding misclassified subjects. The sRCT has good consistence in hypothesis testing and performance in effect size estimation compared with true RCT and bootstrap for outcome variable with normal distribution.

Conclusion The proposed novel analytical method, simulated RCTs based on real clinical treatment data, can be used to compare effectiveness of two treatments as preliminary evidence to RCTs.

Gender–Specific relationship between carotid intima–media thickness and cardiac diastolic function in a healthy Chinese population

Lulu Han1, Xiaojuan Bai2, Hongli Lin3, Xuefeng Sun1, Xiangmei Chen4
1 Department of Gerontology and Geriatrics, The First Affiliated Hospital of China Medical University
2 Department of Gerontology and Geriatrics, Shengjing Hospital of China Medical University
3 Department of Kidney, Dalian Medical University
4 Department of Kidney, General Hospital of Chinese PLA

Background It has been suggested the existence of ventricular-arterial coupling effect which could be a key determinant of cardiovascular performance. However, little is known about the gender differences in ventricular-arterial interaction in healthy Chinese population.

Objective To identify gender difference in the associations between carotid intima-media thickness (CIMT) and cardiac diastolic function in healthy Chinese individuals.

Methods We examined 852 healthy participants (aged 30 – 98 years, 46% men) in three north China cities by M-mode ultrasonography to analyze CIMT and cardiac structure and function. Cardiac function was measured by determining the ratio of early diastolic peak flow velocity (E) and late diastolic peak flow velocity (A) (E/A), as well as the deceleration time of the early mitral velocity (MV-DT). Cardiac dysfunction was defined as E/A values < 25th percentile (E/A < 0.778 for males and LA V values > 75th percentile (LA V > 34.86 ml for males and > 32.16 ml for females), and MV-DT values > 75th percentile (MV-DT > 210 ms for males and > 195 ms for females).

Result CIMT, E/A, LA V, and MV-DT significantly correlated with age in both males (CIMT: r = 0.418, P < 0.01; E/A: r = -0.325, P < 0.01, LA V: r = 0.123, P < 0.05; MV-DT: r = 0.175, P < 0.01) and females (CIMT: r = 0.429, P < 0.01; E/A: r = -0.423, P < 0.01; LA V: r = 0.180, P < 0.01; MV-DT: r = 0.174, P < 0.01). Interestingly, left ventricular ejection fraction (LVEF) was not significantly correlated with age in both genders. CIMT was significantly associated with lower E/A in an unadjusted model in tertile II and III. The odds ratio (95% CI) for males was 2.428 (1.36 – 4.335) and 3.017 (1.674 – 5.437), respectively. However, this association disappeared upon age adjustment. The odds ratio (95% CI) for females was 3.298 (1.742 – 6.246) and 6.002 (3.202 – 11.251), respectively, and were still significant after adjustments for all other variables, including age, blood pressure, blood lipid and inflammatory markers (tertile II: 3.031, 95% CI: 1.228 – 7.48; tertile III: 3.224, 95% CI: 1.308 – 7.946). A higher MV-DT significantly correlated with higher CIMT only in an unadjusted model for females, and this association was lost upon age adjustment. There were no significant association between CIMT and higher values of LA V.

Conclusion Aging related increases in CIMT correlated with the decline in cardiac diastolic function only in females, which may contribute to the higher incidence of heart failure with preserved ejection fraction.
Educational level, obesity and incident diabetes among Chinese adult men and women aged 18–59 years old: an 11–Year follow-up Study
Xianwen Shang, Xiuzhong Shi, Qiushan Tao, Jing Li, Xi Li, Lihua Zhang, Xiancheng Liu, Qing Wang, Jiongyi Li, Yuhong Zhao, Shuang Hu, Lixin Jiang, Ying Yang
1 State Key Laboratory of Cardiovascular Disease, China Oxford Centre for International Health Research, Cardiovascular Institute & FuWai Hospital, Chinese Academy of Medical Sciences & Peking Union Medical College
2 Qing Dao Fu Wai Hospital
3 Department of Epidemiology and Bio-statistics, School of Public Health, Peking University Health Science Center

Objective To determine whether educational level and overweight/obesity was associated with the development of diabetes among Chinese adult men and women, when mediating factors were measured repeatedly and when long term exposure is accounted for.

Methods A retrospective cohort (2000 – 2011) of 10 704 participants aged 18 – 59 years (8 238 men, 2 466 women) in Qingdao Port Health Study (QPHS) were recruited in this study. The annual health checkup records included personal lifestyle, height, weight, waist circumference, resting heart rate, blood pressure, fasting plasma glucose, total cholesterol, triglycerides and plasma uric acid. Factors associated with incidence of diabetes was estimated by using hazard ratios (HR), and when long term exposure is accounted for. Obesity was associated with the development of diabetes among Chinese adult men and women. The association was not found among women.

Conclusion Baseline overweight/obesity was an independent risk factor of diabetes for both men and women. Low educational level was adversely associated with incident diabetes through normal weight, overweight and obesity groups, with the association being substantially attenuated by mediating factors only in the obesity group among men. The association was not found among women.

Association between kidney function and Framingham global cardiovascular risk score
Bo Jin, Xiaojian Bai, Jing Liu, Lulu Han, Weigang Zhang, Xiangmei Chen
1 Department of Gerontology and Geriatrics, The First Affiliated Hospital of China Medical University
2 Department of Gerontology and Geriatrics, Shengjing Hospital of China Medical University
3 Department of Kidney, General Hospital of Chinese PLA

Background Renal function is considered a predictor for cardiovascular disease (CVD) risk. Estimated glomerular filtration rate (eGFR) is a feasible clinical measure of kidney function. Framingham global CVD risk score (FRS) equation is the most widely accepted tool for predicting CVD risk in the general population. Most studies confirm that chronic kidney disease is an independent risk factor for CVD, but conclusion in individuals with eGFR ≥ 60 ml/min/1.73 m² is uncertain. This study examined the association between FRS and eGFR in a Chinese population with eGFR ≥ 60 ml/min/1.73 m².

Methods Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equation and CKD-EPI equation for Asians (CKD-EPI-ASIA) were used to measure eGFR and individuals with eGFR < 60 ml/min/1.73 m² were excluded. Pearson correlation coefficient was used to evaluate the association between FRS and eGFR after adjustment for traditional cardiovascular risk factors.

Result Significantly inverse association between FRS and eGFR was confirmed in our two analyses, with Pearson correlation coefficients of -0.669, -0.698 (eGFRCKD-EPI, P < 0.001, P < 0.001), and -0.658, -0.690 (eGFRCKD-ASIA, P < 0.001, P < 0.001). FRS was not significantly associated with eGFR after adjustment for traditional cardiovascular risk factors in 2008 (P > 0.05). However, with increasing FRS and decreasing eGFR, eGFR was independently associated with FRS in 2011 (P < 0.05).

Conclusion Renal function is a risk factor for CVD, even in individuals with eGFR ≥ 60 ml/min/1.73 m². With increasing FRS and decreasing eGFR, renal function was independently associated with CVD risk.

Hypertension control in community health centers across China: analysis of antihypertensive drug treatment patterns
State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Disease, Peking Union Medical College & Chinese Academy of Medical Sciences

Objective To assess the pattern of antihypertensive drug treatment in community health centers (CHCs) across China.

Methods 1 000 CHCs were selected, based on geographical location, previous cooperative experience, and accepting the invitation to implement a protocol of community-based standardized blood pressure management. Baseline information for each hypertensive patient under the care of CHCs was collected and the present pattern of hypertensive drug treatment was analyzed.

Result 92 325 hypertensive patients were recruited. The most frequently prescribed drug class was single pill combinations (SPCs)
(48.9%), followed by calcium channel blockers (CCBs) (36.8%), angiotensin converting enzyme inhibitors (ACEIs) (18.3%), beta blockers (BBs) (10.4%), diuretics (7.9%), and AT1 receptor blockers (ARBs) (4.0%). Most of the SPCs (86.7%) consisted of centrally active drugs (reserpine, clonidine) and/or vasodilators (dihydralazine, dibazol, pargyline). The most preferred drug class on mono therapy remained SPC (52.8%), followed by CCB (25.8%). ACEI+CCB was the most used combination for two-drug therapy (25.0%), ACEI+CCB+BB for three drug therapy (17.6%). ACEI and BB combination was used by 3.6% of patients, while ACEI+BB+diuretic and ARB+BB+diuretic were used by 4.6% and 2.4% of patients, respectively. The proportion of patients on mono-, SPC-, and 2+ therapies was 36.3%, 40.6%, and 23.1%, respectively; the corresponding control rates were 27.7%, 25.0%, and 22.5%.

Conclusion Our study ascertained major shortcomings in the present status of antihypertensive pharmacotherapy in routine medical practice in China. SPCs, mostly composed of less-used drugs, were the most preferred medication. Intensive professional education of primary care physicians in CHCs is warranted.

Survey on prevalence of cardiovascular diseases and its risk factors in China (China CVD study): background, aim, and method and design

Zengwu Wang, Lifeng Zhang, Zuo Chen, Xin Wang, Lan Shao, Min Guo, Manlu Zhu, Runlin Gao
State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Disease, Peking Union Medical College & Chinese Academy of Medical Sciences

Objective Survey on Prevalence of Cardiovascular Diseases and its Risk Factors in China are to obtain data on prevalence and distribution of following conditions in the general population of China: 1) high blood pressure, obesity, smoking, alcohol consumption, physical inactivity; 2) impaired fasting glucose, dyslipidemia, atrial fibrillation, chronic heart failure, valvular heart disease, cardiomyopathy, abdominal aortic aneurysm, peripheral arterial disease; 3) congenital heart disease among neonates; and 4) coronary heart disease events and stroke events.

Method and Result Using a stratified multistage random sampling method, a representative sample of 500,000 participants aged ≥ 15 years old will be selected in 22 provinces, 5 autonomous regions and 4 municipalities across China to survey for Aim I and IV; a sub-sample of 70,000 participants aged ≥ 35 years old will be recruited for Aim II. 40,000 neonates will be screened for Aim III in random-selected hospitals. All of the investigators will be trained before the survey in site. Data on demographic and other factors, including education, occupation, and lifestyle will be recorded. For each participant, self reported history of CVD will also be recorded. Blood pressure, height, weight, and waist circumferences will be measured using standard Methods. ECG, ABI, UCG, as well as total cholesterol, high density lipoprotein cholesterol, triglycerides, glucose, and creatinine, will be collected. All of the neonates will be tested using UCG.

Conclusion This study will provide fully evidence-based scientific information about the prevalence and distribution of CVD and its risk factors. It is useful for the development of CVD prevention and control strategies in China.

Features of complementary and alternative medicine use by patients with coronary artery disease in Beijing: a cross-sectional study.

Fuyong Chu, Hongxu Liu, Jie Wang, Xue Yan
1 Department of Cardiology, Beijing Hospital of Traditional Chinese Medicine, Capital Medical University, Beijing, China.
2 Department of Cardiology, Guang An Men Hospital, China Academy of Chinese Medical Sciences, Beijing, China.

Objective Few studies have been conducted to investigate the prevalence, types, attitudes, reasons, as well as associated factors of complementary and alternative medicine (CAM) use in patients diagnosed with coronary artery disease (CAD) in China. Therefore, the aims of the present study were to: (1) determine the prevalence, types, perceived effectiveness, and reasons of CAM use in CAD patients in Beijing; (2) investigate the differences between CAM users and non-CAM users; (3) explore possible different CAM use features between CM and WM hospitals.

Method From May to Jul. 2009, 546 out of 600 distributed questionnaires resulted in valid values were included in the present study.

Result CAM was used by 69% of the patients with CAD. “Few side effects” (49.6%) was the main reason of CAM use; whereas “doubt of effect” (61.5%) was the main reason for non-use. Patent herbal medicine (90.7%) was the most commonly used type. Compared with the non-CAM use group, CAM users tended to be older, have a longer disease duration and better current health status. In addition, CAM users had significant lower odds for emergency admission and hospitalization within the past one year.

Conclusion Patients with CAD from Chinese medicine and Western medicine hospitals differ in CAM use frequency, types, perceived effectiveness, as well as reasons for CAM use or non-CAM use. For a better understanding of features and the prevalence of CAM use, large scale randomized studies are warranted.

Risk factors for morning blood pressure surge: fasting blood glucose and blood lipid

Fangchao Liu, Dingding Zhang, Xue Jiang, Jinsuo Kang, Jianfeng Huang
Chinese Academy of Medical Sciences and Peking Union Medical College State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases

Objective To investigate risk factors for morning blood pressure surge (MBPS) in outpatients and provide evidences for targeted prevention and treatment.

Methods Two hundred and eighty subjects (male, 161; female, 119) aged from 19 to 79 were recruited from persons attending 24-hour ambulatory blood pressure monitoring (ABPM) in Fuwai Hospital (Beijing) from Jan. to Jun. in 2011. They have not been treated by antihypertensive agents. Subjects were divided into morning surge group (MS group) and non-morning surge group (non-MS group) by the highest quartile of morning systolic blood pressure surge (28.4 mm Hg) for further analysis on the relation between hypertension, fasting blood glucose (FBG), blood lipid and exaggerated morning blood pressure surge.

Result The baseline characteristics, such as age, body mass index and percentage of gender, were almost similar in both MS group and non-MS group. Systolic blood pressure (SBP), diastolic blood pressure...
Epidemiology and Prevention of CV Disease

Objective Cardiac rehabilitation program is an essential part of the contemporary care of the patient with cardiovascular disease (CVD). Guidelines for prescribing aerobic exercise for patients with CVD is available elsewhere, except China. The major cause is the safety and the adherence. By the mid-1980s, it was established that post-MI patients could undertake prescribed aerobic exercise safely and achieve a level of functional improvement similar to that resulting from supervised exercise in traditional CR. To investigate the effects of home-based exercise maintenance programs at the intensity of anaerobic threshold (AT: anaerobic threshold) for exercise tolerance in aged patients with acute myocardial infarction after primary percutaneous coronary intervention.

Methods Ninety-seven patients with aged AMI (≥ 65 years of age) who had undergone successful PCI were assigned to either a rehabilitation (n = 50) or a control group (n = 47), who finished twice in home and can improve their exercise cardiopulmonary function.

Conclusion Impaired fasting glucose and higher blood lipid levels were independent risk factors for exaggerated morning blood pressure surge.

Effects of home-based exercise programs at the intensity of anaerobic threshold in aged patients with acute myocardial infarction after primary percutaneous coronary intervention
Lin Che, Zhu Gong, Guanghe Li, Lemin Wang
Department of Cardiology, Tongji hospital, Tongji University, Shanghai, 200065, China

Patient with atrial fibrillation and other primary diagnosis in the emergency department: baseline characteristics and outcomes
Han Zhang, Yamin Yang, Jun Zhu, Xinghui Shao, Juan Wang, Li Tian, Bi Huang
Emergency and Intensive Care Center, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, China

Background Atrial fibrillation (AF) is common in the emergency department (ED), however, patients with AF sometimes visit ED because of other primary reason. There are no data on the characteristics and outcomes of ED patients with atrial fibrillation who have other primary ED diagnoses.

Methods In this prospective observational multicentre registry study, all AF cases were confirmed by the electrocardiograms (ECGs) in the ED from Nov. 2008 to Oct. 2011 in China. Repeat ED visits were excluded. By pulling all patient charts, we separated patients with a primary diagnosis of atrial fibrillation from those with other primary ED diagnoses, using the ICD's first diagnosis written on the ED chart. Patient's demographics, medical history, type of AF, treatment, and outcome of emergency room visit were collected at baseline by the treating physicians using a standardized questionnaire. The main outcome measure was all-cause mortality at 1 year post-ED visit. As a secondary analysis, logistic regression was used to compare 1 year mortality of these patients to those with primary ED diagnoses of atrial fibrillation seen during the same time period.

Result During the study period, 2 016 Chinese patients visited the ED, AF was the primary reason only in 825 patients (40.9%), while AF was the secondary diagnosis in the remaining patients. Patients with secondary AF diagnosis were older (69.8 ± 13.1 vs 66.6 ± 13.3 years) and thinner (BMI, 23.2 ± 3.6 vs 24.0 ± 3.5), while systolic blood pressure (SBP) was higher (133.8 ± 24.7 vs 129.0 ± 21.3) and heart rate was lower (97.4 ± 27.1 vs 107.9 ± 31.3). Permanent AF was more frequent (8.3 ± 4.7 to 9.0 ± 3.1 ml·min⁻¹·kg⁻¹) and workload (26.1 ± 5.7 to 26.9 ± 7.2 J·s⁻¹) at AT level and the O₂ consumption (8.3 ± 4.7 to 9.0 ± 3.1 ml·min⁻¹·kg⁻¹) and workload (26.1 ± 5.7 to 26.9 ± 7.2 J·s⁻¹) at peak level increased after 3 months in rehabilitation group, and the O₂ consumption (13.2 ± 3.6 to 15.1 ± 2.8 ml·min⁻¹·kg⁻¹) and workload (51.7 ± 11.9 to 60.3 ± 11.8 J·s⁻¹) (P = 0.046) at peak level had not obvious change after 3 months in control group.

Conclusion It was feasible and safe to proceed sub-maximal CPET in aged patients with AMI after PCI. Individually exercise programs at AT intensity in aged AMI patients after successful PCI may be safely finished in home and can improve their exercise cardiopulmonary function.

Patients with atrial fibrillation and other primary diagnosis in the emergency department: baseline characteristics and outcomes
Han Zhang, Yamin Yang, Jun Zhu, Xinghui Shao, Juan Wang, Li Tian, Bi Huang
Emergency and Intensive Care Center, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, China

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Methods In this prospective observational multicentre registry study, all AF cases were confirmed by the electrocardiograms (ECGs) in the ED from Nov. 2008 to Oct. 2011 in China. Repeat ED visits were excluded. By pulling all patient charts, we separated patients with a primary diagnosis of atrial fibrillation from those with other primary ED diagnoses, using the ICD's first diagnosis written on the ED chart. Patient's demographics, medical history, type of AF, treatment, and outcome of emergency room visit were collected at baseline by the treating physicians using a standardized questionnaire. The main outcome measure was all-cause mortality at 1 year post-ED visit. As a secondary analysis, logistic regression was used to compare 1 year mortality of these patients to those with primary ED diagnoses of atrial fibrillation seen during the same time period.

Result During the study period, 2 016 Chinese patients visited the ED, AF was the primary reason only in 825 patients (40.9%), while AF was the secondary diagnosis in the remaining patients. Patients with secondary AF diagnosis were older (69.8 ± 13.1 vs 66.6 ± 13.3 years) and thinner (BMI, 23.2 ± 3.6 vs 24.0 ± 3.5), while systolic blood pressure (SBP) was higher (133.8 ± 24.7 vs 129.0 ± 21.3) and heart rate was lower (97.4 ± 27.1 vs 107.9 ± 31.3). Permanent AF was more frequent (8.3 ± 4.7 to 9.0 ± 3.1 ml·min⁻¹·kg⁻¹) and workload (26.1 ± 5.7 to 26.9 ± 7.2 J·s⁻¹) at AT level and the O₂ consumption (8.3 ± 4.7 to 9.0 ± 3.1 ml·min⁻¹·kg⁻¹) and workload (26.1 ± 5.7 to 26.9 ± 7.2 J·s⁻¹) at peak level increased after 3 months in rehabilitation group, and the O₂ consumption (13.2 ± 3.6 to 15.1 ± 2.8 ml·min⁻¹·kg⁻¹) and workload (51.7 ± 11.9 to 60.3 ± 11.8 J·s⁻¹) (P = 0.046) at peak level had not obvious change after 3 months in control group.

Conclusion It was feasible and safe to proceed sub-maximal CPET in aged patients with AMI after PCI. Individually exercise programs at AT intensity in aged AMI patients after successful PCI may be safely finished in home and can improve their exercise cardiopulmonary function.
ED diagnoses were congestive heart failure (30.3%), respiratory diseases (7.7%), stroke/TIA (7.6%), dyspnea (7.1%), fever (7.0%), palpitation (6.0%), coronary artery disease (6.0%), dizzy (5.7%), and chest pain not yet diagnosed (5.0%). 1-year mortality were 7.8% and 18.3%, respectively. In the adjusted analysis, an alternative primary ED diagnosis was associated with an increased risk of death (HR = 1.84; 95% CI, 1.38 – 2.46, P < 0.001).

Conclusion Patients seen in the ED with AF and different primary ED diagnoses are older and have more comorbidities higher than patients with primary ED diagnoses of AF. 1-year mortality was also higher in patients with secondary AF diagnosis. Future studies of AF in the ED should distinguish between these two populations and the potential contribution of AF to mortality in the setting of other primary ED diagnoses.

Is the CHADS2 score predicts prognosis in atrial fibrillation patients concomitant with valvular atrial fibrillation

Han Zhang, Yanmin Yang, Jun Zhu, Xinghui Shao, Juan Wang, Li Tian, Bi Huang
Emergency and Intensive Care Center, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, China

Background We sought to evaluate the prognostic performance of the CHADS2 score for prediction of death and major adverse events (MAEs) in patients with atrial fibrillation (AF) and valve heart disease (VHD).

Methods In China AF registry, we enrolled 2 016 patients with AF, 336 of whom were concomitant with VHD. We calculated the CHADS2 scores (congestive heart failure, hypertension, age ≥ 75, diabetes mellitus 1 point each), and prior stroke or transient ischemic attack (TIA) (2 points). All patients were followed by 1 year. The primary outcome was death from any reason. The second outcome was the composite adverse events of death, stroke, and non-CNS systemic embolism.

Result Of the 2 016 subjects with AF, 162 (9.0%) had a body mass index (BMI) in the underweight category (BMI < 18.5 kg/m²), 1 224 (60.7%) were categorized as normal weight (BMI 18.5 to 25.0 kg/m²), 524 (25.7%) patients in overweight group (BMI 25.0 to 30 kg/m²), and 105 (4.6%) subjects met the BMI criteria for obesity (BMI ≥ 30.0 kg/m²). The rate of death and MAEs were higher in underweight (23.9% and 27.7%) and normal (15.7% and 22.7%) weight patients than overweight (8.1% and 16.1%) and obesity patients (8.6% and 20.0%). On multivariate analysis, BMI stratification was associated with 1-year all-cause mortality (P = 0.008). Using overweight patients as reference, the risk of death was significantly lower in overweight (HR = 0.52; 95% CI: 0.33 – 0.84, P = 0.007), but not in normal weight (HR = 0.91; 95% CI: 0.62 – 1.32, P = 0.616) and obesity patients (HR = 0.57; 95% CI: 0.26 – 1.21, P = 0.141). Continuous analyses of BMI also revealed BMI predicted 1-year mortality in patients with AF (HR = 0.94; 95% CI: 0.90 – 0.97, P = 0.69) for normal weight, 0.86 (95% CI: 0.58 – 1.27, P = 0.438) for overweight, and 1.09 (95% CI: 0.63 – 1.89, P = 0.753) for obese. As a continuous variate, BMI was also not associated with MAEs (HR = 0.98; 95% CI: 0.95 – 1.01, P = 0.139).

Conclusion In patients with AF, lower BMI appears to be a risk factor of 1-year mortality.

Characteristics and antithrombotic treatment of patients with valvular and non-valvular atrial fibrillation in China: data from a multicenter hospital E.R. based prospective registry

Xin Gao, Han Zhang, Yanmin Yang, Jun Zhu
Emergency and Intensive Care Center, Fuwai Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College.

Background The real-life clinical characteristics and clinical management of patients with atrial fibrillation (AF) in China is not well established. Studies focusing on this topic relied mainly on foreign samples of patients, scarcely representative of Chinese population group. We aimed at evaluating baseline clinical characteristics and antithrombotic treatment of patients with AF in a large Chinese sample.

Methods This prospective registry enrolled patients presenting
to emergency departments with AF or atrial flutter, either as the primary reason for their visit or as a secondary diagnosis on the basis of consecutive fashion at 19 sites in China. Data collected at baseline included demographics, medical history, nature of atrial fibrillation, and treatments initiated at diagnosis. The characteristics and their treatment (whether on anti-platelet treatment or on oral anticoagulation) of patients with valvular AF were compared with those with non-valvular AF.

**Findings** Of 2 016 patients enrolled between Nov. 2008 and Oct. 2011, 336 (16.7%) were patients with valvular AF while 1 678 (83.2%) with non-valvular AF. 618 (30.7%) were patients with paroxysmal AF, 452 (22.4%) with persistent AF, and 452 (22.4%) with permanent AF. Patients with valvular AF were significantly younger and constituted of more females, more likely to have heart failure and permanent pacemaker implanted than those with non-valvular AF. They also had lower BMI and less likely to have coronary heart disease, prior myocardial infarction, hypertension, diabetes mellitus, prior stroke, cognitive defects, prior COPD. A less frequent use of anti-platelet agents, mainly aspirin, in the valvular AF group was observed compared with non-valvular AF group (43.4% vs 59.5%), on the contrary, a more frequent use of oral anticoagulants in the valvular AF group was observed (41.9% vs 14.0%). 14.7% of patients with valvular AF did not receive either anti-thrombotic treatment. Further analysis divided 1678 patients with non-valvular AF into CHADS2 score ≥ 2 (n = 903) group and CHADS2 score < 2 (n = 775) group. 63.1% of patients with CHADS2 score ≥ 2 were on anti-platelet treatment. They were significantly older, more likely to have coronary heart disease, prior myocardial infarction and hypertension compared with those on oral anticoagulant. 14.1% of patients with CHADS2 score ≥ 2 were receiving oral anticoagulant, who were more likely to have prior stroke. The rest 22.8% patients were not treated with either antithrombotic treatment. 53.4% of patients with CHADS2 score.

**Interpretation** These contemporary registry data on valvular and non-valvular atrial fibrillation in Chinese population indicate that anti-platelet medication or oral anticoagulation remains underutilized according to stroke risk scores. The fact that anti-platelet agents were used more frequently than oral anticoagulant in non-valvular AF may be attributed to the comorbidities of coronary heart disease, hypertension, diabetes mellitus or prior stroke, which are the absolute indications for anti-platelet agents. The reason of insufficient prescription of oral anticoagulation may be concern of bleeding risk when combined with anti-platelet agents.

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**Objectives** Children over the age of 3 years who were seen in medical care settings should have their blood pressure (BP) measured at least once during every health care episode according to The US fourth report diagnosis, evaluation, and treatment of high blood pressure in children and adolescents. Pediatricians and other health professionals need the criterion of hypertension for age and sex when evaluating children's BP. Although, The criterion of blood pressure has existed in China, few reference of the automated BP recorder can be consult in preschool children. The aim of this study therefore was to develop blood pressure reference percentile curves representative sample of preschool children in Shanghai.

**Methods** We collected data for 4 619 healthy preschool children from 2 to 6 years of age. All these children were live born from Shanghai Minhang Maternal and Child Health Hospital. After each child had rested in the sitting position for 5 min, the blood pressure and heart rate were measured on the right arm at the level of the heart, using automated BP recorder (Model 45NEO-E6, Welch Allyn, USA) All measurements were performed in the clinic room of the hospital. The temperature of the clinic room kept between 20°C and 25°C at the time. Children were kept natural posture when BP was measured by trained pediatricians. Centile curves for SBP and DBP were drawn by sex using LMS method, the 5th, 10th, 25th, 50th, 75th, 90th, 95th, and 99th percentile curves were compared with reference of normal blood pressure and hypertension in Japanese preschool children.

**Results** BP increases linearly with age for both boys and girls. Generally, the means of girls' SBP and DBP show slightly lower than boys (female: 5.55 mm Hg vs 2.05 mm Hg; male: 6.62 mm Hg vs 4.62 mm Hg) respectively. The references of study were significantly differing from the Japanese reference. For example, the SBP 95th percentile of current study was significantly lower than Japanese references for boys and girls aged 2 – 6 by 6 – 11 mm Hg. The DBP 95th percentiles of boys aged 2 were slightly lower than Japanese reference, however they remained the same levels after from 3 – 6 years old. The percentiles of girls at 2 – 3 years old were lower than the Japanese reference, and exceeded at 3 – 4 years old and kept slightly higher to age of 6. Compared the study population of height and developmental level with the Japanese reference, we found the study children's height were lower than Japanese reference during the age range for both boys and girls (male) 1.16, 3.16, 6.06, 7.54, and 6.3 (female) 1.15, 2.27, 6.68, 8.23, and 7.33).

**Conclusion** This study provides the median, 90th and 95th percentile reference values of SBP and DBP based on a single large sample of children aged 2 – 6. These reference percentiles may be useful for the early screening and prevention of hypertension in children.

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**Influence of regional economic status and healthcare insurance on secondary prevention following coronary artery bypass grafting in China**

Heng Zhang1, Xin Yuan1, Huawe Gao2, Fangchao Liu1, Chenfei Rao1, Kun Hua1, Shengshou Hu1, Zhe Zheng1

1 State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College
2 Department of Surgery, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

**Objective** The present study aims to investigate the influence of regional economic status and healthcare insurance on the secondary prevention patterns among patients after coronary artery bypass grafting in China.

**Methods** Data on 47 hospitals distributed in 17 provinces in China and 15 083 patients who underwent isolated CABG and discharged alive during 1 Jan. 2004 and 31 Dec. 2008 were enrolled. Hospitals were categorized as from the east coastal area or from the mid and west hinterland which stands for different economic status in China.
Healthcare insurance and use of discharge medication including aspirin, angiotensin-converting enzyme inhibitors (ACEIs) or angiotensin receptor blockers (ARBs), β-blockers and lipid-lowering were collected and compared.

**Result** 10 of the 47 hospital were from the mid and west hinterland (21.3%), from which 1 854 patients were enrolled (12.3%). 47.8% of these patients got healthcare insurance, and the rate was significantly lower than that from the east area (61.2%; P < 0.001). However, the proportion of prescription with more than 2 discharge medications was 59.8% in hinterland and 38.3% in the east (P < 0.001). ACEI or ARB (49.1% for the west, 20.5% for the east; P < 0.001), and lipid-lowering (40.7% for the west, 32.0% for the east; P < 0.001) were prescribed in less than 50% of patients. After multivariable adjustment, hospitals located in the east (adjusted OR = 1.597, 95% CI; 1.426 – 1.788; P < 0.001), patients without insurance for healthcare (adjusted OR = 1.206, 95% CI; 1.119 – 1.300; P < 0.001) were independent factors for poor performance in evidence-based medication prescription.

**Conclusion** Both variation among regions with different economic status and healthcare insurance have significant influence on the patterns of medication prescription in patients undergoing CABG in China. However, high level of economic status does not correlate to better use of evidence-based medication.

**Hospital characteristics and evidence-based medication discrepancies at discharge among patients undergoing coronary artery bypass grafting in China**

Heng Zhang1, Xin Yuan2, Huawei Gao2, Fangchao Liu1, Chenfei Rao1, Kun Hua3, Shengshou Hu1, Zhe Zheng1
1 State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College
2 Department of Surgery, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

**Objective** Benefit of evidence-based medication after coronary artery bypass grafting (CABG) has been widely confirmed. This study sought to evaluate hospital-based adherence and medication discrepancies at discharge among patients undergoing CABG in China.

**Methods** A national analysis was conducted on treatment rates with evidence-based medications from throughout the 2 time periods during 2004 – 2005 and 2007 – 2008. A total of 15 083 patients undergoing isolated CABG and discharging alive from 47 hospitals distributed in 17 provinces were enrolled into the analysis. Use of medication including aspirin, β-blockers, angiotensin-converting enzyme inhibitors (ACEIs) or angiotensin receptor blockers (ARBs) and lipid-lowering was investigated and compared with 2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery.

**Result** In the time period of 2004 – 2005 and 2007 – 2008, aspirin was prescribed at a percentage of 94.1% and 95.9% (P < 0.001), respectively. The use of β-blockers increased from 79.3% to 83.8% (P < 0.001). However, prescriptions for ACEI or ARB therapy at hospital discharge covered only 1/4 of the whole population, and decreased from 25.1% to 23.0% between the two periods (P = 0.002). 33.0% of patients received more than 2 categories of medication at discharge, while the proportion increased slightly to 41.4% during 2007 – 2008 compared with 2004 – 2005. 29.2% of patients received 2 categories of medication at discharge among patients with diabetes (P = 0.034), hyperlipidemia (P < 0.001), hypertension (P < 0.001), and who had undergone prior percutaneous coronary intervention (PCI) (P < 0.001). During 2004 – 2005, 40.5% of patients received more than 2 categories of medication at discharge, while the proportion increased slightly to 41.4% during 2007 – 2008 (adjusted OR = 0.917; 95% CI 2.329 – 3.168; P = 0.022).

**Conclusion** Although the use of guideline-recommended medications has improved gradually among CABG patients at discharge in China, significant difference exists between the real-world situation and the documented criteria.
Influence of regional economic status and healthcare insurance on secondary prevention following coronary artery bypass grafting in China

Heng Zhang, Xin Yuan, Huawei Gao, Fangchao Liu, Chenfei Rao, Kun Hua, Shengshou Hu, Zhe Zheng

1. State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, Peoples Republic of China

2. Department of Cardiovascular Surgery, State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, Peoples Republic of China

Objective Regional economic status and healthcare insurance may affect clinical strategies. The present study aims to investigate the influence regional economic status and healthcare insurance on the secondary prevention patterns among patients after coronary artery bypass grafting in China.

Methods Data on 47 hospitals distributed in 17 provinces in China were abstracted from Chinese Cardiac Surgery Registry. 15 083 patients who underwent isolated CABG and discharged alive during 1 Jan. 2004 and 31 Dec. 2008 were enrolled. Hospitals were categorized as from the east coastal area or from the mid and west hinterland which stands for different economic status in China. Healthcare insurance and use of discharge medication including aspirin, angiotensin-converting enzyme inhibitor (ACEI) or angiotensin receptor blockers (ARBs), β-blockers and lipid-lowering were collected and compared.

Result 10 of the 47 hospital were from the mid and west hinterland (21.3%), from which 1 854 patients were enrolled (12.3%). 47.8% of these patients got healthcare insurance, and the rate was significantly lower than that of the east area (61.2%; P < 0.001). However, the proportion of prescription with more than 2 discharge medications was 59.8% in hinterland and 38.3% in the east (P < 0.001). ACEI or ARB (49.1% for the west, 20.5% for the east; P < 0.001), and lipid-lowering (40.7% for the west, 32.0% for the east; P < 0.001) were prescribed in more than 50% of patients. After multivariable adjustment, hospitals located in the east [adjusted OR, 1.597; 95% CI, 1.426 – 1.788; P < 0.001], patients without insurance for healthcare [adjusted OR 1.206, 95% CI, 1.119 – 1.300; P < 0.001] were independent factors for poor performance in evidence-based medication prescription.

Conclusion Both variation among regions with different economic status and healthcare insurance have significant influence on the patterns of medication prescription in patients undergoing CABG in China. However, high level of economic status does not correlate to better use of evidence-based medication.
studies ($I^2 = 64.5\% ; P = 0.001$). The pooled ORs for the subcategories with sleep duration 6 h, 6 – 7 were 1.35 (95% CI: 1.26 – 1.44) and 1.07 (95% CI: 1.02 – 1.11) respectively compared with the subcategory with 7 – 8 h.

**Conclusion** Short sleep durations are significantly associated with the prevalence of hypertension in adults.

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### Type 2 diabetes incidence attributable to abdominal obesity in China

**Haiteng Xue, Ying Li, Jichun Chen, Jianxin Li, Jie Cao, Jianfeng Huang, Dongfeng Gu**  
Dept of Evidence based Medicine, Fuwai Hospital, Chinese Academy of Medical Sciences and Peking Medical College

**Objective** Abdominal obesity, using waist circumference (WC) as indicators, is a strong risk factor for type 2 diabetes and has been increasingly prevalent in economically developing regions of the world. The aim was to estimate type 2 diabetes incidence attributable to abdominal obesity in China.

**Method** We conducted cohort studies: Multicenter Collaborative Study of Cardiovascular Epidemiology and Cardiovascular Health study in China since 1998 and 2000. Data on WC and other risk factors were collected at a baseline examination using a standard protocol. Follow-up evaluation was conducted in 2007 to 2008, with a response rate of 79.8%. We used multivariable-adjusted hazard ratio and prevalence of abdominal obesity in each age group, stratified according to sex, to calculate type 2 diabetes incidences attributable to abdominal obesity.

**Result** There was a significant association between abdominal obesity and incident diabetes in both men and women after adjustment for multiple risk factors ($P < 0.001$). We estimated that 19.3% of type 2 diabetes incidence (95% CI: 14.2% – 24.7%) was attributable to abdominal obesity among men and 27.5% (95% CI: 20.5% – 34.3%) among women in China.

**Conclusion** Our study documents that abdominal obesity is a major risk factor for incident type 2 diabetes in China. Continued strengthening of national programs and initiatives for abdominal obesity prevention is needed to reduce abdominal obesity-related diabetes in China.

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### Real world practice of community-based cardiovascular disease preventive care and practice characteristics in Beijing

**Xiaohui Yang**, **Changsheng Ma**, **Xin Du**, **Gang Liu**, **Kexing Zhao**  
1 Beijing Municipal Office for CVD prevention & Control, Beijing Anzhen Hospital, Capital University of Medical Sciences  
2 Beijing Administrative Center for Community Health Service

**Objective** To observe the real world practice of community-based cardiovascular disease preventive care and practice characteristics in Beijing and to realize self-confidence and barriers for delivering cardiovascular disease (CVD) preventive interventions recommended by guidelines among general practitioners (GPs). And to analysis the influencing factors and barriers for incorporating of CVD preventive care into practice for GPs.

**Methods** 1. Selection of investigating district/counties: 2 districts and 3 counties were chosen from 4 districts in Beijing by multi-stage cluster random sampling Methods. All the Community Health Service Centers (CHSCs) with daily outpatient number more than 20 in the selected district/counties were recruited as the study sites. 2. Methods of GPs selection: 50 outpatients (aged 50 years and over) who visiting any selected CHSC during 3-month period were recruited. The survey contents included demographic characteristics, duration of hypertension, measurements and documents of blood pressure, lipid profile and serum glucose levels, medications taking, unhealthy behaviors and acceptance of diagnostic and therapeutic interventions delivered by GPs. 3. General practitioners’ survey: 4 – 6 GPs in each selected CHSC were surveyed by face-to-face interview by trained interviewers by using questionnaires on “Awareness and incorporation of CVD risk factors preventive care and self-evaluation of competency in helping patients preventing CVD”. The cross-sectional survey in both patients and GPs were conducted by trained investigators by using unified special questionnaires from Jul. to Sep. 2011.

**Conclusion** In patients with documented coronary heart disease, the medication taking rate according to medication recommendations of aspirin, ACEI/ARB, β-blockers, lipid-lowering statins was 45%, 19.4%, 13%, 13.1% respectively. The percent of patients managed 100% consistency with the guidelines was less than 2%. The control rates of CVD risk factors for achieving the recommended level were low. The proportion of fully confident about their ability in helping patients prevent CVD and multiple risk factors based on self-reported from GPs were as follows: make patients being adherent with their prescribing medicines (21.5%), helping patients being awareness about the values of risk factors for CVD (20%), urging patients in healthy dietary intake (13.7%), blood pressure (BP) therapy and control to optimal level (10.4%). The most lowest self-reported ability in preventing acute myocardial infarction (AMI) were as successfully preventing AMI events (6.6%), delivering smoking cessation counseling (7%) and weight management counseling (8.5%). Key barriers to implementation of guidelines by GPs were seen as prescribing cost or non-reimbursement (39.7%), poor patient incomplete (38.6%), guideline related reasons such as too many guidelines (29.2%), impracticality of guidelines (28.5%), etc; as well as lack of time (23.3%).

**Conclusion** 1. The majority of patients visiting CHSCs were not receiving standardized preventive interventions for CVD and its risk factors recommended by guidelines. The control rate of CVD risk factors were at low levels. 2. GPs in Beijing were lack of self-confidence in delivering CVD preventive care and incorporating CVD prevention guidelines into practice. Many barriers were observed in keeping consistency with guideline recommendations in real practice. Efforts should be directed toward the establishment of sustainable system to effectively disseminate CVD prevention guidelines and improve quality of CVD preventive care at the community-based level, and in the end enhance the effectiveness of CVD prevention and control.

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### Investigation of the influence of antidepressant therapy on blood pressure and quality of life in elderly patients both with hypertension and depression

**Lina Ma**  
Xuanwu Hospital of Capital Medical University

**Objective** To explore the influence of antidepressant therapy on blood pressure and quality of life in elderly patients both with hypertension and depression.

**Method** A total of 67 elderly patients with hypertension and depression in the department of internal medicine of Xuanwu hospital during Aug.
The relationships between serum uric acid and impaired fasting glucose or diabetes in male

Xiaolin Li, Pei Feng, Xiaohui Niu, Hao Peng, Mo Zhou, Yonghong Zhang, Tan Xu
1. NingXia Teachers University College of Medicine
2. School of Public Health, Medical College of Soochow University

Objective Explore the relationships between serum uric acid and impaired fasting glucose or diabetes in male in order to provide scientific evidence for the prevention and clinical treatment of diabetes.

Methods The blood pressure, height, weight and waist circumference were measured and factors such as smoking, alcohol intake, family history of hypertension, etc. were investigated and blood glucose, blood lipid, serum uric acid were tested for 1 168 men aged ≥ 30 years who lived in Jinchang district of Suzhou. The concentrations of uric acid were categorized into four levels according to the quartiles of serum uric acid. The relationships between serum uric acid and impaired fasting glucose or diabetes were calculated by multiple logistic models.

Result There were 114 participants with impaired fasting glucose, the prevalence was 9.76%; and there were 148 participants with diabetes, the prevalence was 12.67%. The uric acid concentrations in participants with diabetes were higher than that in participants with impaired fasting glucose or normoglycemia. Whether adjusted for other factors or not, the association between uric acid levels and impaired fasting glucose was not significant. Compared to the lowest quartile of serum uric acid, the second, third and forth quartile could decrease the prevalence of diabetes (OR = 0.236 – 0.458, P < 0.05). And the prevalence of diabetes decreased along with the increasing of uric acid levels (P trend < 0.001).

Conclusion The prevalence of diabetes decreased along with the increasing of uric acid levels in male.

Circulating adipocyte–fatty acid binding protein levels and clinical significance in patients with coronary heart disease

Cong Yuan1, Jie Wu1, Zhisheng Jiang1, Changhui Liu1, Gebo Wen1, Jin Zou1, Fang Sui1
1. Department of Cardiology, the First Affiliated Hospital, University of South China
2. Institute of Cardiovascular Disease and Key Lab for Arteriosclerosis, University of South China

Objective The aim of the study is to investigate the changes of circulating A-FABP levels in patients with CHD, to study the variation of A-FABP in genders and its relationship with Gensini scores, and to define the A-FABP as a risk factor of CHD and the association with severity of coronary artery stenosis.

Methods A total of 102 subjects were recruited from the first afflicted hospital of the university of South China, who underwent the coronary angiography (CAG) during 2010 to 2012. Based on the CAG, the subjects were divided into following groups: non-CHD of 35 cases and CHD group of 67 cases. According to clinical presentation, ECG and the serological markers, CHD group was further classified into two subgroups: 28 cases of stable angina pectoris (SAP) group and 39 cases of acute myocardial infarction (AMI) group. According to the coronary artery lesion, all subjects can be divided into four groups: non-CHD group (35 cases), CHD single-vessel lesion group (26 cases), CHD double-vessel lesions group (20 cases), and CHD triple-vessel lesions group (21 cases). The quantitative assessment of the severity of coronary artery lesion was made in line with Gensini scores. The severity of coronary artery stenosis was assessed by the number of coronary artery lesion and the sum of the Gensini scores. According to the median level of A-FABP (P95 = 24.79 ng/mL), all subjects can be divided into two groups: A-FABP of A group is ≤ 24.79 ng/mL, A-FABP of B group is > 24.79 ng/mL. The A-FABP levels were determined by enzyme-linked immunosorbent assay (ELISA). The levels of CK, CK-MB, cTnT, ESR, hs-CRP, TG, TC, LDL-C, HDL-C, and FPG were also detected. Gensini score was calculated and the correlation between A-FABP, serological markers and clinical presentation, severity of coronary artery disease were analyzed. The SPSS 18.0 software was used for data analysis.

Result There was no statistically significant difference in A-FABP levels between CHD group and non-CHD group (26.60 ± 2.62 ng/mL vs 24.27 ± 3.14 ng/mL, P > 0.05). The A-FABP levels in AMI group were higher compared with SAP group (30.57 ± 3.14 ng/mL vs 24.27 ± 2.69 ng/mL, P < 0.05) and non-CHD group (30.57 ± 3.14 ng/mL vs 24.79 ± 3.14 ng/mL, P < 0.05). The A-FABP levels in CHD group were further classified into two groups: CHD triple-vessel lesions group (21 cases). The quantitative assessment of the severity of coronary artery lesion was made in line with Gensini scores. The severity of coronary artery stenosis was assessed by the number of coronary artery lesion and the sum of the Gensini scores. According to the median level of A-FABP (P95 = 24.79 ng/mL), all subjects can be divided into two groups: A-FABP of A group is ≤ 24.79 ng/mL, A-FABP of B group is > 24.79 ng/mL. The A-FABP levels were determined by enzyme-linked immunosorbent assay (ELISA). The levels of CK, CK-MB, cTnT, ESR, hs-CRP, TG, TC, LDL-C, HDL-C, and FPG were also detected. Gensini score was calculated and the correlation between A-FABP, serological markers and clinical presentation, severity of coronary artery disease were analyzed. The SPSS 18.0 software was used for data analysis.

Conclusion The A-FABP levels may contribute to CHD risk stratification. The A-FABP levels in female may become one independent risk factor for CHD. The A-FABP levels may predict the severity of CHD.
Objective The heritability of renal function has been established. However, our understanding of the genomic mechanisms underlying these traits remains limited. We performed a genome-wide linkage scan and positional candidate gene analysis to identify genetic determinants of estimated glomerular filtration rate (eGFR) and serum creatinine among the participants of the GenSalt study.

Method The GenSalt study was conducted among 3142 participants from 633 Chinese families. The eGFR was estimated based on gender, age, and serum creatinine, using the Modification of Diet in Renal Disease (MDRD) equation. The eGFR and serum creatinine phenotypes were inverse-normal transformed, adjusted for age, gender, field center, body mass index, systolic blood pressure, glucose and smoking status in all analyses. Multipoint quantitative trait linkage-analysis was performed using SOLAR software. A systematic literature search was used to identify candidate genes for renal function phenotypes under the linkage peaks (LOD > 2). The additive associations between single SNPs in the candidate genes and the phenotypes were assessed using a mixed linear regression model to account for familial correlations.

Result Suggestive linkage signals were identified for eGFR at 12p13.33 - 12p13.2 and 20q13.13 - 20q13.2, with maximum multipoint LOD scores of 3.2 and 2.2, respectively. For serum creatinine, we observed suggestive linkage signals at 6p12.3 and 12p13.33 - 12p13.31, with maximum multipoint LOD scores of 2.2 and 2.7, respectively. The strongest association signal for both eGFR and creatinine was found for marker rs10744670, located in the 3' flanking region of the KCNA1 gene at 12p13.32 (P = 4.4×10^{-4} and 6.2×10^{-4}, respectively). KCNA1 encodes a voltage-gated potassium channel that is involved in magnesium reabsorption in the kidney.

Conclusion Linkage regions on chromosomes 6, 12 and 20 may harbor susceptibility loci for renal function. In addition, the marker near KCNA1 showed consistent associations with eGFR and creatinine.
Protective effect of hydrogen sulfide on myocardial ischemia reperfusion injury in rats
Xiehui Chen, Peng Li, Xiaoping Huang
The 2nd People’s Hospital of Futian District, Shenzhen, Guangdong 518049

Objective To explore the effects and function mechanism of hydrogen sulfide on myocardial ischemia reperfusion arrhythmia in Rats.

Method We used sodium hydrosulfide (NaHS) as the donor of H₂S, SD rats were randomly divided into sham group, myocardial ischemia reperfusion group (IR group), IR+NaHS group, and IR+NaHS+glibenclamide group. We monitor the hemodynamics of rats, including heart rate, arterial pressure, left ventricular pressure, et al. We also observe the rate of ventricular arrhythmia in each group.

Result H₂S can significantly reduce rats’ heart rate, arterial pressure and left ventricular pressure. It also reduces the rate of ventricular arrhythmia in myocardial ischemia reperfusion rats (H₂S 66.5% vs IR 33.5%, P < 0.05; H₂S 2.6 ± 0.7 vs IR 4.3 ± 0.9, P < 0.05). The KATP Channel Blocker glibenclamide can weaken the H₂S antiarrhythmic effects (H₂S 2.6 ± 0.7 vs H₂S+GLI 4.1 ± 0.7, P < 0.05).

Conclusion H₂S possesses protective effect against myocardial ischemia reperfusion. The function mechanism may be associated with the KATP signal transduction pathway in cells.

Effect of delayed remote ischemic preconditioning on the mitochondrial miR-181c level in isolated perfused rat hearts
Chenghui Zhou1, Xiaqing Cao2, Lihuan Li1
Department of Anesthesiology, State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, Peoples Republic of China1, Key Laboratory of Cardiac Regenerative Medicine, Ministry of Health, National Center for Cardiovascular Diseases, Beijing, 100037, China2

Aim Although delayed remote ischemic preconditioning (DRIPC) has been proved effective in cardioprotection in various animal and human studies, limited data concerning the underlying mechanisms has been reported. Mitochondrial microRNA-181c (miR-181c) has been found to confer cardioprotective potential. Hence, this study was designed to investigate this effect on the mitochondrial miR-181c level in isolated perfused rat hearts.

Method Isolated rat hearts were perfused with 95% oxygen oxygenated Krebs – Henseleit buffer solution (KHBs) in a Langendorff apparatus. After 30-min balanced perfusion, hearts were subjected to 30 min ischemia followed by 60 min reperfusion except a total of 90-min perfusion for control (ischemia/reperfusion, I/R). DRIPC was conducted with 4 cycles 5-min occlusion/5-min reflow at the unilateral hindlimb one day before heart isolation. Heart rate (HR), left ventricular developed pressure (LVDP), and maximum LVDP increase (+dp/dt) and decrease (-dp/dt) rate were continuously collected. Infarct size and cardiac troponin I levels was measured. The total RNA was extracted in isolated mitochondrial pellet. The expression of miR-181c was detected by real-time reverse transcription polymerase chain reaction using TaqMan method.

Result DRIPC improved the recovery of heart function (HR, LVDP, ± dp/dt), and reduced the release of cTnI (P < 0.05). DRIPC limited the infarct size caused by ischemic reperfusion injury (22.34 ± 4.02% vs 33.50 ± 4.55%, P < 0.001). Compared with control, I/R did not affect the miR-181c level (6.21 ± 4.87 vs 4.61 ± 0.63, P > 0.05). However, DRIPC significantly increased this level (9.16 ± 2.68 vs 4.61 ± 0.63, P < 0.05).

Conclusion DRIPC offers cardioprotective effect and increases the mitochondrial miR-181c level.

The role of p66shc adapter protein in cardiac mitochondrial damage in selenium deficiency rats
Ming Zhang, Hu Shan, Rui Yan, Lin Lin, Jin Wei
Department of Cardiology, the Second Affiliated Hospital, Xian Jiaotong University

Objective To study the expression of p66shc adapter protein in selenium deficiency rat hearts, and its effect on the cardiac mitochondria.

Methods Twenty male Sprague-Dawley rats were randomized into normal control group (n = 8) and selenium deficiency model group (n = 12). When rats were fed for twenty weeks, the cardiac function was measured by hemodynamic studies. The cardiac mitochondrial structure was observed under electron microscopy, and the mitochondrial stereological parameters including surface density (Sv), volume density (Vv) and specific surface (Rsv, surface-to-volume ratio) were further studied. The protein expression of p66shc in the whole myocardium and mitochondrial fraction was measured using western-blot.

Result Compared with the control group, the rats in the model group had reduced systolic and diastolic function. Under electron microscopic observation, the cardiac mitochondria in the model group were swelling with fractured or dissolved cristae. Further stereological study showed that notable decreases in Sv and Rsv, and remarkable increase in Vv in the selenium deficiency rat hearts compared with the control group (P < 0.05). The protein expression of phosphorylated p66shc in the whole myocardium and total p66shc in the cardiac mitochondria were both significantly increased in the model group compared with the control group (P < 0.05). Pearson linear correlation analysis showed that the protein expression of total p66shc in the cardiac mitochondria had positive correlation with Vv, and negative correlations with Sv and Rsv (P < 0.01).

Conclusion Selenium deficiency may increase the protein expression of total p66shc in the cardiac mitochondria, which may result in cardiac mitochondrial injury and the ultimate progress of heart failure.

The dynamic change of mitochondrial cytochrome c is involved in myocardial cell apoptosis in selenium deficiency rat hearts
Ming Zhang, Xiaoqing Pan, Lin Lin, Jin Wei
Department of Cardiology, The Second Affiliated Hospital, Xian Jiaotong University

Objective To study the protein expression of cytochrome c in
cardiac mitochondria in selenium deficiency rats and its effect on myocardial cell apoptosis.

Methods Thirty-six rats were randomized into normal control group (n = 18) and selenium deficiency model group (n = 18). When rats were fed for 20 weeks, 30 weeks and 40 weeks respectively, the cardiac function was detected by carotid artery intubation. At the corresponding time points, the alterations of cardiac mitochondria were observed under the electron microscopy, and the myocardial cell apoptosis rate was detected by immunohistochemistry (SP method). The cardiac mitochondria were extracted from the rats at the corresponding time points for detecting the protein expression of cytochrome c by western-blot.

Result Compared with the corresponding control group, the cardiac function in the model group was significantly decreased (P < 0.05). Morphometric analysis showed that cardiac mitochondria in the model group were notable swelling with fractured or dissolved cristae. Myocardial cell apoptosis rates were significantly increased in the model group compared with the corresponding control group, and the increases were greater as the time extension of selenium deficiency (P < 0.05). The protein expression of cytochrome c in the cardiac mitochondria of selenium deficiency rats was significantly decreased compared with the corresponding control group, and the decreases were greater as the time of selenium deficiency prolonged (P < 0.05). Pearson linear correlation analysis showed that the protein expression of mitochondrial cytochrome c had a negative correlation with myocardial cell apoptosis rate (r = -0.858, P < 0.01).

Conclusion Selenium deficiency can down-regulate the protein expression of cytochrome c in the cardiac mitochondria, which is involved in mitochondria-mediated myocardial cell apoptosis.

Quantitative analysis of mitochondrial DNA deletions in patients with viral myocarditis and dilated cardiomyopathy
Jin Wei, Ming Zhang, Hu Shan, Rui Yan
Department of Cardiology, The Second Affiliated Hospital, Xi'an Jiaotong University

Objective To study the mitochondrial DNA (mtDNA) deletions in myocardial biopsy samples from the patients with viral myocarditis (VMC) and dilated cardiomyopathy (DCM), and the relation between mtDNA deletions and peripheral lymphocytes.

Method mtDNA4977 base pair (mtDNA4977) and mtDNA7436 base pair (mtDNA7436) deletion rates of myocytes and lymphocytes were measured by the method of quantitative PCR in VMC patients (n = 20), DCM patients (n = 12) and control bases (12 myocardial samples from the healthy cases died of accident, and 23 blood samples of lymphocytes from the blood donors).

Result mtDNA4977 and mtDNA7436 deletions were observed in both controls (0.175%) and patients with VMC (0.385%) and DCM (3.004%). The severity of mtDNA deletions in VMC and DCM cases were 1.2 and 16.2 fold higher than in normal subjects respectively, mtDNA deletion rates in patients with DCM were 6.8 fold higher than that in patients with VMC (P < 0.05). The degree of mtDNA deletions in peripheral lymphocyte was similar with that in myocardium, and also showed good correlation with that in myocardium (r = 0.960, P < 0.001).

Conclusion mtDNA deletions in myocardium might play an important role in the pathogenesis of VMC as well as its development to DCM. The value of peripheral lymphocyte in the study of myocardial mtDNA deletion needs to be further investigated.

Quantitative analysis of mitochondrial proliferation and loss of mitochondrial membrane phospholipids in lymphocytes from patients with viral myocardial disease
Jin Wei, Ming Zhang, Hu Shan, Lin Lin
Department of Cardiology, The Second Affiliated Hospital, Xi'an Jiaotong University

Objective To study the degrees of mitochondrial proliferation and loss of mitochondrial membrane phospholipids in peripheral blood lymphocytes from the patients with viral myocardial disease and their relations to cardiac function.

Method Mitochondrial proliferation and loss of mitochondrial membrane phospholipids in peripheral blood lymphocytes from patients with viral myocardial disease (50 with viral myocarditis and 33 with dilated cardiomyopathy) were studied using Dermer's tricomp1ex flocculation technique under the electron microscope. And the severity of mitochondrial proliferation and loss of mitochondrial membrane phospholipids in peripheral blood lymphocytes was further analyzed according to NYHA cardiac function. 23 healthy blood donors were selected as the controls.

Result The levels of the mitochondrial proliferation and the loss of mitochondrial membrane phospholipids in peripheral blood lymphocytes were significantly increased in patients with viral myocardial disease compared with those in the controls. The mitochondrial proliferation and the loss of mitochondrial membrane phospholipids in patients with normal cardiac function were different from those in the controls and showed positive relations to the severity of cardiac function.

Conclusion The impairment of mitochondrial membrane phospholipids in peripheral blood lymphocytes might play an important role in the pathogenesis of viral myocardial disease.

The deletion of mitochondrial DNA in patients with viral myocardial disease and its relation to cardiac function
Jin Wei, Ming Zhang, Hu Shan, Rui Yan, Yanhe Zhu
Department of Cardiology, The Second Affiliated Hospital, Xi'an Jiaotong University

Objective To study the mitochondrial DNA (mtDNA) deletion rate in peripheral blood lymphocytes in patients with viral myocardial disease, and its relation to cardiac function.

Methods 83 patients with viral myocardial disease including viral myocarditis (n = 50) and dilated cardiomyopathy (n = 33), and 23 blood donators as the control cases were selected to be investigated. mtDNA4977 base pair (mtDNA4977) and mtDNA7436 base pair (mtDNA7436) deletion rates in peripheral blood lymphocytes were measured by the method of quantitative polymerase chain reaction (qPCR). Correlation analysis was used to study the relation between the mtDNA deletion rate and cardiac function.

Result mtDNA4977 and mtDNA7436 deletions were observed in all groups. The mtDNA deletion rates in viral myocarditis and dilated cardiomyopathy were both significantly increased compared with the control values (P < 0.001). The degree of mtDNA deletion rate showed well accordance with the severity of cardiac function, which was (0.145 ± 0.090)% in patients with NYHA class I and increased to (3.451 ± 1.214)% in patients with NYHA class IV. mtDNA deletion rate had
positive correlations with NYHA classification, cardiothoracic ratio, and the diameters of left atrium and ventricle. And the correlation coefficients of mtDNA4977 and mtDNA7436 deletion rates with left ventricular ejection were -0.681 and -0.675 respectively (both P < 0.05).

**Conclusion** The degree of mtDNA deletion in patients with viral myocardial disease is closely related to the impairment of cardiac function, which might play an important role in the pathogenesis of viral myocardial disease.

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**Vasoprotective effect of the combination of amloidipine and atorvastatin in salt–sensitive hypertension**

Mingsheng Zhou1, Wang Aimei1, Runxia Tian2, James Edgar3, Raij Leopoldo2

1. Department of Physiology, Leping Medical University, Jinzhou, P.R. of China
2. Nephrology–Hypertension Section, Veterans Affairs Medical Center and Division of Nephrology and Hypertension and Vascular Biology Institute, University of Miami Miller School of Medicine, Miami, FL
3. Nephrology Division, University of Alabama at Birmingham Veterans Affairs Medical Center, Birmingham, AL, U.S.A

**Objective** Current treatment for the secondary prevention of cardiovascular (CV) diseases frequently requires the prescription of several concomitant agents, particularly antihypertensives and the HMG-CoA reductase inhibitors, statins. We have previously shown that in salt-sensitive (SS) hypertension either the statin atorvastatin (AT) or the calcium channel blocker amloidipine (Aml) are endowed with vasoprotective effects. Here, we investigated in Dahl (DS) SS rats the effect of combination therapy of Aml and AT on aortic endothelial function, superoxide (O2-) production, and the expression of endothelial nitric oxide synthases (eNOS), and the proinflammatory/proatherogenic monocytes monocyte chemotactic protein-1 (MCP-1) and lectin-like oxidized LDL receptor-1 (LOX-1).

**Method** Groups of DS rats were fed either a normal (NS, 0.5% NaCl) or a high (HS, 4% NaCl) salt diet for 6 weeks. In addition, 3 separate groups of HS rats were given AT (15 mg/kg/day), Aml (5 mg/kg/day) or combination AT (15 mg/kg/day)/Aml (5 mg/kg/day). Systolic blood pressure (SBP) was measured by tail-cuff method; endothelium-dependent relaxation (EDR) to acetylcholine or endothelin (ET) 1-induced vasoconstriction was determined by using organ chamber bath, superoxide (O2-) production in aorta rings by lucigenin chemiluminescence, the protein expression of eNOS and proinflammatory matory cytokines MCP1 and LOX1 by Western blot.

**Result** HS rats developed hypertension (207 ± 7 mm Hg vs 153 ± 4 mm Hg in NS rats, P < 0.05) aortic (25%) and cardiac (30%) hypertrophy, accompanied by upregulation of MCP-1 (80%) and LOX-1 (45%), downregulation of eNOS phosphorylation in the aorta, increased plasma C-reactive protein (CRP) level, and aortic O2- (230%), and impaired EDR to acetylcholine (Emax 64 ± 9 vs 96 ± 4% in NS rats, P < 0.05) and ET1-induced vasoconstriction. Aml reduced SBP, aortic hypertrophy, plasma CRP, vascular O2-, and MCP-1 expression and improved EDR. AT reduced aortic hypertrophy and plasma CRP, improved EDR, and eNOS phosphorylation (Ser1179), normalized vascular O2-, MCP-1 and LOX1 despite only a 10% reduction in SBP. Combination therapy further reduced SBP, normalized aortic hypertrophy, eNOS phosphorylation, EDR, and plasma CRP.

**Conclusion** The present study has provided evidences to support clinical data suggesting that combination with amloidipine and atorvastatin has synergistic effects on cardiovascular system and preventing end-organ damage. Complementary mechanisms of action by two appear to facilitate the increased beneficial effects. Our findings may provide the scientific basis for the combination therapy of statin with antihypertensive agents to reduce and prevent cardiovascular events and atherosclerotic diseases.

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**Analysis of SCN5A mutation in patients with arrhythmogenic right ventricular cardiomyopathy/dysplasia**

Jinzhu Hu, Jianhua Yu, Xiyuan Dai, Hui Zhou, Juxiang Li, Xiaoshu Cheng, Kui Hong

Cardiology Department, the Second Affiliated Hospital of Nanchang University, Nanchang of JiangXi, China

**Aim** Arrhythmogenic right ventricular cardiomyopathy/Dysplasia (ARVC/D) is a genetically determined disorder, characterized by the two components: cardiomyopathy and arrhythmia. To date, the molecular pathogenesis underlying this phenomenon is poorly understood. Whether the ion channel defect involved in the ARVC/D is unknown. The aim of this study was systematically evaluate the sodium channel variants in ARVC/D.

**Method** The patients according to the diagnostic guideline of ARVC/D revised in 2010 were collected. Genomic DNA was extracted from peripheral blood lymphocytes. All the exons and exon-intron boundaries of the SCN5A gene and desmosomal genes known to be associated with ARVC/D, including DSG2, DSG2, DSP, JUP and PKP2 were sequenced through the direct DNA sequencing.

**Result** A total of 13 unrelated index patients were collected. A new missense heterozygote mutation I137M in SCN5A gene was found in one proband 5. The mutation sited at the exon 4 of the SCN5A and the S1 segment in Domain I of Nav1.5, consisted of an C-to-G substitution at nucleotide site 411 (c.411C > G), which predicted a substitution of isoleucine for methionine at codon site 137 (P. Ile137Met, I137M). I137M was not detected in the 400 healthy control chromosomes from individuals of the same ethnic background, which indicated that this mutation was a conservative site in SCN5A gene and the encoding protein – Nav1.5 may have a functional defect.

**Conclusion** Our study for the first time systematically evaluates the sodium channel variants in patients with ARVC/D and find a new SCN5A mutation – I137M. The result increases the insight of genetic pathogenesis in ARVC/D. The mutational sodium channel may destroy the “desmosomal-related complex” and cause the genesis of ARVC/D.

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**Paracrine action of MSCs in mouse infarcted hearts**

Yan Yao, Shaoping Nie, Xin Du, Jianzeng Dong, Changsheng Ma

Department of Cardiology, Beijing Anzhen Hospital, Capital Medical University, Beijing, China.

**Background** Mesenchymal stem cells (MSCs) have recently been demonstrated as a promising stem cell type to rescue damaged myocardium after acute infarction. One of the most important mechanisms underlying their therapeutic effects is the secretion of paracrine factors. However, the expression profile of paracrine factors of MSCs in infarcted hearts, especially at single cell level, is poorly defined.
Aim We aimed to depict the transcriptional profile of paracrine factors secreted by MSCs in vivo, with particular interest in the comparison between normal and infarcted hearts.

Result MSCs were isolated and injected into mice hearts immediately after infarction surgery. Bioluminescence imaging indicated a proportion of cells still alive even up to 12 days post surgery. Parallelized with survived cells, cardiac function was significantly improved after MSCs injection compared to that in PBS-injected mice, indicated by echocardiography and MRI. Despite increased number of vessels in MSCs-injected hearts, endothelial cells and cardiomyocytes transdifferentiation were rarely observed in infarcted hearts 5 days after infarction. Furthermore, laser capture microdissection followed by high throughput real time PCR was employed in our study, uncovering that the injected MSCs, compared to local cardiomyocytes, displayed elevated levels of secreted factors. To further investigate the regulation of those factors, we performed single cell analysis to dissect the gene expression profile of 48 MSCs in infarcted and normal hearts, respectively. Consistent with the in vivo observation, a similar regulation pattern of those factors was detected in cultured MSCs.

Conclusion Our study, for the first time, elucidated gene expression profiles, as well as regulation of paracrine factors, of MSCs at single cell level in vivo, indicating that paracrine factors from MSCs account for the improvement of cardiac function after infarction.

The effect of different chemical compounds on rescuing nonsense mutations of HERG gene associated with LQT syndrom

Haiyun Yu, Jian Huang, Yinhui Zhang, Roumu Hu, Jielin Pu
State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

Objective It is known that aminoglycosides can promote readthrough of nonsense codons to produce full-length proteins in many genetic diseases caused by nonsense mutation. Recently, PTC124 with low toxicity has been indicated as a new compound for the treatment of HERG gene. And the site of mutations influenced the rescuing efficiency of them.

Result The effect of different chemical compounds on rescuing nonsense mutations of HERG gene was studied by adding G418, gentamicin, tobramycin or PTC124 into mutant cDNAs. Pharmacological rescue of different compounds was transiently transfected with equal amount of WT or HERG nonsense mutant cDNAs. Pharmacological rescue of different compounds was studied by adding G418, gentamicin, tobramycin or PTC124 into Dulbecco's modified Eagle's culture medium (DMEM) for 24 hours. Western blot was performed to evaluate the protein expression of WT or mutant HERG genes with and without drugs. Patch clamp was used to test the function of Ikr before and after adding drugs.

Conclusion These Result indicate that chemical compounds can induce different patterns of read-through effect on nonsense mutations of HERG gene. And the site of mutations influenced the rescuing efficiency of them.
investigated in this article.

**Methods** Male mongrel dogs underwent a 15- or 60-min occlusion of the left anterior descending coronary artery, followed by a 120-min reperfusion. Additionally, a sham-operation group was assigned. The animals were killed after 120-min reperfusion and the heart was quickly removed. The myocardium was examined pathologically by electron microscopy. HSP70 mRNA expression both in intact and ischemic myocardium was measured by a semiquantitative reverse transcription-polymerase chain reaction (RT-PCR) method using complementary DNA normalized against the housekeeping gene β-actin.

**Result** (1) No ultrastructural changes of microvessels and myocardial cells except a slight loss of mitochondrial granules were noted in reperfusion myocardium from dogs of 15-min ischemia group. In 60-min ischemia group, endothelial cells of capillaries were slightly swelling, and the intercellular linking gaps of endothelial cells slightly widened. As for myocardial cells, intercellular, intermyofibrillar, and intermyoflamellent edema were present. Besides, the fractures of a few myofilaments, the granule loss and swelling of mitochondrias were also seen. (2) HSP70 mRNA expression level in both ischemia-reperfusion zone and intact myocardium in 15-min ischemia group was markedly higher than in sham-operation group (36.2 ± 6.5 vs 22.0 ± 4.0, P = 0.005; 29.8 ± 4.5 vs 22.2 ± 4.7, P = 0.050). Compared with sham-operation group, however, no changes in mRNA HSP70 levels in 60 min ischemia group (25.7 ± 7.5 vs 22.0 ± 4.0, P = 0.681; 28.5 ± 4.7 vs 22.2 ± 4.7, P = 0.118) were seen. The ratio of HSP70 mRNA expression content in ischemia-reperfusion zone to that in intact myocardium in 15-min ischemia group was not significantly different from sham-operation group (1.22 ± 0.16 vs 1.01 ± 0.22, P = 0.233), but remarkably higher than 60-min ischemia group (1.22 ± 0.16 vs 0.89 ± 0.17, P = 0.019).

**Conclusion** The change of HSP70 expression in ischemia-reperfusion myocardium is associated with ischemia time, that is, short duration ischemia promotes HSP70 expression, whereas long time ischemia does not. Furthermore, the HSP70 expression changes consist with the protective extent of myocardial ultrastructures.

**Identification of novel pre-translational regulatory mechanisms for NF-κB activation**

Xiao Huang1,2, Ren Gong1,3, Xinyuan Li1, Fan Yang1, Irene H. Yang1, Xiaoshu Cheng1, Xiaofeng Yang1, Hong Wang1

1. Cardiovascular Research Center/Thrombosis Research Center, Department of Pharmacology, Temple University School of Medicine, Philadelphia, PA 19140
2. Department of Cardiology, Second Affiliated Hospital of Nanchang University, Nanchang, Jiangxi, China 330006
3. Department of Cardiology, Jiangxi People’s Hospital, Nanchang, Jiangxi, China

**NF-kB controlled transcriptional regulation plays a central role in inflammatory and immune responses.** Currently understanding about NF-kB activation mechanism emphasizes IκB-tethered complex inactivation in the cytoplasm. In the case of NF-kB activation, IκB phosphorylation leads to its degradation followed by NF-kB relocating to the nuclear and trans-activation of NF-kB targeted genes. Pre-translational mechanism mediated NF-kB activation remains poorly understood. In this study, we investigated NF-kB pre-translational regulation by performing a series of data-base mining analysis and using six large national experimental data-bases; NCBI Unigene EST profile database, Gene Expression Omnibus (GEO) database, Transcription Element Search System (TESS) database, AceView database and Epigenomics databases, and TargetScan software. We reported the following findings: 1) NF-kB signaling genes are differentially expressed in human and mouse tissues; 2) Heart and vessels are the inflam matory privilege tissues and less easy to be inflamed because lacking of key NF-kB signaling molecular expression; 3) NF-kB signaling genes are induced by cardiovascular disease risk factors oxidized-phospholipids and pro-inflam matory cytokines in endothelial cells; 4) Transcription factors C/EBPs and NF-kB have higher binding site frequencies in the promoters of Pro-inflam matory cytokine-induced NF-kB genes; 5) Most NF-kB signaling genes have multiple alternative promoters and alternatively spliced isoforms; 6) NF-kB family genes can be regulated by DNA methylation; 7) 27 out of 38 NF-kB signaling gene can be regulated by microRNAs. Our findings provide important insight into the mechanism of NF-kB activation, which may contribute to cardiovascular disease, inflam matory diseases and immunological disorders.

**Caspase–1 promotes endothelial progenitor cells (EPC) undergo pyroptosis and weakens EPC’s angiogenesis after myocardiac infarction**

Ren Gong1,2, Xiao Huang1,3, Ying Yin1, Xinyuan Li1, Xiaohua Jiang1, Hong Wang1, Xiaofeng Yang1

1. Cardiovascular Research Center, Temple University School of Medicine, Philadelphia, PA 19140, USA; 2. Department of Cardiology, Jiangxi People’s Hospital, Nanchang, Jiang Xi Province, China; 3. Department of Cardiology, Nanchang University Second Hospital, Nanchang, Jiang Xi Province, China;

We examined an important question whether endothelial progenitor cells (EPCs) have caspase-1 pathway, which can sense dyslipidemia, a risk factor for cardiovascular disease, as a metabolic danger-associated molecular pattern (DAMP), and activate EPC death and weaken EPC repairing. Using techniques including immunological, biochemical, gene deficient mice, cell therapy, and myocardiac infarction model, we have made the following findings: 1) Dyslipidemia induces the decrease of mouse EPC numbers and promotes EPC undergo inflam matory cell death (Pyroptosis); 2) Stimulation with proatherogenic oxidation product, oxidized low density lipoprotein (oxLDL), decreases mouse EPC numbers and promotes EPC undergo pyroptosis; 3) Caspase-1 activation inhibits vascular endothelial growth factor receptor (VEGFR) expression on EPCs and weakens VEGF inhibition of oxLDL-induced EPC decrease; 4) Caspase-1 gene deficient (−/-) mouse Sca-1+ progenitor cell therapy improves mouse cardiac function after myocardiac infarction; and 5) Caspase-1/- Sca-1+ progenitor cell therapy improves capillary density, increases peripheral EPC percentages, inhibits caspase-1 activities and improves VEGFR2 expression on EPCs after myocardiac infarction. Our Result have provided a first insight on how caspase-1 in EPCs senses hyperlipidemia, promotes EPC pyroptosis and weakens EPC repairing, and our Result have also demonstrated a potential of caspase-1 inhibitory EPC therapy for myocardiac infarction.
The comparative study of the right ventricle training Result between the young and old sheep by gradually increasing the pressure

Yonghui Zhang, Shoujun Li, Xin Wu, Fengying Lu, Minghu Xiao, Kai Mu, Wenlei Li, Qiuming Chen
State Key Laboratory of Cardiovascular Disease Fuwai Hospital, National Center for Cardiovascular Diseases, Peking Union Medical College and Chinese Academy of Medical Sciences, Beijing, 100037, P. R. China

Objective To study the different Result of the right ventricle training between the young and old sheep induced by gradually increasing the after load.

Methods 12 male sheep, 5 – 6 months old, 26 – 37 kg, were randomly divided into experimental group and control group, each comprising 6 animals (respectively 29.00 ± 2.78 kg and 28.36 ± 4.24 kg, no statistically significant difference); 12 male sheep, 5 – 6 years old, 72 – 83 kg, were randomly divided into experimental and control group, each comprising 6 animals (75.63 ± 4.57 kg and 76.38 ± 3.62 kg respectively, no statistically significant difference). After opening the chest through the second left intercostals, pulmonary trunk was dissociated and the adjustable pulmonary artery banding device was put around it. Then the balloon of the device was gradually inflated to narrow the pulmonary artery and to train the right ventricle. The shape of the right ventricle was studied by echocardiogram and the changes of the hemodynamic and myocardial histopathology were observed.

Result Young and old sheep both were able to achieve the aim of ventricular training (right ventricular pressure/left ventricular pressure greater than 0.6). After training the right ventricular systolic and diastolic function of the two groups were enhanced, although the added value of ± dp/dt in the young sheep were higher than old, but there was no statistical significant difference between the two groups. Pathological Result showed that both right ventricular hypertrophy index were both added, but no significant difference. The myocardial histopathology in the old experimental group were observed degeneration of myocardial cells, interstitial edema, focal fibrosis and a small number of pathological changes such as fatty degeneration, liver biopsy showed central venous congestion and expansion of sinusoidal liver cells such as hepatic congestion with mild degeneration performance.

Conclusion The young and old sheep were successfully able to achieve the aim of ventricular training by gradually increasing the after load, but the old sheep occurred myocardial pathologic changes and heart dysfunction.

Pigment epithelium–derived factor exerts different effects on the survival and function of endotheliocytes and cardiomyocytes in rat myocardial infarction

Hao Zhang1, Hongyan Dong2, Zhongming Zhang3, Shoujie Feng1, Lei Xu1, Yanliang Yuan1, Zheng Wang2
1. Institute of Cardiovascular Disease, Affiliated Hospital of Xuzhou Medical College, Xuzhou, Jiangsu, China
2. Department of Biology, Xuzhou Medical College, Xuzhou, Jiangsu, China

Background Ischemic heart disease (IHD) is of increasing importance in aging populations. Alternative forms of treatment have been studied in an attempt to reduce myocardial ischemia and relieve symptoms. Gene therapy is an option that may induce angiogenesis, establish collateral circulation, reperfuse ischemic myocardium and recover cardiac function. Although there is much interest in a therapeutic angiogenesis strategy for IHD, Result have been modest because angiogenic inhibiting factor has been overlooked, so there vascular regeneration is poor in infarcted myocardium. Pigment epithelium–derived factor (PEDF) is a pleiotropic gene with anti-inflammaatory, antioxidant, neurotrophic and powerful anti-angiogenic properties. The role of PEDF on endothelial cells' cardiomyocytes function and survival, however, remains unclear.

Methods Adult Sprague-Dawley rats myocardial infarction models were surgically established. PEDF-RNAi-LV or PEDF-LV was respectively delivered into the ischemic myocardium for 4 weeks. Reverse transcription-polymerase chain reaction, western blotting and immunofluorescence staining were used to detect gene and protein expression. The apoptosis of endothelial cells/cardiomyocytes, vessel density, vascular permeability, inflammation and animal cardiac function were also evaluated.

Result The expression of PEDF and VEGF are opposite each other in the myocardium, so that when one is up the other is down. The inhibited PEDF expression activated the mitochondria and death receptor domain apoptotic signal pathway, promoted the apoptosis of cardiomyocytes, impaired cardiac function, and also leads to endogenous VEGF/VEGFR2 up-regulation. VEGF/VEGFR2 pathway mediated protection of endothelial cells, induced endothelial cells' sprouting, and initiated angiogenesis locally. The new vessels at this stage, however, were unstable. Relative over-expression of PEDF reduced the cardiomyocytes’ apoptosis, protected cardiac function, but induced apoptosis of endothelial cells, and inhibited angiogenesis.

Conclusion Expression of PEDF in myocardial tissue leads to significant changes in the myocardial internal environment. Survival of endothelial cells and cardiomyocytes was increased or decreased respectively via multiple apoptosis signal pathways in infarcted myocardium. Moreover, PEDF expression inhibited angiogenesis of infarcted myocardium, and the cardiac function was significantly influenced.

Probucol prevents atrial remodeling by inhibiting reactive oxygen species production and NF-kappaB activation in alloxan–induced diabetic rabbits

Huaying Fu, Tong Liu, Changli Liu, Jian Li, Xinghua Wang, Wansong Yang, Guangping Li
Tianjin Institute of Cardiology, department of cardiology, the second hospital of Tianjin Medical University

Objective This study sought to assess the effects of probucol on atrial remodeling and atrial fibrillation (AF) promotion in alloxan–induced diabetic rabbits and to elucidate the underlying mechanisms.

Background Diabetes mellitus (DM) is an independent risk factor for AF. However, the underlying mechanisms for the increased propensity for AF in DM and the effects of probucol on atrial remodeling remain unclear.

Methods 40 Japanese rabbits were randomly assigned to a normal control group (C, n = 10), a alloxan–induced diabetic group (DM, n = 10), probucol-treated group (CPR, n = 10) and probucol-treated diabetic group (DPR, n = 10). Rabbits in the DPR and CPR groups were orally administered Probucol (1000 mg/day) for 8 weeks. Plasma malonaldehyde (MDA) levels were measured bychemical colourimetric Methods. The protein expression of NF-κB and TGF-β in left atrial tissue were orally administered Probucol (1000 mg/day) for 8 weeks. Plasma malonaldehyde (MDA) levels were measured bychemical colourimetric Methods. The protein expression of NF-κB and TGF-β in left atrial tissue were orally administered Probucol (1000 mg/day) for 8 weeks. Plasma malonaldehyde (MDA) levels were measured bychemical colourimetric
were analyzed by western blot, the mRNA expression levels of TNF-α were analysed by RT-PCR Methods. Isolated Langendorff perfused rabbit hearts were prepared to evaluate atrial refractory effective period (AERP) and its dispersion (AERPD), interatrial conduction time (IACT) and vulnerability to AF. Atrial interstitial fibrosis was evaluated by Sirius-Red staining.

**Result** The DPR rabbits exhibited significant alleviation of oxidative stress displayed as decreased plasma MDA compared with diabetic rabbits (P < 0.05). Probrucol significantly downregulated atrial NF-xB, TGF-β protein expression and TNF-α mRNA expression in left atrial tissue of alloxan-induced diabetic rabbits. Probrucol administration increases stability of vulnerable atrial fibrillation in diabetic rabbits (P < 0.05). Histological analysis revealed suppression of DM-related histological changes (interstitial fibrosis) by probrucol.

**Conclusion** Probrucol prevented atrial remodeling and suppressed AF development in alloxan-induced diabetic rabbits. Its inhibition of ROS Production, NF-xB, TGF-β and TNF-α overexpression may contribute to its antiremodeling effects.

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### Role of GRK4 in the regulation of arterial AT1 receptor in hypertension

Ken Chen1,2, Li Liu1,2, Caiyu Chen1,2, Chunyu Zeng1,2

1. Department of Cardiology, Daping Hospital, the Third Military Medical University
2. Chongqing Institute of Cardiology, Chongqing, P.R. China

**Background** G protein-coupled receptor kinase 4 (GRK4) gene variants, via impairment of renal angiotensin system function, decrease the ability to excrete a sodium load, resulting in sodium retention and an increase in blood pressure. Increased aortic stiffness, a risk factor in cardiovascular disease, may be related to increased activity of the renin-angiotensin system. Whether or not GRK4 and the angiotensin type 1 receptor (AT1R) interact in the aorta is not known.

**Methods** GRK4 expression in vascular smooth muscle cells (Vs MCs) of the aorta was analyzed by confocal microscopy of double-stained, RT-PCR and immunoblotting. AT1R protein expression and function in GRK4 variant 142V transfected A10 cells and WT cells was quantified by immunoblotting and AT1R-mediated intracellular calcium concentration. AT1R phosphorylation level was determined by immunoprecipitation. The interaction between GRK4 and AT1R was determined by immunoprecipitation and confocal microscopy of double-stained. NF-xB activity was analyzed by electrophoretic mobility shift assay (EMSA). Angiotensin II-mediated vasoconstriction of the aorta from 142V-transgenic mice and WT mice was analyzed by tension measurement of the artery rings.

**Result** In this study, we find that GRK4 is expressed in Vs MCs of the aorta. Heterologous expression of the GRK4 variant 142V in aortic A10 cells increased AT1R protein expression and AT1R-mediated increase in intracellular calcium concentration. The increase in AT1R expression was related, in part, to an increase in AT1R mRNA expression via NF-xB, because blockade of NF-xB abolished those effects of GRK4 142V. As compared with control (vector-transfected) cells, cells expressing GRK4 142V had greater NF-xB activity than cells expressing GRK4 142V with NF-xB bound to the AT1R promoter. The increased AT1R expression in cells expressing GRK4 142V was also associated with decreased AT1R degradation, which may be ascribed to lower AT1R phosphorylation.

There was a direct interaction between GRK4 and AT1R in A10 cells that was decreased by GRK4 142V and could have caused the lower AT1R phosphorylation. The regulation of AT1R expression by GRK4 142V in A10 cells was confirmed in GRK4 142V transgenic mice; AT1R expression was higher, while AT1R phosphorylation was lower in the aorta in GRK4 142V than GRK4 wild-type (WT) mice. Angiotensin II-mediated vasoconstriction of the aorta was also higher in GRK4 142V than GRK4 WT mice.

**Conclusion** This study provides a mechanism by which GRK4, via regulation of arterial AT1R expression and function, participates in the pathogenesis of conduit vessel abnormalities in hypertension.

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**c-Met overexpression promote reendothelialization and inhibit neointimal formation after balloon injury**

Mingbao Dong, Yankun Shi, Gang Zhao, Xuejun Yu, Jianfei Chen, Lan Huang

Institute of Cardiovascular Diseases of PLA, Xinqiao Hospital, Third Military Medical University, 400037 Chongqing, Peoples Republic of China

**Aim** To explore the effect of c-met overexpression in EPCs on reendothelialization after balloon injury.

**Methods** EPCs derived from mouse bone marrow were isolated and cultured. 3- (4, 5-dimethylthiazol-2-y)-2, 5-diphenyltetrazolium bromide assays were used to evaluate EPC proliferation. Adenoviral vector expressing c-Met was generated using the AdEasy system. To evaluate the role of HGF/Met in vascular repair in vivo, we used balloon-injured rat carotid artery model. Evans Blue dye was administered to evaluate reendothelialization after 10 days injury, and the neointimal formation was assessed at 21 days following vascular injury.

**Result** The effect of HGF on EPC proliferation was examined 48 h after exposure to different quantities of HGF (range 2 – 20 ng/ml). The proliferation effect was strongly dose-dependent and significantly increased in c-met-EPCs group compared with EPCs group. After transfusion of c-met-EPCs or EPCs to balloon-injured rat via vessel, Evans Blue dye was administered to evaluate reendothelialization after balloon injury. Reendothelialized area was significantly larger in c-met-EPCs group than in EPCs group (64.25 ± 8.90% vs 43.21 ± 7.24%, n = 5, P < 0.01). A marked decrease in the neointimal area and I/M ratio was found in c-met – EPCs compared with EPCs group at day 21 (0.29 ± 0.06 vs 0.63 ± 0.13, n = 5, P < 0.01).

**Conclusion** c-Met overexpression improve EPCs proliferation, promote reendothelialization and inhibit neointimal formation after balloon injury.

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**The effects of anticoagulant therapy on coagulant state and platelet function following transcatheter closure of atrial septal defect**

Guocai Chen, Yi Wang, Lan Huang, Yaoming Song, Zhaohua Geng, Kaibin Tan, Jun Qin

The Institute of Cardiovascular Disease of PLA, Xinqiao Hospital, Third Military Medical University, Chongqing, China

**Background** Several studies have demonstrated coagulant system was activated after transcatheter closure of ASD, but changes of platelet function still remain controversial. Currently, it is not clear which anticoagulant regimen is more effective to prevent thrombosis and embolic events after device implantation. This study was to compare the
effects of three anticoagulant regimens on coagulant state and platelet function following transcatheter closure of atrial septal defect (ASD).

**Methods** A total 138 patients who underwent transcatheter closure of ASD were randomized into three groups to receive different anticoagulant therapy: unfractionated heparin (UFH) for 24 hours, low molecular weight heparin (LMWH) for 24 hours, and LMWH for 72 hours (PLMWH). Aspirin was given to all patients for 6 months after intervention. The laboratory measurements included beta-thromboglobulin (β-TG), platelet factor 4 (PF4) and prothrombin fragment 1+2 (F1+2) which were done before intervention as baseline, immediately after, and day 1, 2, 3, 7, 30 and 90 after intervention.

**Result** In 3 groups, β-TG, PF4 and F1+2 elevated immediately after implantation procedure. β-TG and PF4 declined slightly on day 1 and 2, and rose to a highest level on day 3, then fell down to baseline on day 7. The F1+2 gradually returned to baseline on day 90. However, the F1+2 in pLMWH group was markedly lower than that in UFH and LMWH groups on day 3. No thrombo-embolic events were noted during follow-up.

**Conclusion** Transcatheter closure of ASD was associated with significant activation of both platelets and coagulation. These findings support an antithrombotic regimen after procedure including anticoagulant and antiplatelet agents. The F1+2 level fell down earlier in pLMWH group. However, there were no differences of clinical outcomes among three groups on day 90 after intervention. Therefore, a larger size and longer follow-up study is needed to further clarify this issue.

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**Dopamine D1-like receptors suppress proliferation of vascular smooth muscle cell induced by Insulin-like Growth Factor-1**

Yu Han1,2, Di Yang1,2, Yukai Liu1,2, Jinhuan Fu1,2, Shuo Zheng1,2, Duofen He1,2, Lin Zhou1,2, Chunyu Zeng1,2
1. Department of Cardiology, Daping Hospital, The Third Military Medical University
2. Chongqing Institute of Cardiology, Chongqing, P. R. China

**Objective** Proliferation of vascular smooth muscle cells (VSMCs) participates in the pathogenesis and development of cardiovascular diseases, including essential hypertension and atherosclerosis. Our previous study found that stimulation of D1-like dopamine receptors inhibited insulin-induced proliferation of VSMCs. Insulin-like growth factor-1 (IGF-1) and insulin share similar structure and biological effect. However, whether or not there is any effect of D1-like receptors on IGF-1-induced proliferation of VSMCs is not known. Therefore, we investigated the inhibitory effect of D1-like dopamine receptors on the IGF-1-induced VSMC proliferation in this study.

**Method** VSMC proliferation was determined by [3H]-thymidine incorporation, the uptake of 3-(4, 5-dimethylthiazol-2-yl)-2, 5-diphenyl tetrazolium bromide (MTT) assay and cell number. Phosphorylated/non-phosphorylated IGF-1 receptor, Akt, mTOR and p70S6K expressions were determined by immunoblotting. The oligodeoxynucleotides were transfected to A10 cells to identify the effect of D1 and D5 receptors respectively.

**Result** IGF-1 increased the proliferation of VSMCs, while in the presence of fenoldopam, IGF-1 mediated stimulatory effect was reduced. Use of either the antisense for D1 or D5 receptor partially inhibited the fenoldopam-induced anti-proliferation effect of VSMCs. Use of both D1 and D5 receptor antisenses completely blocked the inhibitory effect of fenoldopam. In the presence of PI3k and mTOR inhibitors, the IGF-1 mediated proliferation of VSMCs was blocked. Moreover, IGF-1 increased the phosphorylation of PI3k and mTOR. The inhibitory effect of fenoldopam on VSMC proliferation might be due to the inhibition of IGF-1 receptor expression and IGF-1 phosphorylation, since in the presence of fenoldopam, the stimulatory effect of IGF-1 on phosphorylation of IGF-1 receptor, PI3k and mTOR is reduced, the IGF-1 receptor expression was reduced in A10 cells.

**Conclusion** Activation of the D1-like receptors suppressed the proliferative effect of IGF-1 in A10 cells via the inhibition of the IGF-1/R/Akt/mTOR/p70S6K pathway.

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**Association between -1562 C>T polymorphism in the promoter region of matrix metalloproteinase-9 (MMP-9) and coronary artery disease: A meta-analysis**

Ken Chen1,2, Hongmei Ren1,2, Lin Zhou1,2, Chunyu Zeng1,2
1. Department of Cardiology, Daping Hospital, The Third Military Medical University
2. Chongqing Institute of Cardiology, Chongqing, P. R. China

**Objective** To determine the association between -1562 C>T polymorphism in the promoter region of matrix metalloproteinase-9 (MMP-9) and coronary artery disease (CAD) risk.

**Methods** This meta-analysis was on the basis of 26 studies including 12 776 cases and 6 371 controls. The was assessed by the Q-statistic test and the F-statistic test. Sensitivity analysis was conducted by sequentially omitting any single study and recalculating the ORs and 95% CIs. Funnel plots and Egger’s test were performed to test the potential publication bias. All the data were analyzed by using STATA version 12.0.

**Result** We found that -1562 C>T polymorphism did not contribute to susceptibility to CAD in the overall Result (ORCC vs TT = 0.99, 95% CI = 0.94 – 1.04, Pheterogeneity = 1.00; ORCC + CT vs TT = 0.99, 95% CI = 0.95 – 1.04, Pheterogeneity = 1.00; ORCC vs CT + TT = 0.96, 95% CI = 0.92 – 1.01, Pheterogeneity = 0.992; ORallele C vs allele T = 0.98, 95% CI = 0.95 – 1.01, Pheterogeneity = 1.00; ORCT vs TT = 0.98, 95% CI = 0.89 – 1.07, Pheterogeneity = 1.00). But the stratified analysis by ethnicity and source of control indicated -1562 C>T polymorphism may be a risk factor for the CAD risk in Asians and hospital populations.

**Conclusion** Our meta-analysis supported the fact that -1562 C>T polymorphism was not associated with the susceptibility to CAD. Further larger studies are required to confirm our findings.

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**Effects of prescription of Jiashen on ventricular remodeling and infiltration of monocyte/macrophages in the early period after myocardial infarction in rats**

Mingjun Zhu, Yanyan Liu, Youping Wang, Shiyang Xie, Bin Li
1. First Affiliated Hospital, Henan University of Traditional Chinese Medicine

**Objective** This study was designed to test the hypothesis that PJS modulates inflammation processes to prevent cardiac functional deterioration and reduce ventricular remodeling after MI.

**Methods** Male Sprague-Dawley rats (9 – 10 weeks) were subjected...
to sham-MI or MI by ligation the left anterior descending coronary artery for 1 and 4 weeks. The rats were divided into five groups: sham, MI, PJS (3 g/kg/day), PJS (6 g/kg/day), and losartan (an AT1, antagonist, 10 mg/kg/day). The vehicle, PJS, or losartan was given by oral gavage once a day after MI. Cardiac functions were determined by echocardiographic measurements at 1 and 4 weeks after MI. Fibrinogen at the site of infarction and in ischemic myocardium were determined by Masson staining. Result of quantitative analysis were used to detect the level of hydroxyproline. Monocyte/macrophages expression was detected by immunohistochemistry staining and quantitative analysis.

Result The echocardiographic measurement showed that both LVEDd and LVESd in the PJS-6 and Losartan groups were significantly shorter than in the MI group at both week 1 and week 4 post-MI. Both FS and EF were well-maintained in the PJS-6 and Losartan groups than in the MI group at both week 1 and week 4 post-MI. Masson trichrome staining of cardiac sections; At 1 and 4 weeks after myocardial infarction, fibrinogen proliferation was much more obvious in MI group than in sham operation group. A detectable reduction of fibrinogen with PJS-6 and Losartan groups at the site of infarction was not found but was reduced at ischemic sites. Result of quantitative analysis shows: compared to the MI group, the PJS-6 and losartan groups significantly decrease at both the infarction and ischemia areas the level of fibrinogen. Immunohistochemical Result of monocyte/macrophages showed; At 1 and 4 weeks after myocardial infarction, monocyte/macrophages was much more obvious in MI group than in sham operation group. Compared to the MI group, the PJS-6 and losartan groups significantly decrease at both the infarction and ischemia areas of monocyte/macrophages.

Conclusion Our studies demonstrate that the PJS improves cardiac function, inhibits cardiac remodeling and suppresses infiltration of monocyte/macrophages after myocardial infarction. The data indicate that PJS inhibits its ventricular remodeling possibly via inhibiting infiltration of monocyte/macrophages. The Result suggest that PJS may have a promising potential for the prevention and treatment of MI.

Circulating microRNAs (miRNAs) are gaining more substantial research in recent years. They may serve as biomarker of certain diseases, and they are also biological active in disease progression. High density lipoprotein (HDL) was proved to be an novel endogenous circulating miRNA transporters. Low density lipoprotein (LDL) is similar to HDL in molecular structure, can also transport miRNAs in plasma. The aim of the study was to prove the existence of miRNAs in LDL, and reveal the changes in patients in coronary artery disease.

Methods Samples from 3 patients with coronary angiography diagnosed CAD and 3 healthy controls. LDL (1.019-1.063 g/ml) was isolated from the plasma by sequential ultracentrifugation, followed by desalting and dehydration by ultrafiltration. The LDL was then further purified by fast protein liquid chromatography. The expression of Ado2, NPM1 and CD 63 in plasma and LDL were detected by western-blot Methods. Total RNA was isolated from the highly purified LDL by mirVanaTM miRNA isolation kit. The miRNA expression profiles were analyzed by miRCURY TM LNA Array (v.18.0) chip.

Result Ultracentrifugation and FPLC can separate the LDL from other miRNA protein transporters. The apolipoprotein in highly purified LDL was apoB100, without any HDL components (apoAI). The miRNA chip revealed that LDL contains up to 280 miRNAs. LDL from CAD patients contains more miR-4778-5p than that from the healthy. Biological information studies reveal that the potential target genes of mir-4778-5p is ABCA1 and ABCG1. miR-4778-5p might regulate cholesterol efflux by regulating ABCA1 and ABCG1 directly.

Conclusion LDL is a novel endogenous miRNA transporter. The expression profiles were significantly changed in CAD patients. The miRNAs in LDL might be biological active in atherosclerosis.

Effects of prescription of Jiashen on TGF-β/
Smads pathway after myocardial infarction in rats

Mingjun Zhu, Xiaoli Nan, Youping Wang, Shiyang Xie, Bin Li
First Affiliated Hospital, Henan University of Traditional Chinese Medicine

Objective This study was designed to study the effect of PJS on
Tirofiban improves renal outcome in a rat model of ischemia/reperfusion injury by modulating nO synthases

Zhen Wang1,2,1, Yu Han1,2, Hongmei Ren1,2, Yukai Liu1,2, Xun Kou1,2, Di Yang1,2, Jinjun Fu1,2, Duofen He1,2, Pedro A. Jose1, Lin Zhou1,2, Chunyu Zeng1,2
1. Department of Cardiology, Daping Hospital, The Third Military Medical University
2. Chongqing Institute of Cardiology, Chongqing, P. R. China

Aim Renal ischemia/reperfusion (I/R) injury is a common clinical disease. We have known that NO-signal transduction has an important effect on renal I/R injury. NO is produced by NO synthases. Endothelial NO synthase (eNOS) plays a protective role while inducible NO synthase (iNOS) induces impairment. There is evidence that tirofiban may cause alteration of NO production by affecting eNOS/iNOS. So in the present study, we investigated whether tirofiban can affect NO Synthases and improve renal outcome in a rat model of I/R injury.

Methods and Results Tirofiban (100 μg/kg) was intraperitoneally administered to Sprague-Dawley rats, which were divided into four groups: sham operated control group (N = 3); sham operated plus tirofiban (100 μg/kg) group (N = 3); I/R group (N = 3); I/R plus tirofiban group (N = 3). After 24 h reperfusion, kidney and blood were collected to estimate renal function, oxidative stress, apoptosis of renal tissues and plasma NOX – production. In I/R group, the level of serum urea, Scr, and AST was much higher compared with control. Pathological damage score was also much higher in I/R group. Tirofiban improves renal function damaged by I/R injury and reduce histopathological changes. Besides, tirofiban also decrease oxidative stress, apoptosis and the level of plasma NOX.

Conclusion Tirofiban plays a protective role in renal I/R injury. And the alterations of NO-transduction related to eNOS/iNOS may participate in the mechanism of tirofiban protection.

LincRNA–p21 feedback enhances P53 activity via interaction with MDM2 function in vascular smooth muscle cells proliferation dominantly neo-intimal hyperplasia of atherosclerosis

Yu Han, Jin Cai, Caiyu Chen, Duofen He, Yue Cai, Hefei Huang, Yujia Yang, Chunyu Zeng
Department of Cardiology, Daping Hospital, The Third Military Medical University

Objective To investigate the relationship and molecular mechanism of lincRNA-p21 in the development of atherosclerosis (AS).

Methods Firstly, we detected the expression of lincRNA-p21 expression in the aortic plaque of apoE−/− mice fed with high-fat diet and peripheral blood mononuclear cells of clinical coronary disease patients. Then we observed the role of lincRNA-p21 in cell proliferation and apoptosis using mice macrophage cell line RAW264.7 and human vascular smooth muscle cell line HA-Vs MCs by loss-of-function and gain-of-function approaches. Meanwhile, the expression of mRNA and protein levels of apoptosis-related downstream targeting of p53 also been detected. Furthermore, we preformed bioinformatics prediction, RNA-Immunoprecipitation (RIP), RNA-pulldown and deletion mapping experiments to test the potential interaction and specific interaction pattern between lincRNA-p21 and MDM2. Then co-Immunoprecipitation (co-IP) and Chromatin-Immunoprecipitation (ChIP) assays were performed to verify the possible influence on p53 transcriptional activity of this binding. We further investigated whether or not lincRNA-p21 was involved in the formation of neo-intimal hyperplasia in vivo, therefore recombiant lentivirus vector expressing Si-RNA against lincRNA-p21 was injected into the injured area of mouse carotid arteries.

Result In this study, we have indentified lincRNA-p21 was down-regulated in apoE−/− AS model mice. By loss-of-function and gain-of function approaches, we found that both lincRNA-p21 and p53 could repress proliferation and induce apoptosis inVs MCs. LincRNA-p21 knockdown blocked P53 signaling and the effect of p53 on Vs MC proliferation and apoptosis. MDM2 is a key factor to regulate p53 activity by prevention of P300-induced p53 acetylation. We found that lincRNA-p21 can binding to MDM2 directly, which makes the MDM2 dissociation with p53, therefore, leads to p53 acetylation by P300, increases p53 activity. This finding is of significance, because after treatment with SiRNA against lincRNA-p21, the neointimal hyperplasma in vivo, therefore recombiant lentivirus vector expressing Si-RNA against lincRNA-p21 was injected into the injured area of mouse carotid arteries.

Discussion It is well-known that p53 plays an important role on the pathogenesis of AS. Both the quantity and transcriptional activity of p53 can be regulated by multiple ways, but the epigenetic modifications...
PHD2 silencing enhances the survival and paracrine function of transplanted adipose-derived stem cells in infarcted myocardium

Dezhong Yang, Liangpeng Li, Wei Wang, Yulan Peng, Caiyu Chen, Peng Chen, Xuewei Xia, Hongyong Wang, Ganfeng Xie, Haiyun Huang, Yanli Guo, Linda Ye, Dayue Darrel Duan, Xiongwen Chen, Steven R. Houser, Chunyu Zeng

1. Department of Cardiology, Daping Hospital, Third Military Medical University, Chongqing
2. Department of Oncology, Southwest Hospital, Third Military Medical University, Chongqing
3. Department of Ultrasonography, Southwest Hospital, Third Military Medical University
4. Department of Pharmacology, University of Nevada School of Medicine, Reno, NV 89557-0270, USA.
5. Cardiovascular Research Center, Temple University School of Medicine, Philadelphia, PA 19140, USA.

Rationale Transplantation of stem cells into damaged hearts has had modest success as a treatment for ischemic heart disease. One of the limitations is the poor stem cell survival in the diseased microenvironment. Prolyl hydroxylase domain protein 2 (PHD2) is a cellular oxygen sensor that regulates two key transcription factors involved in cell survival and inflammation, hypoxia-inducible factor (HIF) and nuclear factor-kB (NF-kB).

Objective We studied if and how PHD2 silencing in human adipose-derived stem cells (ADSCs) enhances their cardioprotective effects after transplantation into infarcted hearts.

Methods and Results ADSCs were transduced with lentiviral shPHD2 to silence PHD2. ADSCs with or without shPHD2 were transplanted after myocardial infarction (MI) in mice. ADSCs reduced cardiomyocyte apoptosis, fibrosis and infarct size and improved cardiac function. shPHD2-ADSCs exerted significantly more protection. PHD2 silencing induced greater ADSC survival, which was abolished by shHIF-1a. Conditioned medium (CM) from shPHD2-ADSCs decreased cardiomyocyte apoptosis. Insulin-like growth factor 1 (IGF-1) levels were significantly higher in the CM of shPHD2-ADSCs vs ADSCs, and depletion of IGF-1 attenuated the cardioprotective effects of shPHD2-ADSCs CM. NF-kB activation was induced by shPHD2 to induce IGF-1 secretion via binding to IGF-1 gene promoter.

Conclusion PHD2 silencing promotes ADSCs survival in MI hearts and enhances their paracrine function to protect cardiomyocytes. The pro-survival effect of shPHD2 on ADSCs is HIF-1α dependent and the enhanced paracrine function of shPHD2-ADSCs is associated with NF-kB-mediated IGF-1 up-regulation. PHD2 silencing in stem cells may be a novel strategy for enhancing the effectiveness of stem cell therapy after MI.

Background Recent studies have demonstrated that transplantation of adipose-derived stem cell (ADSC) can improve cardiac function in animal models of myocardial infarction (MI). However, the mechanisms underlying the beneficial effect are not fully understood. In this study, we characterized the paracrine effect of transplanted ADSC and investigated its relative importance vs direct differentiation in ADSC transplantation mediated cardiac repair.

Methodology/Principal Findings MI was experimentally induced in mice by ligation of the left anterior descending coronary artery. Either human ADSC, conditioned medium (CM) collected from the same amount of ADSC or control medium was injected into the peri-infarct region immediately after MI. Compared with the control group, both ADSC and ADSC-CM significantly reduced myocardial infarct size and improved cardiac function. The therapeutic efficacy of ADSC was moderately superior to ADSC-CM. ADSC-CM significantly reduced cardiomyocyte apoptosis in the infarct border zone, to a similar degree with ADSC treatment. ADSC enhanced angiogenesis in the infarct border zone, but to a stronger degree than that seen in the ADSC-CM treatment. ADSC was able to differentiate to endothelial cell and smooth muscle cell in post-MI heart; these ADSC-derived vascular cells amount to about 9% of the enhanced angiogenesis. No cardiomyocyte differentiated from ADSC was found.

Conclusion ADSC-CM is sufficient to improve cardiac function of infarcted hearts. The therapeutic function of ADSC transplantation is mainly induced by paracrine-mediated cardioprotection and angiogenesis, while ADSC differentiation contributes a minor benefit by being involved in angiogenesis.
Experiment of cellular repressor of E1A-stimulated genes (CREG) delivery via nanoporous Stent in a porcine coronary mode

Jie Deng, Ya-Ling Han, Cheng-Hui Yan, Jian Kang, Ming-Yu Sun
Department of Cardiology, Institute of Cardiovascular Research of People's Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background In this study we investigate the in vitro pharmacokinetic of nanoporous CREG eluting-stent (CREGES) and evaluate the efficacy and safety of nanoporous CREGES in inhibiting neointima proliferation in porcine coronary model.

Methods (1) The human 293F cells were transfected with pcDNA3.1 myc-His/hCREG using Lipofectamine 2000. (2) For the absorption of the CREG protein by the nanoporous stent, the stents were totally immersed and kept vertical in solution of CREG protein in a phosphate buffer. In vitro proliferation assays were performed using isolated endothelial and smooth-muscle-cells from to investigate the cellspecific pharmacokinetic effect of CREG protein and rapamycin. (3) The nanoporous bare metal stent (BMS), nanoporous CREGES and sirolimus-eluting stent (PARNTER) were implanted in left anterior descending coronary, left circumflex coronary and right coronary artery of forty porcines in random. And after 7, 14 and 28-day, animals were sacrificed for histomorphologic and pathologic score analysis.

Result The lysates of 293F cells transfected pcDNA3.1 myc-His/ hCREG plasmid were detected by Western blot with Anti-hCREG, Anti-myc and Anti-His respectively. The recombinant hCREG protein was purified with Ni-NTA column according to 6×His affinity chromatography theory. After the elution was concentrated with Centriprep centrifugal filter devices, the concentration of recombinant protein was determined to be 1.6 mg/mL by BCA assay. The purity of recombinant protein reached 92% identified with image-J software analysis. Stents eluting the CREG protein were tested for their adsorption characteristics by radioisotope technique with 125I-labeled CREG protein. The amount of CREG protein adsorbed onto the nanoporous bare metal stent was dependent on the concentration and duration of immersion in the solution. We had tested three different concentrations for 48 h. Maximal CREG protein binding was therefore defined as the amount of agent bound to stent wires after 48 hours immersion in a 1.5 mg/ml solution. We implant the CREG eluting stents and 316L stainless steel stents as the control in pig model, to study the bio-security validity of prevention ISR by sliding microtome, SEM, transmission electron microscope (TEM), immunohistochemistry, tissue stain and biochemistry Methods.

Conclusion The nanoporous CREGES represents a novel promising device in preventing in-stent restenosis by inhibiting the thrombosis and neointimal hyperplasia via accelerating the endothelialization of the stent surface and inhibiting the smooth muscle cell proliferation.

Rosuvastatin prevents contrast-induced nephropathy in diabetic nephropathy rats

Jie Deng, Yaling Han, Guijun Han, Chen Yang, Xiaozeng Wang
Department of Cardiology, Institute of Cardiovascular Research of People’s Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background The aim of the present study was to assess the effects of rosuvastatin on contrast-induced nephropathy (CIN) in diabetic nephropathy rats.

Methods Male SD rats, using a single intraperitoneal injection of streptozotocin (STZ) to create a diabetic nephropathy model. The model rats were randomly grouped into diabetic nephropathy group, contrast group and the rosuvastatin + contrast group, 10 in each group. Intravenous injection of iopromide (3500 u/kg) given 72 hours later, the line serum creatinine testing, to determine the CIN formation. The serum total cholesterol, triglycerides, creatinine, nitric oxide, interleukin-6, and tumor necrosis factor alpha levels were analyzed. Urine samples were taken to measure the albumin/urinary creatinine ratio. Kidneys were sectioned and stained with hematoxylin/eosin and Masson's trichrome. Immunohistochemical analysis of the renal tissue was performed to detect macrophage infiltration of the glomeruli.

Result The contrast group had a significantly reduced nitric oxide level and an increased interleukin-6 and tumor necrosis factor alpha level, albumin/urinary creatinine ratio and number of macrophages in the renal glomeruli. Rosuvastatin increased the nitric oxide level and reduced the interleukin-6 and tumor necrosis factor alpha levels, glomerular macrophage number and albumin/urinary creatinine ratio in the contrast + rosuvastatin group.

Conclusion Rosuvastatin treatment reduced glomerular damage due to improvement in the inlla mmatory pattern independent of serum lipid level. These effects may lead to improvements in the treatment of CIN.

Low density lipoprotein contained microRNAs as potential novel atherogenic factors

Chuanwei Li, Caiyu Chen, Fang Pei, Jing Cai, Faying Zhou, Hongyong Wang, Chunyu Zeng
Department of Cardiology, Daping Hospital, The Third Military Medical University; Chongqing, PR China

Objective Circulating microRNAs (miRNAs) are gaining more substantial research in recent years. They may serve as biomarker of certain diseases, and they are also biological active in disease progression. High density lipoprotein (HDL) was proved to be an novel endogenous circulating miRNA transporters. Low density lipoprotein (LDL) is similar to HDL in molecular structure, can also transport miRNAs in plasma. The aim of the study was to prove the existence of miRNAs in LDL, and reveal the changes in patients in coronary artery disease.

Methods Samples from 3 patients with coronary angiography diagnosed CAD and 3 healthy controls. LDL (1.019 – 1.063 g/ml) was isolated from the plasma by sequential ultracentrifugation, followed by desalting and dehydration by ultrafiltration. The LDL was then further purified by fast protein liquid chromatography. The expression of Ago2, NPM1 and CD63 in plasma and LDL were detected by western-blot
Methods. Total RNA was isolated from the highly purified LDL by mirVanaTM miRNA isolation kit. The miRNA expression profiles were analyzed by miRCURY TM LNA Array (v.18.0) chip.

Result Ultracentrifugation and FPLC can separate the LDL from other miRNA protein transporters. The apolipoprotein in highly purified LDL was apoB100, without any LDL components (apoAI). The miRNA chip revealed that LDL contains up to 280 miRNAs. LDL from CAD patients contains more miR-4778-5p than that from the healthies. Biological imformation studies reveal that the potential target genes of miR-4778-5p is ABCA1 and ABCG1. miR-4778-5p might regulate biological active in atherosclerosis.

Comparison of biomarkers of endothelial dysfunction and risk of early organ damage between primary aldosteronism and essential hypertension

Pinming Liu1, Gang Liu1, Shaoling Zhang2, Guoshu Yin3, Juying Tang4, Dujuan Ma5, Li Yan1, Jingfeng Wang6
1. Department of Cardiology, Sun Yat-sen Memorial Hospital, Sun Yat-sen University, Guangzhou 510120, China
2. Department of Endocrinology, Sun Yat-sen Memorial Hospital, Sun Yat-sen University, Guangzhou 510120, China

Objective To compare plasma concentrations of biomarkers of endothelial dysfunction between primary aldosteronism (PA) and essential hypertension (EH), and to determine whether elevated levels of these biomarkers predict development of early organ damage.

Methods Thirty-six cases with PA and 39 controls with EH individually matched for age, sex, blood pressure and duration of hypertension were assessed in this study. Plasma levels of biomarkers reflecting endothelial dysfunction (vWf, soluble intercellular adhesion molecule 1 (sICAM-1), and oxidized low density lipoprotein (ox-LDL)) were detected and compared between cases with PA and their matched controls. Left ventricular mass index (LVMI) [g/m²], 124.7 ± 33.6 vs 109.1 ± 25.7; 24 h proteinuria (UPQ) [g], 0.17 ± 0.10 vs 0.09 ± 0.04 and microalbuminuria was defined as UAER of between 20 µg/min and 200 µg/min.

Result The biomarkers of endothelial dysfunction (vWf and sICAM-1), as well as ox-LDL, LVMI, 24-hour urinary protein quantitation (24 h UPQ) and UAER, were significantly higher in PA cases than in EH controls (vWf [%], 122.3 ± 53.8 vs 113.1 ± 68.3; sICAM-1 [µg/ml], 401.0 ± 74.1 vs 300.9 ± 87.0; ox-LDL [µL], 13.6 ± 10.0 vs 8.1 ± 5.9; LVMI [g/m²], 124.7 ± 33.6 vs 109.1 ± 25.7; 24 h UPQ [g], 0.17 ± 0.10 vs 0.09 ± 0.04 and UAER [µg/min], 25.9 ± 7.7 vs 9.7 ± 5.9, all P values < 0.05). Elevated plasma vWf, sICAM-1 levels and plasma aldosterone concentration independently incident probable microalbuminuria in multiple regression models; whereas, elevated plasma vWf and ox-LDL levels, plasma aldosterone concentration and systolic blood pressure independently predicted left ventricular hypertrophy.

Conclusion Patients with PA have greater endothelial dysfunction reflected by multiple biomarkers and early organ damage than with EH, and plasma aldosterone concentration and multiple endothelial dysfunction biomarkers predict early organ damage independently.

Transcriptome analysis of chamber specific genes during heart development

Yisong Zhen
State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, Peoples Republic of China

Objective To curate ventricle and atrium specific genes in heart development and propose a statistics method to discriminate chamber genes.

Methods Microarray data was downloaded from public NCBI GEO database. Gene expression pattern was validated by extensive literature search. Data analysis was performed by using free software R and graphic was generated by local R scripts. Significant result was reported if P-value was lower than 0.05.

Result We confirmed the accuracy of microarray data from public database by its consistency with published result. We then curated a collection of chamber-derived genes by setting an empirical threshold and used these groups of genes to classify lineage (ventricle and atrium) specific cells.

Conclusion Cardiac regeneration is the holy grail of heart failure treatment. Embryonic stem cells (ESCs), induced pluripotent stem cells (iPSCs) and direct reprogramming of fibroblasts into cardiomyocytes are potential strategies in clinical practice to regenerate injured heart. However, the current problem is to assess the ability of those approaches to differentiate into chamber specific heart cells which include ventricle and atrial as well as pacemaker cardiomyocytes. Here, we proposed a statistic method to discriminate the ventricle and atrium lineage cells using combined gene expression pattern. In doing so, we first confirmed the accuracy of microarray data from public database by its consistency with published result. We then curated a collection of chamber-derived genes by setting an empirical threshold and used these groups of genes to classify lineage (ventricle and atrium) specific cells. Our result indicates that current protocol of directed differentiation of embryonic stem cells might generate atrium and ventricle enriched gene expression pattern. Therefore, we infer that we should take a cautious step to apply these Methods to clinical translation and evaluate the possibility of eliciting environmental “niche” to induce lineage transformation.

CFD analysis & PIV experimental Study on the flow in inlet & outlet cannulas of FW–2 ventricular assist pump

Guangmao Liu, Jianye Zhou, Shengshou Hu, Hansong Sun, Haibo Chen
State Key Laboratory of Cardiovascular Disease, Key Laboratory of Cardiovascular Regenerative Medicine, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

Objective To analyze and test the hydraulic characteristics of the blood flow in the inlet and outlet cannulas of FW–2 ventricular assist pump with the Methods of computational fluid mechanics (CFD) and particle image velocimetry (PIV). Then the blood compatibility of the inlet and outlet cannulas was evaluated.

Methods According to the feature and applicability of CFD and PIV Methods, we determined to calculate the flow fields in the inlet...
cannula with CFD Methods and test the flow fields in the outlet cannula with PIV Methods. The numerical model of inlet cannula was built by ANSYS software. The blood viscosity and density parameters were setup. The boundary conditions were set up as flow was 5 L/min and the outlet pressure was 0 MPa. Then the flow field was simulated. The risk of thrombogenesis was evaluated on the basis of the CFD Result of vortex and stagnant flow in the inlet cannula. The hemorhage characteristic was analyzed according to the distribution of shear stress in the inlet cannula. We tested the hydrodynamics characteristics in the central section of the assist pump outlet cannula on the two dimensional PIV system. And the hydrodynamics characteristics in the whole outlet cannula were tested. We selected the outlet section of the pump as the first test section and the last section was 20 mm far away from the first section. We tested ten sections totally. Then we analyzed the possibility of thrombogenesis in blood pump outflow cannula. The Result of the ten sections were arranged according to its spatial position to obtain the flow fields of the whole outlet cannula. The flow was set to 5 L/min in the testing. Finally we analyzed the possibility of thrombogenesis in outlet cannula according to the hydrodynamics characteristics of the outlet cannula.

**Result** The CFD Result displayed that the flow velocity in the inlet cannula was well-distributed and the maximum velocity was 1 m/s. There was no vortex or stagnant flow in the inlet cannula. The maximum shear stress was 40 Pa meanwhile the exposed time of the blood in the inlet cannula was less than 1 second. The PIV Result displayed that the flow velocity in the outlet cannula was well-distributed and mainly in the range of 1 m/s to 1.18 m/s. The maximum velocity was 1.4 m/s in the outlet cannula. The streamline displayed that there was no vortex flow in the outlet cannula. The blood velocity near the outlet cannula inner wall increased to the maximum rapidly outside the boundary layer so there was no flow stagnation. The 3D PIV Result displayed there was spiral flow near the cannula inner wall. The spiral flow disappeared away from the pump outlet 20 mm because it wears off along the outlet cannula.

**Conclusion** It is difficult to form thrombus in the FW-2 inlet cannula because there is no vortex or stagnant flow field in the inlet cannula. The well-distributed flow in the inlet cannula can improve the flow distribution in the assist pump and advance the biocompatibility of the pump. The influence of inlet cannula on hemorhages can be negligible because the red blood cells are unlikely be damaged by the shear stress in the inlet cannula. The blood is unlikely remain onto the inner wall of outlet cannula. The thrombus caused by low speed flow won’t happen. The diffuser of the assist prevents the eddy diffusion effectively. The outlet cannula. The thrombus caused by low speed flow won’t happen. The 3D PIV Result displayed that there was no flow stagnation. The 3D PIV Result displayed there was spiral flow near the cannula inner wall. The spiral flow disappeared away from the pump outlet 20 mm because it wears off along the outlet cannula.

Ghrelin protects human pulmonary artery endothelial cells against hypoxia–induced injury via PI3–Kinase/Akt

Dan Yang, Zhihong Liu, Hongjiang Zhang, Qin Luo
Center for pulmonary Vascular Disease, State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, Peoples Republic of China

**Objective** To investigate the effect of Ghr on the hypoxia-induced injury in human pulmonary artery endothelial cells (HPAECs) and on the involved transduction pathway.

**Methods** HPAECs were purchased from Cascade Biologics. HPAECs injury was induced by exposure of cells to hypoxia/serum-starving in a sealed GENbox hypoxic chamber. Effects were investigated by treating cells with varying concentrations of Ghr in the absence or presence of inhibitors that target phosphoinositide 3-kinase (PI3K), in normoxic or hypoxic conditions for 24 h. Cell viability was determined using a cell counting kit-8 assay. Apoptosis was detected using the Hoechst/PI and terminal deoxynucleotidyl transferase-mediated dUTP-biotin nick nick-end-labeling assays. The NO secreted by HPAECs was detected by nitric acid reduction method. Western blot analysis was used to examine the changes in the expression levels of endothelial nitric oxide synthase (eNOS), phospho-eNOS, phospho-Akt, Akt, m mammalian target of rapamycin (mTOR), phospho-mTOR, B-cell lymphoma-2 (Bcl-2), and Bcl-2 associated X protein (Bax).

**Result** Our Result indicated that the treatment with 10-7 mol/l 1 Ghr significantly enhanced cell viability (PP-7 mol/l) significantly increased NO secretion and eNOS phosphorylation in comparison with the hypoxia or normoxia alone group (P < 0.05, n = 4) Nevertheless, the treatment with LY294002 (20 µmol/l) decreased the Ghr-induced NO release as well as the eNOS activity.

**Conclusion** In conclusion, we have demonstrated that Ghr could promote HPAECs survival and improve its function under hypoxic condition. We also have shown that the Ghr strongly activated Akt and eNOS, and this potentially beneficial effect of the Ghr was at least partly mediated by the PI3K/Akt pathway in these cells. The bcl-2/bax ratio was also involved in the protective action of the Ghr in HPAECs.

Influence of genetic polymorphisms of uptake (OATP1B1) and efflux (BCRP/MRP2) transporters on the pharmacokinetics of rosuvastatin

Lei Tian, Juanjuan Jiang, Hong Liu, Lulu Han, Yiling Huang, Yishi Li
Key Laboratory of Clinical Trial Research in Cardiovascular Drugs, Ministry of Health, Fu Wai Hospital, PUMC & CAMS, Beijing, 100037

**Objective** The aim of the present study was to investigate the contribution of genetic polymorphisms of uptake (OATP1B1) and efflux (BCRP/MRP2) transporters on the pharmacokinetics of rosuvastatin in Chinese subjects, and provide molecular mechanism to the individual differences in drug disposition and response caused by membrane transporters.

**Methods** After genotyping screening, twenty four healthy Chinese subjects were enrolled in the following study groups: OATP1B1 521TT (n = 15) and 521TC+CC (n = 9), BCRP 421CC (n = 15) and 421CA+AA (n = 9), and MRP2-24CC (n = 13) and -24CT+TT (n = 11). Each subject was given multiple oral doses of rosuvastatin for 7 days. The plasma and urine concentrations of rosuvastatin were determined by LC-MS/MS. The pharmacokinetic parameters of rosuvastatin, including area under the plasma concentration-time curve (AUC), peak plasma concentration (Cmax), and terminal half-life (t1/2), were compared according to genotype groups.

**Result** After single oral dose of rosuvastatin, the AUC0-t, Cmax and percent of cumulative amount eliminated into the urine (Percent_excretion) were significantly higher in BCRP 421CA+AA group than those in the 421CC wild-type group (P = 0.030, 0.015 and 0.041, respectively), whereas there was no difference in the t1/2 and Tmax between these groups. In contrast, no significant differences were found between the two genotype groups in terms of AUCs, Cmax, total clearance and renal clearance values at steady state (P > 0.05), but a prolonged t1/2 was observed in 421CC wild-type group compared with that in 421CA+AA group (P = 0.035). In addition, the OATP 1B1 521T>C and MRP2 -24C>T variants were not associated with differences in the
pharmacokinetic parameters of rosuvastatin.

**Conclusion** The BCRP421C﹥A variant, rather than MRP2-24C﹥T and OATP 1B1 521T﹥C, is one of the determinant factors governing the interindividual variability in the pharmacokinetics of rosuvastatin.

**Tongxinluo dose-dependently decreases apoptosis of mesenchymal stem cells under hypoxia and serum deprivation via the MEK/ERK1/2 pathway**

Na Li, Hehe Cui, Qian Zhang, Chen Jin, Haiyan Qian, Hao Zhang, Yuejin Yang
State Key Laboratory of Cardiovascular Disease, FuWai Hospital, National Center for Cardiovascular Disease, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China

**Background** and Objective Mesenchymal stem cells (MSCs) are one of the optimal candidates for myocardial infarction. However, the survival ratio of implanted cells in the infarcted heart is low. Tongxinluo (TXL) is a traditional Chinese herbal medicine with multiple cardiovascular protective effects and has been widely used in China to treat patients with coronary heart disease. MEK/ERK pathway plays an important role in mediating cell survival. Therefore, we hypothesized that TXL could promote MSCs survival under hypoxia and serum deprivation (H/SD) via MEK/ERK pathway.

**Methods** MSCs from the Sprague-Dawley rats bone marrow (60 – 80 g, male) were pretreated with TXL (100 – 800 μg/ml) for 6 hours under H/SD. For inhibitor studies, the cells were preincubated with MEK1/2 inhibitor U0126 (10 μM) for 1 hour prior to the addition of TXL (800 μg/ml). Cell apoptosis was assessed using Annexin V/propidium iodine (PI) by flow cytometry, apoptosis related protein bax, cytochrome C and bcl-2 was assessed by western blot. The expression of ERK1/2 and phosphorylation of ERK1/2 were measured by western blot.

**Result** We found that cell apoptosis was significantly upregulated under H/SD conditions compared with the normal. TXL decreases the apoptosis level in a dose-dependent manner especially in the 800 mg/ml concentration, demonstrated by reduced apoptosis rate, decreased expression of pro-apoptotic protein bax and cytochrome C and increased expression of anti-apoptotic protein bcl-2. Further, TXL upregulated the phosphorylation of ERK1/2. And treatment with U0126 attenuated the protective role of TXL coupled with downregulated phosphorylation of ERK1/2.

**Conclusion** TXL protects MSCs from H/SD injury via MEK/ERK1/2 pathway. It provides a further explanation for the protective effects of TXL on MSCs survival.

**Increased plasma level of haptoglobin is associated with stable coronary heart disease**

Li Rong Yan, Hong Lin, Dongxue Wang, Xiaoyuan Guan, Hui Zhao, Xiaoxing Zhang, Yishi Li
Key Laboratory of Clinical Trial Research in Cardiovascular Drugs, Ministry of Health, FuWai Hospital, National Center for Cardiovascular Disease, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing 100037, China;

**Purpose** Haptoglobin (HP) is an acute phase protein and has been shown to play an anti-inflammatory role by binding free haemoglobin. The role and implication of HP in patients with stable coronary heart disease (CHD) are not completely defined. This study is to assess the plasma level of HP in patients with CHD and explore the relationship between the concentration of HP and the severity of CHD.

**Methods** Two hundred and fifty-five patients with CHD, defined as more than 50% stenosis in at least one main vessel by coronary angiography, were enrolled in the CDH group and 157 age and gender-matched subjects without CHD were selected as the control group. Patients with diabetes were all excluded. The severity of CHD was determined by the Gensini score and patients in the CHD group were divided into three sub-groups according to the score: less than 40, between 40 and 90, and more than 90. The plasma levels of HP were detected with an immunoturbidimetric method in all patients.

**Result** The plasma level of HP in the CHD group (n = 255) was significantly higher than that in the control group (n = 157) (98.6 ± 55.1 mg/dl vs 85.7 ± 43.6 mg/dl, P < 0.01). Plasma levels of HP were 95.7 ± 53.6 mg/dl, 97.1 ± 61.3 mg/dl, and 103.7 ± 53.6 mg/dl in each CHD sub-group with Gensini score less than 40, between 40 and 90, and more than 90, respectively, with no statistical difference of HP levels among the three sub-groups (P = 0.881). In addition, no liner correlation was observed between the plasma HP levels and Gensini scores (r = 0.014, P = 0.868).

**Conclusion** The plasma level of HP is significantly higher in the patients with CHD and might associated with CHD, but not in accordance with the severity of CHD assessed using the Gensini score. The mechanism, accounting for the association, is worth to discuss.

**Salt induces endothelial cell dysfunction by activating oxidative stress and p38 MAPK pathway**

Yuyue Zhang, Yaling Han, Xin Zhao, Chenghui Yan, Shaowei Liu
Department of Cardiology, Institute of Cardiovascular Research of People’s Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

**Background** Dietary salt plays a major role in the regulation of blood pressure. However, the mechanisms underlying endothelial cell dysfunction induced by sodium have not yet been completely elucidated.

**Methods** SD rats were randomly divided into high salt group (n = 10, 1.5% NaCl in drinking water) and control group (n = 10, no NaCl in drinking water). Systemic blood pressure (SBP) was measured weekly by the tail-cuff method. Blood samples were collected at 8 and 12 weeks for later analysis. Human coronary artery endothelial cells were firstly cultured in medium containing aldosterone at physiological concentration (0.45 nmol/L) for 3 days. Secondly sodium at different concentrations, i.e. 125, 135, 145, 155, 165 mmol/L, was applied to these cells for 3 hours. For mechanical study, SB203580 and tempol were used for 1 hour prior to NaCl stimulation. Cells and supernatant were collected after NaCl stimulation for later analysis. F-actin of endothelial cells was observed to NaCl stimulation. Cells and supernatant were collected after NaCl stimulation for later analysis. F-actin of endothelial cells was observed to NaCl stimulation. Cells and supernatant were collected after NaCl stimulation for later analysis. F-actin of endothelial cells was observed to NaCl stimulation. Cells and supernatant were collected after NaCl stimulation for later analysis.

**Purpose** Haptoglobin (HP) is an acute phase protein and has been shown to play an anti-inflammatory role by binding free haemoglobin.
unaffected by acute changes under sodium concentration ≤ 135 mmol/L but rose steeply under sodium concentration ≥ 145 mmol/L. NO generation and expression of eNOS were found down-regulated, but ONOO− generation, the expression of gp91, p-P38 and p-HSP27 were found up-regulated in endothelial cells cultured in sodium concentration ≥ 145 mmol/L. Tempol and SB203580 markedly inhibited NaCl-induced alterations in endothelial actin reorganization and activation of p38 MAPK. Tempol markedly inhibited NaCl-induced alterations in the generation of NO, ONOO−, the expression of eNOS and gp91, but SB203580 did not prevent these responses.

**Conclusion** The Result suggest that salt may induce endothelial cell dysfunction and thus control vascular tone by activating oxidative stress and p38 MAPK.

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**Transplantation of cellular repressor of E1A–stimulated gene modified embryonic stem cells improves heart function post–myocardial infarction through blocking MAPK–ERK1/2 pathway**

Jian Zhang, Xiaoxiang Tian, Chenghui Yan, Xiaolin Zhang, Jian Kang, Yaling Han

Department of Cardiology, Institute of Cardiovascular Research of People’s Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

**Background** Cellular repressor of E1A-stimulated genes (CREG) is a mannose-6-phosphate-containing secreted glycoprotein of 220 amino acids. It has been proposed that CREG acts as a ligand that enhances differentiation and/or reduces cell proliferation. In humans, the potential therapeutic role of embryonic stem cells (ESCs) in ischemic heart disease is subject to intense investigation. Particularly, the contribution of ESCs to angiogenesis and cardiomyogenesis in myocardial ischemia is not well established. In our studies, we induced myocardial infarct (MI) in mouse model, and monitored the effects of CREG modified ESCs transplantation on cardiac function.

**Methods** pCXN2-Flag-wtCREG, pCXN2-Flag-mutCREG and pCXN2-Flag-EGFP plasmids were transfected into ESCs by lipofectamine 2000. Myocardial infarction was induced by coronary artery ligation in seven- to nine-week-old mice. A total of 2×10⁵ ESC over-expressing wild type CREG (wtCREG), glycosylation mutant CREG (mutCREG) and EGFP or 20 μl PBS were injected into the peri-infarct area. Four groups of mice were analyzed for hemodynamic and pathologic parameters 1 and 2 months after MI and injection. Heart functions were assessed by small animal ultrasound system. Left ventricular pressure was measured by catheterization through right carotid artery. Fibrosis and collagen synthesis were assessed by Masson staining. Apoptosis was determined by TUNEL assay. Protein possibly involved in signaling pathway was detected by Western Blot.

**Result** wtCREG and mutCREG-ESCs significantly improved murine cardiac function after MI, as compared with EGFP-ESCs or PBS. The beneficial effect of wtCREG and mutCREG-ESCs may mostly be ascribed to their notable resistance to apoptosis and fibrosis, and to their anti-inflammatory action, since cardiomyogenesis was limited. These beneficial effects were associated with attenuation of the mitogen-activated protein kinase (MAPK)-extracellular signal-regulated kinase 1 (MAPK-ERK1/2)/dependent signaling cascade. In addition, CREG expression attenuated fibrosis and collagen synthesis through blocking MAPK-ERK1/2-dependent Smad2/3 activation in vivo.

**Conclusion** Therefore, the expression of CREG improves cardiac functions and inhibits inflammation and fibrosis through blocking MAPK-ERK1/2-dependent signalling.

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**Effect of apelin on the cardiac hemodynamics in hypertensive rats with heart failure**

Hui Pang, Peiyi Zhang, Jun Liang, Xianchi Li, Zhen Peng

Central Hospital of Xuzhou, Xuzhou 221000, China

**Background** Apelin has definite protective effects on various cardiovascular diseases, but the mechanism of how hypertension with heart failure (H-HF) is influenced by pyroglutamylated apelin-13 (Pyr-AP13) remains unclear.

**Methods** Male SD rats (200 – 220 g) were divided into five groups: (i) sham group (n = 8), (ii) H-HF group (n = 8), (iii) H-HF group, infusion of 0.1 mg Pyr-AP13 or 5%GS (n = 8), (iv) H-HF group, infusion of 1 mg Pyr-AP13 or 5%GS (n = 8), (v) H-HF group, infusion of 10 mg Pyr-AP13 or 5%GS (n = 8). Histological determination of the fibrosis was performed using hematoxylin eosin or Masson’s trichrome staining. The concentration of cyclic adenosine 3’, 5’-monophosphate (cAMP) was determined using ELISA method.

**Result** The expression of membrane and cytosol proteins was evaluated with Western blot analysis. Significant cardiac and perivascular fibrosis was observed in the H-HF group. After infusion of Pyr-AP13, the systolic and diastolic function was significantly improved in cardiac hemodynamic parameters in H-HF group. Apelin receptor (APJ) activated by exogenous infusion of Pyr-AP13, partially recycled from cytoplasm back to the plasma membrane, but membrane APJ was eventually down-regulated in H-HF rats than the sham rats.

**Conclusion** Our findings suggested that a complex was formed after Pyr-AP13 combined with cellular membrane APJ receptor, which may activate the phosphorylation of extracellular signal-regulated kinase 1/2 (P-ERK1/2) regulated by cAMP. However, endogenous down-regulation of APJ receptor Result in benefits from the exogenous administration of apelin reduction.

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**Molecular genetics and clinical features of Chinese IPAH and HPAH patients**

Dong Liu, Qianqian Liu, Melanie Eyries, Wenhui Wu, Ping Yuan, Rui Zhang, Florent Soublier, Zhicheng Jing, Jingmin Liu

Department of Cardio-Pulmonary Circulation, Shanghai Pulmonary Hospital, Tongji University, School of Medicine

**Objective** To improve knowledge of the genetic origin of PAH in Chinese patients with the disorder.

**Methods** We investigated 15 unrelated families with PAH and 290 sporadic PAH patients for BMPR2 mutations. Direct sequencing to detect mutations in coding regions and flanking splice sites, in addition to analysis of exon dosage across the entire gene using multiplex ligation-dependent probe amplification (MLPA®) showed a wide BMPR2 mutation spectrum in Chinese patients with PAH.

**Result** Our study reports an extensive molecular investigation of the BMPR2 gene in Chinese patients with PAH. The overall genetics of PAH in Chinese patients was similar to that of other populations already explored for this disease, although few characteristics were noteworthy. We found polymorphisms of the BMPR2 gene which are important to know in the context of genetic investigation of the disease in Chinese patients. The predisposing effect of the BMPR2 gene was similar to that
of other populations, and the younger age at diagnosis suggests that the BMPR2 mutation constitutes the first hit that increases the probability of an early onset of the disease.

**Conclusion** Our study provides an extensive investigation of the genetic etiology of Chinese heritable and idiopathic PAH which gives insight into the variety of BMPR2 mutations among different ethnic groups.

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**Oestriadiol ameliorates monocrotaline pulmonary hypertension via NO, PGI2 and ET–1 pathways**

Ping Yuan, Wenhui Wu, Lan Gao, Zeqi Zheng, Dong Liu, Hanying Mei, Zhuoli Zhang, Zhicheng Jing, Jingmin Liu

Department of Cardio-Pulmonary Circulation, Shanghai Pulmonary Hospital, Tongji University School of Medicine

**Objective** Pulmonary hypertension (PH) continues to be a serious clinical problem with high mortality. As oestrogen is a potential vasodilator of the pulmonary circulation, this study examined the mechanisms by which 17β-oestradiol improves monocrotaline (MCT)-induced PH.

**Methods** Female Sprague-Dawley rats underwent bilateral ovariectomy or sham operations. The rats received MCT (50 mg/kg) and were treated with 17β-oestradiol (1 mg/kg/day) for 5 weeks or only from Week 4 to Week 5. Plasma 17β-oestradiol concentrations were decreased in sham-operated, MCT-treated rats compared with sham-operated rats (17.7 ± 4.7 vs 50.3 ± 15.4 pg/mL; P = 0.029). The 17β-oestradiol anabolic enzyme cytochrome P450 (CYP) 19 was decreased by MCT treatment, while the catabolic enzymes CYP 1A1 and 1B1 were increased.

**Result** Ovariectomized and MCT-treated rats had more severe PH. 17β-oestradiol suppressed pulmonary arterial smooth muscle cell proliferation and macrophage infiltration, and enhanced apoptosis by increasing nitric oxide and prostacyclin levels and reducing endothelin-1 levels. PI3K and Akt phosphorylations were markedly increased but were inhibited by 17β-oestradiol treatment in PH rats.

**Conclusion** Oestrogen deficiency may aggravate development of PH. 17β-oestradiol improved PH via activation of the PI3K/Akt pathway to regulate nitric oxide, prostacyclin and endothelin-1 expression.

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**MicroRNA–31 regulate phenotypic modulation of human vascular smooth muscle cell via its target gene CREG**

Jie Wang

1. Department of Cardiology, Institute of Cardiovascular Research of People’s Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China
2. Xijing Hospital, Fourth Military Medical University, Xi’an, China

**Background** Cellular repressor of E1A-stimulated genes (CREG) plays an important role in phenotypic modulation of Vs MCs, but the mechanism of its upstream signaling regulation is not clear. Recently, microRNAs (miRNA) have been found to play a critical role in cell differentiation and proliferation, suggesting that miRNA may be an upstream regulator of CREG. Thus, we aimed to investigate which miRNA bind to CREG directly and involved in CREG-mediated effect on Vs MCs phenotypic modulation.

**Methods** Human Vs MCs were stimulated by platelet derived growth factor (PDGF) and serum starvation to establish phenotypic modulation model. Expression of CREG and Vs MC differentiation marker genes in different phenotypic Vs MCs were determined by Western blot. Computational analysis has suggested that miR-31 is able to bind to CREG mRNA 3′-UTR. To find the miRNA which has a negative relationship with CREG, CREG and miR-31 expressions were determined by qRT-PCR in Vs MCs with different phenotype. To overexpress and knockdown miRNA expression, miRNA mimic and inhibitor were used. SM α-actin and CREG expressions were analyzed by Western blot and qRT-PCR. To identify miR-31 can bind to CREG directly, luciferase expression of a firefly luciferase reporter construct containing CREG mRNA 3′-UTR was measured by using a dual luciferase reporter system. At last, CREG was knocked down by its shRNA in Vs MCs and miRNA inhibitor was transfected into CREG deficient cells, SM α-actin expression were determined by Western blot.

**Result** In cultured Vs MCs, Vs MC differentiation marker genes and CREG expressions were downregulated in differentiated Vs MCs and upregulated in proliferative cells. As expected, miR-31 and CREG have a negative relationship at protein and mRNA level in Vs MCs with different phenotype. Furthermore, gain-of-function and loss-of-function showed that SM α-actin and CREG expressions are suppressed by miR-31 mimic and are increased by miR-31 inhibitor in vitro. More importantly, miR-31 mimic decreased luciferase expression driven by the construct of CREG mRNA 3′-UTR in HEK293 cells, confirming CREG is a direct target of miR-31. Finally, knockdown of CREG in Vs MCs, the effect of miR-31 inhibitor on SM α-actin expression is decreased.

**Conclusion** We conclude that miR-31 directly binds to CREG and modulate Vs MC phenotype through its target gene CREG, and miR-31 can act as a more efficient biomarker of vascular diseases with pathological lesion based on Vs MC phenotypic modulation.

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**CREG promotes vasculogenesis of embryonic stem cells by activating PI3K/Akt/VEGF pathway**

Xiaoxiang Tian, Na Zhang, Jian Kang, Jian Zhang, Chengfei Peng, Chenghui Yan, Yaling Han

Department of Cardiology, Institute of Cardiovascular Research of People’s Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

**Background** Vasculogenesis plays an important role under both physiological and pathological conditions. Factors controlling vasculogenesis is still far to be fully elucidated. Cellular repressor of E1A activating gene (CREG) has been reported to be highly expressed in endothelium and prevent injured endothelial cells from apoptosis, suggesting its potential role in regulating vasculogenesis. The aim of this study was to investigate the role and mechanism of CREG in regulating vasculogenesis of embryonic (ES) stem cells.

**Methods** CREG over-expression (wtCREG) and knock-down (shCREG) ES cell lines were established by transfection of wild type ES cell R1 (wtR1) with pCXN2-Flag-CREG-IRE-EGFP and mouse CREG shRNA vectors respectively, using ES cells expressing EGFP as a control (ctlR1). We first detected CREG expression during wtR1 and ctlR1 differentiation by Western Blot. Then embryoid bodies (EB) derived from 4 groups of ES cells were plated on fibronectin coated cover slips and cultured for 10 days to make an in vitro vasculogenesis model. Endothelial network formation was detected by CD31
immunofluorescence. Transcription of CD31, VEGFR2 and VEGF were measured by real-time polymerase chain reaction (RT-PCR). Protein involved in several signaling pathways, including JNK, ERK1/2, PI3K/Akt and VEGFR2, VEGF were detected by Western Blot. PI3K/Akt inhibitor and VEGF neutralizing antibody were used for blocking study in wtCREG group. VEGF were supplemented for rescue study in shCREG group.

Result Expression of CREG increased with differentiation of ES cells in control group (wtR1 and ctrlR1). wtCREG had significantly higher density of endothelial network formation identified by CD31 immunofluorescence in contrast to shCREG, which barely had endothelial network formation. RT-PCR also showed that transcription level of CD31, VEGFR2 and VEGF are up-regulated in wtCREG and down-regulated in shCREG. Western blot showed no difference in JNK, ERK1/2, but significant change of PI3K/Akt, VEGFR2, VEGF parallel to CREG expression in 4 groups. Blocking assay showed that PI3K/Akt inhibitor wortmannin and VEGF neutralizing antibody could effectively eliminate the CREG induced vasculogenesis, and VEGF could successfully rescue failed vasculogenesis due to CREG gene silence.

Conclusion CREG promotes vasculogenesis of ES cells by activating PI3K/Akt/VEGF pathway.

Cellular repressor of E1A–stimulated genes accelerates endothelial angiogenesis via integrin–linked kinase–PINCH–Cdc42 activation

Jie Tao, Chenghui Yan, Huimin Zhang, Xiaoqiang Tian, Yang Li, Jian Zhang, Mingyu Sun, Shaohua Li, Yaling Han
Department of Cardiology, Institute of Cardiovascular Research of People’s Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background Cellular repressor of E1A-stimulated genes (CREG) is an important endothelial-protective gene, which is reported to modulate the mobility of endothelial cells. The study aimed to investigate the effects of CREG on endothelial angiogenesis.

Methods Aortic expression of CREG protein was detected by western blot and immunostaining in CREG heterozygous (CREG+/−) mice and wild-type littermates 14 days after hind limb arterial ligation (78.23 ± 7.62% vs 12.15 ± 2.058% in calf; 58.23 ± 6.5% vs 32.15 ± 3.514% in thigh; P < 0.001). Subsequently, overexpression of CREG in HUVEC increased endothelial cell network formation in vitro, enhanced neovascularization and improved limb perfusion in vivo, accompanied by filopodium formation and changes in cell shape. Mechanismly, integrin-linked kinase (ILK), a key adhesion plaque protein, participated in CREG-mediated endothelial angiogenesis. Furthermore, studies using small interfering RNA identified p-Cdc42 to be a key downstream molecule of ILK involved in CREG-mediated endothelial cell filopodium formation. Transfection with binding-site-mutant plasmids of ILK and co-immunoprecipitation revealed that CREG activated the ILK-PINCH complex, which is involved in the regulation of p-Cdc42 activation.

Conclusion CREG overexpression stimulates the endothelial filopodium formation and regulates angiogenesis via the ILK/PINCH/p-Cdc42 signaling pathway, which provides the basis for future studies in the field of angiogenesis.

Overexpressing Cellular repressor of E1A–stimulated genes promote hypoxia–induced VEGF paracrine via HIF–1α in mesenchymal stem cells

Chengfei Peng, Yaling Han, Xiaoqiang Tian, Jie Deng, Chenghui Yan, Ji Wang
1. Xijing Hospital, Fourth Military Medical University, 710032, Xi’an, China
2. Department of Cardiology, Institute of Cardiovascular Research of People’s Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background Hypoxia inducible factor-1α (HIF-1α) is the key transcription regulator for multiple angiogenic factors, including vascular endothelial growth factor (VEGF). Cellular repressor of E1A-stimulated genes (CREG) has also been identified a potent promoter of angiogenesis. However, the mechanisms by which CREG promotes angiogenesis are not fully understood. Here, we show that CREG is an effective stimulator of HIF-1α under hypoxia in bone marrow-derived mesenchymal stem cells (BMSCs).

Methods All experiments were performed on rat BMSCs. The level of VEGF was measured by ELISA. The HIF-1α mRNA was analyzed by RT-PCR. The level of HIF-1α protein and the mechanisms mediating these proangiogenic effects were determined by Western blotting.

Result We found that VEGF release from BMSCs was significantly increased in parallel with high level of HIF-1α in BMSCs following anoxia or hypoxia in time-dependent manner. Furthermore, the level of VEGF released from BMSCs overexpressing CREG and the expression of HIF-1α in BMSCs overexpressing CREG were higher than the normal BMSCs under hypoxia. Rather, HIF-1α steady-state mRNA was also affected by CREG. This effect was associated with constitutive activation of phosphatidylinositol 3-kinase (PI3K)/Akt and its effector p70 S6 kinase (P70S6K), but not extracellular-signal regulated kinase 1/2. The use of small molecule inhibitors LY294002 or rapamycin to inhibit PI3K/Akt and p70S6 kinase (P70S6K), but not extracellular-signal regulated kinase 1/2. The use of small molecule inhibitors LY294002 or rapamycin to inhibit PI3K/Akt and p70S6K activities, respectively, resulted in diminished HIF-1α activation and subsequent VEGF expression. RNA interference-mediated knockdown of HIF-1α suppressed CREG-induced VEGF synthesis and angiogenic tube formation, confirming that the effect was HIF-1α specific.

Conclusion Overexpressing CREG promote hypoxia-induced VEGF paracrine via HIF-1α in mesenchymal stem cells. Therefore, CREG could play a major role in angiogenesis and vascular remodeling.
Relationship between paraoxonase 1 (PON1) gene polymorphisms, haplotypes, concentration, activity and immunohistochemical analysis with coronary artery disease risk in Chinese Han population

Tengfei Liu, Xiaolin Zhang, Wenzhi Cai, Chenghui Yan, Jian Zhang, Ying Sun, Yaling Han
Department of Cardiology, Institute of Cardiovascular Research of People's Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background Paraoxonase 1 (PON1) is a high-density lipoprotein (HDL)-associated enzyme capable of inhibiting the progression of atherosclerosis, thus preventing the development of coronary artery disease (CAD). The polymorphisms of PON1 gene are known to affect the PON1 concentration and activity, thereby affect the CAD risk. As to its crucial role in preventing of CAD, we determined PON1 polymorphisms and haplotypes, concentration and activity, in addition to the immunohistochemical analysis of PON1 in this population and correlated them with CAD.

Methods A total of 864 controls and 792 patients with CAD confirmed by angiography (≥ 70% stenosis) were recruited in Shenyang Northern Hospital. The concentration of PON1 was measured with Human PON1 Elisa Kit. PON1 activity towards phenylacetate was determined by spectrophotometrically at 270 nm. In addition, genotypes were determined by polymerase chain reaction (PCR). The genotypes and haplotypes were determined by SHEsis and SNPStats softwares respectively. PON1 expression in coronary and carotid arteries was detected by immunohistochemical analysis.

Result Among all studied polymorphisms, only Q192R (rs662) had significant effect on the risk of CAD (Q192R, P < 0.001). In a logistic regression model, after adjustment for the conventional risk factors for CAD, QR and RR genotypes of Q192R had significantly higher CAD risk. Haplotypes Q-L-T-C-G (OR: 0.511, 95% CI: 0.401 – 0.651) was also significantly associated with CAD. Both serum PON1 concentration and activity reduced significantly in CAD patients as compared to the controls (P < 0.001). Immunohistochemical analysis showed that during the atherosclerosis of coronary artery, smooth muscle cell staining for PON1 was greatly reduced as compared to the controls, so did in the external carotid artery.

Conclusion The coding Q192R polymorphism and Q-L-T-C-G haplotype are all independently associated with CAD. Serum PON1 concentration and activity were lower in CAD patients than the controls. Additional with the evidence of immunohistochemical analysis, our data add support to the point that PON1 is a strong factor in predicting the risk of CAD.

No association between PON1 gene single nucleotide polymorphisms and clopidogrel resistance in Chinese Han population

Tengfei Liu, Xiaolin Zhang, Wenzhi Cai, Chenghui Yan, Jian Zhang, Ying Sun, Yaling Han
Department of Cardiology, Institute of Cardiovascular Research of People's Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background Clopidogrel requires bioactivation in vivo to convert the pro-drug into its active metabolite to show its antiplatelet effects. The variability in the clinical response to clopidogrel treatment has been attributed to genetic factors, but the specific genes and mechanisms underlying clopidogrel bioactivation remain unclear. Recent studies report that Paraoxonase-1 (PON1) as a key enzyme play vital part in clopidogrel bioactivation. The aim of our study was to assess whether PON1 gene polymorphisms are correlation with clopidogrel resistance (CR) in patients receiving clopidogrel after percutaneous coronary intervention (PCI).

Methods A total of 850 patients undergoing PCI were enrolled in this study, according to clopidogrel response which was assessed by post-treatment 20 μmol/L ADP-induced platelet aggregation ratio (PRA), RPA (RPA ≥ 70%) was defined as clopidogrel resistance (CR). We genotyped five SNPs of PON1 gene, the coding polymorphisms Q192R (rs662) and L55M (rs854560), the promoter polymorphisms -108C/T (rs705379), -162A/G (rs705381) and -909G/C (rs854572) variants by using polymerase chain reaction (PCR). In addition, activity level of PON1 towards phenylacetate was measured by spectro-photometrically at 270 nm. The SPSS 21.0 software was used to analyze all the included data.

Result The genotype frequencies of all studied SNPs were well to the Hardy-Weinberg equilibrium in both CR group and NCR group. Between the two groups, the five SNPs have the similar genotype and allele frequency (Q192R, P = 0.325 and 0.421; L55M, 0.806 and 0.499; rs705379, P = 0.426 and 0.263; rs705381, P = 0.513 and 0.484; rs854572, P = 0.482 and 0.798 respectively). The serum PON1 activity was lower in CR as compared to the NCR group, but not statistically significant (P = 0.554). In the two groups, we did not observed any significant difference in PON1 gene polymorphisms and PON1 activity.

Conclusion This study demonstrates that neither PON1 gene polymorphisms nor PON1 activity are associated with CR in patients receiving clopidogrel after PCI.

Association between polymorphism in the chemokine CCL21 gene rs10972201 and coronary artery disease in Chinese Han population

Wenzhi Cai, Xiaolin Zhang, Xueyao Feng, Jing Bai, Tengfei Liu, Yaling Han
Department of Cardiology, Institute of Cardiovascular Research of People’s Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background Atherosclerosis is an inflammatory disease characterized by the formation of atherosclerotic plaques. Homeostatic chemokine CCL21 was up-regulated within the atherosclerotic lesions, which could potentially contribute to atherosclerosis and plaque destabilization with subsequent thrombus formation and development of acute ischemic events. Although CCL21 expression may be genetically determined, the relationship between CCL21 polymorphisms and the risk of coronary artery disease (CAD) is unclear. The aim of this study was to investigate the relationship between the polymorphism of CCL21 rs10972201 and the CAD in a Chinese Han population.

Methods Matched case-control study was conducted between January 2010 to September 2011 among 282 patients with CAD and 258 hospitalized controls. All the subjects had undergone coronary angiography, and inclusion criteria for CAD were ≥ 50% narrowing of the lumen of at least 1 of the major coronary arteries by coronary angiography. Additionally, angiographic severity of disease was
defined as 0-, 1-, 2- or 3-vessel disease based on the number of luminal narrowing ≥ 50% in the three major coronary arteries. The control subjects were selected from the subjects admitted to the hospital for the evaluation of chest pain, whose major coronary artery had no stenosis, and did not have any vascular disease. The groups were matched for age, sex, body mass index, smoking, hypertension, hypercholesterolemia, and diabetes. Polymorphic genotypes were determined by polymerase chain reaction and sequencing analysis.

**Result** The genotype frequencies of GG, AG and AA in CCL21 rs10972201 polymorphism were 83.33%, 15.96%, 0.71% in CAD group, 84.49%, 15.12%, 0.39% in the control respectively. The A allele frequency of CCL21 rs10972201 polymorphism allele in CAD cases and controls were 8.69% and 7.95% respectively. No significant differences in the genotype or allele frequencies were revealed between the two groups (P = 0.864 and 0.659, respectively). Further stratification analysis between the polymorphism of CCL21 rs10972201 and angiographic severity of CAD also yielded negative Result (P > 0.05).

**Conclusion** This study indicates that the CCL21 rs10972201 polymorphism is unlikely to be a major contributor to the pathogenesis of CAD.

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**Combination of danhong injection and adipose-derived stem cells transplantation promote angiogenesis in ischemic hind limb of diabetic nude mice through a endogenous hydrogen sulfide dependent mechanism**

Feng Wu, Zhiqing He, Ruizhen Ji, Xin Wang, Chun Liang, Zonggui Wu
Department of Cardiology, Changzheng Hospital, Second Military Medical University, Shanghai 200003, China.

**Objective** To investigate the efficacy of Danhong injection (DH) combined with Adipose tissue-derived stem cells (ADSCs) transplantation on angiogenesis in diabetic hind limb ischemia model and the related molecular mechanism.

**Methods** Male nude mice were induced to diabetes by injection of streptozotocin intraperitoneal. Diabetes modeling success was identified by random blood glucose levels higher than 16 mmol/L twice. After 2 weeks, hind limb ischemia model was established by ligation and excision of femoral artery. Forty 8-week-old nude mice were randomly divided into four groups: group I (n = 10): diabetic hind limb ischemia model, group II (n = 10): ADSCs (1×10⁶ cells, i.m.) transplantation, group III (n = 10): DH (2 μL/g× 7 days) i.p., group IV (n = 10): combination of DH and ADSCs transplantation. After 2 weeks, perfusions, vessel regeneration, and local VEGF expression of lower limbs among different groups were evaluated with LDPI, X-ray arterography, real-time PCR and ELISA respectively. And microvascular densities of lower limb muscle were investigated by immunocytochemical staining of CD31. The expression of cystathionine beta synthase (CBS), cystathionine γ-mama lyase (CSE), 3-mercaptopropionate sulffurtransferase (3-MST), which are three major sources for endogenous enzymatic production of hydrogen sulfide (H₂S), were measured by western blot. Hydrogen sulfide tissue concentration in mice ischemic muscles was measured by pre-column derivatization with monobromobimane (mBrB) and the corresponding reversed-phase high performance liquid chromatography (RP-HPLC)- fluorescence quantitation method.

**Result** Only ADSCs transplantation or DH ip could significantly increase perfusion, promote the formation of collateral circulation, and enhance local VEGF, CBS/CES/3-MST and H₂S expression after 2-week intervention compared with control group, without decreasing blood glucose and increasing serum H₂S and VEGF. And meanwhile capillary density of the ischemic hind limb showed similar trend by CD31 staining. While combination of DH and ADSCs transplantation could increase the protective affects further vs DH ip or ADSCs transplantation alone.

**Conclusion** ADSCs transplantation or DH ip alone could improve ischemia perfusion and vascular tube-like generation in diabetic hind limb models through endogenous hydrogen sulfide actions. And, combination of DH ip and ADSCs transplantation could exert more protective effects. Which might be a novel therapy strategy against diabetic hind limb ischemia.

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Advanced Glycation End Products induces apoptosis and shortens telomere length in human adipose tissue–derived stem cells through modulation of MAPK pathways

Feng Wu, Zhiqing He, Ruizhen Ji, Xin Wang, Chun Liang, Zonggui Wu
Department of Cardiology, Changzheng Hospital, Second Military Medical University, Shanghai 200003, China.

**Objective** To investigate the effects of advanced glycation end products (AGEs) on apoptosis and telomere length of human adipose tissue-derived stem cells (ADSCs) and the related molecular mechanism.

**Methods** ADSCs were obtained by combination with enzymatically digestion and centrifugation, and then were identified to observe cultured cells' morphology, induce differentiation towards adipocytes, osteocytes and chondrocytes, and determine by fluorescence activated cell sorter (FACS) analysis. The cells were exposed to AGE-HSA (concentration of 0, HSA 200, 10, 50, 100, 200 μg/ml) for 24 h. The apoptotic rates were investigated by Annexin V-FITC Apoptosis Detection Kit and Caspase-Glo™ 3/7 Assay. Telomere lengths were measured by quantitative PCR. The expression of RAGE, p-EPK1/2, p-p38 MAPK, p-JNK1/2 and caspase-3 was determined by western blot. Then the cells were preincubated with ERK, p38 and caspase-3 inhibitors before the stimuli, the apoptosis and telomere length of ADSCs were evaluated once more. And microvascular densities of lower limbs among different groups were evaluated with LDPI, X-ray arterography, real-time PCR and ELISA respectively.

**Result** Compared with the 200 μg/ml HSA group, AGE-HSA (50, 100, 200 μg/ml) could significantly inhibit the apoptosis, short telomere length, decrease phosphorylation-ERK1/2 (P-ERK1/2), and increase p-p38MAPK, but do not affect expressions of p-JNK1/2 in ADSCs. Moreover, treatment of ADSCs with 100 μg/ml AGE-HSA resulted in activation of caspase-3. Furthermore, PD98059 (ERK1/2 inhibitor) significantly enhanced AGE-HSA induced apoptosis and shortened telomere length in ADSCs, whereas caspase-3 inhibitor or SB203580 (P-p38MAPK inhibitor), decreased apoptosis and longer telomere length in ADSCs.

**Conclusion** AGE-HSA could promote the apoptosis and shortened telomere length in ADSCs via of activation of RAGE-MAPK-Caspase3 pathway. These findings partly revealed a novel mechanism about telomere length participating in the dysfunction of ADSCs induced by AGE-HSA.
Effects of advanced glycation end products on function and angiogenesis of adipose tissue–derived stem cells and protective effects of Danhong injection

Feng Wu, Zhiqiang He, Ruizhen Ji, Xin Wang, Chun Liang, Zongguo Wu
Department of Cardiology, Changzheng Hospital, Second Military Medical University, Shanghai 200003, China.

Objective To investigate the effects of Nε- (carboxymethyl) Lysine albumin (CMLs), a primary advanced glycation end products isofom in diabetic body, on function and angiogenesis of adipose tissue-derived stem cells (ADSCs) and protective effects of Danhong injection.

Methods ADSCs were obtained by combination with enzymatically digestion and centrifugation, and then were identified to observe cultured cells' morphology and induce differentiation towards adipocytes, osteocytes and chondrocytes. The cells were exposed to 5 different interventions respectively for 24 h, including PBS, 60 μg/ml BSA, 60 μg/ml CML-BSA, 0.5 μl/ml DH and 60 μg/ml CML-BSA+0.5 μl/ml DH. The proliferation capability of such cells were evaluated using WST-1 assay, migration ability were explored by transwell assay, the apoptotic rates were investigated by FC, secreted VEGF in culture supernatant were measured by ELISA, and angiogenesis of such cells was observed in matrigel in vitro.

Result Compared with the BSA control group, proliferation, migration and secretion capability of ADSCs were inhibited by stimuli with CML-BSA (n = 6, P < 0.05), but the apoptosis of such cells were promoted. Finally, angiogenesis of ADSCs was significantly inhibited. DH (0.5μl/ml) could promote proliferation, migration and secretion capability but inhibit apoptosis of ADSCs (n = 6, P < 0.05) vs PBS, and furthermore partially reverse the negative effects of CML-BSA (60 μg/ml) on ADSCs (n = 6, P < 0.05).

Conclusion CMLs could significantly inhibit proliferation, migration, but promote apoptosis and reduce VEGF expression and secretion of ADSCs. DH injection would partially reverses the negative effects of CMLs. CMLs could significantly inhibit angiogenesis of ADSCs, which would partially reversed by DH injection.

Gene–gene interactions among PPAR α / δ / γ polymorphism for lipid accumulation product in Chinese Han population

Bo Hai 1, Zhirong Guo 1, Ming Wu 2, Qiu Chen 3, Zhengyuan Zhou 1
1. Department of Epidemiology, School of Public Health, Soochow University, Su Zhou, Jiang Su, China, 215123.
2. Center for Disease Control of Jiangsu Province, Nan Jing, Jiang Su, China, 210009.
3. Department of Radiation Biology, Soochow University, Su Zhou, Jiang Su, China, 215123.
4. Center for Disease Control of Chang Shu City, Su Zhou, Jiang Su, China, 215500.

Objective This study aimed to investigate the association between 10 single-nucleotide polymorphism (SNPs) in the peroxisome proliferator-activated receptors (PPARs) and lipid accumulation product (LAP), and to discuss whether there is a gene-gene interaction among these 10 SNPs of PPARs.

Method We randomly selected 820 subjects of genetic polymorphism research based on the Metabolic syndrome (MS) study in Jiangsu province, and no individuals were consanguineous. Ten SNPs (rs135539, rs4253778, rs1800206, rs79974, rs2016520, rs10865710, rs1805192, rs709158, rs3856806 and rs4684847) in PPARα/δ/γ were genotyped. The genetic polymorphism of rs4253778 was detected by polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP), while other SNPs were determined by using the Taqman fluorescent probe. A linear regression model was used to analyze the relations between gene polymorphism and LAP. Mean difference (Difference) and 95% confident interval (95% CI) were calculated. Gene-gene interactions were explored by the method of generalized multifactor dimensionality reduction (GMDR).

Result The 10 SNPs were within Hardy-Weinberg equilibrium (P > 0.05). Linkage analysis showed that there was no significant linkage disequilibrium between these polymorphism (all D' < 0.75). There was significant difference in the rs709158 allele and genotype distribution between male and female participants (P = 0.011). The frequency of the G allele of rs709158 was higher in male participants (33.7% in male subjects vs 27.6% in female subjects, P = 0.011). Single factor analysis showed that after adjusted for gender, age, smoking, alcohol consumption, high fat diet and low fiber diet, rs1800206, rs1805192 and rs3856806 were significantly associated with a higher level of LAP, the Difference (95% CI) were 35.39 (25.66 – 45.12), 13.56 (5.12 – 21.99) and 14.24 (6.04 – 22.45), respectively. While rs2016520 was significantly associated with a lower level of LAP, the Difference (95% CI) was –15.64 (-23.80 – 7.48). GMDR analysis showed a significant gene-gene interaction among rs135539, rs1800206 and PPARα/δ/γ polymorphism may contribute to the level of LAP independently and/or in an interactive manner.

Regulatory effects of p66shc–related phosphotyrosine adaptor proteins on vascular aging

Haian Shan, Siyang Zhang, Xin Zhao
Department of Gerontology, The First Affiliated Hospital of China Medical University

Objective p66shc (66-kilodalton isoform of Shc gene products) gene, which encodes a phosphotyrosine signal adapter protein, extends life span by 30%. To observe Regulatory effects of Shc-related phosphotyrosine adaptor proteins on vascular aging.

Methods On the base of regular observation of aortic structure changes in 4, 10, 16, 24 months old rats respectively, Malondialdehyde (MDA) and superoxide dismutase (SOD) level of aorta plasma were detected, and the compliance of rat carotid segment was measured by constant liquid injection. p66shc, Caspase-3 gene expression associated with senescence in healthy rats were analyzed by Western-blotting in the same periods.

Result With aging, aorta wall thickened, fibrosis degree increased, MDA concentration evidently ascended (P < 0.05), but SOD markedly declined (P < 0.05). The carotid flexibility increased, especially flexibility area were significantly different (P < 0.05). The protein expressions of p66shc, Caspase-3 were increased in vascular ageing-related remodeling.
Study on Valsartan delaying endothelial cell senescence and gene expression of p16INK4a
Haiyan Shan, Kai Yu, Xin Zhao
Department of Gerontology, The First Affiliated Hospital of China Medical University

Aim To investigate the role of Valsartan on Angiotensin II (Ang II)-induced senescence of human umbilical endothelial cell senescence and gene expression of p16INK4a.

Methods HUVECs were cultured in vitro and intervened by Ang II (10^(-6) mol/L) and Valsartan (Ang II type 1 receptor blocker). HUVECs were divided into 3 groups, the control group, Ang II group, Valsartan group. β-gal staining was used to identify cell aging status. Flow cytometry was used for analyzing the cell cycle changes; the positive cell rate of p16INK4a protein was determined by Western-blotting.

Result Compared with the control cells, the positive cell number of β-gal staining was significantly higher in Ang II-induced cells (81.24 ± 6.46%); the cell cycle was at G0-G1, (88.36 ± 6.45%). In Valsartan group, p16INK4a protein expression decreased evidently (P II group, which suggests that p16INK4a activity plays an important role in regulating vascular endothelial cell senescence lifespan in vitro.

Conclusion Cell Endothelial cell senescence is induced by Ang II. One of its molecular mechanisms might be associated with increasing the expression level of p16INK4a in aging cell, and then up-regulating the amount of cells blocking in G1 phase of cell cycle. Valsartan could antagonize the process effectively and delay endothelial cell aging significantly.

The regulatory effects of peroxiredoxin II on cardiac contractility and the underlying mechanisms
Wen Zhao1, Wenlei Lu1, Hongmin Liu1, Evangelia G. Kranias2
1. Zhengzhou University School of Pharmaceutical Sciences, 100 Kexue Avenue, Zhengzhou, Henan 450001, P. R. China
2. University of Cincinnati College of Medicine, Department of Pharmacology & Cell Biophysics, Cincinnati, Ohio 45267–0575, USA

Peroxiredoxin II (prxII), a cytosolic form of the anti-oxidant peroxiredoxin family, has been reported to protect cardiomyocytes from oxidative stress-induced injury. Interestingly, we found that prxII expression levels were decreased to 60% in failing human hearts, compared to donors. However, the expression levels of this cellular peroxidase were significantly increased in the hyperdynamic hearts of two genetically modified mouse models with: a) phospholamban ablation; and b) overexpression of the active inhibitor-1 of protein phosphatase 1. To determine whether alterations in prxII levels may contribute to altered cardiac contractility, we generated adenoviruses with sense (Ad-prxII) and anti-sense prxII (Ad-prxII-AS) insertions and infected adult rat cardiomyocytes with these viruses. Myocyte contractility and calcium kinetics were then recorded after 24 hours of infection. Overexpression of Ad-prxII was associated with decreases in the basal rates of contraction and relaxation to 31 and 25%, respectively, of GFP control levels. The fractional shortening was also reduced to 36% of GFP controls. In parallel, calcium kinetics were inhibited as evidenced by 65% decreases in the peak of the calcium transient and prolongation in the time to 80% decay of calcium peak to 70% of controls. The caffeine-induced sarcoplasmic reticulum calcium content was also reduced to 80% of GFP controls. Isoproterenol stimulation abolished the inhibitory effects of prxII overexpression. On the other hand, Ad-prxII-AS infected cardiomyocytes exhibited enhanced contractile parameters and Ca-kinetics, compared to GFP controls under basal conditions, but the maximally stimulated parameters by Iso were similar among the three groups. Interestingly, the depressed or increased contractility by Ad-prxII or Ad-prxII-AS respectively was associated with parallel decreases or increases in phosphorylation of phospholamban (Ser16 and Thr17), compared to GFP-infected cells. There were no alterations in the expression levels of key SR calcium handling proteins; SERCA2, phospholamban, calsuberin and rymodine receptor in the infected cells. These findings indicate that prxII, an anti-oxidant protein, may regulate basal cardiomyocyte contractile performance through phospholamban phosphorylation.

The expression of cystathionine gamma-lyase/hydrogen sulfide pathway in CVB3-induced myocarditis and the protective role of hydrogen sulfide
Yuanhai Zhang1, Lulu Pan, Yayan Yue, Aihua Zhou, Yingying Zhang, Dan Wang, Yan Qian, Maoping Chu
Department of Heart Center, Paediatrics, The first affiliated Hospital of Wenzhou Medical College, Zhejiang Wenzhou, 325000, P. R. China
1 Departement of Cardiology, Paediatrics, Yuying Children’s Hospital of Wenzhou Medical College, Zhejiang Wenzhou, 325000, P. R. China

Objective This study aimed to investigate the expression of cystathionine gamma-lyase/hydrogen sulfide pathway in CVB3-induced myocarditis and the protective role of hydrogen sulfide.

Methods A total of 140 five-week-old Balb/c male mice were randomly assigned to four groups: control group, viral myocarditis group, sodium bisulfide (NaHS) group (50 μmol/kg), DL-proparglyglycine (PAG) group (40 mg/kg). Experimental viral myocarditis was induced by injecting coxsackie virus B3 (CVB3). NaHS or PAG was administered intraperitoneally to mice with viral myocarditis from day 0 to day 10 after infection. On day 4 and day 10, ten mice of each group were sacrificed, and then blood and heart specimens were harvested. The heart sections were stained with hematoxylin and eosin. Levels of H2S, IL-6 and TNF-α were measured by ELISA. The expressions of CSE mRNA and CVB3 mRNA were investigated by quantitative real time PCR (qRT-PCR), and the expression of CSE protein was detected by western-blotting.

Result The levels of H2S, CSE mRNA and CSE protein were decreased in CVB3-induced myocarditis. Treatment of NaHS attenuated the histopathological severity of CVB3-induced myocarditis and upregulated the levels of serum and tissue H2S, while PAG as an irreversible CSE inhibitor aggraivated myocardial injury, inflammatory cells infiltration and interstitial edema and inhibited the expression of H2S and CSE. Moreover, the RT-PCR also showed that NaHS inhibited the expression of CVB3 mRNA, while PAG upregulated the expression
Panax notoginseng saponins ameliorates coxsackievirus B3-induced myocarditis by activating cystathionine γ-mma–lyase/hydrogen sulfide pathway

Lulu Pan, Yuyan Zhang, Yayun Yue, Aihua Zhou, Yingying Zhang, Dan Wang, Yan Qian, Maoping Chu
1. Department of Heart Center, Pediatrics, The first affiliated Hospital of Wenzhou Medical College, Zhejiang Wenzhou, 325000, P. R. China
2. Department of Paediatrics, Yuying Children’s Hospital of Wenzhou Medical College, Zhejiang Wenzhou, 325000, P. R. China

Objective This study aimed to investigate whether or not panax notoginseng saponins (PNS) ameliorates coxsackievirus B3-induced myocarditis by activating cystathionine γ-mma–lyase (CSE)/hydrogen sulfide (H$_2$S) pathway.

Methods A total of 140 five-week-old Balb/c male mice were randomly assigned to five groups: control group, viral myocarditis group, sodium bisulfide (NaHS) group (50 μmol/kg), DL-propargylglycine (PAG) group (40 mg/kg) and panax notoginseng saponins (PNS) group (100 mg/kg). After injection for four and ten days, ten mice of each group were sacrificed, then blood and heart specimens were harvested. Histopathology was performed using haematoxylin and eosin. ELISA was used to measure the concentration of H$_2$S. Total RNA was collected for qRT-PCR of CVB3 mRNA and CSE mRNA, and total protein was collected for western bolt analysis of CSE protein.

Result The serum and tissue H$_2$S level, CSE mRNA and CSE protein levels were decreased in CVB3-induced myocarditis. PNS and NaHS treatments alleviated myocardial injury and upregulated the expression of H$_2$S, CSE mRNA and CSE protein on post-infection day 4 and day 10. PAG, as an irreversible CSE inhibitor, aggravated myocardial injury and downregulated the expression of H$_2$S, CSE mRNA and CSE protein. The qRT-PCR also showed that PNS and NaHS inhibited expression of CVB3 mRNA and PAG upregulated expression of CVB3 mRNA. Moreover, all the effects of PNS are much more positive than NaHS and no significant difference was observed between the groups on post-infection day 4 and day 10.

Conclusions The data indicated that PNS ameliorated myocardium injury and inhibited virus replication by activating the CSE/H$_2$S pathway in CVB3-induced myocarditis. These Result suggested that PNS played a potential role as a potential medication for viral myocarditis therapy.

Ischemia/reperfusion–induced MKP–3 impairs endothelial NO formation via inactivation of ERK1/2 pathway

Dan Yang, Ping Xie, Zhihua Liu
Institute of Medicinal Plant Development, Chinese Academy of Medical Sciences & Peking Union Medical College, Beijing, China

Mitogen-activated protein kinase phosphatases (MKPs) are a family of dual-specificity phosphatases. Endothelial cells express multiple MKP family members, such as MKP-3. However, the effects of MKP-3 on endothelial biological processes have not yet been fully elucidated. Here, we address the association between MKP-3 and endothelial Nitric oxide (NO) formation under ischemia/reperfusion (IS/RP) condition. Human umbilical vein endothelial cells (HUVECs) were subjected to IS/RP treatment. The MKP-3 expression and NO formation were examined. IS/RP induced endothelial MKP-3 expression and inhibited eNOS expression and NO formation, accompanied by an increase of endothelial apoptosis. The siRNA experiments showed that MKP-3 was an important mediator in impairing eNOS expression and NO production in endothelial cells. Transfection of HUVECs with constitutively active ERK3 plasmids suggested that the above mentioned effect of MKP-3 was via inactivation of ERK1/2 pathway. Furthermore, impairment of eNOS expression was restored by treatment of histone (HDAC) inhibitor and related to histone deacetylation and recruitment of HDAC1 to the eNOS promoter. Finally, Salvianolic acid A (SalA) markedly attenuated induction of MKP-3 and inhibition of eNOS expression and NO formation under endothelial IS/RP condition. Overall, these Result for the first time demonstrated that IS/RP inhibited eNOS expression by inactivation of ERK1/2 and recruitment of HDAC1 to the gene promoter, leading to decreased NO formation through a MKP-3-dependent mechanism in endothelial cells, and SalA has therapeutic significance in protecting endothelial cells from impaired NO formation in response to IS/RP.

Angiotensin II–Induced cardiomyocyte hypertrophy is attenuated by neuregulin receptor degradation Protein–1

Yuan Zhang, Li Su, Lisha Han, Hai Hu, Kun Zhang, Yanguo Wang, Jia Liu
1. Department of Pathophysiology, BaoTou Medical College
2. Department of Pathophysiology, BaoTou Medical College

Objective Recent studies indicate ubiquitin-proteasome system particularly the E3 ubiquitin ligase plays a key role in cardiac hypertrophy. We have previously shown that overexpression of Neuregulin receptor degradation protein-1 (Nrdp1) increased cardiomyocyte injury by inhibiting the target protein of ErbB3 and downstream signaling molecules. In the present study we asked whether overexpression of Nrdp1 might exhibit antihypertrophic effects, and therefore we tested this hypothesis both in vitro.

Methods Neonatal cardiomyocytes were treated with Ang-II for different times and different concentrations, along with RT-PCR and Western Blotting were used to detect the levels of Nrdp1 mRNA and protein. Neonatal cardiomyocytes were infected with adenovirus containing GFP (Ad-GFP) and Nrdp1 wild-type (Ad-Nrdp1), then treated with Ang-II for 24 hours. Quantitative real-time PCR was used to determine the level of hypertrophy-related genes. Immunofluorescence and 3H-leucine incorporation assay were performed to detect the cell size.

Conclusion Ang-II stimulation markedly downregulated Nrdp1 mRNA and protein expression in cardiomyocytes especially in 24 hours (P < 0.05). After stimulated by Ang II, the area of cardiomyocytes and protein expression in cardiomyocytes significantly increased in Ad-Nrdp1 group compared with Ad-GFP control group (P < 0.05). Furthermore, the mRNA levels of ANF and β-MHC in Ad-Nrdp1 group were significantly lower than that of Ad-GFP group (P < 0.05).

Conclusion The E3 ligase protein Nrdp1 prevents Ang-II–induced...
cardiomyocyte hypertrophy. Thus, overexpression of Nrdp1 might represent a novel approach to attenuate pathological cardiac hypertrophy.

The establishment and mechanism of spontaneous calcification of aortic interstitial cells in SD rats
Huiqiang Chen, Wei Cui, Haijuan Hu, Fan Liu, Jingchao Lu, Xiuchun Yang, Bing Xiao
Department of Cardiology, the Second Hospital of Hebei Medical University

Objective Aortic valve interstitial cells (AVICs) play a vital role in the development of aortic valve stenosis. The aim of this study is to observe that whether or not AVICs calcified spontaneously and to detect the expression of osteogenic factors in the formation of calcified cell nodules.

Methods AVICs were cultured in explant method, calcification were detected by Von Kossa, alizarin red S stain and a calcium assay kit, and expression of osteogenic factors, such as Cbfa1/OC/BMP-2/BMP-4, were detected by RT-PCR and western-blot analysis at different times.

Result 1. AVICs aggregated and formed small cell nodules after 4–6 day culture, and the number of nodules become more and the diameter is bigger at day 12 than that at day 6.
2. The cell nodules were positive by Von Kossa and alizarin red S stain, which indicated that they were calcified nodules. The statistical analysis indicated that both the content of alizarin red S and calcium at day 12 were higher than that at day 0 and day 6 (F = 106.167, F = 116.379, respectively; P < 0.001).

3. The statistic analysis of the osteogenic gene expression indicated that the Cbfa1/OC/BMP-4 mRNA were lowest at day 0, higher at day 6 and highest at day 12 (F = 410.106, F = 38.463, respectively; P < 0.005), and BMP-2 mRNA were lowest at day 0, higher at day 6 and day 12 (F = 56.565, P < 0.001). The statistic analysis of the osteogenic protein expression indicated that the BMP-2/4 protein expression were lowest at day 0, higher at day 6 and highest at day 12 (F = 7.200, F = 452.482, respectively; P < 0.05).

Conclusion AVICs calcified spontaneously with extend culture time, in which the differentiation of AVICs into osteoblasts-like cells may play an important role in the process of calcification.

Expression and significance of Fibulin-5 in the vessel wall of aortic dissection
Zhixiong Wang, Xiaoping Hu
Cardiovascular surgery, RenMin Hospital of Wuhan University, Hubei 430060, China

Objective To discuss the effect of Fibulin-5 on the integrity of aortic structure and function.

Methods EVG staining, SP immunohistochemistry and Western blot were used to identify the differential expression of Fibulin-5 between the AD group (AD group, n = 12) and the control group (control group, n = 12).

Result The morphology and arrangement of elastic fibers in the aortic media were anomalous in AD group. Immunohistochemistry showed Fibulin-5 positively expressed in the cytoplasm of smooth muscle cells, and the expression of Fibulin-5 was lower in the AD group than control group. Western blot also showed the expression of Fibulin-5 was lower in the AD group with statistical significance (P < 0.05).

Conclusion Down-regulation of Fibulin-5 in the aortic media may affect the synthesis of elastic fibers, resulting in a decrease of elastic fibers in the media and structure disturbance of the media. Finally, it indicates that Fibulin-5 may play a crucial role in the formation of AD.

Loss of cardioprotection by sevoflurane postconditioning against myocardial ischemia–reperfusion injury in old rats
Huatong Li, Dong Chen, Lihuan Li
National Center for Cardiovascular Disease, Fuwai Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, China

Background Sevoflurane postconditioning protects young hearts against ischemia-reperfusion injury. It is unknown whether the infarct-limiting effect is also maintained in aged cohorts, and whether there are age-associated differences in the underlying mechanisms.

Methods Young or old rats were subjected to 30 min of myocardial ischemia, induced by left anterior descending coronary artery occlusion, followed by 2 h of reperfusion with or without anesthetic postconditioning, administered by inhalation of 1.0 MAC (minimal alveolar concentration) sevoflurane initiated immediately upon reflow for 5 min in the presence or absence of LY294002 (PI3K inhibitor) or U0126 (MEK1/2 inhibitor). Myocardial infarct size was measured by Evans Blue and TTC staining. Cardiac expression level of phosphorylation of Akt and ERK1/2 was determined by Western blotting analysis. Myocardial NAD+ content was measured to indicate mitochondrial permeability transition pore (mPTP) opening.

Result Sevoflurane postconditioning significantly decreased myocardial infarct size in young (35 ± 4% vs 56 ± 3%, P < 0.05) but not old rats (45 ± 3% vs 47 ± 4%, P > 0.05), compared with each control group. Sevoflurane postconditioning substantially augmented the phosphorylation level of Akt (0.74 ± 0.03 arbitrary units vs 0.27 ± 0.03 arbitrary units, P < 0.05) and ERK1/2 (0.85 ± 0.04 arbitrary units vs 0.29 ± 0.04 arbitrary units, P < 0.05) compared with control group, which was abolished by LY294002 and U0126 in young rat hearts respectively, but failed to activate Akt and ERK1/2 in old rat hearts. Cardiac NAD+ content was significantly higher in response to sevoflurane postconditioning in young (118.57 ± 9.27 nmol/g tissue vs 46.78 ± 4.54 nmol/g tissue, P < 0.05) but not old rats (58.50 ± 7.16 nmol/g tissue vs 45 ± 3% vs 47 ± 4%, P > 0.05), compared with each control group. LY294002 or U0126 abrogated the infarct-sparing effect and inhibition of loss of NAD+ induced by sevoflurane postconditioning in young rats respectively.

Conclusion Cardioprotection mediated by sevoflurane postconditioning in young rats is not effective in senescent rats, which may at least be the consequence of failure to activate Akt and ERK1/2, and resultant failure to inhibit mPTP opening.
miRNA-16/21 as a biomarker for coronary atherosclerotic unstable plaques

Xuesong Fan, Chun Gu, Xianyun Wang, Fang Wang, Jinjing Yang, Lin Cai, Xiangfeng Cong, Xi Chen
State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

Objective To investigate the probability of circulating miRNA as the biomarker for coronary unstable plaques.

Method Outpatients of Fuwai hospital were divided into non-calciﬁed plaque group, calcified plaque group and normal controls group, by CT examination and ACS symptoms. 11 kinds of miRNAs associated with plaque instability were detected (n = 12 cases); a further detection (n = 50 cases) was continued.

Result 5 miRNAs are varied; further detection (n = 50 cases) showed miR-16 levels was signiﬁcantly higher in the non-calciﬁed plaque group than other group (P = 0.024); miR-21 levels in the three groups was in ascending order (P < 0.001). ROC curve showed that AUC for miR-16 individually identiﬁed in patients with non-calciﬁed plaque was 0.603 (P = 0.023, 95% CI 0.513 – 0.694); miR-21 was 0.640 (P = 0.013, 95% CI 0.534 – 0.746); miR-16 and miR-21 combination was 0.679 (P = 0.001, 95% CI 0.578 – 0.781).

Conclusion Serum levels of miR-16 and miR-21 may become biomarkers for unstable coronary plaques.

Lysophosphatidic acid inhibits the role of hydrogen peroxide–induced apoptosis of bone marrow mesenchymal stem cells

Xianyun Wang, Xuesong Fan, Fang Wang, Lin Cai, Jinjing Yang, Xiangfeng Cong, Xi Chen
State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

Objective Stem cell transplantation is becoming a new strategy of ischemic heart disease treatment in recent years. The survival rate of transplantation stem cell is the key problem to limit its curative effect. We use hydrogen peroxide (H2O2) induced rat bone marrow mesenchymal stem cells (BMSC) apoptosis to build cell oxidative stress damage model for exploring anti-apoptosis role of a kind of endogenous bioactive molecules - hemolysis phosphatidic acid (LPA).

Methods Whole bone marrow of SD rats were separated and used to isolate and culture bone marrow mesenchymal stem cells. Different concentrations of H2O2 stimulated BMSC for apoptosis test. LPA pretreatment cells gave H2O2 stimulus were observed after 4 hour of H2O2; LPA1/3 cell receptor antagonist (Ki16425) pretreatment for LPA role observe whether LPA mediates BMSC apoptosis through the two receptor subtypes. Flow cytometry instrument Annexin V method to detect apoptosis cell percentage; and Western blotting was used to detect the expression chang of apoptotic cell markers Caspase 3, Bax and antiapoptotic marker Bcl 2.

Result H2O2 can induce apoptosis showing concentration dependence. LPA shows obvious inhibition effect of apoptosis induced by H2O2. Annexin V - PI double dye and Western Result showed that 100 μM H2O2 can obviously induce apoptosis; 10 – 50 μM LPA can obviously decrease the percentage of apoptosis of BMSC. Annexin V - PI Result showed that the LPA can make BMSC survival rate increased by 80%. Western Result also showed that 10 – 50 μM LPA can signiﬁcantly decrease the Caspase 3 and Bax expression and increase Bcl2 expression. LPA1/3 receptor antagonist (Ki16425) can obviously inhibit the rise of Bcl 2 and Result the increase of cleaved caspase3 and bax.

Conclusion H2O2 can induce apoptosis showing concentration dependence. LPA shows obvious inhibition effect of apoptosis induced by H2O2. This kind of antiapoptotic effect may be mediated via LPA1/3 receptor.
Novel mutations in the SCN5A gene associated with ischemic malignant ventricular arrhythmias
Lingling Cao 1,2, Jinzhu Hu 1, Hui Zhou 1, Qing Cao 1, Qinmei Xiong 1, Yang Shen 1, Xin Liu 1, Zhenyan Xu 1, Xiyan Dai 1, Qingshong Zhou 1, Kui Hong 1
1. The Second Affiliated Hospital of Nanchang University
2. The No.1 Peoples Hospital of Jiujiang

Objective The purpose of this study is to explore whether the SCN5A gene mutations relates to sudden cardiac death in patients with coronary heart disease.

Materials and Methods (1) Clinical investigation: Detailed clinical evaluation was performed and congenital genetic causes of malignant ventricular arrhythmias were excluded. (2) Genetic Screening: Total coding region of SCN5Agene were screened by DNA direct sequencing. (3) Mutagenesis and Transfection: Mutated SCN5Achannel cDNA was generated by site-directed mutagenesis system. Human embryo kidney (HEK) 293 cells were transfected with the WT- or mutated-SCN5Aconstructs with the help of liposomes. (4) Electrophysiological Analysis: We characterized the membrane current and the voltage dependence of steady-state activation (SSA) and steady-state inactivation (SSI) by whole-cell patch clamp.

Result (1) Clinical Findings: 20 unrelated patients with age ranging from 42 to 81 years old were enrolled. And among them 5 were females, 18 got VT and 2 got VF. (2) Genetics and Corresponding phenotype: Two heterozygous missense mutations were found in SCN5Agene respectively. Mutant A1427S composed of G-to-T substitution at nucleotide site 4338 (c.4338G>T), predicted a substitution of Arginine for Cysteine at codon site 812 (P.Arg812Cys). And R812C substitution of Arginine for Cysteine at codon site 812 (P.Arg812Cys). The two mutations were not detected in the 200 healthy control chromosomes of the same ethnic background. (3) Electrophysiological Properties: Compared to WT, A1427S channel produced significant reduction of peak and current density of INa, inducing a depolarization shift of the I-V relationship curve and voltage dependence of SSA of INa. However, there was no statistic difference between WT and R812C channel in SSI of INa. Compared to WT, R812C channel produced significant increase of peak and current density of INa, resulting in a depolarization shift of the I-V relationship curve, voltage dependence of SSA of INa. But there was no statistic difference between WT and R812Cchannel in SSI and SSI of INa.

Conclusion SCN5AA1427S and R812C mutation were first reported in patients of coronary heart disease with malignant ventricular arrhythmias. “Loss of function” or “gain of fuction” of SCN5Amay be related to ischemic arrhythmias.

Effect of atorvastatin on endothelium–independent relaxation of small pulmonary arteries in monocrotaline–induced PAH rats
Zhi Jiang, Liangdi Xie, Zhihong Lin
First Affiliated Hospital of Fujian Medical University Institute of Hypertension

Objective To examine the preventive effect of atorvastatin on sodium nitroprusside (SNP)-induced endothelium-independent relaxation (EDIR) in small pulmonary artery (SPA) rings in monocrotaline (MCT)-induced pulmonary hypertension rats.

Methods 72 Male SD rats were randomly assigned into four groups: normal control (Ctri), pulmonary arterial hypertension (PAH), PAH preventively treated with 5 mg/kg/d (LAtor) and 10 mg/kg/d (HAtor) atorvastatin (Ator) respectively. Rats were sacrificed after 1, 2 and 4 wks drug gavage. Mean pulmonary arterial pressure (mPAP), right ventricular hypertrophy index (RVHI%), and vasomotion function were determined. The potency of vascular relaxation was expressed as the pD2.

Result mPAP in PAH was significantly higher than that in Ctri 4 wks after MCT injection (32.19 ± 0.91 vs 14.39 ± 0.35, P < 0.01). While preventively treated with Ator for 4 wks, mPAP was significantly decreased in LAtor and HAtor rats as compared with PAH (19.13 ± 0.10, 17.55 ± 0.20 vs 32.19 ± 0.91; P < 0.01). RVHI% was significantly decreased 4 wks after preventively treated with Ator in LAtor and HAtor rats compared with PAH (36.09 ± 4.29 vs 56.76 ± 5.86; 28.93 ± 5.08 vs 56.76 ± 5.86, P < 0.01). SNP-induced EDIR of SPA rings in PAH was not significantly decreased 1 or 2 wks after MCT injection, and significantly decreased 4 wks after the injection (5.89 ± 0.97 vs 8.53 ± 0.91, P < 0.01). There were no difference in SNP-induced EDIR of SPA rings among Ctri, LAtor, and HAtor rats 1 wk after preventively treated with different doses of Ator. However, SNP-induced EDIR was significantly ameliorated in SPA
Krüppel-like factor 4 transcriptionally regulates TGF-β 1, contributing to hypertensive cardiac fibrosis

Yi Zhang1,2, Jie Du1, Ying Wang1, Yan Liu3, Nanping Wang1
1. Department of Innovative Care Unit, China–Japan Friendship Hospital, Beijing, China
2. Beijing AnZhen Hospital, Capital Medical University, The Key Laboratory of Remodeling-related Cardiovascular Diseases, Ministry of Education, Beijing Institute of Heart Lung and Blood Vessel Diseases, Beijing, China
3. Key Laboratory of Molecular Cardiovascular Sciences of Ministry of Education, Peking University, Health Science Center, Beijing, China

Background Angiotensin II (Ang II) plays a major role in the pathogenesis of cardiac fibrosis in hypertension. It is known that Ang II stimulates myofibroblast differentiation and cardiac fibrosis through regulating expression of a variety of transcription factors. However, it has not yet been fully elucidated that the type and function of the transcription factors involved in fibrotic injury caused by Ang II. As well, how transcription factors interact and constitute a network-control the development process of hypertension-induced heart infarction and fibrosis is unknown.

Methods To study the role of Krüppel-like family transcription factors in hypertensive cardiac fibrosis, we prepared hypertensive mouse model with Ang II (1500 ng/kg/min) infusion for 7 days. We tested expression of Klf11 in heart tissue and different cell types after Ang II stimulation. In vitro, Klf4 were overexpressed by Ad Klf4 Infection or knockdown by small Interfering RNA transfection to detect its role in myofibroblast differentiation and collagen synthesis. The Klf4 regulated target genes were determined by ChIP Seq. Furthermore, ChIP assay and pG-L3-TGF-beta1-luc+ plasmids transfection were done to detect the Klf4 binding site at TGF-beta1 promoter region. In vivo, myofibroblast-specific deletion of Klf4 (Klf4 fl/fl; alpha-SMA-Cre) and Klf4 fl/fl mice were infused continuously with Ang II or saline for 7 day. The extracellular matrix deposition was evaluated by Masson trichrome staining. Myofibroblast formation was associated with alpha-SMA immunohistochemical staining. Mac-2 and MCP-1 protein expression were tested to determine macrophage infiltration and expression of inflammatory cytokines.

Result Klf4 was the highest expressed among the Klf members in Ang II-induced cardiac fibrosis. Klf4 promotes fibroblast-to-myofibroblast differentiation and collagen synthesis. Klf4 transcriptionally regulates fibrogenic genes including TGF-beta1. The sites at -184 to -180 bp and -45 to -41 bp in the TGF-beta1 promoter were responsible for Klf4 transactivation of the TGF-beta1 promoter. Cardiac fibrosis area was significantly lower in Klf4 fl/fl; alpha-SMA Cre mice than that in Klf4 fl/fl mice (11.13 ± 0.90% vs 7.22 ± 0.59%, P < 0.05). Alpha-SMA positive area was significantly decreased (3.90 ± 0.71% vs 1.11 ± 0.22%, P < 0.05) in hearts of the Klf4 fl/fl; alpha-SMA Cre mice. Mac-2 and MCP-1 positive area were both significantly lower (2.76 ± 0.27% vs 2.07 ± 0.35%, P < 0.05; 3.16 ± 0.46% vs 1.47 ± 0.75%, P < 0.05) for Ang II-infused 7 days.

Conclusion Our studies demonstrate that AngII could directly activate Klf4 expression of cardiac fibroblasts. Klf4 transcriptionally regulated fibrosis related gene, which including TGF-beta1. Klf4 plays a pivotal role in hypertension-induced cardiac fibrosis and inflam mation.

Genetic variant of endoglin gene is associated with sporadic intracranial aneurysms in the Chinese Han population

Yahui Lin1, Ying Gong2, Miaomiao Suo1, Hui Yu1, Weihua Song1, Kai Sun1, Yan Song1, Yinhui Zhang1, Channa Zhang1, Yufang Zhu1, Qi Pang2, Ruita Hui1, Jingzhou Chen1
1. Sino–German Laboratory for Molecular Medicine, State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, People’s Republic of China
2. Department of Neurosurgery, Shandong Tumor Hospital, Jinan, 250117, China
3. Department of Neurosurgery, Shandong Provincial Hospital, Shandong University, Shandong, 250021,

Background It has been reported that the prevalence of unruptured IAs was significantly higher (10.5 – 13.5%) in a Japanese subgroup with a family history of IAs, indicating that genetics also plays a role. Endoglin plays a pivotal role in the in vascular development and disease. Variant of endoglin gene have been shown to be risk factors for IAs in different racial population. In the present study, we investigated the correlation between polymorphisms in the endoglin gene with IAs in Chinese Han population.

Methods The association of endoglin D366H variants (rs1800956) with sporadic IAs was tested in 313 patients with intracranial aneurysms, and 450 controls. A chi-square test was used to test for genotype/allele frequencies, the effects of the variant on risk of IAs were tested using a logistic-regression model. The covariables selected for logistic regression model were conventional vascular risk factors, including age, sex, blood pressure, smoking, and alcohol consumption.

Result The frequency of the GG+CG genotype of rs1800956 was significantly higher in patients with IAs than in the controls (22.0% vs 15.3%, P = 0.018; crude OR, 1.56; 95% CI, 1.08 – 2.26). After adjustment for conventional vascular risk factors, including age, sex, blood pressure, smoking, and alcohol consumption, the G allele of rs1800956 conferred a high risk of IAs (adjusted OR, 1.56; 95% CI, 1.08 – 2.26, P = 0.019).

Conclusion The variant rs1800956 of endoglin is genetic risk factors for sporadic IAs among individuals of Chinese Han ethnicity. This study confirms the association between endoglin and IAs.

Rosuvastatin could modulate insulin signaling and inhibit atheroclerosis beyond its plasma cholesterol-lowering effect in insulin-resistant mice

Haitao Lu, Hangyuan Guo
Shaoxing Peoples Hospital

Objective To provide evidence that rosuvastatin could improve
insulin-resistance and inhibit atherogenesis by modulating insulin signaling, and whether this effect extends beyond its plasma cholesterol-lowering effect.

**Methods** Thirty-two 6-week-old low-density lipoprotein receptor deficient (LDLR−/−) mice were randomized into four groups (n = 8 in each group): Normal control group (NC); High fat and high fructose diet group (HFF); HFF plus rosuvastatin group (HRF); HFF plus mevalonic acid (HFFRMA). After 12 weeks, we measured the fasting blood sugar (FBS), fasting insulin (FINS) and total cholesterol (TC); the morphological concentrations of the aorta artery and aorta sinuses; the expression of insulin receptor substrate 2 (IRS-2), phosphorylated insulin receptor substrate 2 (P-IRS-2), protein kinase B (AKT, also known as PKB) and phosphorylated protein kinase B (P-AKT) in liver.

**Result** Compared with other groups, FBS and FINS increased significantly in HFF group. Furthermore, HFF group had an increase in the morphological concentrations of the aorta artery and aorta sinuses, but there was a significant decrease in HFFRMA group and HFF group. Moreover, there was a high expression of IRS-2, P-IRS-2, AKT and P-AKT in HFFRMA group and HFF group, but a lower expression in HFF group. And there is no significant difference regarding to each afore-mentioned index in HFF group and HFFRMA group.

**Conclusion** Our data show that rosuvastatin could improve insulin-resistance and inhibit atherogenesis in HFF-fed mice by partially reversing the decrease in the insulin stimulated IRS-2/PI3-K/AKT pathway in liver, and this effect is independent of its cholesterol-lowering effect.

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**Autophagy flux mediates cardiac protection of sevoflurane post-conditioning**

Yulin Zhang, Yuntai Yao, Chenghui Zhou, Huatong Li, Junsong Gong, Gang Cheng Shan Zhou, Yang Yu, Lihuan Li

1. State Key Laboratory of Cardiovascular Medicine, Fuwai Hospital, National Center for Cardiovascular Disease, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, China;
2. Department of Anesthesiology, Fuwai Hospital, National Center for Cardiovascular Disease, Beijing, 100037, China;

**Objective** We have previously shown that sevoflurane, a major volatile anesthetic gas in cardiac surgery, protects cardiomyocytes from ischemia reperfusion (I/R) injury both in pre- and post-conditioning. However, its mechanism is not fully elucidated. It has been reported that sevoflurane induces autophagy, and may play a role in cardiac protection, but it has not been investigated whether I/R induced autophagy flux is associated with the cardioprotection afforded by sevoflurane post-conditioning.

**Methods** The Sprague-Dawley rats weighing between 250 and 300 g were randomly assigned into three groups: (I) sham group; (II) IR group, in which hearts subjected to 30 min of ischemia and 120 min of reperfusion; (III) SPoC group, in which sevoflurane (3%) administered at the first 5 min after reperfusion. Infarct size was delineated by tetrazolium staining and expressed as a percentage of the at-risk myocardium, as well as cardiomyocytes apoptosis by TUNEL assay was investigated at the end of 2 hours reperfusion. Counts and morphology of autophagosomes for transmission electron microscopy (TEM), expression of microtubule-associated protein light chain 3-II, and mitochondrial permeability transition pores (MPTP) opening for calcine release were evaluated after the 30 min of reperfusion. To investigate whether the efficacy of sevoflurane post-conditioning was maintained with CQ (chloroquine) treatment, additional rats were given CQ (10 mg/kg, i.p.) at 1 hours prior to surgery, (IV) Sham+CQ group, (V) IR+CQ group, (VI) SPoC+CQ group. Infarct size and ratio of apoptotic cardiomyocytes were evaluated. Moreover, number of autophagosomes, autophagic mark LC3 and MPTP were detected.

**Result** Sevoflurane post-conditioning was cardioprotective: infarct size was 21.1 ± 2% in the SPoC group vs 38.7 ± 1% in the IR group (P < 0.05), respectively. Sevoflurane post-conditioning was associated with decreased expression of microtubule-associated protein light chain 3B-II (LC3B-II) (8.03 ± 0.45 vs 5.95 ± 0.41, P < 0.05, n = 3) and the counts of autophagosomes were decreased in the SPoC group. Compared to IR group, SPoC group exhibited inhibition of MPTP opening in heart tissues, and attenuated the apoptosis of myocardicymocytes. Surprisingly, in adding CQ group, the cardiomyocytes protective effects were abrogated. Infarct size areas in SPoC+CQ was increased than those in SPoC group (21.1 ± 2% vs 53.0 ± 1%, P < 0.05, n = 6). The ratio of LC3-II/I was elevated (9.38 ± 0.32 vs 5.95 ± 0.41, P = 0.0026, n = 3). Furthermore, SPoC+CQ group was associated with elevated apoptosis of cardiomyocytes and MPTP opening.

**Conclusion** Our Result demonstrate that sevoflurane post-conditioning attenuated I/R induced apoptosis of myocardicymocytes. Sevoflurane post-conditioning promotes autophagy flux in reperfusion period, which inhibits MPTP opening in I/R pathological process, at least partly contributing to the key step in the cardioprotection of sevoflurane.

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**The Role of ER stress in the process of BH3-only protein Bim-mediated cardiomyocytes apoptosis induced by hypoxia**

Zhen Xia

The Second Affiliated Hospital of Nanchang University

**Objective** To investigate the role of endoplasmic reticulum stress in the injury induced by Bim of hypoxic cardiomyocytes.

**Methods** The Rat cardiomyocytes, 1 – 3 days after birth, were cultured primarily and identified by using antibody targeting α-actin of striated muscle. Bim-siRNA were transfected transiently into cardiomyocytes by lipofectamine 2000. Establish a model of hypoxia (The cells after 48 h transfection, were given a deal with hypoxia for 12 h). The experiments were divided into five groups: Blank Control Group, Hypoxia Group, Hypoxia + Negative Control siRNA Group, Hypoxia + Mock control Group, Hypoxia + Bim-siRNA Group. The cell survival rate was determined by MTT method; the cell apoptosis rate and the change of the calcium concentration in cells were determined by flow cytometry; the expression of Bim and the markers of endoplasmic reticulum stress Caspase-12 and InSP3 were assessed by Western blot.

**Result** Immunohistochemical identification confirmed that rat cardiomyocytes were successful cultured. Green fluorescence was observed in the cells transfected of negative control siRNA group though the fluorescence microscope. The Result of Western blot showed that the transfected of Bim-siRNA decreased the expression of Bim effectively (P < 0.01). Compared with the blank control group, The MTT assay determined that the survival rate of cardiomyocytes was decreased (P < 0.05) after the injured by hypoxia. And the Result of flow cytometry showed that hypoxia increased cell apoptosis rate (P < 0.01) and the concentration of calcium (P < 0.01), while the transfection of Bim-siRNA reduced the effects caused by hypoxia (P < 0.05 or P < 0.01). Compared with the hypoxia+Negative Control siRNA group, the transfection of Bim-siRNA increased the cell survival rate, decreased cell apoptosis rate.
and the concentration of calcium (P < 0.01). The Result of Western blot showed that the transfection of Bim-siRNA reduced the expression of Caspase-12 and InSp3 (P < 0.05 or P < 0.01), which were endoplasmic reticulum stress markers. And reduced the effects that hypoxia increased the expression of Caspase-12 and InSp3 (P < 0.05 or P < 0.01).

Conclusion Cardiomyocytes apoptosis induced by hypoxia can be inhibited by Silencing Bim gene. Caspase-12 and InSp3 which are the markers of endoplasmic reticulum stress may participate in the process of Bim-mediated rat cardiomyocytes apoptosis induced by hypoxia. It is likely to be a new direction for treatment of coronary atherosclerotic heart disease.

The effect of BH3-only protein Bim silencing by siRNA on apoptosis induced by hypoxia in rat cardiomyocyte

Zhen Xia, Juxiang Li, Hao Ding, Guofang Sun, Kui Hong, Yanqing Wu, Xiaoshu Cheng
The Second Affiliated Hospital of Nanchang University

Aim To investigate the effect of BH3-only protein Bim (Bcl-2) interacting the mediator of the cell death) on apoptosis induced by hypoxia in rat cardiomyocytes.

Methods The Rat cardiomyocytes, 1-3 days after birth, were cultured primarily and identified by using antibody targeting α-actin of striated muscle. Bim-siRNA was transfected transiently into cardiomyocytes by lipofectamine 2000. Establish a model of hypoxia (The cells after 48 h transfection were given a deal with hypoxia for 12 h). The experiments were divided into five groups: Blank Control Group, Hypoxia Group, Hypoxia + Negative Control siRNA Group, Hypoxia + Mock control Group, Hypoxia + Bim-siRNA Group. With the inverted microscopy, the Cardiomyocyte beat frequency and rhythm can be observed and recorded; the content of lactate dehydrogenase (LDH) in cell culture fluid was detected by automatic biochemical analyzer; The cell survival rate was determined by MTT method; the cell apoptosis rate was determined by flow cytometry; the expression of Bim, Bax, Bcl-2 and p-p38MAPK was assessed by Western blot.

Result Immunohistochemical identification confirmed that rat cardiomyocytes were successful cultured. The beat frequency of cardiomyocyte was slowed down after hypoxia stimulation, the rhythm was disordered (P < 0.01). And the content of lactate dehydrogenase (LDH) in cell culture fluid increased obviously (P < 0.01). The MTT result showed that the survival rate was decreased (P < 0.05). And the Result of flow cytometry showed that hypoxia increased cell apoptosis rate (P < 0.01), while the transfection of Bim-siRNA reduced the effects caused by hypoxia (P < 0.05 or P < 0.01). The Result of Western blot showed that the transfection of Bim-siRNA decreased the expression of Bim (P < 0.01). It confirmed that Bim was silenced by Bim-siRNA effectively. The hypoxia increased the expression of Bax and p-p38 (P < 0.05), and decreased the expression of Bcl-2 (P < 0.01), while the transfection of Bim-siRNA reduced the effects caused by hypoxia (P < 0.05). These were greatly related to the decreasing of apoptosis.

Conclusion The down-regulation of the expression of Bim can suppress the apoptosis of rat cardiomyocyte induced by hypoxia. Its mechanism is associated with the down-regulation of p-p38MAPK, Bax expression and up-regulation of Bcl-2. It is likely to be a new direction for treatment of coronary atherosclerotic heart disease.

Clinical and genotype characteristics of arrhythmogenic right ventricular cardiomyopathy with left ventricular involvement

Jingru Bao, Bingbo Hou, Lingmin Wu, Jizheng Wang, Shu Zhang, Rutai Hui, Lei Song, Yan Yao
State Key Laboratory of Cardiovascular Diseases, National Center for Cardiovascular Disease, Fuwai Hospital, Peking Union Medical College - Chinese Academy of Medical Sciences, Beijing, China

Objective Arrhythmogenic right ventricular cardiomyopathy (ARVC) is mainly caused by mutation of genes encoding desmosomal proteins. It is supposed that both ventricles should be involved in the disease since the effect of ultrastructural and molecular dysfunction of desmosome plays an equal role on both ventricles. This study was aimed to identify the clinical and genotype characteristics of ARVC with left ventricular (LV) involvement.

Methods A total of 172 ARVC patients were enrolled for clinical evaluation. LV involvement was defined by echocardiography with at least one of the followings: LV end-diastolic diameter > 57 mm, LV ejection fraction ≤ 50%, LV wall being thin, or LV dyskinesia. One hundred patients of the total sample underwent genetic screening for 9 reported ARVC-causing genes, including JUP, DSP, PKP2, DSG2, DSC2, TGFβ3, TMEM43, DES, and LMNA. The genotype-phenotype correlation of the patients with LV involvement was analyzed.

Result Thirty-one (18%) patients were found to have LV involved. Compared with patients without LV involvement, the involved group had similar sex ratio, onset age, duration between onset and diagnosis, clinical manifestations, except more severe right ventricular structural impairment (58% vs 32%, P = 0.008). Among the 64 mutation carriers, LV involvement was found in 11 (17%) patients. The involved group had more multi-mutation carriers (64% vs 30%, P = 0.046), but less plakophilin-2 mutation carriers (36% vs 72%, P = 0.037).

Conclusion In Chinese ARVC patients, 18% has echocardiography identified LV involvement, which is related to multi-mutation and right ventricular structural impairment progression.

Metabolomic investigation of ischemic myocardial tissue in BA-MA mini-pigs with diabetes mellitus

Yongchun Cui, Kai Li, Yue Tang, Zhong Tian, Xiaopeng Liu, Weimin Yuan, Peng Peng, Jianzhong Yang
State Key Laboratory of Translational Cardiovascular Medicine, Fuwai Hospital of Cardiovascular, National Center for Cardiovascular Disease, Peking Union Medical College, Chinese Academy of Medical Sciences, Animal Experimental Center

Objective The purpose of this study is to establish the small molecule fingerprints on acute ischemic myocardial model of diabetic and non-diabetic miniature swine using metabolites. We will utilize statistical analysis combined with clinical physiological indexes and network database to identify differential small molecule metabolic products, aiming to explore new molecules from metabolic view more sensitively, accurately, specifically as diagnostic markers of diabetic patients with acute myocardial ischemia.

Methods First, we injected STZ (150 mg/kg, iv) to set up a small pig model of diabetes, then collecting blood the day prior to administration, after administration for a week, monitoring fasting
blood glucose, serum insulin and C-peptide levels dynamically, continued increase of FBG (FBG ≥ 7.0 mmol/L) indicated successful model. Then, we used thoracoscopic to do minimally invasive coronary artery ligation of the left anterior descending (LAD) to establish diabetes and non-diabetic miniature swine with acute myocardial ischemia. Dynamic ECG was used for 48 h after coronary artery ligation. We collected blood before coronary clogging, coronary clog for 10 min, 4 h and 48 h respectively. Before animal's execution (48 h), we collected sinus blood and ischemic myocardium for metabolomics analysis. Finally, we used UPLC/TOF-MS and NMR to detect homogenates glucose, fatty acids, lactic acid, ketone bodies, amino acids fingerprinting of myocardial tissue according to time point. Then we compared the changes of metabolic products before and after ischemia and did related metabolites contour analysis, finding relations between specific metabolites and FBG, insulin levels, cardiac electrophysiology and cardiac function to clarify the pathogenesis of decreased tolerance of diabetic myocardial ischemia, aiming to look for new possible therapeutic targets.

**Result** FBG was significantly increased and maintained at 17.7 – 20.1 mmol/L after injection of STZ for 24 h, C-peptide and insulin levels were significantly lower. The total protein, alanine aminotransferase, aspartate aminotransferase, and creatinine were not significantly changed in model group, urea nitrogen and albumin decreased slightly, blood uric acid w significantly decreased. (P < 0.05). Western blot showed that compared with the control group, pancreas, liver and renal tubular basement membrane glucose transporter protein 2 significantly reduced in model group. We confirmed that a one-time injection of high-dose STZ of can successfully establish type I diabetes miniature pig model, and there were significant effects on liver and kidney function. Metabolomics data obtained by the model is of confidence. After one week stable blood sugar of diabetic group, we did coronary artery ligation shock (VATS). Serum troponin I (cTnI) and myoglobin (MYO) was significantly higher after VATS for 4 h, (10 – 100 times higher than normal limit), reaching the diagnostic criteria of myocardial infarction (5 times higher than the upper normal limit). Echocardiography, MRI and histopathological analysis showed that myocardial injuries were the apex, left ventricular anterior wall and septum. Diabetic miniature swine heart function was relatively lower, infarct area/highest risk infarct area ratio (diabetic group 18: 1 vs control group 5: 1); the myocardial infarction was heavier (>75%), which was in line with poor tolerability of diabetes myocardial ischemia. Acute myocardial ischemia pathological changes were obvious in all animals, pathological Q waves formed after 48 h, the diabetic group QRS score was higher than the control group (6.9 ± 2.4 vs 4.1 ± 1.8, P <0.05); and pathological staining showed that the infarction area was larger than the control group (29.2 ± 5.1% vs 15.3 ± 3.4%, P < 0.05), the correlation coefficient was 0.92. We used SIMCA-P software to do PCAPLS-DA. The Result showed that there were 14 differential metabolites in ischemic myocardial tissue, including four types amino acids, they were a neutral amino acid (glycine, serine), a non-polar imino acid (Proline) and 2 acidic amino acids (glutamic acid), which decreased by 1.56 times, 1.62 times, 2.23 times and 3.76 times respectively compared with control group. 4 hexose (glucose, fructose, galactose, and pyran-galactose) increased slightly, rising by 1.4 – 2.6 times than control group on average; cholesterol content decreased by nearly 1.7 times. The most significant changes were peanuts arachidonic acid, nearly 5 times decrease, the difference had statistically significant.

**Conclusion** (1) high-dose STZ successfully established a type I diabetes miniature pigs model, which had little effect on liver and kidney function. (2) VATS surgery is a safe, effective method in doing diabetic AMI model. (3) Diabetes with acute myocardial ischemia would lead to myocardial necrosis easily; infarct size was significantly larger than that of the control group; ECG testing on determines infarct size had good correlation with pathological method. (4) metabolomics studies showed that arachidonic acid, which was an important constituent of the myocardial cell membrane, may become diagnosis and prognostic candidate molecules marker in diabetic myocardial ischemia.

**Pulmonary microRNA expression changes in a piglet model of deep hypothermic low–flow cardiopulmonary bypass induced immature lung injury**

Wenlei Li, Shoujun Li, Fuxia Yan, Jinping Liu, Hao Zhang, Kai Ma, Yonghui Zhang
Center of Pediatric Cardiac Surgery, Fuwai Hospital and Cardiovascular Institute, Chinese Academy of Medical Sciences, Peking Union Medical College, Beijing, China

**Background** After cardiac surgery performed under deep
hypothermia with low-flow (DHLF) cardiopulmonary bypass (CPB), the lung injury often becomes more severe in infants, which is usually driven by diverse pathogenic etiologies. Due to their pleiotropic actions, microRNAs (miRNAs) are potential candidates involved in diverse pathophysiological processes and diseases via regulating gene expression. The objective of this study was to investigate the changed miRNAs and their potential target genes in neonatal piglet lungs in response to DHLF-CPB.

Methods Piglets (n = 10) aged 18.2 ± 1.55 days, weight 4.9 ± 1.21 kg, were randomly divided into two groups: sham-operated (Control, n = 5), DHLF-CPB (CPB group, n = 5). In CPB group, the DHLF-CPB was routinely established, which was cooled to 25°C with low-flow for 60 minutes (50 ml/kg/min) during in the 2 hours aortic cross-clamping. At 2 hours after weaning from CPB, the right lower lobe was harvested. Lung function indices were recorded and morphological changes in the lung were examined by haematoxylin and eosin. The levels of cytokine (TNF-alpha, IL-6 and SP-A) and the activity of NF-kappa B in lung tissue were measured by enzyme-linked immunosorbent assay (ELISA) and electrophoresis mobility shift assay (EMSA), respectively. The miRNA profiling was obtained by applying miRNA chip, and real-time quantitative polymerase chain reaction (RT-PCR) was used to validate the differentially expressed miRNAs in RNA samples from lungs of piglets.

Results The lung function indices showed greatly elevation of respiratory index, descent of oxygenation index and histopathological changes revealed the piglets' lungs were greatly impaired due to DHLF-CPB. There were a great increase in the levels of TNF-alpha ([36.1 ± 6.5] pg/ml vs [15.6 ± 1.5] pg/ml, [P < 0.05]), IL-6 ([175.47 ± 29.58] pg/ml vs [133.03 ± 26.28] pg/ml, [P < 0.05]) and decrease in the levels of SP-A ([9.26 ± 0.71] pg/ml vs [11.00 ± 1.23] pg/ml [P < 0.05]) in the CPB group. Using miRNA microarray we identified that there are 16 miRNAs expression significantly changed (P < 0.05) and verified up-regulation of miR-21, miR-204 and down-regulation of miR-127, miR-145 in CPB group. Using miRNA microarray we identified that there are 16 miRNAs expression significantly changed (P < 0.05) and verified up-regulation of miR-21, miR-204 and down-regulation of miR-127, miR-145 in CPB group by RT-PCR analyses. Especially, miR-21 is known can be induced by activation of NF-kb and miR-204 putatively targets the SP-A mRNA, which is correlated with a strongly activation in the activity of NF-kappa B (P < 0.05) and decrease of SP-A expression in CPB group in our study. And we found no significant changes in the expression of miR-324 and miR-885.

Conclusion Our Result show that DHLF-CPB induces great lung injury and dynamic changes in miRNA expression in piglet lungs. Moreover, the changes of NF-kappa B activity and SP-A expression may be important to understand the influence of differentially expressed miRNAs on DHLF-CPB-induced immature lung injury.

Involvement of calcineurin pathway in TGF–beta1 induced cardiac fibroblasts proliferation

Mingqiang Fu1, Jingmin Zhou1, Juaying Qian1, Hongmin Zhu1, Kun Jiang1, Jianfeng Xu1, Lingti Zhu1, Yunzeng Zou1, 3, Junbo Ge1, 3

1. Department of Cardiology, Shanghai Institute of Cardiovascular Diseases, Zhongshan Hospital, Fudan University
2. Department of Cardiology, the Affiliated Hospital of North Sichuan Medical College
3. Institute of Biomedical Sciences, Fudan University

Objective Transforming growth factor-beta1 (TGF-beta1) and calcineurin (CaN) each plays a role in promoting cardiac fibroblasts proliferation. However, the regulatory effect of TGF-beta1 on CaN remains unknown yet. We therefore sought to investigate if calcineurin and its pathway are involved in TGF-beta1 induced cardiac fibroblasts proliferation.

Methods Primary cardiac fibroblasts from 1- to 2-day-old Sprague-Dawley rats were isolated by trypsinization and purified by differential anchoring velocity technology. The cultured cells of passage 3 were stimulated by TGF-beta1 either with a concentration gradient (0, 0.1 ng/ml, 0.5 ng/ml, 5 ng/ml, 10 ng/ml and 25 ng/ml) or at different time points (0, 30 min, 1 h, 2 h, 6 h and 12 h), calcineurin and downstream NFAT-3 expressions were examined, respectively. On the other hand, cardiac fibroblasts were divided into three groups: control group, CaN-siRNA group and CaN-overexpression group. CaN/NFAT-3 expressions and cell proliferation in each group were determined.

Result NFAT-3 is activated by TGF-beta1 in a dose- and time-dependent manner in parallel with that of CaN. Pretreatment with CaN-siRNA lentivirus significantly attenuated cardiac fibroblasts proliferation induced by TGF-beta1, while overexpression of CaN promoted the proliferation of CFs.

Conclusion The present study demonstrates that apart from Smads signaling cascade, TGF-beta1 could also promote CF proliferation via activating calcineurin/NFAT-3 pathway, thus calcineurin might be a potential target of reversing myocardial fibrosis.

Overexpressed HSP22 protects against hypoxia/reoxygenation-induced apoptosis in endothelial cells

Huihui Bao, Qi Chen, Kui Hong, Xiaoshu Cheng
Cardiology Department, the Second Affiliated Hospital of Nanchang University, Nanchang of JiangXi, China

Vascular endothelial cells (VEC) injury induced by ischemic-reperfusion can lead to endothelial barrier dysfunction, thrombosis and edema. Further study indicated that apoptosis was first seen in the endothelial cells in the stages of reperfusion. Several studies demonstrate that the dysfunction and incompetence of VEC precedes myocyte cells apoptosis and restoration of its function is later than myocyte cells in ischemic-reperfusion. Therefore, it is of great significance to protect endothelial cells against ischemic-reperfusion injury. Several studies have shown that HSP22 could protect myocardial cells ischemia-reperfusion injury against apoptosis and oxidative stress. Recently, we found significant increase in HSP22 expression in vascular endothelial cells undergoing hypoxia/reoxygenation. But, it was so far not known whether HSP22 have beneficial effects on endothelial cells during hypoxia/reoxygenation injury. This problem was examined in a model of hypoxia/reoxygenation stress when endothelial cells were infected with virus-based vectors expressing HSP22 or green fluorescent protein (GFP) which expressed to 24 hours of hypoxia followed by reoxygenation. We further investigated the levels of Bcl-2, Bax and NF-kB, which were considered to be the relational proteins of endothelial cells apoptosis. HSP22 inhibited hypoxia/reoxygenation-induced apoptosis associated with up-regulation of Bcl-2 and down-regulation of NF-kB levels at reoxygenation 0 h, 3 h, 6 h, and 12 h following 24 h hypoxia (P < 0.01). Furthermore, Co-immunoprecipitation indicated HSP22 could directly bind to IKK-α, increase IkB-α level, then reduce NF-kB transcription activity.
The expression of CXCL9 is elevated in congenital pulmonary hypertension

Li Wang, Guo Liang Wang, Liu Kun Meng, Xiao Yan Liu, Sheng Hua Liu, Ying Jie Wei
State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

Background and purpose CXC-chemokine ligand 9 (CXCL9) is one of chemokines involving in both physiological and pathological processes of inflammmation, and the CXC group of chemokines is gaining importance in various diseases for being angiostatic and angiogenic in function. Abnormal angiogenesis participate in the pathobiology of pulmonary arterial hypertension (PAH). We investigated the serum level of CXCL9 inpatients of congenital pulmonary hypertension and lung tissue of PAH rats. Experimental approach Rat model of PAH was induced by monocrotaline (50 mg/kg, subcutaneous injection). The expression level of CXCL9 and its receptor (CXCR3) was measured by RT-PCR. Serum CXCL9 level was measured by protein affinity microarray. CXCL9 level of patients of congenital heart disease with severe PAH or without PAH was compared.

Key Result Compared with control, CXCL9 expression level in lung tissue of rat was elevated about 3 times after monocrotaline injection 1 week, and then declined gradually. The expression level of CXCR3, receptor of CXCL9, also increased after monocrotaline injection, and reached the top (about 1.4 times) in week 3. The mean serum CXCL9 level of congenital heart disease patients with severe PAH was $11500 \pm 410$ pg/ml, about 4 times of congenital heart disease patients without PAH.

Conclusion and implication Our preliminary Result showed the serum CXCL9 level is elevated in congenital pulmonary hypertension. This study augments the probability of serum CXCL9 being a new biomarker of PAH.
Traditional Chinese medicine TongXinLuo protects human cardiac microvascular endothelial cells against hypoxia/reoxygenation injury via inhibition of JAK/STAT pathway

Hehe Cui, Yuejin Yang, Xiangdong Li
State Key Laboratory of Cardiovascular Disease, Fuwai Hospital and Cardiovascular Institute, National Center for Cardiovascular Diseases, Peking Union Medical College and Chinese Academy of Medical Sciences

Objective To elucidate the role of JAK/STAT pathway in hypoxia/reoxygenation injury of cardiac microvascular endothelial cells (CMECs), and its activity regulation by traditional chinese medicine TongXinLuo.

Methods CMECs were cultured to passage 3-4 and assigned to different groups: TongXinLuo (TXL) concentration groups (50, 100, 200, 400, 800 μg/ml) and pathway verification groups: (AG490 50 uM with or without TXL 800 μg/ml. Cells were subjected to 2 hours' hypoxia then 2 hours' reoxygenation. Flowcytometry was used to analyze cell apoptosis rate via Annexin-V/PI staining method. Western blotting was used to determine the changes of apoptosis related proteins such as Bcl-2, Bax and pathway related proteins JAK2, phosphorylated-JAK2; STAT3, phosphorylated-STAT3.

Result Flowcytometric assays showed CMECs apoptosis rate significantly increased after hypoxia/reoxygenation (H/R) (23.45 ± 2.62% in H/R group compared to 7.54 ± 1.57% in control group, P < 0.05). TXL protected CMECs against H/R injury in a concentration dependent trend, and most significantly in 800 μg/ml group (12.83 ± 1.92%, P < 0.05). CMECs apoptosis rate was decrease by JAK/STAT pathway inhibitor AG490 significantly (7.05 ± 0.97%, P < 0.05 vs H/R group) and by AG490 with TXL 800 μg/ml in larger extent (3.79 ± 1.04%). Correspondingly, Bax was increased and Bcl-2 was decreased after hypoxia/reoxygenation, while TXL 800 μg/ml, AG490, and combination groups reversed the trends (P < 0.05). AG490, TXL 800 μg/ml and combination groups significantly decreased the phosphorylated-STAT3 in Tyr-705 location.

Conclusion TongXinLuo could significantly decrease apoptosis rate of human cardiac microvascular endothelial cells after hypoxia/reoxygenation in 800 μg/ml, and JAK/STAT pathway inhibition is one of mechanisms in its protection roles.

Involvement of Vascular peroxidase 1 in angiotensin II–induced H9c2 cells hypertrophy

Wei Yang¹, Guangjie Cheng², Guogang Zhang³, Ruizheng Shi¹
1. Department of Cardiovascular Medicine, Xiangya Hospital, Central South University
2. Division of Pulmonary, Allergy & Critical Care Medicine, Department of Medicine, University of Alabama at Birmingham

Objective Oxidative stress induces hypertrophic gene expression and collagen deposition that mediates cardiac hypertrophy and myocardial fibrosis. Vascular peroxidase 1 (VPO1) is a new heme-containing peroxidase, which can utilize hydrogen peroxide (H2O2) generated from co-expressed NADPH oxidase (NOX) to produce hypochlorous acid (HOCl) and catalyze peroxidative reactions. Considering the key role of the interaction between oxidative stress and endothelial dysfunction in causal mechanisms in hypertension. The aims of this study were to determine the potential role of VPO1 in endothelial dysfunction in hypertension.

Methods 20 weeks old Spontaneous hypertension rats (SHR) and Wistar-Kyoto rats were selected. The concentration-relaxation curve of aortic ring and the expression of VPO1 and endothelial nitric oxide synthase (eNOS) in arterial tissues were assessed; the nitric oxide (NO) level in plasma was measured. Human umbilical vein endothelial cells (HUVECs) were cultured and treated with angiotensin II, the eNOS expression and NO level were assessed while the expression of VPO1 and generation of H2O2 and HOCl were measured. Moreover, the effects of NOX inhibitor, the H2O2 scavenger, and the VPO1 inhibitor on the VPO1 expression, H2O2 and HOCl production were measured. Moreover, the direct effects of HOCl on eNOS expression and NO generation were also examined.

Result The VPO1 expression was significantly increased concomitantly with definite endothelial dysfunction in SHR's assessed by the substantial right shift of the concentration-relaxation curve, the decreased expression of eNOS in aortic ring and the decreased NO level in plasma. In cultured HUVECs we found that the angiotensin II-mediated down-regulation of eNOS expression and NO level was inhibited by knockdown of VPO1 using small hairpin RNA or the VPO1 specific inhibitor 4-aminobenzoic acid hydrazide. Moreover, the NADPH oxidase inhibitor and the hydrogen peroxide scavenger attenuated the angiotensin II-mediated up-regulation of VPO1 and HOCl generation. Furthermore, treatment with HOCl markedly decreased the eNOS expression and NO production.

Conclusion VPO1 is a novel regulator of endothelial dysfunction via NOX-H2O2-VPO1-HOCl-eNOS/NO pathways, which may contribute to the pathogenesis and/or development of hypertension.
by pretreatment with DPI, catalase and ABAH. Moreover, pretreatment with ABAH abolished the angiotensin II-induced up-regulation of p-ERK activity, not p-38, p-JNK expression.

Conclusion These Result indicated that VPO1 play a role in angiotensin II induced cell hyperthrophy via NOX-H2O2-VPO1-activity, not p-38, p-JNK expression.

Traditional Chinese medicine banxiao capsule inhibits the development of atherosclerosis plaques in a rabbit model
Chenghong Yu, Ruizhen Ji, Zhiqing He, Chun Liang, Zonggui Wu
Department of Cardiology, Changzheng Hospital, Second Military Medical University, Shanghai 200003, China

Objective Banxiao capsule is a compound prescription formulated according to the Gualou Xieba Decoctio originated from jinguiyaolue, which has been used for the treatment of coronary heart disease and angina pectoris for several hundred years and got very eminent effects in modern clinic. The novelty of Banxiao capsule is that we add Radix Notoginseng to treat CHD more effectively based on the treatment of statin combined with antplatelet agent. The object is to investigate the protective effect of Banxiao capsule on lowering serum lipid levels and inhibiting the development of atherosclerosis in a rabbit model.

Methods Fifty male New Zealand white rabbits were randomly divided into five groups (n = 10 each). The rabbits in the normal group were fed with normal diet, while rabbits in model group and drug treatment groups were fed with high cholesterol diet, then underwent the injury of the left carotid artery adventitia with digestion and blunt dissection, meanwhile the contralateral one obtained sham operation. After the atherosclerotic rabbit model was successfully established, each group was treated with Atorvastatin or different dosage of Banxiao for 16 weeks. At the end, serum lipid, pathologic, immunohistochemical, and gene expression studies were performed.

Result After treatment for 16 weeks Banxiao dose-dependently reduced the level of triglycerides (TG), low-density lipoprotein cholesterol (LDL-C) and raised the level of high-density lipoprotein cholesterol in blood than model groups. Compared with model group, Banxiao decreased the content of many infa mmmatory cytokines in plasm and plaques dose-dependently. Morphological analysis of carotid artery showed that Banxiao increased fibrous cap thickness and smooth muscle cells, reduced lipid core area and macrophages, and contributed to inhibit matrix degradation and infa mmmatory response as well as atorvastatin.

Conclusion Our study show that Banxiao capsule may lower serum lipid level and inhibit the development of atherosclerosis in rabbit model, indicating that this medicine was a reasonable drug for treating cardiovascular atherosclerosis diseases in clinical.

Delivery of AAV9 cyclin–A2 via hyaluronic acid hydrogel induces cardiac regeneration as well as improves cardiac function in vivo post MI
Xiang Ma
First Affiliated Hospital of Xinjiang Medical University Department of Coronary Heart Disease

Objective To assess the effects of exogenous AAV9 Cyclin-A2 in vivo post MI.

Methods Forty-eight male Sprague Dawley rat were randomly divided into four groups: MI+PBS (n = 12); MI+AAV9 Cyclin-A2 (n = 12); MI+HA (n = 12); MI+HA+AAV-9 Cyclin-A2 (n = 12). The recombinant was constructed, and 2 × 10
11 genome copies constructs were injected into the infarcted myocardium at three different points. Echocardiography was performed done to assess the left ventricular function. The hearts of each group were excised post MI four weeks to evaluate gene expression, apoptosis, vascular density, infarct area by Western Blot, immunohistochometry, and Masson Triple Stain techniques.

Result There was a significant statistical difference in expression of Cyclin-A2 and PCNA between HA+AAV9 Cyclin-A2 and two other control groups (MI + PBS and MI + HA) after four weeks. However, mitosis specific protein, H3P, had no statistical difference in expression among four groups (P > 0.05). Strikingly, sequential delivery of AAV9 Cyclin-A2 increased EF compared with PBS alone (P < 0.01) or HA blank (P < 0.01), but no significant difference in the LVEDD was observed between the groups. The values of LVEDD at four weeks were: PBS alone 1.18 ± 0.06; HA alone 1.11 ± 0.04; AAV9 Cyclin-A2 1.18 ± 0.05; and HA+AAV9 Cyclin-A 21.26 ± 0.05 respectively. Meanwhile, the values of EF were: PBS alone 0.82 ± 0.03; HA blank 1.02 ± 0.12; AAV9 Cyclin-A2 0.94 ± 0.05, and HA+AAV9 Cyclin-A 1.12 ± 0.06 respectively.

Conclusion HA can be used as a vehicle for gene delivery. AAV9 Cyclin-A2 serves as a new approach in cardiac remodeling as well as promoting cardiomyocytes regeneration.
Cyclin-A2 promotes cardiac regenerates via the recruitment of cardiac stem cells after myocardium infarction.

Xiang Ma, Aichao Zhao, Yongzhao Yao, Wen Cao, Fen Liu, Bangfang Chen, Yitong Ma
The first affiliated hospital of XinJiang medical university, The department of Coronary heart disease.

Objective To determine whether or not exogenous Cyclin-A2 promotes cardiac regeneration and restart cardiomyocytes cycle in vivo after MI.

Methods Mice were randomly divided into two groups; MI + saline (n = 30) and MI + rAAV9-CMV-Cyclin-A2 (n = 30). 2 × 10^9 genome copies in 200 μl saline were delivered into the mice myocardium through the caudal vein one week before MI. The control group was injected with saline at the same volume and time. Post MI observation was one week and three weeks respectively. Echocardiography was performed to measure LV end diastolic diameter (LVEDD), LV end systolic diameter (LVESD), and ejection fraction (EF). Western Blot and immunohistochemical analysis were used to detect the expression and location of Cyclin-A2. PCNA and phosphohistone-H3 were used to confirm DNA synthesis and mitosis respectively. C-Kit and connexin 43, which were defined as cardiac stem cells markers, were also measured.

Result Western Blot showed that expression of Cyclin-A2 started increased from time 0 to 2 weeks and peaked at 4 weeks after injection. Expression of Cyclin-A2 in the two groups had a significant statistical difference with p < 0.01. PCNA was specific in S phase and exhibited higher expression in Cyclin-A2 treated group than control group (0.75 ± 0.03 vs 0.43 ± 0.02, P = 0.036). However, mitosis specific protein H3P had no statistical difference between the two groups (P > 0.05). C-Kit and connexin 43 showed an increase in Cyclin-A2 treated group than control group (0.25 ± 0.03 vs 0.17 ± 0.02, P < 0.01). PCNA was specific in S phase and exhibited higher expression in Cyclin-A2 treated group than control group (0.75 ± 0.03 vs 0.43 ± 0.02, P = 0.036). However, mitosis specific protein H3P had no statistical difference between the two groups (P > 0.05). C-Kit and connexin 43 showed an increase in Cyclin-A2 treated group than control group (0.75 ± 0.03 vs 0.43 ± 0.02, P = 0.036). However, mitosis specific protein H3P had no statistical difference between the two groups (P > 0.05). C-Kit and connexin 43 showed an increase in Cyclin-A2 treated group than control group (0.25 ± 0.03 vs 0.17 ± 0.02, P < 0.01).

Conclusion Cyclin-A2 promotes cardiac self-repair via the recruitment of cardiac stem cells and restart cardiomyocytes cycle after myocardial infarction.

The angiogenic effect of saponin extract from root and biennial flower of Panax Notoginseng in zebrafish

Zhenyi Zhang, Shang Li, Youhua Wang, Mingyuan Li, Jingyi Tang, Xin Zhou, Li Wei, Ping Liu, Duan Zhou
1. Chinese Medical Sciences University of Macau
2. Longhua Hospital Shanghai University of TCM, Shanghai 200032, China

Objective To evaluate the angiogenic effect of saponin extract from root and biennial flower of Panax Notoginseng in zebrafish.

Methods Healthy transgenic zebrafish embryos at 24 hours post fertilization (hpf) were treated with embryo medium containing 25, 50, 100 μg/ml of PNS and Sanqi F for 48 h. In the other treatment plan, zebrafish embryos at 21 hpf were pre-treated with VEGF receptor kinase inhibitor II (VRI) for 3 h then VRI was washed out and subsequently post-treated with the indicated concentrations of 25, 50, 100 μg/ml PNS and Sanqi F for 48 h. The subintestinal vessels (SIVs) and intersegmental vessels (ISVs) in zebrafish were assessed for the pro-angiogenic/protective blood vessels effect of PNS and Sanqi F on vascular change at 72 hpf.

Result In healthy zebrafish, Sanqi F stimulated angiogenesis in the SIVs and reflected in increasing the number of sprouting vessels from SIVs basket and frequency of ectopic SIVs embryos in dose-dependent manner. Quantitative analysis confirmed that Sanqi F had been showed more effective angiogenesis than PNS in healthy zebrafish. And in VRI-induced blood vessels loss model, PNS and Sanqi F both could rescue the SIVs and ISVs respectively. It was clear that Sanqi F showed more remarkable potency and efficacy than PNS on recovery rate in VRI-induced blood injury zebrafish.

Conclusion The present study demonstrated that PNS and Sanqi F both exhibited pro-angiogenic effect in healthy zebrafish and restorative effect in VRI-induced blood vessels loss model in zebrafish. Intriguingly, our findings also shed light on that Sanqi F showed more powerful and significant angiogenic/restorative effect than PNS.

Proarrhythmic risk window exists in drugs that block multiple ion channels in the heart

Xiaohong Wei, Lin Wu, Yong Huo, Yansheng Ding
Department of Cardiology, Peking University First Hospital

Objective The proarrhythmic risk of QT prolonging drugs varies significantly. However, the mechanisms responsible for the high or low risk of drug-induced arrhythmias remain unknown. In this study, we tested our hypothesis that a proarrhythmic window exists for drugs that block multiple ion channels, which may be a cause of drugs with a high or low risk of proarrhythmia. Based on data from single cell research, tolterodine (a bladder inotropic drug), amiodarone and ranolazine are used as multiple channel inhibitors.

Methods Hearts from New Zealand White female rabbits weighing 2.5 – 3.5 kg were isolated, perfused in a Langendorff mode with modified Krebs-Henseleit solution. The atrioventricular nodal area was thermally ablated to produce complete atrioventricular block, and then heart was paced at a frequency of 1 Hz. Multiple channel monophasic action potentials (MAP) and pseudo 12-lead electrocardiograms (ECGs) were recorded. MAPDq, and transmural dispersion of repolarization (TDR) were measured.

Result In the absence of a drug (control), MAPDq recorded from epicardium and endocardium of left ventricle were 186.5 ± 5.5 and 206.5 ± 5.1 ms (n = 8), respectively. Administration of tolterodine from 10 nM to 600 nM, MAPDq was increased, in concentration dependent manners, from 196.7 ± 4.9 to 281.7 ± 26.8 ms, and 220.0 ± 4.6 ms to 350.6 ± 18.7 ms (n = 8, p < 0.001 vs control), respectively. However, when the concentration of tolterodine increased to 10 μM from 600 nM, MAPDq was decreased to 224.2 ± 5.9 and 252.5 ± 5.9 ms (n = 8), respectively. In addition, the incidence of TdP was correlated with the biphasic changes of MAPDq. Polymorphic ventricular tachycardias (PVT) were recorded at concentrations of 0.1 – 1 μM. There was no arrhythmia in the presence of 100 – 600 nM and 3 – 10 μM tolterodine. In contrast, amiodarone caused PVT only at 0.03 – 0.3 μM in the presence of late INa enhancer ATX-II. Ranolazine prolonged MAPD90 in absence, but not in the presence of ATX-II and caused no PVT.

Conclusion The biphasic pattern of MAP induced by tolterodine, as well as by amiodarone and ranolazine, suggests that a proarrhythmic window exists in multiple ion channel blockers, which may be a determinant of the risk of drug-induced proarrhythmias. The mechanism of the biphasic change may be attributed to the relative selectivity of drug on IK and late INa.
Isolation and culture of SD rats aortic valve interstitial cells
Huiqiang Chen, Wei Cui, Haijuan Hu, Fan Liu, Jingchao Lu, Xiaochun Yang, Bing Xiao
Department of Cardiology, The Second Hospital of Hebei Medical University

Objective Aortic valve interstitial cells (AVICs) play a vital role in the development of aortic valve stenosis. However, little progress is reported in isolation and culture of AVICs in rats, which is a wide used animal model for human diseases. The aim of this study is to isolate and culture AVICs from SD rats using an improved method.

Methods Aortic valves were isolated from the SD rats and techniques were developed with an improved explant method. The myofibroblast markers, α-smooth muscle actin (α-SMA) and vimentin, were analyzed using immunofluorescence. Ultrastructural characterization of cells was examined with transmission electron microscope (TEM).

Result 1. The time of primary culture were sharply cut down by shorten the contact time of aortic valve with culture media and increasing the density of fetal bovine serum in culture media. 2. Isolated cells exhibited an elongated morphology at low densities and cobblestone morphology at confluence. Cells from SD rats aortic valves were positive for α-SMA and vimentin. TEM analysis showed ultrastructural features of cells with abundant mitochondria, prominent rough endoplasmic reticulum, and plentiful myofilaments.

Conclusion This study provides a reliable and efficient explant method to isolate and culture AVICs from SD rats, which maybe helpful to the mechanism study of aortic valve stenosis and heart valves tissue engineering.

Relationship between ischemia duration and expression of heat shock protein 70 in ischemia–reperfusion canine hearts
Yang Yang, Yi Luo
Department of Cardiology, Guangzhou First Peoples Hospital Affiliated to Guangzhou Medical University

Background Heat shock protein 70 (HSP70) has been shown to exert a protective effect in hearts subjected to ischemia-reperfusion and alleviate adverse effects of myocardial ischemia-reperfusion injury (MIRI). However, little is known about the influence of ischemia time on HSP70 expression. The effects of ischemic duration on the content of HSP70 transcripts in ischemia-reperfusion myocardium were investigated in this article.

Methods Male mongrel dogs underwent a 15- or 60-min occlusion of the left anterior descending coronary artery, followed by a 120-min reperfusion. Additionally, a sham-operation group was assigned. The animals were killed after 120-min reperfusion and the heart was quickly removed. The myocardium was examined pathologically by electron microscopy. HSP70 mRNA expression both in intact and ischemic myocardium was measured by a semiquantitative reverse transcriptase-polymerase chain reaction (RT-PCR) method using complementary DNA normalized against the housekeeping gene β-actin.

Result (1) No ultrastructural changes of microvessels and myocardial cells except a slight loss of mitochondrial granules were noted in reperfusion myocardium from dogs of 15-min ischemia group. In 60-min ischemia group, endothelial cells of capillaries were slightly swelling, and the intercellular linking gaps of endothelial cells slightly widened. As for myocardial cells, intercellular, intermyofilobriar, and intermyofilamentous edema were present. Besides, the fractures of a few myofilaments, the granule loss and swelling of mitochondria were also seen. (2) HSP70 mRNA expression level in both ischemia-reperfusion zone and intact myocardium in 15-min ischemia group was markedly higher than in sham-operation group (36.2 ± 6.5 vs 22.0 ± 4.0, P = 0.005; 29.8 ± 4.5 vs 22.2 ± 4.7, P = 0.050). Compared with sham-operation group, however, no changes in mRNA HSP70 levels in 60min ischemia group (25.7 ± 7.5 vs 22.0 ± 4.0, P = 0.681; 28.5 ± 4.7 vs 22.2 ± 4.7, P = 0.118) were seen. The ratio of HSP70 mRNA expression content in ischemia-reperfusion zone to that in intact myocardium in 15-min ischemia group was not significantly different from sham-operation group (1.22 ± 0.16 vs 1.01 ± 0.22, P = 0.233), but remarkably higher than 60-min ischemia group (1.22 ± 0.16 vs 0.89 ± 0.17, P = 0.019).

Conclusion The change of HSP70 expression in ischemia-reperfusion myocardium is associated with ischemia time, that is, short duration ischemia promotes HSP70 expression, whereas long time ischemia does not. Furthermore, the HSP 70 expression changes consist with the protective extent of myocardial ultrastructures.

Animal survival experiments for ventricular assist device of “TongXin Demo4”
Chuangye Xu1,2, Changyan Lin1,2, Xiujian Liu1,2, Guanghui Wu1,2, Xiaotong Hou1, Haiyang Li1, Peng Yang1
1. Beijing An Zhen Hospital, Capital Medical University
2. Beijing Institute of Heart Lung and Blood Vessel Diseases
3. ChinaHeart Biomedical Inc.

Objective Ventricular assist devices are of great clinical value in treating end-stage heart failure, but they need preclinical animal experiments to evaluate their hemocompatibility and reliability in order to reduce potential complications such as bleeding, thrombus, infection and multiple organ dysfunction syndrome. “TongXin Demo 4”, a third generation electromagnetic bearingless blood pump manufactured by ChinaHeart Biomedical Inc. at the basis of previous prototype, has an advanced structure design resulting in smaller size and lighter weight. CFD analysis shows a considerable blood compatibility. This study intends to implant “TongXin Demo 4” into animals for mid-and-long term auxiliary circulation, and then assess its hemocompatibility, reliability and effects on end-organs.

Methods First, “TongXin Demo 4” was connected into a mock circulatory loop, and generated (4.6 ± 0.1) L/min outflow against a head pressure of (100 ± 3) mm Hg by adjusting thermistor and pump rate. Blood samples were drawn from the reservoir before pumping and at every hour of pumping for measurement of plasma free hemoglobin (FHB) and hematocrit (Hct). The normalized index of hemolysis (NIH) was evaluated. Then pumps were implanted into 2 healthy male sheep (weight 44.25 ± 0.25 kg) via the fifth rib after anesthesia, with inflow inserted into the left ventricular apex and outflow graft anastomosed to the descending aorta, thus building a bypass for blood of “left ventricular→VADs→descending aorta”. Routine hematologic and biochemical tests were performed preoperatively and postoperatively. Pump operating parameters were monitored continuously. At the termination, the sheep were humanely killed for observing pumps, and the end-organs were examined macroscopically and histopathologically.

Result We obtained NIH for “TongXin Demo 4” as (0.0012 ± 0.0008) g/100L; both sheep stood up after pulling out breathing cannula
in 2 hours. Hematologic and biomedical data were within the normal range and showed no evidence of organ dysfunction; the animals survived without bleeding and infection; the pumps worked without mechanical failure; 36 days after surgery, no thrombosis were observed in the pump, inlet and outlet; histopathological examinations showed no lesions for end-organs.

**Conclusion** The “TongXin Demo 4” has excellent blood compatibility and reliability; it basically has no structural and functional effects on major organs; the specific performance needs to be tested through more samples.

The expression of CXCL10 is elevated in congenital pulmonary hypertension

Guoliang Wang, Liukun Meng, Xiaoyan Liu, Shenghua Liu, Li Wang, Yingjie Wei
State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

**Background and Purpose** CXC-chemokine ligand 10 (CXCL10) inhibits angiogenesis and attracts activated T lymphocytes. Abnormal angiogenesis and lymphocytic infiltration participate in the pathobiology of pulmonary arterial hypertension (PAH). Serum CXCL10 is reported elevated in idiopathic PAH and is associated with clinical outcomes. We investigated the serum level of CXCL10 inpatients of congenital pulmonary hypertension and lung tissue of PAH rats.

**Experimental Approach** Rat model of PAH was induced by monocrotaline (60 mg/kg, subcutaneous injection). Human pulmonary arterial smooth muscle cell (HPASMC) proliferation was induced by fetal bovine serum (10%) after starvation for 24 hours. The expression level of CXCL10 and its receptor (CXCR3) was measured by RT-PCR. Serum CXCL10 level was measured by protein affinity microarray. CXCL10 level of patients of congenital heart disease with severe PAH or without PAH was compared.

**Result** Compared with control, CXCL10 expression level in lung tissue of rat was elevated about 2 times after monocrotaline injection 1 week, and then declined gradually. The expression level of CXCL10, receptor of CXCL10, also increased after monocrotaline injection, and reached the top (about 1.4 times) in week 3. FBS can induce HPASMC expression CXCL10, the expression level was elevated about 1.91 ± 0.17 times after 24 hours compared with control. The expression level of CXCR3 in HPASMC changed insignificantly. The mean serum CXCL10 level of congenital heart disease patients with severe PAH was 2163 ± 560 pg/ml, about 2 times of congenital heart disease patients without PAH.

**Conclusion and Implications** Serum CXCL10 is reported elevated in idiopathic PAH and is associated with clinical outcomes. Our preliminary Result showed it is also elevated in congenital pulmonary hypertension. This study augments the probability of serum CXCL10 being a new biomarker of PAH.

The expression of CCL4 is elevated in congenital pulmonary hypertension

Guoliang Wang, Liukun Meng, Xiaoyan Liu, Shenghua Liu, Li Wang, Yingjie Wei
State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

**Background and Purpose** Inflammatory processes are prominent in various types of human and experimental pulmonary hypertension (PH) and are increasingly recognized as major pathogenic components of pulmonary vascular remodeling. Macrophages, T and B lymphocytes, and dendritic cells are present in the vascular lesions of PH. CCL4 is an important chemoattractant for macrophages and T lymphocytes. We investigated the serum level of CCL4 inpatients of congenital pulmonary hypertension and lung tissue of PAH rats.

**Experimental Approach** Rat model of PAH was induced by monocrotaline (60 mg/kg, subcutaneous injection). The expression level of CCL4 and its receptor (CCR5) was measured by RT-PCR. Serum CCL4 level was measured by protein affinity microarray. Circulating CCL4 level of patients of congenital heart disease with severe PAH or without PAH was compared.

**Result** CCL4 expression level in lung tissue of rat was elevated rapidly after monocrotaline injection and maintained with high level. The top level was reached at week 2, about 6.8 times compared with control. The expression level of CCR5, receptor of CCL4, increased slightly after monocrotaline injection and has no significant compared with control. The mean serum CCL4 level of congenital heart disease patients with severe PAH was 277 ± 18, significantly higher than patients without PAH (about 9 times).

**Conclusion and Implications** Our preliminary result showed serum CCL4 level is elevated in rat PAH model and congenital pulmonary hypertension patients. This study emerged the probability of serum CCL4 being a new biomarker of PAH.

Comparative myocardial protection between HTK solution and cold blood cardioplegia in immature heart during cardiopulmonary bypass

Yan Chen, Cun Long, Jingping Liu
Department of CPB, Surgery, Fuwai Cardiovascular Hospital Chinese Association of Medical Science, Peking Union Medical College Beijing, 100037, China

**Objective** The optimal myocardial protection strategy for newborns/infants undergoing prolonged cardiac arrest during congenital heart surgery remains controversial. Which is the better option between HTK or blood cardioplegia during neonatal cardiopulmonary bypass is unclear. The purpose of this study was to compare myocardial protection using HTK and cold blood cardioplegia in a neonatal piglet model.

**Materials and Methods** Fifteen piglets were randomized to three groups: the control group (C group, n = 5), a single dose of HTK group (HTK group, n = 5) and muti-dose cold blood cardioplegia group (cardioplegia : blood = 1 : 1, CBC group, n = 5). Animals in the two experimental groups were placed on hypothermic CPB, after which the ascending aorta was clamped for 2 h. The control animals underwent normothermic CPB without cardiac arrest. Serum troponin-T, troponin-I, CK-MB levels were measured before CPB and 2 h after weaning from
myocardial histopathology was examined by light microscopy. Mitochondrial structural damages were assessed by electron microscopy.

Result Transfusion requirement in the CBC group was significantly more than that in the HTK group (P < 0.01). Immediately after declamping, both the difference between arterial and coronary sinus blood lactate concentrations and the oxygen extraction did not differ between the two experimental groups (P > 0.05). At 2 h after weaning from CPB, rise in serum TnT, TnI and CK-MB levels showed no significant differences between the three groups (P > 0.05). There were no differences in eNOS, VEGF, iNOS, TNF-α and IL-1β content in myocardium as well as histopathological score between the HTK group and the CBC group (P > 0.05). However, mitochondrial score under electronic microscopy in HTK group was higher than that in the CBC group (P = 0.045), and myocardial ATP content in the HTK group was lower than that in the control group (P = 0.017). Moreover, TUNEL positive cells in the HTK group increased compared to the CBC group (P = 0.037).

Conclusion Compared with cold blood cardioplegia, there are no differences in myocardial metabolism, biochemical markers, endothelial activation and early inflammatory reaction and histopathological injury between the HTK group and the CBC group. However, mitochondrial injury in the HTK group shows more damages than that in the CBC group, and there are increased apoptotic cells and trend of reduced ATP content in myocardium in the HTK group. Less transfusion requirement in HTK group, and there are increased apoptotic cells and trend of reduced ATP injury in the HTK group shows more damages than that in the CBC group (P < 0.01). Immediately after weaning from CPB, rise in serum TnT, TnI and CK-MB levels showed no significant differences between the three groups (P > 0.05). There were no differences in eNOS, VEGF, iNOS, TNF-α and IL-1β content in myocardium as well as histopathological score between the HTK group and the CBC group (P > 0.05). However, mitochondrial score under electronic microscopy in HTK group was higher than that in the CBC group (P = 0.045), and myocardial ATP content in the HTK group was lower than that in the control group (P = 0.017). Moreover, TUNEL positive cells in the HTK group increased compared to the CBC group (P = 0.037).

The cardioprotective effect of an improved cardioplegia

Feilong Hei, Bei Wu, Cun Long, Shilei Wang, Chunni Qin, Kun Yu
Cardiopulmonary bypass department, Fu Wai Hospital, Peking Union Medical College, Beijing, 100037

Objective The heart preservation solution is indispensable for the donor-heart preservation during transplantation. We combined “the cardiac protection and the coronary protection” together to intensify the isolated heart preservation effects. We used the isolated rat heart perfusion model to assess the hypothermic preservation effects of the newly designed solution.

Methods We randomly divided the male Wistar rats (n = 15) to 3 groups as follow: Control, FW and HTK. The hearts, except the control group, were preserved by simple immersion them for 8 hours at 4°C in each solution. At the end of the storage period, the hearts were perfused immediately in the Langendorff model. Some indices of myocardial function were measured, every kind of myocardial enzymes were measured in the coronary effluent. Myocardium was reserved to observe the changes of myocardial ultra-structure to assess the quality of heart preservation.

Result The heart function of the experimental group decreased to a different degree. Group FW and HTK had a lower mean left ventricular developed pressure (LVDP), dp/dtmax, dp/dtmin compared with the Control group (P < 0.01). Group HTK showed better coronary flow (CF) compared to group FW (P < 0.05). Group FW showed remarkably decreased release of every kind myocardial enzymes compared to group HTK (P < 0.01, respectively) in cTnI, GOL and CK.

Conclusion After the preservation in the three kind of profound hypothermia cardioplegia solution for 8 hour, the heart function decrease. Cardioprotection effects of FW solution is better than the HTK solution in the isolated rat heart model during hypothermic preservation.

Effect of FW solution on sodium channel in ischemia–reperfusion newborn rat myocytes

Feilong Hei, Bei Wu, Cun Long, Shilei Wang, Chunni Qin, Kun Yu
Cardiopulmonary bypass department, Fu Wai Hospital, Peking Union Medical College, Beijing, 100037

Objective To study the effect of the FW solution on sodium channel (INa) in ischemia-reperfusion (I/R) neonatal rat myocytes.

Methods Myocytes were primary cultured for 18-48 h before using in the experiment. Cells were treated with I/R in the I/R group and with I/R plus Histidine-tryptophan-ketoglutarate (HTK) solution or FW solution in the HTK and the FW group, respectively. Whole cell patch clamp was used to record the current and gating.

Result The peak current density in the FW group decreased significantly than the I/R and the HTK group (-305.9 ± 64.1 pA/pF vs. -617.2 ± 74.2 pA/pF and -547.3 ± 20.8, P < 0.05), the I-V curve of the FW group up-shifted. The peak current in the HTK group decreased than the I/R group, however no significant difference was observed. Compared with the I/R and the FW group, the activation and inactivation...
curves of the HTK group left-shifted.

**Conclusion** FW solution could inhibit the INa current after I/R injury in neonatal rat myocytes without affecting the gating characteristics of the channel. This could help alleviating intracellular Na⁺ and calcium (Ca²⁺) overload.

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**Effects of bushen jiangya decoction on the CPT–1 gene regulation mechanisms in insulin resistance of spontaneous hypertensive rats**

Xiaochen Yang, Xingjiang Xiong, Yun Zhang, Jie Wang
Department of Cardiology, Guang'anmen Hospital, China Academy of Chinese Medical Sciences, Beijing 100053, China

**Objective** To investigate mitochondrial fatty acid oxidation enzymes carnitine palmitoyl transferase (CPT-1) gene regulation mechanisms in insulin resistance of spontaneous hypertensive rats (SHR), and to observe the effects of Bushen Jiangya Decoction (BJD) on the blood pressure, insulin resistance and the myocardial energy metabolism of adult spontaneous hypertensive rats (SHR).

**Methods** 60 SHRs, 12 weeks old, were randomly divided into five groups.

**Result** After 8 week-treatment, the blood pressure in all rats were recorded; The level of fasting blood glucose (FPG) was determined with enzyme colorimetric and the insulin sensitivity index (ISI) was calculated.

**Conclusion** Bushen Jiangya Decoction can increase CPT-1 gene expression in cardiac tissue, promote myocardial fatty acid metabolism, thereby improve insulin resistance in SHR, and the mechanism may be related to increase the serum level of adiponectin, and improve myocardial tissue adiponectin signaling pathway.
Cardiovascular Imaging and Laboratory medicine

Protective effect of Shen Yuan Dan, a traditional Chinese medicine, against myocardial ischemia/reperfusion injury in vivo and vitro

Fuyong Chu1, Juju Shang1, Bao Wu1, Aiyong Li1, Tong Tong1, Hongxu Liu1
1. Cardiology, Beijing Hospital of Traditional Chinese Medicine, Beijing, China.
2. Cardiology, Daxing Hospital of Traditional Chinese Medicine, Beijing, China.

Objective The myocardial ischemia/reperfusion injury is a major problem in myocardial ischemia/reperfusion injury and pharmacological postconditioning could alleviate the injury. The purpose of this study was to investigate the effects and mechanisms of Shen-Yuan-Dan postconditioning could alleviate the injury. The purpose of this study was to investigate the effects and mechanisms of Shen-Yuan-Dan postconditioning on myocardial ischemia/reperfusion injury.

Methods The rat ischemia/reperfusion model was established by ligation of left anterior descending coronary artery for 30 min and reperfusion for 3 h and the I/R model in vitro was performed on cultured neonatal cardiomyocytes subjected to simulated hypoxia/reoxygenation. Myocardial injury markers and histopathology staining were examined in rat model. In vitro experiment, cell viability was detected by 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide assays. Cellular apoptosis was determined by hoechst 33342 staining. The protein expressions of Bcl-2 and Bax in different groups were determined by immunocytochemistry assay.

Result Both low dose of SYD reduced lactic dehydrogenase and creatine kinase-MB activity and malondialdehyde content, increasing superoxide dismutase activity and attenuating histopathology apoptosis. Meanwhile, SYD promoted cell viability and inhibited the cardiomyocyte apoptosis. The expressions of Bcl-2 and Bax were restored to the normal level by SYD pharmacological postconditioning. These effects of SYD were reversed by LY294002, the inhibitor of the phosphatidylinositol 3-kinase/Akt pathway.

Conclusion Out data suggested that SYD pharmacological postconditioning showed cardioprotection against myocardial ischemia/reperfusion injury via activating the phosphatidylinositol 3-kinase/Akt pathway.

The association between SAA in HDL and coronary heart disease

Dongxue Wang, Hong Liu, Lirong Yan, Xiaoyuan Guan, Yuexin Jiang, Xiaoxing Zhang, Lu Hua, Youhong Jia, Zhimin Xu, Jue Chen, Jie Qian, Yishi Li
Key Laboratory of Clinical Trial Research in Cardiovascular Drugs, Ministry of Health, State Key Laboratory of Cardiovascular Diseases, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College.

Objective Serum amyloid A protein (SAA), majorly combining with high density lipoprotein (HDL) in circulation, plays a role in the atherosclerosis. Whether there was an association between SAA in HDL and CHD was unclear. The present study was to explore the association between SAA in HDL and coronary heart disease (CHD).

Methods Stable CHD patients and age and gender matched control subjects were enrolled in this case-control study. Fast plasma was collected before coronary angiography. Potassium bromide (KBr) density gradient ultracentrifugation was used to isolate HDL from plasma. The levels of SAA in the HDL samples were detected by enzyme-linked immunosorbent assay kits. Logistic regression analysis was used to study the association between SAA in HDL and CHD.

Result Over 67 patients with confirmed stable CHD and 67 control subjects matched in age and gender were enrolled. Compared with controls, patients with CHD had a significant increase in the level of log (SAA) (1.39 ± 0.58 vs 1.15 ± 0.46, P = 0.011) independently from age, BMI, HDL cholesterol (HDL-C), etc. Logistic regression analysis showed the level of SAA in HDL was independent determinant of CHD (OR = 5.685, 95% CI: 1.371 – 23.581), which meant when log (SAA) increase 1 unit, the incidence of CHD increase 4.685 times.

Conclusion The composition of HDL altered in HDL isolated from CHD patients. The level of SAA in HDL may be associated with the incidence of CHD.

Two autopsied cases of sudden death in young people with severe coronary atherosclerotic heart disease

Xinshan Chen, Kaiyi Liu, Chunyu Shen
Department of Forensic Pathology, Tongji Medical College, Huazhong University of Science and Technology.

Objective To explore the tendency of the incidence of the sudden coronary death in young by analyzing the 2 cases of sudden death in young with severe coronary heart disease.

Methods Two cases of sudden death in young with severe coronary heart disease were selected from the autopsied cases in the Department of Forensic Pathology.

Result The two cases were both male with the age being 24 and 27 years old. Both of them had no history of heart disease and died without an hour after onset. Autopsy found that there were severest atherosclerotic lesions (in the fourth degree) in the three main branches of coronary arteries in the 24 years old man, of which 2 main branches were up to 90% and 95% respectively. The 27 years old man was found severe atherosclerotic lesions in the fourth degree in LAD and in the third level in RCA.

Conclusion Although both the severity degree of the coronary lesion and the incidence of SCD were lower in China than that in the European and American countries, SCD tended to be younger. People should pay more attention to prevention CHD and SCD and that rescue should be done in time and further resuscitation can become possible in order to got survival opportunity for them.
The electrophysiological changes of inward rectifier potassium channel in ischemia postconditioning of cardiomyocyte

Zhihui Liao, Zhengyi Feng, Cun Long
Cardiopulmonary bypass department, Fu Wai Hospital, Peking Union Medical college, Beijing, 100037

**Background** Previous study suggested that adjusting the inward rectifier potassium channel in the process of ischemia postconditioning may affect the result of the myocardial protection against the ischemia reperfusion injury, but it is unclear the extent of change of the current density in the myocardial ischemia postconditioning. We observed the difference of inward rectifier potassium channel currents density between the groups with different procedure after a 45 min sustained hypoxia in cultured myocytes of neonatal rat myocardial cells. Patch clamp recorded the inward rectifier potassium channel current density, cell death rate was observed by using trypan blue staining.

**Method** A 105 min continuous oxygenation (CON group), 45 min sustained hypoxiaproceeded with 60 min reoxygenation (I/R group), 45 min sustained hypoxia, preceded with 3 × 5 min hypoxiareoxygenation (IPO group) and after 45 min sustained hypoxia, added 1 μmol/L zacopride at the onset of reoxygenation (PZ group) on cultured neonatal rat myocardial cells. Patch clamp recorded the inward rectifier potassium channel current density, cell death rate was observed by using trypan blue staining.

**Result** Compared to the I/R group, inward and outward current density of the inward rectifier potassium channel in IPO group and PZ group were significantly increased: (at -120 mV; -22.34 ± 3.14, -16.67 ± 4.27 vs -10.34 ± 0.82 pA/pF, P < 0.05, at -10 mV 2.35 ± 0.18, 2.48 ± 0.11 vs 0.41 ± 0.29 pA/pF, P < 0.05). The myocytes mortality of IPO group and PZ group was significantly lower than that of the I/R group (49 ± 7% vs 69 ± 5% pA/pF, P < 0.05).

**Conclusion** Hypoxia postconditioning increased inward rectifier potassium channel current density which may be an important mechanism to against the hypoxia-reperfusion injury by myocardial hypoxia postconditioning.

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Reversal effect of Dahuang Zhechong Pill combined with Jiawei Xiaoyao Pill on atherosclerosis and evaluation of MRI

Jingjing Hu, Xiaoming Shu, Liangping Luo, Lin Qiu, Changzheng Shi, Peikao Chen
The First Affiliated Hospital of Jinan University, Guangdong, China

**Objective** To observe the atherosclerotic plaque reversal effect with our drugs treatment by MRI.

**Methods** To establish rabbit model of atherosclerosis by abdominal aorta injury operation and high fat diet for 2 months. After the MRI detection of modeling in experiment 1, drug treatment was administered, and MRI detection was administered 1 month and 3 months after. In experiment 2, the rabbits were divided into high dose group, low dose drug group, positive control group and blank control group. The drug groups were treated for 2 months.

**Result** In the three phases of experiment 1, the white development become from annular thick to thin annular and punctuate, finally to disappear. In experiment 2, the plaque of low dose group was significantly reduced, and the plaque of high dose group completely disappeared, while the plaque volume of positive control group remained constant.

**Conclusion** The plaques decreased to disappear completely. To cure coronary heart disease is possible.

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Preclinical study of the iValveTM transcatheter valve and delivery system: early result of successful TAVI by transapical approach in 18 consecutive miniature pigs

Yue Tang1, Xiaoping Liu2, Yi Tian2, Fuliang Luo2, Weimin Yuan2, Jianzhong Yang2, Baojie Zhang2, Hong Du2, Jubo Li2 and Ji Zhang2
1. Ward B, Center of Cardiac Surgery for Adult, State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, P. R. China
2. Animal Experiment Center, State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, P. R. China

**Objective** Transcatheter aortic valve implantation (TAVI) is an emerging technology developed for treating patients with severe aortic stenosis who are considered inoperable or at high risk for traditional surgery. In this study, an innovative aortic prosthesis valve - the iValveTM transcatheter valve (Jie Cheng Medical Technologies, Suzhou, China) that has unique navigation element specifically designed for accurate positioning and alignment of the prosthesis is being introduced for the first time. The purpose of this study is to perform preclinical evaluation for the feasibility and safety of fast transapical implantation of this valve, as well as its early stage hemodynamic performance after implantation, in eighteen Chinese miniature pigs.

**Methods** Self-positioning nitinol stent valve: The iValveTM prosthetic aortic valve (Jie Cheng Medical Technologies, Suzhou, China) contains two relatively independent components, the valve body and the navigation element, both self-expandable and are moveably attached. The valve body consists of a porcine aortic valve sewn to a cylindrical nitinol stent, which is covered with a polyester skirt to prevent periprosthetic regurgitation. The navigation elements are composed of three highly elastic recumbent nitinol filaments joined by three vertical slide tracks at the upper borders. This specific configuration ensures the flexibility and deformability of the navigation elements such that easy yet firm anchor at the bottom of native aortic cusps could be achieved. So the navigation elements are capable of achieving accurate self-positioning and alignment and providing operators with tactile feedbacks in the process that they capture and anchor into the aortic cusps. The connecting elements are placed at the bottom of the valve body where corresponding to the co mmisures of the leaflets on one end, and within the slide tracks on the other end. They can slide along the tracks during implantation.

The iValve TA-VTM delivery system is composed of a cambered delivery catheter at the distal end and a control handle at the proximal end. During implantation, the valve body lies above the aortic cusps and within the corresponding to the commissure of the leaflets on one end, and within the slide tracks on the other end. They can slide along the tracks during implantation.

The iValve TA-VTM delivery system is composed of a cambered delivery catheter at the distal end and a control handle at the proximal end. During implantation, the valve body lies above the aortic cusps and within the slide tracks when the prosthetic valve is to be compressed and loaded in the delivery catheter in vitro. However, the valve body will be pulled downwards to the native annulus after the navigation elements have opened and accurately positioned in the aortic cusps. The valve body descends until to the designed position which is relatively to the level
of navigation elements. At this point, the valve body has automatically aligned within the aortic root. Then the valve body is deployed and released. All the above steps can be finished easily by rotating four corresponding knobs in the control handle.

**Implantation procedure:** Experimental evaluation was performed on eighteen Chinese miniature pigs with a weight between 40 and 62 kg (49.0 ± 6.8 kg). An inferior partial median sternotomy and longitudinal incision of the pericardium was adopted to access the left ventricular apex. After pre-operative angiogram of aortic root, the 24F delivery catheter was introduced into the left ventricle and the ascending aorta. Then the prosthetic valve was positioned and released by a standardizable delivery procedure described above. Finally, the delivery catheter and guidewire were retracted from the heart and the apex was closed with the purse string suture.

**Result** Valve implantation: One 21 mm-size, six 23 mm-size and eleven 25 mm-size valves were implanted with fluoroscopic guidance, all valves were successfully deployed after accurate positioning of the navigation elements in the aortic cusps in consecutive 18 miniature pigs except one. In one procedure, a second positioning was processed because one of the navigation ears failed to capture the native valve in the first attempt. Valve position was confirmed by angiography right after release, one valve showed moderate obliqueness to the mitral valve, and the animal dead 6 h after implantation because of valve failure. Another one showed slight obliqueness with no effect on valve's function. No coronary obstruction, valve migration or other serious adverse event was observed during the implantation processes, no conduction block or other type of arrhythmia was recorded either. Benefiting from the navigation ears, valve release procedures only took an average time of 7.3 ± 2.5 minutes. No angiography was needed during the release procedure and no more than three times of angiography were achieved during the whole implantation process. Hemodynamic performance: Hemodynamic performance of the prosthetic valves was evaluated immediately after valve implantation and on the seventh day after implantation. Cardiac output was measured by Swan-Ganz catheter before and after valve deployment as well as during the implantation process, no conduction block or other type of arrhythmia was recorded either. Benefiting from the navigation ears, valve release procedures only took an average time of 7.3 ± 2.5 minutes. No angiography was needed during the release procedure and no more than three times of angiography were achieved during the whole implantation process. Hemodynamic performance: Hemodynamic performance of the prosthetic valves was evaluated immediately after valve implantation and on the seventh day after implantation. Cardiac output was measured by Swan-Ganz catheter before and after valve deployment, all of them were traced from the heart and the apex was closed with the purse string suture.

**Conclusion** In this study we demonstrated feasibility and safety of the iValveTM transapical system which has novel navigation elements. This unique design enabled the iValveTM prosthesis valve to get anatomically correct self-positioning and alignment automatically within the native aortic annulus during a fast deployment procedure. The valve also showed optimal hemodynamic performance right after implantation, which was unchanged at 7 days follow-up.

**The effect of inward rectifier potassium channel in ischemia postconditioning of isolated rat heart**

Zhihui Liao, Zhengyi Feng
Cardiopulmonary bypass department, Fu Wai Hospital, Peking Union Medical College, Beijing, 100037

**Background** Numerous studies discovered that inward rectifier potassium channel is changed in ischemia-reperfusion injury, but its effect on myocardial ischemia postconditioning is unclear. The objective of this study is to observe the effect of inward rectifier potassium channels in the protection of myocardial ischemia postconditioning against the ischemia reperfusion injury.

**Method** 32 isolated rat hearts (n = 8) suffered a 45 min sustained ischemia, followed by the process of sustained reperfusion (UR group), ischemic postconditioning (IPO group), ischemic postconditioning + inward rectifier potassium channel antagonist 20 μmol/L BaCl2 (PB group), and post-processing + inward rectifier potassium channel agonist 1 μmol/L Zacopride (PZ group). Recorded the hear rate (HR), left ventricular developed pressure (LVDP), ± dp/dtmax, coronary flow (CF), cardiac troponin I (cTnI), malondialdehyde (MDA) and total superoxide Dismutase (T-SOD), myocardial infarct size.

**Result** PZ group had better performance in cardiac function and coronary flow than IPO group had after the reperfusion; PB group also reduced the release of cTnI, MDA and increased the synthesis of T-SOD. The infarct size was significantly reduced in PZ group than in IPO group (18.5 ± 5.2% vs 29.0 ± 4.2%, P < 0.05). PB group were declined in the performance of cardiac function and CF, increased in the release of cTnI, MDA, but T-SOD synthesis was decreased comparing with the IPO group.

**Conclusion** 20 μmol/L BaCl2 partly eliminated, but 1 μmol/L Zacopride enhanced the protection of ischemia postconditioning against the myocardial ischemia reperfusion injury.

**Dyslipidemia in rat fed with high-fat diet is not associated with PCSK9–LDL–receptor pathway but ageing**

Yanjun Jia, Jin Liu, Yuanlin Guo, Ruixia Xu, Jianjun Li
Division of Dyslipidemia, State Key Laboratory of Cardiovascular Disease, Fu Wai Hospital, National Center for Cardiovascular Disease, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, China

**Background** Obesity is associated with unfavorable alternations in plasma lipid profile and a broad spectrum of cardio-metabolic disorders. Proprotein Convertase Subtilisin Kexin type 9 (PCSK9) is a novel circulating protein that promotes hypercholesterolemia by decreasing hepatic low lipoprotein density receptor (LDLR) protein. However, the relationship between PCSK9 concentration and lipid profile in an obesity condition has less been investigated.

**Objective** In this study, we aimed to examine the changes of plasma PCSK9 concentration in a rat model fed with high fat diet (HFD) and its correlation to lipid profile, body weight and ageing.

**Method** Twenty male Sprague Dawley rats were divided the two groups: the control group (fed with normal pellet for 4 weeks), and high-fat diet group (fed with 3% cholesterol enrich diet for 4 weeks). Blood samples of rats were obtained before and at days 14, 21, and 28 in both groups. The body weight, plasma metabolic parameters (glucose, lipid profile) and PCSK9 were determined at indicated time points.

**Result** The body weights were significantly increased in rats fed with HFD compared to that in rats with normal pellet at day 28. Additionally, total cholesterol (TC), Triglyceride (TG), and low density lipoprotein cholesterol (LDL-C) levels in rat fed with HFD were also higher than that in rat fed with control diet while a decreased high density lipoprotein cholesterol (HDL-C) levels were found in rats with HFD at day 28. More interesting, there were no differences of plasma PCSK9 concentrations as well as hepatic expression of LDLR between the two
Atrial vagal–selective denervation using cell–penetrating (cp)–Gαi1/2 C–terminal peptide via ultrasound–targeted microbubble destruction

Hua Jiang, Xianhui Zhou, Fei Li, Baopeng Tang, Jian Zhang, Haoxuan Qin, Tianyi Gan
Department of Cardiology, First Affiliated Hospital, Xinjiang Medical University, Urumqi 830011, PR China

Objective
The parasympathetic nervous system plays a critical role in the pathogenesis of atrial fibrillation (AF). The parasympathetic signalling is primarily mediated by the heterotrimeric G-protein, Gαiβγ. We hypothesized that targeted inhibition of Gαi interactions in the left atrium would suppress vagal-induced AF via ultrasound-targeted microbubble destruction.

Methods
By stimulating vagus nerve trunk and rapid right atrial pacing, we established paroxysmal atrial fibrillation model in canine. Rhodamine-labeled cell-penetrating (cp)-Gαi1/2 C-terminal peptide combined with ultrasound-targeted microbubble using a direct connection method. The fluorescent intensity and binding rates were measured and analyzed using the fluorescence microscope observation and flow cytometry detection. A total of 12 canines were divided into 2 groups (n = 6): the experimental group using ultrasound plus targeted microbubbles with cp-Gαi1/2 peptide, while in control group using ultrasound plus targeted microbubbles only. Confocal fluorescence microscopy was used to verify the expression of cp-Gαi1/2 peptide. Gαi1/2 subunit mRNA and protein expression were assessed by real-time PCR and western blot respectively. The amounts of cAMP in left atrium (LA) homogenates were assessed via competitive enzyme immunoassay.

Result
Microbubbles and cp-Gαι1/2 peptide were combined successfully. Fluorescence microscope observation showed that the microbubble's surface emitted orange-red fluorescence before and after washing; Result of flow cytometry detection showed that the binding rates of cp-Gαι1/2 peptide were 93.4% ± 11.0% and 90.2% ± 9.4% before and after washing respectively. Cp-Gαι1/2 peptide was confirmed in experimental group LA. There was no significant difference in the mRNA and protein expression of Gαι1/2 subunit between the two groups, while cAMP levels in experimental group was found to be significantly higher than that in control group (P < 0.01). Electrophysiological mapping of canine left atrial pulmonary veins (PVs), left atrial appendage (LAA) and coronary sinus (CS) indicated that the delivery of cp-Gαι1/2 peptide into the LA prolonged effective refractory periods (ERP) and the dERP of different sites (P < 0.05).

Conclusion
These Result demonstrate that specific Gαι C-terminal peptide can be used to achieve selective disruption of parasympathetic-mediated MRGαi1/2 protein coupled signalling by the inhibition of AC/cAMP/PKA pathway, thus decreases vagal-induced atrial fibrillation.

The protective effects of a Non–depolarizing cardioplegia and its electrophysiological mechanisms

Wu Bei, Hei Feilong, Long Cun, Wang Shilei, Qin Chunni, Yu Kun
Cardiopulmonary bypass department, Fu Wai Hospital, Peking Union Medical College, Beijing, 100037

Objective
1. To investigate the cardioprotective effects of St. Thomas (ST) solution, Histidine-Tryptophan-Ketoglutarate (HTK) solution and Non-depolarizing (NDP) solution after preservation in the three solutions at room temperature and 4 °C, separately. 2. To investigate the effects of ST solution, HTK solution and NDP solution on the electrophysiological characteristics of action potential (AP), fast sodium current (INa), L-type calcium current (ICa-L) and transient outward potassium current (Ito) from new-born rat cardiomyocytes. 3. To investigate the effects of ST solution, HTK solution and NDP solution on the cytoplasmic and mitochondrial calcium metabolism and their membrane potential migration. 4. Compare the cardioprotective and electrophysiological effects of ST solution, HTK solution and NDP solution.

Methods
Sixty-four isolated SD rat hearts were perfused with 37 °C oxygen-saturated KH solution for 15 min and then divided into 8 groups, 8 for each group. (1) for the hearts preserved under room temperature: we used 24 – 26 °C calcium-free KH solution, ST solution, HTK solution and NDP solution for cardiac arrest and the 1 hour-preservation for the Con group, the ST group, the HTK group and the NDP group separately. After preservation, hearts were reperfused with 37 °C oxygen-saturated KH solution for 1 h; (2) for the hearts preserved under icy temperature: we used 4 °C calcium-free KH solution, ST solution, HTK solution and NDP solution for cardiac arrest and the 8 hour-preservation for the Con group, the ST group, the HTK group and the NDP group separately. After preservation, hearts were rewarmed with each solution and reperfused with 37°C oxygen-saturated KH solution for 1 h. Heart function recovery, Cardiac troponin I (cTnI) level, myocardial infarction area, ATP and lactic acid (LA) content and morphology variations were compared between each group. 2. We cultured the new-born rat cardiomyocytes. Cells after 36 hours' cultivation were used for whole-cell patch clamp detection. Five groups were included: (1) the Control (Con) group: normal cardiomyocytes; (2) the ischemia/reperfusion (I/R) group: cells were treated with 3-hour ischemia and 1-hour-reperfusion; (3) the ST group, the HTK group and the NDP group: during the ischemia-reperfusion (I-R) treatment, ST solution, HTK solution and NDP solution were added in the culture medium separately. The characteristics of the AP, INa, ICa-L and Ito were compared between each group. 3. We cultured the new-born rat cardiomyocytes. Cells after 5 days' cultivation were used for laser confocal microscopy scanning. Cells were incubated with four different fluorochromes. Under each condition, four groups were included: the Con group were scanned for 35 min continuously; after 5 min scanning, the ST group, the HTK group and the NDP group were treated with ST solution, HTK solution and NDP solution separately, and then followed with 30 min continuous scanning.

Result
1. Under the 1-hour-room temperature condition: the heart function recovery in the HTK group and the NDP group were superior to the ST group (P < 0.05); the coronary flow in the NDP group increased compared with the ST group and the HTK group (P < 0.05); the infarction percentage and cTnI level in the HTK group were lower than the ST and NDP groups (P < 0.05); there was no significant difference in the ATP and LA content among the three groups. 2. Under the 8-hour-icy temperature condition: the heart function of the ST group could not effectively recover; the heart function of the NDP group could recover...
to the level of 90% of the preischemic value; the cTnl levels of the HTK and NDP groups were lower than the ST group. Compared with the ST group and the HTK group, the infarction area of the NDP group decreased, and the ATP content increased. There was no significant difference in the LA content among the three groups. 3. The electrophysiological changes of each group were as follows. (1) AP: the action potential amplified (APA) and action potential duration (APD) of the I/R group decreased and the resting membrane potential (RMP) depolarized compared with the Con group. The RMP, APA, APD of the NDP group recovered almost to the normal level. (2) INa: the peak current density of the I/R group decreased significantly than the Con group (P < 0.05), the activation curve right-shifted and the inactivation curve left-shifted. Compared with the I/R, ST and the HTK groups, the peak current density increased (P < 0.05), and the inactivation curve right-shifted. (3) ICa-L: the peak current density of the I/R group decreased significantly than the Con group (P < 0.05), the activation curve right-shifted and the inactivation curve left-shifted. Compared with the I/R, ST and the HTK groups, the peak current density increased (P < 0.05), and the inactivation curve right-shifted. (4) Ito: the peak current density of the I/R group decreased significantly than the Con group (P < 0.05), the activation curve right-shifted and the inactivation curve left-shifted. Compared with the I/R, ST and the HTK groups, the peak current density of the NDP group increased (P < 0.05), and the inactivation curve left-shifted. 4. The calcium and membrane potential variations of each group were as follows. After the addition and the inactivation curve left-shifted. Compared with the I/R, ST and the HTK groups, the peak current density increased (P < 0.05), and the inactivation curve right-shifted. Compared with the ST group, the NDP and the Con level. (3) Mitochondrial calcium: the fluorescent intensity in the ST and the HTK groups, the membrane potential kept at a depolarization baseline in the NDP group kept staying at a lower level compared with the ST and the HTK groups. (2) Cell membrane potential: the potential of the NDP group maintained at a hyperpolarization level, while of the ST and the HTK groups, the membrane potential kept at a depolarization level. (3) Mitochondrial calcium: the fluorescent intensity in the ST group increased than the Con and the HTK groups, while the NDP group decreased. (4) Mitochondrial membrane potential: the depolarization level of the ST group increased gradually, while the NDP and the Con groups tended to be more hyperpolarized.

**Conclusion** 1. Under the 1-hour-room temperature condition, the NDP solution could effectively protect the coronary function. The HTK solution and the NDP solution could improve the I-R heart function recovery, while there was no significant difference between the two groups. The result suggested that the application advantage of NDP solution in the regular cardiac surgery needed further studies. 2. Under the 8-hour-icy temperature condition, the NDP solution could improve the heart function to an almost normal level. This result suggested, compared with the HTK solution, that the NDP solution was a more ideal preservation solution during the organ transferation process in heart transplantation. 3. The NDP solution could superiorly recover the electrophysiological characteristic changes caused by I-R injury. 4. The NDP solution could maintain the cytoplasm and the mitochondria calcium concentration at a continuous low level. These Result indicated that the NDP solution could effectively reduce the risk of the intracellular calcium overload, and was beneficial for the mitochondrial calcium absorption function, which could intensify the myocardial anti-I-R effects. 5. The NDP solution tended to induce the cell and the mitochondria membrane potential at hyperpolarization level, which could help maintain the cell calcium homeostatic and prevent the heart against oxidative damages during the I-R procedure.

**Median nerve stimulation reduces ventricular arrhythmia induced by isoproterenol infusion in normal dogs**

Jun Yu, Min Tang, Haiwen Yu, Keping Chen, Yue Tang, Yi Tian, Xiaolin Zheng, Shu Zhang
Cardiovascular Institute and FuWai Hospital, Chinese Academy of Medical Sciences, Peking Union Medical College, 167 Beilishi Road, Xicheng District, Beijing 100037, China.

**Background** Spinal cord and vagus nerve stimulation were demonstrated to reduce the incidence of ventricular arrhythmias (VAs), somatic nerve stimulation was reported to improve myocardial ischemia and showed a salutary effect on arrhythmias, we hypothesized that median nerve stimulation (MNS) decreases the incidence of VAs induced by isoproterenol (ISO) infusion.

**Methods** 12 anesthetized dogs were instrumented to measure heart rate (HR) and arterial blood pressure (BP). Stimulating electrodes were positioned in right ventricular and bilateral median nerves. Each animal underwent two same episodes of VAs induction, during the second episode, animals received MNS. VAs were induced by intravenous ISO (0.6 μg/kg/min, 5 minutes), if no VAs induced, ISO (0.6 μg/kg/min) with progra mmed stimulation (PS) was used to induce VAs again. The dogs with successfully induced VAs solely by ISO were used to testify the effect of vagus nerve.

**Result** HR and BP were reduced by MNS but without significant difference compared with baseline (P > 0.05), HR was increased and decreased abruptly after infusion and cessation of ISO, MNS prevented this suddenly change (P < 0.05), and delayed the occurrence of maximum HR (155.0 ± 66.1 s vs 225.0 ± 87.0 s, P < 0.05). No VAs was induced in baseline during MNS. VAs were successfully induced in 8 dogs with ISO infusion (4 with PS); the number of arrhythmic beats was significantly reduced (58.4 ± 80.5 vs 11.4 ± 7.7 P < 0.05), and the time of first arrhythmic beat occurrence was significantly delayed (224.1 ± 178.7 s vs 424.4 ± 277.3 s, P < 0.05) by simultaneous ISO infusion and MNS. The inhibitory effect of MNS on VAs was not affected after bilateral vagotomy.

**Conclusion** Concurrent MNS reduced the magnitude responses of HR to ISO infusion. MNS decreased the occurrence of ISO-induced VAs in normal dogs, and this inhibitory effect had no relationship with the vagus nerve.

**The role of αB-Crystallin in the mTOR activation–induced cardiomyopathy**

Yi Chen¹, Hongbing Yan¹, Fang Wang², Hongbing Zhang²
1. Cardiovascular Institute & Fu Wai Hospital, Chinese Academy of Medical Science, 100037
2. Chinese Academy of Medical Science, Peking Union Medical College, Basic Medical Research Institute, 100005

**Objective** Dilated cardiomyopathy (DCM)'s and hypertrophic cardiomyopathy (HCM)'s underlying mechanisms remain poorly understood, and there is no effective treatment for them. The mammalian target of rapamycin (mTOR) is critical in maintaining the hemostasis of cardiomyocytes. Hyperactivation of mTOR can lead to cardiac hypertrophy and dilation in mice. αB-crystallin is a member of the small heat shock protein (HSP) family. The missense mutation and the deletion mutation of αB-crystallin can cause various forms of myocardial...
disorders, including HCM, DCM and heart failure. Our recent studies demonstrate that αB-crystallin is a downstream target protein of mTOR signaling and one of the central controllers of cell growth, proliferation and cancer development.

We hypothesized that the activation of mTOR could induce cardiac hypertrophy and dilation through upregulation of αB-crystallin, so inhibition of αB-crystallin might abolish mTOR activation-induced cardiac hypertrophy and dilation.

We investigated the role of αB-crystallin in the mTOR activation-induced cardiac hypertrophy and dilation in this study. And the completion of this project can expand our understanding of the pathogenesis of cardiomyopathy, which may provide a better therapeutic strategy for the treatment of HCM and DCM.

Methods To test this hypothesis, we generated an mTOR activation-induced cardiac hypertrophy and dilation mouse model through inducible tuberous sclerosis complex 1 (Tsc1) knockout in cardiomyocytes (Tsc1-cKO). These mice then are crossmated to αB-crystallin knockout mice to check whether the hypertrophy and dilation phenotype of Tsc1-cKO mice could be ameliorated or even disappears. Cardiac morphology and function were quantified using echocardiography at different time points. The heart size, heart weight and the thickness of left ventricular wall were determined by heart weight to body weight ratio (HW/BW) and HE staining. The protein levels of mTOR signaling were measured using Western Blot. The re-expression of cardiac fetal genes, such as ANF, BNP, β-MyHC and Sk.Actin, were assessed using real-time PCR. Meanwhile, the mortality was observed.

Result ① Within two weeks of inducible cardiac Tsc1 knockout, the mice had a higher mortality (50% vs 0%, P < 0.001). The hearts exhibited a significant left ventricular dilation (left ventricular internal diameter in diastole (LVID, d) 3.68 ± 0.21 mm vs 3.40 ± 0.29 mm, P < 0.05; left ventricular internal diameter in systole (LVID, s) 2.46 ± 0.24 mm vs 1.90 ± 0.41 mm, P < 0.05) concomitant with decreased systolic and diastolic function (EF 37.8 ± 4.3% vs 70.6 ± 8.6%, P < 0.001; FS 18.1 ± 2.3% vs 39.9 ± 7.2%, P < 0.01). Besides that, the movement of ventricular wall was worse. In a word, cardiac dilation happened. ② At four weeks after Tsc1 knockout, the mice developed cardiac hypertrophy. The heart weight of Tsc1-cKO mice was significantly increased (HW/BW 0.0666 ± 0.0009 vs 0.0049 ± 0.0007, P < 0.05; LV Mass (AW) Corrected 110.6 ± 15.3 mg vs 83.8 ± 12.5 mg, P < 0.01) accompanied with an increased heart size when compared with controls. Moreover, the thickness of ventricular wall was increased (left ventricular anterior wall thickness in diastole (LVAW, d) 1.02 ± 0.10 mm vs 0.88 ± 0.08 mm, P < 0.05; left ventricular posterior wall thickness in diastole (LVPW, d) 1.01 ± 0.11 mm vs 0.74 ± 0.08 mm, P < 0.05). ③ After Tsc1 knockout in cardiomyocytes, mTOR signaling was hyperactivated, and cardiac function deteriorated rapidly afterward, which resulted in the significantly elevation of cardiac fetal genes re-expression, including ANF (P < 0.05), BNP, β-MyHC and Sk.Actin (P < 0.01), as assessed using real-time PCR. ④ As Western Blot showed, αB-crystallin was the downstream target protein of mTOR signaling. When mTOR activated, it upregulated the expression level of αB-crystallin. ⑤ Cardiac-specific Tsc1 and αB-crystallin double knockout resulted in an improvement in cardiac morphology and function, as well as a decreased mortality.

Conclusion ① This study showed that after cardiac-specific Tsc1 knockout, hyperactivation of mTOR signaling was induced, which upregulated the expression of αB-crystallin, then cardiac hypertrophy and dilation happened. ② Inhibition the expression of αB-crystallin may attenuate mTOR signaling activation induced-cardiac hypertrophy and dilation, which provides therapeutic potential for HCM and DCM.

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Effects of renal sympathetic denervation on the development of atrial fibrillation Substrates in dogs with pacing–induced heart failure
Xiaozhan Wang MD, Qingyan Zhao MD, PhD*, Shengbo Yu MD PhD*, Jinping Xiao MD; Zixuan Dai MD, Xule Wang MD, Congxin Huang MD, PhD
Cardiovascular Research Institute of Wuhan University, Renmin Hospital of Wuhan University, 236 Jiefang Road, Wuhan, Wuhan City, 430060, PR. of China

Objective We examined the role of renal denervation on the inducibility of AF in dogs with pacing-induced HF.

Background Atrial fibrillation (AF) and heart failure (HF) are common interrelated conditions that are associated with renin-angiotensin-aldosterone system activity.

Methods and Result Nineteen dogs were randomized into sham-operated (7 dogs), HF (6 dogs) and HF+renal artery ablation (RAA, 6 dogs) groups. Sham-operated dogs were implanted with transvenous cardiac pacemakers without pacing. Dogs in the HF group were implanted with pacemakers and underwent right ventricular pacing for 3 weeks at 240 bpm to induce HF. The dogs in the HF+RAA group received double renal artery ablation. The dogs recovered for 8 weeks and underwent the same HF-inducing procedure. Compared to the baseline, the atrial dimensions increased and the right atrial ERP (131 ± 14 ms to 112 ± 12 ms, P = 0.02) decreased significantly after 3 weeks in the HF dogs but not the HF+RAA dogs. A greater number of AFs were induced in the HF dogs than the HF+RAA dogs (2.2 ± 0.6 vs 0.3 ± 0.3, P = 0.03). The atrium from HF hearts revealed a large amount of fibrosis, whereas control and HF+RAA dogs showed minimal fibrous tissue. The levels of BNP, Ang II, TNF-α and expression of TGF-β and Cx43 in atrial tissue were increased in the HF dogs compared to the sham-operated and HF+RAA dogs.

Conclusion RAA suppressed the atrial substrate remodeling and the AF vulnerability that was induced by long-term rapid ventricular pacing.

Membrane trafficking dysfunction plays an important role in the pathogenesis and progression of pulmonary hypertension
Yong Wang, Hongliang Zhang, Zhihui Zhao, Le Luo, Qing Zhao, Zhihong Liu
State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

Background Pulmonary hypertension is a pathophysiologic syndrome with high mortality and disability. Pulmonary hypertension is associated with intracellular membrane trafficking in which the protein Snap-23 is crucial. The aim of this study is to investigate the role of membrane trafficking dysfunction in the pathogenesis of pulmonary hypertension.

Methods We create a membrane trafficking model in human pulmonary artery endothelial cells by down regulation of Snap-23 gene expression. The mRNA and protein level of Snap-23, endothelial nitric oxide synthase, caveolin-1, bone morphogenetic protein receptor II were
tested by reverse transcription-real time PCR and Western Blot.

**Result** In our cell model, compared to the control group, the expression of endothelial nitric oxide synthase, caveolin-1, bone morphogenetic protein receptor II were decreased.

**Conclusion** Membrane trafficking dysfunction plays an important role in the pathogenesis and progression of pulmonary hypertension.

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### Neuregulin-1 attenuates doxorubicin–induced autophagy in neonatal rat cardiomyocytes

Tao An, Yuhui Zhang, Jian Zhang
Heart Failure Center, State Key Laboratory of Cardiovascular Diseases, Fuwai Hospital, National Center for Cardiovascular Disease, Chinese Academy of Medical Sciences, and Peking Union Medical College, Beijing, China

Recombinant human neuregulin-1 (rhNRG-1) improves cardiac function in animal models of doxorubicin (DOX)-induced cardiomyopathy, but the underlying mechanism remains largely unknown. Here, we confirm a role for rhNRG-1 in attenuating DOX-induced autophagy and define the signaling pathways through which it mediates some of its effects. Neonatal rat ventricular myocytes were subjected to different treatments in order to both induce autophagy and to determine the effects of rhNRG-1 on the process. rhNRG-1 is a potent inhibitor of DOX-induced autophagy and multiple signaling pathways, including Akt and activation of ROS, play important roles in the autophagy effect. rhNRG-1 is a novel drug that may be effectively therapeutically in protecting further damage in DOX-induced damaged myocardium.

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### The effect of sildenafil on the pathology progress and mechanism research on pulmonary arterial hypertension induced by monocrotaline in pneumonectomized rats

Lei Yang, Xiuming Mo, Ning Yin, Huanhuan Fan, Jirong Qi, Song Wang, Yaqin Shu, Yu Feng
Department of Cardiothoracic Surgery, Nanjing Children's Hospital, Affiliated of Nanjing Medical University; the Center of Children with Congenital Heart Disease of Jiangsu Province; Nanjing 210008, China

Objective To investigate the effects of sildenafil on the remodeling of pulmonary arterial and TNF-alpha expression in model induced by monocrotaline in pneumonectomized rats.

**Methods** Male 24 SD rats were randomly divided into sham group (n = 8), PAH group (n = 8) and sildenafil group (n = 8). The rats in group PAH and sildenafil were treated with monocrotaline (MCT) after pneumonectomy (PE); The sildenafil group was given sildenafil 50 mg/kg/day while others the saline. The rats were sacrificed at the 35th day and hemodynamic measurements and study on the morphological were performed. The expression of TNF-alpha was detected by the RT-PCR and WB.

**Result** Compared with the control, the PAH group had higher mPAP, sRVP, RV/LV+S ratio, RMT (all P < 0.05) and the TNF-alpha expression (P < 0.05). Between the control and the sildenafil group, no differences were found (all P > 0.05).

**Conclusion** Sildenafil inhibits the remodeling of the PAH perhaps relying on the down-regulation of the TNF-alpha.
Objective To investigate the effects of Captopril on the hemodynamic, the pulmonary arterial remodeling and PI3K/AKT expression in pulmonary arterial hypertension (PAH) induced by chronic hypoxia in rats.

Methods Male 30 SD rats were randomly divided into control (n = 10), PAH group (n = 10) and Captopril group (n = 10). The rats in group PAH and Captopril were treated with chronic hypoxia; the Captopril group was given Captopril 100 mg/kg/day while others the saline. The rats were sacrificed at the 28th day. The hemodynamic and morphological study was performed. The expressions of PI3K/AKT were detected by the RT-PCR and WB.

Result Compared with the control, the PAH group had higher mPAP, sPAP, RV/LV+S ratio, RMT (all P < 0.05), and PI3K/AKT expression (P < 0.05). Between the control and the Captopril group, these parameters were found no difference (all P > 0.05).

Conclusion Captopril inhibits the pathology progress of the PAH and may rely on the inhibition of expression of the PI3K/AKT.

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Effects and mechanism of Danlou tablets on lipid metabolism and progression of atherosclerosis

Rui Zhen Ji, Chenghong Yu, Zhiqiang He, Feng Wu, Chun Liang, Zongguai Wu
Department of Changzheng Hospital, Second Military Medical University, Shanghai 200033, China

Objective We choose the Danlou tablet which is the only SFDA approved representative of removing both phlegm and blood stasis, through chronic hyperlipidemia and AS rabbits model, to explore the specific curative effect and mechanism of cure phlegm first, as well as the size of atherosclerotic lesions in vascular system.

Methods 44 healthy adult male New Zealand White rabbits were randomly divided into 4 groups: blank control group, model control group, Danlou tablet group, atorvastatin group. After carotid artery adventitial injury, the latter 3 groups rabbits were fed with an atherogenic diet for 28 weeks, which respectively feeding with Danlou tablets (2 g/kg), atorvastatin tablets (1 mg/kg), and vehicle as model controls. Every 4 weeks after intervention, testing blood lipid and plasma lipoprotein oxidation level, unit LDL-C content and its degree of oxidation back to normal, then all the rabbit were killed and their carotid artery, thoracic aorta, liver, ileum were taken out to undergo pathological examination. High pressure liquid chromatography combined with fluorescence detection, immunohistochemistry and real-time RT-PCR were performed to determine MDA content, expressions on high density lipoprotein receptor (SR-BI) and lectin sample oxidized low density lipoprotein receptor (LOX-1) in plaques and expressions of liver HMG CoA reductase, 7-hydroxylase, acetyl-CoA carboxylase, cholesterol transport protein, glucose-6-phosphatase and ileal bile acid transporter.

Result Comparison of model control group can be found after 4 weeks intervention, serum TC TG, LDL - C content has a significant decrease in Danlou tablet (2 g/kg) group (P < 0.05), lipid-lowering effect reach to the peak in 12 weeks; detection of serum lipoprotein oxidation degree show that, to 12 weekends, LDL oxidation degree in Danlou tablet group is significantly lower than the model control group (P < 0.05); after 20 weeks of continuous intervention, compared with model control group, Danlou tablet group animal carotid plaques in load area decreased to 10% significantly (P < 0.05), from local plaques and systemic atherosclerosis disease in comprehensive analysis, the progression of AS disease in Danlou tablet group was obviously lighter than model control group (P < 0.05), and is superior to the conventional dose of atorvastatin. And liver cholesterol and triglyceride levels in Danlou tablet group were significantly lower 30% than the model control group (P < 0.05); Compared to the statin group, liver expression of HMG CoA reductase, 7 - hydroxylase (CYP7A1) in Danlou tablet group have no obvious inhibition (P < 0.05); the expression of liver glucose 6 phosphatase (G - 6 - P) and acetyl CoA carboxylase (ACC) reduced 50% both significantly (P < 0.05); Compared with model control group, ileal bile acid transporter expression in Danlou tablet group reduced 20% significantly (P < 0.05), and the expression of lectin oxidized low density lipoprotein receptor (LOX - 1) significantly reduced, HDL receptor (SR - BI) expression significantly elevated (P < 0.05) and MDA plaques were significantly reduced 50% (P < 0.05) in Danlou tablet group.

Conclusion After long-term intervention, Danlou tablets have significantly lower liver cholesterol and triglyceride levels, serum-lipid lowering effect does not cause liver lipid deposition and does not affect the sugar and lipid normal metabolism, may be related to inhibiting the intestine bile acid transporter gene expression. And it not only reduces carotid atherosclerotic lesions significantly, also can delay systemic atherosclerosis progress.

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Cyclin–A2 promotes cardiac regenerate via the recruitment of cardiac stem cells after myocardium infarction

Xiang Ma, Aichao Zhao, Yongzhao Yao, Wen Cao, Yitong Ma
Department of Coronary/Heart Disease First Affiliated Hospital of Xinjiang Medical University

Objective To determine whether or not exogenous Cyclin-A2 promotes cardiac regenerate and restart cardiomyocytes cycle in vivo after MI.

Methods Mice were randomly divided into two groups; MI+saline (n = 30) and MI+rAAV9-CMV-Cyclin-A2 (n = 30). 2×10³ genome copies in 200 μl saline were delivered into the mice myocardium through the caudal vein one week before MI. The control group was injected with saline at same volume and time. Post MI observation was one week and three weeks respectively. Echocardiography was performed to measure LVEDD, LVEDS, and EF. Western Blot and immunohistochemical analysis were used to detect the expression and location of Cyclin-A2. PCNA and phosphohistone-H3 were used to confirm DNA synthesis and mitosis respectively. C-Kit and connexin 43, which were defined as cardiac stem cells markers, were also measured.

Result Western Blot showed that expression of Cyclin-A2 started at two weeks and peaked at four weeks after injection. Expression of Cyclin-A2 in two groups had a significant statistical difference with P < 0.01. PCNA was specific in S phase and exhibited higher expression in Cyclin-A2 treated group than control group (0.75 ± 0.03 vs 0.43 ± 0.02, P = 0.036). However, mitosis specific protein H3P had no statistical
differences between the two groups (P > 0.05). C-Kit and connexin 43 showed an increase in Cyclin-A2 treated group, but no change in control group (P < 0.05). Immunohistochemistry showed that Cyclin-A2 after transfection was located in cytoplasm but not in nucleus. A decreased level of collagen I and III was observed in Cyclin-A2 treated group than control group (P = 0.029) by Masson Tringle Stain. There was significant difference in LVEDD, LVESD, and EF between the two groups (0.31 ± 0.02 cm vs 0.44 ± 0.01 cm, 0.21 ± 0.02 cm vs 0.34 ± 0.01 cm and 55 ± 2.3% vs 40 ± 1.7%).

**Conclusion** Cyclin-A2 promotes cardiac self-repair via the recruitment of cardiac stem cells and restart cardiomyocytes cycle after myocardial infarction.

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**The expression of lox-1 and upar with oxldl on normal human peripheral blood mononuclear cells**

Zhenzhen Jiao
State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, Peoples Republic of China

**Objective** Investigate the effect of oxLDL in different concentrations on uPAR and LOX-1 protein expression in human peripheral mononuclear cell in different times.

**Methods** PBMC were isolated from peripheral blood of healthy people. Then the mononuclear cells were allowed to culture in RPMI1640 medium with 20% antologous serum. Western blot was used to detect the effect of oxLDL of different concentration and time on protein expression of uPAR and LOX-1.

**Result** In 24 hours, as the concentrations increase, the expression of uPAR and LOX-1 protein level raised, the 50 μg/ml was peaked, and high concentrations (100 μg/ml) were inhibited both of them. At 72 h, low concentrations (10, 20 μg/ml) can not effectively increase the expression of uPAR, higher concentrations (50, 100 μg/ml) can be more effective in increasing the expression of uPAR.

**Conclusion** In this study, oxLDL had different effects on the body in different times, 72 hours, showing more than 24 hours of injury.

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**Relationship between ischemia duration and expression of heat shock protein 70 in ischemia-reperfusion canine hearts**

Yang Yang, Yi Luo
Department of Cardiology, Guangzhou First Peoples Hospital Affiliated to Guangzhou Medical University

**Background** Heat shock protein 70 (HSP70) has been shown to exert a protective effect in hearts subjected to ischemia-reperfusion and alleviate adverse effects of myocardial ischemia-reperfusion injury (MIRI). However, little is known about the influence of ischemia time on HSP70 expression. The effects of ischemic duration on the content of HSP70 transcripts in ischemia-reperfusion myocardium were investigated in this article.

**Methods** Male mongrel dogs underwent a 15- or 60-min occlusion of the left anterior descending coronary artery, followed by a 120-min reperfusion. Additionally, a sham-operation group was assigned. The animals were killed after 120-min reperfusion and the heart was quickly removed. The myocardium was examined pathologically by electron microscopy. HSP70 mRNA expression both in intact and ischemic myocardium was measured by a semiquantitative reverse transcriptase-polymerase chain reaction (RT-PCR) method using complementary DNA normalized against the housekeeping gene β-actin.

**Result** (1) No ultrastructural changes of microvessels and myocardial cells except a slight loss of mitochondrial granules were noted in reperfusion myocardium from dogs of 15-minischemia group. In 60-min ischemia group, endothelial cells of capillaries were slightly swelling, and the intercellular linking gaps of endothelial cells slightly widened. As for myocardial cells, intercellular, intermyofibrillar, and intermyofilamentous edema were present. Besides, the fractures of a few myofilaments, the granule loss and swelling of mitochondrias were also seen. (2) HSP70 mRNA expression level in both ischemia-reperfusion zone and intact myocardium in 15-min ischemia group was markedly higher than in sham-operation group (36.2 ± 6.5 vs 22.0 ± 4.0, P = 0.005; 29.8 ± 4.5 vs 22.2 ± 4.7, P = 0.05). Compared with sham-operation group, however, no changes in mRNA HSP70 levels in 60 min ischemia group (25.7 ± 7.5 vs 22.0 ± 4.0, P = 0.681; 28.5 ± 4.7 vs 22.2 ± 4.7, P = 0.118) were seen. The ratio of HSP70 mRNA expression content in ischemia-reperfusion zone to that in intact myocardium in 15-min ischemia group was not significantly different from sham-operation group (1.22 ± 0.16 vs 1.01 ± 0.22, P = 0.233), but remarkably higher than 60-min ischemia group (1.22 ± 0.16 vs 0.89 ± 0.17, P = 0.019).

**Conclusion** The change of HSP70 expression in ischemia-reperfusion myocardium is associated with ischemia time, that is, short duration ischemia promotes HSP70 expression, whereas long time ischemia does not. Furthermore, the HSP 70 expression changes consist with the protective extent of myocardial ultrastructures.

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**Effects of Visfatin on the function of endothelia progenitor cells and the possible mechanisms**

Rong Hu, Huiliang Liu, Yujie Wei
Department of Cardiology, Armed Police General Hospital

**Objective** We explore the effect and related mechanism of Visfatin on proinflamatory role of EPCs.

**Method** 1. EPCs were isolated and cultured in vitro. 2. EPCs stimulated with Visfatin. 3. PDTC on the stimulation of EPCs to Visfatin.

**Results** 1. The expression of ICAM-1 in 4 groups were 18.25 ± 3.77%, 25.40 ± 4.25%, 38.88 ± 4.02% and 48.83 ± 5.12%, respectively (P < 0.05). The expression of VCAM-1 were 6.75 ± 2.07%, 10.65 ± 2.33%, 17.11 ± 2.37% and 24.82 ± 3.19%, respectively (P < 0.05). 2. ICAM-1 and VCAM-1 mRNA and protein expression increased in Visfatin group in a dose-and effect-relationship. 3. PDTC inhibits the mRNA and protein expression of ICAM-1 and VCAM-1 on EPCs expression of PV group was lower than that of Visfatin group.

**Conclusion** 1. It is feasible to obtain EPCs from cord blood in vitro. 2. ICAM-1 and VCAM-1 mRNA and protein expression increased in Visfatin group in a dose-and effect-relationship. 3. PDTC inhibits the mRNA and protein expression of ICAM-1 and VCAM-1 on EPCs surface, which suggested the inflamatory effect of Visfatin to EPCs may be mediated by NF-kB signaling pathway.
Study the influence of different size balloon on the degree of injury of rabbit abdominal aorta

Huaxiao Geng1, Xiaojuan Ji1, Gengsheng Yu1, Qijian Yi1, Jun Guo2, Xiuquan Zai1, Junshuai Li1
1 Department of Cardiology, the Children's Hospital of Chongqing Medical University, Key Laboratory of Child Development and Disorders Co-founded by Provincial Government and Ministry of Education 2 Key Laboratory of Pediatrics in Chongqing, Chongqing International Science and Technology Cooperation Center for Child Development and Disorders, Chongqing 400014, China
2 Department of Mianyang Central Hospital in Sichuan, Sichuan 621000, China

Objective To study the influence of different size balloon on the degree of injury of rabbit abdominal aortic.

Methods Twenty five New Zealand White rabbits were randomly divided into normal control group (5 rabbits) and operated groups (20 rabbits), averagely divided into (Group A, Group B, Group C, Group D), matching to four types of balloon diameters. Intima-media ratio and intimal proliferation were observed to evaluate the degree of injury with high-frequency ultrasonography and pathology examination after balloon-injury 28 days.

Result Stenosis ratio of Group A, Group B and Group C were higher than the normal control group and Group D (P < 0.05). Neointimal area and intimal-media ratio increased in the operated groups at 4 weeks after injury compared with the normal control group (P < 0.01). The degree of vessel expansion in Group D was the highest, but neointimal area and intimal-media ratio of Group D were smaller than those of Group C (P < 0.05).

Conclusion Rabbit model of abdominal aortic stenosis could be founded successfully and efficiently with balloon/vessel ratio of 1.5-1.75 with balloon catheter technique. If exceeding the ratio, the degree of injury of intima could not be increased with the size of balloon, even occurred the rupture of blood vessels.

Effect of salvianolic acid B on ICAM-1 and E-selectin expression after cerebral ischemia-reperfusion injury in rats

Aiqin Zhong1, Shixin Xu2, Junping Zhang2, Wei Li1
1. Tianjin University of Traditional Chinese Medicine
2. Tianjin University of Traditional Chinese Medicine First Affiliated Hospital

Objective To research ICAM-1, E-selectin expression in rats following focal cerebral ischemia-reperfusion and the intervention effects of salvianolic acid B (SalB).

Methods Wistar rats were randomly divided into sham operation group, model group and SalB group. A rat cerebral middle artery occlusion model was established. At 4 time points (6 h, 24 h, 48 h, 72 h), the neurological deficit scores were evaluated, RT-PCR detection for brain tissue ICAM-1, E-selectin mRNA expression.

Result The neurological behavior scores were higher in SalB group than in model group at 4 time points (P < 0.001). The expression of ICAM-1 mRNA in model group was increased at 6 h, reached peak at 24 h; the expression of E-selectin mRNA was increased at 6 h, reached peak at 48 h. The expression of ICAM-1 in SalB group was lower than in model group at 4 time points (P < 0.001, P < 0.005); the expression of E-selectin at 6 h, 24 h, 48 h (P < 0.001).

Conclusion SalB could improve MCAO rat neurological function and depress ICAM-1, E-selectin expression.

Study of low-frequency focused ultrasound associated with microbubbles to open the blood brain barrier of mice

Wenjun Jiang, Mingxing Xie, Yali Yang
Department of Ultrasonography, Union Hospital of Tongji Medical College, Huazhong University of Science and Technology, Wuhan, Hubei, China

Objective The aim of our study is to explore the safety and effectiveness of low-frequency focused ultrasound associated with microbubbles to open the blood brain barrier (BBB).

Methods The right basal ganglia of the mice were sonicated by the high-MI therapeutic impulses, through their intact skin and skull, after continuous intravenous injection of microbubbles and Evans blue (EB). The degree of BBB opening was evaluated quantitatively based on the extravasation of EB and qualitatively under the fluorescence microscope. The safety was inspected by observation of cell morphology under hematoxylin eosin (HE) staining.

Result After sonicated by the high-MI therapeutic impulses and microbubbles, in the sonicated area, we can see significantly red fluorescence of Evans blue under fluorescence microscope. The concentration of EB in the sonicated side is much higher than the normal side. The cellular morphology and structural integrity were normal.

Conclusion The BBB of mice can be opened targeted and noninvasively by low-frequency focused ultrasound with continuous intravenous injection of microbubbles.

Clinical application of left ventricular systolic function in patients with rheumatic disease by three-dimensional ultrasound speckle tracking imaging

He Li, Mingxing Xie
Department of Ultrasonography, Union Hospital of Tongji Medical College, Huazhong University of Science and Technology, Wuhan, Hubei, China

Objective The aim of our study is to assess left ventricular regional and systolic function in patients with pure mild to moderate rheumatic mitral stenosis (MS) by 3-dimensional ultrasound speckle tracking imaging (3D-STI).

Methods Fifty patients with pure mild to moderate rheumatic MS were enrolled in this study, 40 normal subjects matched with age and sex were selected as control groups. LV 3D-global longitudinal peak systolic strain (GLS), 3D-regional peak systolic strain in 16 segments of left ventricular mitral annular level, papillary muscle level and apical level were measured in all subjects by 3D-STI from the apical full-volume image and compared between groups. LV ejection fraction (LVEF) was acquired from 3DSTI.

Result Despite normal LV systolic function as assessed by LVEF, LV GLS was significantly reduced in patients with isolated MS (P < 0.05). Regional analysis demonstrated that patients with MS had a significantly reduced 3D-regional peak strain in all basal, and some mid (inferior, anteroseptal, posteroseptal) segments of the left ventricle. 3D-regional peak strain values were similar in other segments between the groups. A Pearson correlate revealed that LV GLS corresponded with LVEF (r =
Objective The aim of our study is to explore the correlation between intima-media inhomogeneity (IMI) and carotid artery elasticity in patients with type 2 diabetes mellitus (T2DM). 

Methods Patients with T2DM (n = 39) and normal control subjects (n = 31) were studied. IMI and IMTmean of carotid artery were measured by an automatic measuring system. Elastic indexes ($\beta$mean, Ep, AC, PWV$\beta$mean) of carotid artery were measured by Echo-Tracking. The relationship between the IMI and elastic index and cardiovascular risk factors were analyzed.

Result ① IMTmean, IMTmax and IMI were higher in patients with T2DM than in normal subjects ($P < 0.05$). ② $\beta$mean was higher in patients with T2DM than in normal subjects ($P < 0.05$). ③ IMI was positive correlated with $\beta$mean, Ep, PWV$\beta$mean, age, TG, HDL, FPG and IMTmean ($r = -0.372 – 0.657, P < 0.05 – 0.001$).

Conclusions IMI is thought as a new index to reflect the atherosclerotic wall process.

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Objective The aim of our study is to assess left ventricular regional systolic function in patients with hypertrophic cardiomyopathy (HCM) using real-time three-dimensional echocardiography (RT-3DE).

Methods RT-3DE was performed in 25 HCM patients and 20 healthy subjects. The left ventricle volume-time curves were analyzed quantitatively with Tomtec 4DLV-Analysis 3.0, and regional left ventricular diastolic/systolic volume (rEDV/rESV), the time to minimum systolic volume (rESVT), regional stroke volume (rSV), regional ejection fraction (rEF), regional-global ejection fraction (rgEF) and the parameters of left ventricular dyssynchrony were measured.

Result In HCM group, Tmsv16-Dif, Tmsv16-SD, Tmsv16-Dif%, Tmsv16-SD% were significantly reduced than those of normal group ($P < 0.01$), and rEDV, rSV, rEF and rgEF in hypertrophic segments were lower than those in non-thickening and mild-thickening segments ($P < 0.05$). In normal group, there were no significant difference in those parameters among all segments ($P > 0.05$). Compared with normal group, rEDV, rSV and rgEF in hypertrophic segments were decreased in HCM group ($P < 0.05$). rEF in hypertrophic segments were decreased at basal level but increased at apical level, however, no difference was found at midventricular level; rEF and rgEF in non-thickening and mild-thickening segments were increased ($P < 0.05$).

Conclusion RT-3DE could sensitively detect left ventricular dyssynchrony and accurately assess regional left ventricular volume and function of different segments.

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Assessment of the ventricular–arterial coupling in the patients with systemic lupus erythematosus by ultrasound

Ruitao Zhou, Lu Qing
Department of Ultrasonography, Union Hospital of Tongji Medical College, Huazhong University of Science and Technology,

Objective The aim of our study is to assess the ventricular-arterial coupling in the patients with systemic lupus erythematosus (SLE) by ultrasound.

Methods Twenty-Five patients with SLE and twenty age and gender matched healthy subjects were studied. Left ventricular mass index (LVMI), relative wall thickness end-diastolic (RWT), carotid-femoral pulse wave velocity (CFPWV), effective arterial elastance (Ea) and Ea/Ees were measured.

Result Ea in the patients SLE were significantly higher than those in control group ($P < 0.05$), there was no significant difference in Ees and Ea/Ees between two groups ($P > 0.05$). Ea was correlated positively with

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Evaluation of arterial alterations and associated factors of chronic kidney disease by ultrasonography

Ziming Zhang, Mingxing Xie, Ling Li
Department of Ultrasonography, Union Hospital of Tongji Medical College, Huazhong University of Science and Technology,

Objective The aim of our study is to evaluate the changes in the structural and elastic of the arteries in chronic kidney disease (CKD) patients with predialysisas by echo-tracking technique (ET).

Methods Thirty-nine CKD patients with predialysis were enrolled in the study and were subdivided into CKD stage 2 – 3 group (n = 19) and stage 4 – 5 group (n = 20). Forty healthy subjects were selected as the control group. The parameters of arterial structural and stiffness measured by echo-tracking technique were compared among groups: Intima-media thickness (IMT), stiffness parameter ($\beta$), pressure strain elastic modulus (Ep), arterial compliance (AC), augmentation index (AI), carotid pulse wave velocity (PWV$\beta$), carotid-femoral pulse-wave velocity (PWVcf), carotid diameter (D). Furthermore, we explored the associated factors of arterial stiffness

Result Compared with healthy group, PWVcf and D in stage 2 – 3 group were significantly increased ($P < 0.05$, $P < 0.001$), while PWV$\beta$ significantly were significantly increased in stage 4 – 5 ($P < 0.05$); compared with CKD 2 – 3 group, PWVcf and D were significantly increased in stage 4 – 5 ($P < 0.05$, $P < 0.001$). Stepwise multiple regression analysis demonstrated that age, estimated glomerular filtration rate (eGFR) per 1.73 m$^2$ were independent impact factors of PWVcf.

Conclusion Echo-tracking technique can assess the changes in vascular structure and elasticity in patients with chronic renal insufficiency in the early stage; it can provide valuable information for clinical treatment and prevention of cardiovascular complication.
Ea (r = 0.472, P < 0.01). RWT was correlated positively with Ed and Ea (r = 0.388, P = 0.016; r = 0.336, P = 0.026). Ed was correlated positively with E/e (r = 0.939, P < 0.01). CFPWV was correlated positively with Ed and E/e and LVMI (r = 0.349, P < 0.05; r = 0.376, P < 0.05; r = 0.323, P < 0.05). diffD% was correlated negatively with E/e and LVMI (r = -0.328, P < 0.05; r = -0.428, P < 0.01).

Conclusion The structure and function of left ventricle is associated with arterial elastance. Their matching relation can be applied to evaluate ventricular-arterial coupling.

The value of real-time three-dimensional echocardiography in diagnosis of cardiac mass
Wenjuan Bai, Hong Tang, Zhongxu Chen, Li Rao, Xiaoling Zhang
Department of Cardiology, West China Hospital

Objective To study the value of real-time three-dimensional echocardiography (RT3DE) in diagnosis of cardiac tumor.

Methods Sixty-five patients with primary cardiac mass were retrospective studied. All cases were diagnosed using two-dimensional and RT3DE by Philips Sonos 7500 and iE33. The operative and pathological findings were collected.

Result Of these patients, 24 cases were left atrial mass, 13 cases were right atrial mass, 9 cases were left ventricular mass, 11 cases were right ventricular mass, 1 case was right ventricular and atrial mass, 1 case was right atrial and pericardial mass, 5 cases were pericardial mass, 1 case was pulmonary artery mass. Thirth-nine patients undertook the surgery.

Conclusion Echocardiography is a preferred method in the diagnosis of cardiac mass. Real-time dimensional echocardiography appeared advantages in showing the whole modality and adjacent tissue.

The prognostic role of myocardial fibrosis detected by cardiac magnetic resonance in hypertrophic cardiomyopathy
Tao Zhao, Minjie Lu, Xiuyu Chen, Liwei Xiang, Gang Yin, Shihua Zhao
State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

Background Hypertrophic cardiomyopathy is the most common inherited genetic cardiovascular disease and the main cause of sudden cardiac death (SCD) in the young, it can also cause other hard end points such as heart failure death and stroke. The mechanism is believed due to malignant ventricular and/or left ventricular outflow tract obstruction (LVOTO), and myocardial fibrosis and scar were thought to be the pathological substrate, which is reported as an independent determinant of adverse cardiac events. This study is aim to evaluate the prognostic role of myocardial fibrosis detected by cardiac magnetic resonance late gadolinium enhancement (LGE-CMR) in the mid-term follow up of HCM.

Methods From Apr. 2010 to May 2012, we followed up all HCM patients come to our hospital every 3 to 6 month intervals, with exclusion of those who had prior gradient reduction therapy. Only new events occurred during the follow up were regarded as end points, which primary end points included cardiovascular death, heart transplantation, SCD / aborted SCD, sustained ventricular tachycardia, ventricular fibrillation and appropriate implantable cardiac defibrillator (ICD) discharge; and secondary end point included progressive heart failure, unplanned cardiovascular hospitalization and non-sustained ventricular tachycardia (NSVT). The extent of LGE was divided into three groups: mild (1% – 25%/LV), moderate (25% – 50%/LV) and severe (> 50%/LV). Kaplan-Meier curves and log-rank test were used to estimate the events free survival distributions and compare the difference among different LGE groups. A multivariable Cox proportional hazard model was constructed with a forward selection procedure to estimate the hazard ratio (HR) for the presence or absence of fibrosis and to estimate the effect on the outcomes of increased amounts of fibrosis. Hypertrophic obstructive cardiomyopathy (HOCM) patients were also compared with non-obstructive patients for the events free survival curves, and patients received gradient reduction therapy were compared with those HOCM who didn't receive any surgical procedure.

Result Totally 392 patients were followed up; including 80 patients received gradient reduction therapy during the follow-up. Among the 312 natural processation patients, LGE was observed in 218 patients (70%). There were statistical significance on NYHA cardiac class, left ventricular mass, average wall thickness, extreme hypertrophy (> 30 mm), prevalence of atrial fibrillation and NSVT between patients with and without LGE. 35 patients reached the primary end points, including 5 in the LGE negative and 30 in the LGE positive group (5.3% vs 13.8%, P < 0.05); while 3 cardiac deaths, 1 heart transplantation and 9 sustained ventricular tachycardia / ventricular fibrillation were all happened in the fibrosis group. 77 patients reached the secondary end points, including 10 in the LGE negative and 67 in the LGE positive (10.6% vs 30.7%, P < 0.05). There was statistical significance among Kaplan-Meier survival curves among different LGE groups, no matter regarding to primary or secondary end points. The left ventricular outflow tract obstruction (LVOTO) and LGE positive were the independent determinants for the primary end points after Cox proportional hazard regression, while only LGE was the risk factor for the secondary end points. There were statistical significance among the events free survival among HOCM, non-obstructive and apical HCM patients, and patients received gradient reduction therapy had better prognosis than those HOCM patients who didn't receive intervention.

Conclusion Myocardial fibrosis detected by CMR can play an important prognostic role in HCM. The prognosis of HOCM was worse than the non-obstructive HCM patients, while receive gradient reduction therapy would benefit the mid-term survival.

The application of transthoracic echocardiography for the diagnosis of congenital coronary artery fistula
Mingxing Xie, Zhenxing Sun, Ling Li
Department of Ultrasonography, Union Hospital of Tongji Medical College, Huazhong University of Sciences and Technology, Wuhan, China

Objective The purpose of our study is to evaluate the application of transthoracic echocardiography for the diagnosis of congenital coronary artery fistula (CAF).

Methods The echocardiographic appearances of 74 patients with CAFs were analyzed retrospectively, and the Result were compared with findings of surgery and coronary artery angiography.

Result Right CAFs were detected in forty-one patients (55.4%). Left CAFs were detected in thirty-three patients (44.6%). Most of the entry point was a single orifice (93.2%), rarely, it was multiple...
Background This study focused on the exploratory development of the safety and feasibility of minimal-invasive surgical device closure of perimembranous ventricular septal defects (PMVs Ds) in children and the clinical criteria in assessment and guidance by echocardiography.

Methods We enrolled 730 children diagnosed as PMVs Ds from Apr. 2010 to Nov. 2012. All children underwent full evaluation by transthoracic echocardiography (TTE) and multiplane transesophageal echocardiography (MTEE), such as the sizes, types, spatial positions of defects and the relationship with the adjacent tissues. The chosen domestic device was inserted to occlude the PMVs Ds under the guidance of MTEE.

Result 690 (94.55%) of the 730 children underwent successful closure. By mmetic devices were used in 575 children (including 33 A4B2 occluders) and as mmetic in other 115. All patients received follow-ups at regular intervals after successful occlusion. The occluders had stayed firmly. No noticeable residual shunt or valve regurgitation were discovered except for 1 child, whose original mild aortic regurgitation aggravated to nearly moderate in the follow-up of 18th month. Also, there were no significant arrhythmia detected except two children had sudden attack with Adame-Strokes syndrome 2 and 6 days after operation respectively.

Conclusion Minimal-invasive surgical device closure of PMVs Ds is mostly safe and feasible. Echocardiography plays a vital role and provides relatively reliable basis in all stages of closure. MTEE is more accurate in evaluating the defects, such as the shape and size which is important in determining the right occluder.

Application of echocardiography in minimal-invasive surgical device closure of perimembranous ventricular septal defects
Yifeng Yang1, Lei Gao1, Xinhua Xu1, Tianli Zhao2, Jinfu Yang1, Xin Wang1, Lian Xiong1, NiYin1, Li Xie1, Can Huang1, Wancun Jin1, Qin Wu1
1. Department of Echocardiography, Cardiovascular Research Institute, 2nd Xiangya Hospital, Central South University
2. Department of Cardiac Surgery, Cardiovascular Research Institute, 2nd Xiangya Hospital, Central South University

Objective Increased CO2 levels in the myocardium may be global due to inadequate ventilation/circulation or local due to myocardial ischemia/infarction (by 4 times higher than the normal), and are associated with ventricular arrhythmias. We hypothesized that the increase in CO2 levels augment late sodium current (INa) and is an independent factor to induce polymorphic ventricular tachycardia.

Methods Female rabbit isolated hearts were paced at 1 Hz and exposed to solutions gassed with 5, 10 and 20% CO2. A PH value was kept at 7.4 for all solution and osmolarity was adjusted. Rabbit ventricular myocytes were isolated and exposed to solutions with different CO2 levels (PH = 7.4). Monophasic action potential duration (MAPD) and ion currents were recorded using MAP electrodes and whole-cell patch clamp, respectively.

Result When the pH value in solutions was kept at 7.4 and CO2 levels were increased from 5 (Physiological) to 10 (respiratory failure) and 20% (CO2 intoxication), the amplitude of late sodium current in ventricular myocytes was increased from -0.406 ± 0.009 to -0.827 ± 0.029 and -1.253 ± 0.043 PA/pF (n = 7, p < 0.01, compared to 5% CO2) in a concentration-dependent manner. These increases in late INa were completely reversed by 2 μM TTX in the presence of either 10 or 20% CO2.

Conclusion Increased CO2 levels is an independent factor (to acidosis) to enhance late sodium current and cause APD prolongation. These effects are expected to reduce repolarization reserve in the heart and therefore are proarrhythmic, which may explain the clinical arrhythmias in patients with obstructive sleep apnea, sudden infant death syndrome and ischemia.

Electrocardiographic abnormalities in asymptomatic or mildly symptomatic patients with hypertrophic cardiomyopathy: A cardiovascular magnetic resonance study
Xiuyu Chen, Shihua Zhao, Tao Zhao, Minjie Lu, Gang Yin, Shihua Jiang
State Key Laboratory of Cardiovascular Diseases, Fuwal Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

Background A spectrum of alterations in the 12-lead electrocardiogram (ECG) has been described in hypertrophic cardiomyopathy (HCM). However, although most individuals with HCM are asymptomatic or mildly symptomatic, data from previous studies (mostly echocardiography) that concerned this subgroup were limited.

Aims We sought to investigate the prevalence and diagnostic value of ECG abnormalities in asymptomatic or mildly symptomatic patients with HCM, and relate these ECG patterns to the magnitude and distribution of left ventricular (LV) segmental hypertrophy and myocardial fibrosis, in an attempt to clarify the mechanisms of ECG changes in HCM.
**Methods** 118 patients with asymptomatic or minimally symptomatic HCM were examined with late gadolinium enhancement (LGE) CMR. The distribution and magnitude of LV segmental hypertrophy and LGE were assessed and analyzed in relation to ECG abnormalities.

**Result** Abnormal electrocardiograms were found in 113 of 118 (95%) patients. Patients without LV outflow obstruction (when compared to patients with) had significantly lower frequencies of abnormal electrocardiograms (P = 0.02), repolarization abnormalities (P = 0.01), left ventricular hypertrophy (P = 0.02) and abnormal Q waves (P = 0.01). T-wave inversions were associated with greater apical septal thickness (P = 0.009) and increased ratio of LV septum to free wall thickness (P = 0.01). Giant negative T waves (GNT) were found in 19 patients (16%), and were associated with the type of apical HCM (P < 0.001), greater apical thickness (P = 0.004) and increased ratio of LV apical to basal wall thickness (P < 0.001). However, no significant association was demonstrated between GNT and apical LGE (P = 0.71). Left ventricular hypertrophy was related to greater LV mass (P = 0.002), LVEDV (P = 0.002), mean LV thickness (P = 0.03), maximal LV thickness (P = 0.04), and LV septal thickness (P = 0.04). Abnormal Q waves were associated with greater basal anteroseptal thickness (P = 0.001) and more segments with transmural LGE (P = 0.001).

**Conclusion** The distribution and magnitude of LV hypertrophy and LGE show significant association with various ECG changes. This finding adds pathophysiological insight into understanding ECG changes in HCM, and may suggest a potential role of these ECG patterns in the risk stratification of HCM patients, since the magnitude of LV hypertrophy and myocardial fibrosis have been proved to be indicators of adverse outcomes.

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**Background** To investigate the characteristics of intravascular ultrasound (IVUS) image of target borderline lesion in the proximal anterior descending artery (LAD) for finding the baseline to treating these patients with the lesions.

**Methods** The borderline lesions with 30%–70% dimension stenosis in the proximal LAD were found in 10 patients from Jun. 2010 to Oct. 2011. All the 10 patients had some discomfort in the precordium, including 7 males, 1 with diabetes, 3 with hypertension, 2 smokers and 2 with infant heart history. The intervention was done in the patient with the typical syndrome after IVUS. For the atypical patients, the exercise test was done. The intervention was done in the positive patient after IVUS.

**Result** The discomfo rt in the precordium disappeared in all the 10 patients. The minimal lumen area (MLA) of them in the proximal LAD was 4.85 ± 1.49 mm², MLA in the 7 patients was more than 4 mm². The area stenosis (AS) of them in the proximal LAD was 69.99% ± 7.07%. AS in the 4 patients was less than 70%.

**Conclusion** It is questionable that the 4 mm² of MLA or 70% of AS was considered to be the cut-off value for the intervention therapy. The suitable strategy to the patients with borderline lesion in the proximal LAD should come from the combination of IVUS and clinical condition.

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**Correlations between right ventricular function and increased ¹⁸F-fluorodeoxyglucose uptake of the right ventricle in patients with pulmonary hypertension in fasting and glucose loading conditions**

Tao Yang, Lei Wang, Yan Zhang, Qing Gu, Xinhai Ni, Wei Fang, Zhihong Liu, Changming Xiong, JiaGuo He

State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

Purpose This study was designed to measure glucose uptake of right ventricle (RV) in PH patients by ¹⁸F-fluorodeoxyglucose (FDG) positron emission tomography (PET) imaging in fasting and glucose condition, and attempted to investigate the correlations between FDG uptakes and right ventricular function as well as hemodynamics.

**Methods** Thirty eight patients with PH were observed prospectively. ¹⁸F-FDG PET scanning was performed in fasting and glucose loading conditions in all the patients, and the standardized uptake value (SUV) of RV was measured after corrected for partial volume effect. The ratio of RV to left ventricle (LV) SUV (RV/LV-SUV) was calculated. Right heart catheterization, echocardiography and cardiac magnetic resonance (CMR) were performed in all patients within 1 week.

**Result** RVs SUV and LVs SUV were higher in glucose loading than in fasting condition. RVs SUV and RV/LVs SUV in fasting condition showed significant relations with right ventricular ejection fraction (RVEF) derived from CMR (r = -0.341, P = 0.036 and r = -0.345, P = 0.034), and in glucose loading condition (r = -0.362, P = 0.028 and r = -0.512, P = 0.001). RV/LVs SUV in glucose loading condition also correlated significantly with TAPSE (r = -0.347, P = 0.035), IV A (r = -0.417, P = 0.001) and RVFAC (r = -0.326, P = 0.049).

**Conclusion** The glucose uptake of right ventricle increases with right ventricular systolic function decrease in PH patients, which is more significant in glucose loading than in fasting condition.

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**Echocardiographic parameters in patients with pulmonary arterial hypertension: correlations with right ventricular ejection fraction and hemodynamics**

Tao Yang, Yu Liang, Yan Zhang, Qing Gu, Xinhai Ni, Zhihong Liu, Xiazhuang Lu, Changming Xiong, JiaGuo He

1. State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College
2. Department of Cardiology, Beijing Chaoyang Hospital Affiliated to Capital Medical University

**Background** As the most common and convenient method used to evaluate RV function and hemodynamics of pulmonary circulation, several echocardiographic parameters are studied in previous studies. But the value of these parameters to assess the severity and RV function in patients with pulmonary arterial hypertension (PAH) is not well defined.

**Methods** Patients with PAH were observed prospectively. Right heart catheterization, echocardiograph and cardiac magnetic resonance (CMR) were performed in all patients within 1 week interval. The correlations between echocardiographic parameters and right ventricular...
ejection fraction (RVEF) derived from CMR as well as hemodynamics were analyzed.

**Result** Thirty patients were enrolled including 24 patients with idiopathic arterial pulmonary hypertension, 5 patients with pulmonary hypertension associated with connective tissue diseases and 1 patient with hereditary pulmonary arterial hypertension. All echocardiographic parameters except RV MPI correlated significantly with RVEF measured by CMR (TAPSE, r = 0.426, P < 0.001; S′, r = 0.452, P = 0.004; IVA, r = 0.485, P = 0.002; RV FAC, r = 0.563, P < 0.001; RVETD/LVETD, r = -0.616, P < 0.001; RV MPI, r = -0.208, P = 0.204). After adjusted for mRAP, mPAP and PVR, only IVA and RVETD/LVETD could independently predict RVEF. Four echocardiographic parameters displayed a significant correlation with PVR (TAPSE, r = -0.615, P < 0.001; S′, r = -0.557, P = 0.002; RVFAC, r = -0.454, P = 0.012; RVETD/LVETD, r = 0.543, P = 0.002).

**Conclusion** Among the echocardiographic parameters, IVA and RVETD/LVETD can reflect RVEF independently regardless of hemodynamics, and TAPSE, S′, RVFAC and RVETD/LVETD can also reflect PVR in PAH patients.

**Value of myocardial scar identified by magnetic resonance imaging in predicting left ventricular functional improvement after surgical revascularization**

Tao Yang1, Minjie Lu2, Hansong Sun3, Yue Tang1, Shiwei Pan1, Shihua Zhao2
1. Department of Cardiovascular Surgery, Fu Wai Hospital and Cardiovascular Institute, Peking Union Medical College and Chinese Academy of Medical Sciences
2. Department of Radiology, Fu Wai Hospital and Cardiovascular Institute, Peking Union Medical College and Chinese Academy of Medical Sciences

**Objective** Information on the relative merits of myocardial scar to predict functional recovery in patients with left ventricular (LV) dysfunction who underwent coronary artery bypass grafting (CABG) is lacking. This study assessed the prognostic value of myocardial scar determined by late gadolinium-enhanced cardiovascular magnetic resonance imaging (LGE-CMR) in predicting LV functional improvement after surgical revascularization.

**Methods** Between Nov. 2009 and Nov. 2011, 34 patients with reduced left ventricular ejection fraction (LVEF) referred for isolated CABG were prospectively enrolled, 31 were included in final analysis (3 excluded because of graft failure). LV functional parameters and scar tissue was assessed by LGE-CMR at baseline and 6 months after CABG. Patency of grafts was evaluated by computed tomography angiography (CTA) scan 6 months post-surgery. Predictors for global functional improvement were analyzed.

**Result** The baseline LVEF was 34.6 ± 10.1%, which improved to 44.6 ± 12.0% 6 months later and 22/31 patient’s improved LVEF by ≥ 5%. Multivariate logistic regression analysis showed that the only independent predictor for global functional recovery was the number of scar segments (Odds ratio 3.292, 95% Confidence Interval 1.374 – 7.887, P = 0.008). Receiver-Operator-Characteristic (ROC) analysis demonstrated ≤ 4 scar segments predicted global functional recovery with a sensitivity and specificity of 88.9% and 95.5%, respectively (AUC = 0.92, P < 0.001). Comparison of ROC curves also indicated that scar tissue (AUC = 0.922) was better than viable myocardium (AUC = 0.720) in predicting cardiac functional recovery (P < 0.001).

**Conclusion** Our study suggests that based on the American Heart Association (AHA) 17-segment format, patients with ≤ 4 scar segments on LGE-CMR could improve global LV function after CABG, while patients with more such segments did not. These observations might be useful to determine which patients with LV dysfunction are most likely to benefit from surgical revascularization.
Doppler (CW) to measure peak velocity of tricuspid regurgitation and estimate cross-tricuspid pressure gradient according to the simplified Bernoulli equation $\Delta P = 4V^2$, together with the inherent right atrial pressure to estimate pulmonary artery pressure. Then compare cross-tricuspid pressure gradient and pulmonary artery pressure with cardiac catheterization. Determine its accuracy through statistics. All patients underwent interventional therapy and determine the efficacy of occlusion by CDE.

**Result** All the occlusion of the elderly patients with PDA was successful through the examination by CDE. The diameter of the PDA pulmonary side estimated by the shunt flow signal had a positive correlation with angiocardiography ($r = 0.63, P < 0.001$). Pulmonary artery pressure estimated by the CW had a positive correlation with cardiac catheterization contrast ($r = 0.63, P < 0.001$).

**Conclusion** CDE has an important value in the elderly during the procedure of patent ductus arteriosus occlusion. Using CDFI to estimate PDA pulmonary side diameter and CW to estimate pulmonary artery pressure before the occlusion is the key to screen the indication of occlusion. And it is also important for using CDFI to observe whether there was a residual PDA shunt after transcatheter closure.

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**The value of color Doppler echocardiography in occlusion of elderly with atrial septal defect**

Chuanju Hou, Xianyang Zhu, Duazheng Zhang, Dongan Deng, Xiumin Han.
Department of Congenital Heart Disease, General Hospital of Shenyang Military Area Command, No.83, Wenhua Road, Shenyang District, Shenyang, 110840, China

**Background** To investigate the value of color Doppler echocardiography (CDE) in occlusion of elderly with atrial septal defect (ASD).

**Methods** In total of 64 cases of elderly ASD, observe the location, size and residual edge using two-dimensional echocardiography (2DE), observe the atrial septal colorful shunt bunch flow signal and the heart valve colorful regurgitation bunch flow signal using color Doppler flow imaging (CDFI) and measure the pulmonary artery pressure using continuous Doppler (CW) before the occlusion. If the patient had atrial fibrillation or multiple ASDs, transesophageal echocardiography (TEE) examination should be used to screen the patients according to the indication of ASD occlusion. During the procedure of occlusion of ASD, 2DE was used to monitor the position of occluder, CDFI was used to monitor residual shunt through the atrial septum and CDE was used to determine the efficacy of occlusion.

**Result** According to the Result of CDE, we selected 64 cases of elderly ASD, the implementation of all ASD occlusion were successful and the efficacy was satisfactory.

**Conclusion** CDE plays an important role in ASD occlusion. Before ASD occlusion, 2DE is recommended to observe the location, size and residual edge, CW is recomended to measure the pulmonary artery pressure. TEE is the key to screen according to the indications of ASD occlusion for the patients with atrial fibrillation or multiple ASDs. All elderly patients with ASD should undergo coronary angiography before the occlusion to exclude the patients with coronary artery disease who can't treat by stenting.

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**Value of color Doppler echocardiography in occlusion of rupture of aortic sinus aneurysm**

Chuanju Hou, Xianyang Zhu, Duazheng Zhang, Xiumin Han, Qiguang Wang, Dongan Deng
Department of Congenital Heart Disease, General Hospital of Shenyang Military Area Command, No.83, Wenhua Road, Shenyang District, Shenyang, 110840, China

**Background** To evaluate the value of color Doppler echocardiography (CDE) in occlusion of rupture of aortic sinus aneurysm (RASA).

**Methods** Fifteen patients with RASA were indicated for interventional occlusion by CDE. CDE take part in all the process as monitoring in the occlusion operation, judging the effect after occlusion and follow-up.

**Result** According to the characteristics images of CDE, we correctly confirmed the ruptured sinus and the chamber it ruptured into, any complications, and successfully occluded the ruptures in all 15 cases.

**Conclusion** CDE plays very important roles in case of RASA occlusion. It can defined the ruptured sinus of aorta and the ruptured-into chamber, the diameter of the rupture, and rule out complications as ventricular septal defect before operation which is the most essential for the success of the occlusion. CDE can be used to monitor the correct implantation of the occluder, evaluate the residual shunt signals and the impingement on the aortic valve during the procedure and follow-up.

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**Transthoracic echocardiographic study in transcatheter closure of ventricular septal defects in children**

Xiaotang Sheng, Xianyang Zhu, Chuanju Hou, Dongan Deng, Xiumin Han, Duazheng Zhang, Chunsheng Cui
Department of Congenital Heart Disease, General Hospital of Shenyang Military Region, Shenyang, China 110016

**Background** To evaluate the value of transthoracic echocardiographic (TTE) in transcatheter closure of ventricular septal defects (VSD) in Children.

**Methods** 855 patients aged 3 – 14 years (average 6.8 years) with VSD were occluded, including 828 patients with membranous or perimembranous VSD, 9 patients with muscular VSD and 18 patients with intracristal VSD. TTE was performed before catheterization to examine the VSD and the rims, to evaluate the occluder device, and to evaluate the efficacy of the device occlusion on parasternal long axis of left ventricle, short axis of aorta and five chamber views.

**Result** The size of VSD measured with TTE were 3.0 – 7.0 mm (average 4.8 mm). Mild residual shunt was revealed in 38 patients, which disappeared in 24 – 48 h after the procedure. At follow-up in 1 m – 1 y, TTE revealed 1 patient residual shunt.

**Conclusion** TTE is a useful approach for the preliminary selectable of VSD in children, for decision of the procedure and enables determination of device size, correct placement of the device, assessment of the closure procedure and result evaluation at follow-up.
The usefulness of echocardiogram in predicting post-procedural pulmonary artery pressure in patients with patent ductus arteriosus and severe pulmonary arterial hypertension

Duanzhen Zhang, Xiangyang Zhu, Bei Lu, Chunsheng Cui, Qiguang Wang, Po Zhang, Huoyuan Chen
Department of Congenital Heart Disease, the General Hospital of Shenyang Military Command (110840), Shenyang 110016

Background Patent ductus arteriosus (PDA) is one of the commonest congenital heart defects which are prone to be complicated with pulmonary arterial hypertension (PAH). The present study aims to assess the usefulness of echocardiogram in predicting post-procedural pulmonary artery pressure after transcatheter closure of PDA with severe PAH.

Methods A cohort of patients with PDA and severe PAH undergoing transcatheter closure of PDA were enrolled in this study. Patients with isolated PDA, cardiac function ≤ NYHA class II, systolic pulmonary arterial pressure (sPAP) ≥ 70 mm Hg and pulmonary capillary wedge pressure ≤ 15 mm Hg and those who underwent cardiac catheterization under local anesthesia were included in this study. After PDA was completely closed, pulmonary arterial pressure and aortic pressure were re-measured. According to post-closure sPAP, patients were divided into three groups: patients with sPAP < 40 mm Hg (group A), from 40 to 70 mm Hg (group B) and > 70 mm Hg (group C) after PDA closure. Differences in baseline parameters of echocardiogram and the correlations between these parameters and the decrease (%) in mean PAP were analyzed.

Result A total of 63 patients (49 females) aged from 10 to 60 years were recruited into this study. There was no significant differences in the age (P > 0.05) and the size of PDA (P > 0.05) between groups. The left atrium diameter indexes (35.96 ± 6.60 vs 31.17 ± 6.85 vs 22.24 ± 3.47 mm/m²; P < 0.05) and the left ventricular end diastolic volume indexes (279.45 ± 89.42 vs 162.88 ± 54.13 vs 60.94 ± 9.87 ml/m²; P < 0.05) decreased significantly from group A to group C. The left ventricular diameter/right ventricular diameter ratio in group C (1.86 ± 0.38) was less than that in group A (4.29 ± 1.85; P < 0.05) and group B (3.18 ± 1.21; P < 0.05) but had no significant difference between group A and group B. Linear regression analysis showed a significant correlation between the decrease in pulmonary artery mean pressure and the baseline of left ventricular end diastolic volume index (P < 0.05).

Conclusion In patients with PDA and severe PAH, the baseline echocardiographic parameters are capable of predicting the outcome of transcatheter PDA closure. The decrease in pulmonary artery mean pressure after device closure is well correlated with the baseline left ventricular end diastolic volume index.

Percutaneous transcatheter closure of congenital heart septal defect with real-time three-dimensional echocardiography

Guozhen Chen, Kun Sun, Wei Gao, Yumin Zhong
School of Medicine, Shanghai Children’s Medical Center, Shanghai Jiaotong University

Objective To evaluate the value of percutaneous transcatheter closure of congenital heart septal defects with real-time three-dimensional echocardiography (RT-3DE).

Methods During the catheter-based interventional procedures, thirty-four patients (aged 6.9 ± 4.6 years) were examined and guided by Philips RT-3DE system including Live-3D, Full Volume and 3D Color, etc. Their offline qualitative and quantitative analyses were made and compared with those of two-dimensional Doppler echocardiography (2DE).

Result By objectively demonstrating dynamic detailed cardiovascular normal anatomy and abnormal pathology, RT-3DE was more helpful and informative to the qualitative diagnoses than 2DE. Before transcatheter closure, Live-3D and full volume showed the anatomic position, spatial morphology and size of the septal defect and its relationship to other surrounding cardiac structures from en face view of left and right atrial/ventricular side. 3D Color also showed left-to-right shunt. Furthermore, the whole course of interventional procedure was guided and monitored online by RT-3DE, providing pushed location of guide-wise and catheter sheath, spatial morphology of device and its relation with contiguous cardiac structures, etc. After the device was first released, there were the incorrect spatial location of occluder in 2 cases and the smaller size of device in 1 case displayed by Live-3D and full volume. There was some residual left-to-right shunt with 3D Color. Under the guidance and monitoring of RT-3DE, the second released were correctly completed through replacing the larger device and relocating the position of the delivery sheath and device. There was no residual defect and no residual left-to-right shunt displayed by RT-3DE and also confirmed by Angiography. In addition, the diameter of septal defect measured (1.15 ± 0.67 cm) by RT-3DE was well correlated with that measured (1.01 ± 0.96 cm) by 2DE (r = 0.96), but the measurement of RT-3DE was correlated with the size of its device (r = 0.97) better than that of 2DE (r = 0.92). Thus, RT-3DE played an important role in the process of occluder selection and closure by guiding the measurement of the balloon stretched diameter and validating the position of the delivery sheath and the Amplatzer occluder in the atria/ventricles, etc.

Conclusion With instant visualization of cardiovascular structures and online guidance of percutaneous transcatheter closure, RT-3DE will be a safe and valuable imaging technique for selecting preoperative patient, choosing suitable device, performing optimal interventional manipulation and making postoperative effect assessment.

Quantitative myocardial CT perfusion with rapid kV switching dual energy CT: a microspheres validation study

Aaron So1,2, Jiang Hsieh1, Yasirho Imai1, Suresh Narayanan1, Jean-Baptiste Thibault3, Sandeep Dutta1, Kelley Branch1, Ting-Yim Lee1,2
1. Imaging Research Laboratories, Roberts Research Institute, London, Ontario, Canada
2. Imaging Program, Lawson Health Research Institute, London, Ontario, Canada
3. CT Engineering, GE Healthcare, Waukesha, Wisconsin, United States

Purpose We validated the usefulness of beam hardening (BH) reduction with a rapid kV switching dual energy CT (DECT) protocol in quantitative myocardial perfusion (MP) imaging against microspheres measurement of MP.

Methods Normal pigs were scanned using a Discovery 750 HD scanner (GE Healthcare, GE) with a DECT protocol: 140/80 kilovolts...
Low dose quantitative myocardial CT perfusion with adaptive statistical iterative reconstruction: a microspheres validation study

Aaron So1,2, Jiang Hsiao1, Jean-Baptiste Thibault1, Kelley Branch1, Ting-Yim Lee1,2
1. Imaging Research Laboratories, Robarts Research Institute, London, Ontario, Canada
2. Imaging Program, Lawson Health Research Institute, London, Ontario, Canada
3. CT Engineering, GE Healthcare, Waukesha, Wisconsin, United States
4. Cardiology, University of Washington, Seattle, Washington, United States

Purpose We validated the effectiveness of adaptive statistical iterative reconstruction (ASIR, GE Healthcare, GE) for minimizing image noise in low dose quantitative myocardial perfusion (MP) imaging against microspheres MP measurement.

Methods Indocyanine green (ISooc 370, 0.7 mg/kg) was injected at 3 to 4 ml/s into 68 ± 25 kg normal pigs via an ear vein and the heart was scanned using a GE Discovery 750HD scanner with a prospectively ECG triggered dynamic protocol (Snapshot Pulse (SSP), GE): axial scan every 1-2 heart beats for 22 scans using 140 kV, 0.35 s gantry period and 80 mA (normal dose). MP measurement was repeated with the x-ray tube current reduced to 20 mA (low dose). The normal- and low-dose SSP images were reconstructed using filtered back projection (FBP) (SSP80) and both FBP (SSP80 ASIR) and ASIR (SSP80 ASIR), respectively.

All images were corrected for beam hardening from which MP maps were generated using CT Perfusion (GE). After the CT perfusion studies, fluorescent microspheres were injected into the left atrial appendage of the heart to measure MP. Mean MP measured with microspheres and the three CT image sets were compared using linear regression and Bland-Altman analysis. Effective dose (ED) of each SSP protocol was estimated from the dose-length product provided by the scanner.

Result SSP80 images exhibited the highest correlation with microspheres \((R = 0.69)\) compared to SSP20 ASIR \((R = 0.60)\) and SSP20 ASIR \((R = 0.57)\). SSP80 images also showed the smallest difference in mean MP from microspheres and narrowest limits of agreement with microspheres \([-7.0 \text{ to } -32.9 \text{ to } 46.8 \text{ ml/min} \times 100/\text{g} (80)]\) compared to SSP20 ASIR \([-11.3 \text{ to } -35.3 \text{ to } 57.8 (93)]\) and SSP20 ASIR \([-15.7 \text{ to } -32.8 \text{ to } 64.1 (97)]\). ED of the SSP80 and SSP20 protocols were 4.5 and 1.1 mSv respectively.

Conclusion Noise in low dose SSP images reconstructed with FBP was excessive which led to less accurate and reproducible MP estimation with CT Perfusion but such errors could be reduced with ASIR. With the proposed image acquisition and reconstruction approaches, MP measurement with low dose CT Perfusion is a feasible alternative to MRI and SPECT for studying ischemic heart disease.

Evaluation of functional significance of coronary artery stenosis with baseline myocardial mean transit time

Aaron So1,2, Gerald Wisenberg3, Ali Islan4, Ting-Yim Lee1,2
1. Imaging Research Laboratories, Robarts Research Institute, London, Ontario, Canada
2. Imaging Program, Lawson Health Research Institute
3. Cardiology, London Health Sciences Centre, London, Ontario, Canada
4. Radiology, London Health Sciences Centre, London, Ontario, Canada

Purpose Mean transit time (MTT) is inversely related to perfusion pressure. We herein investigated the relationship between baseline myocardial MTT measured by dynamic contrast-enhanced (DCE) CT imaging and the degree and hemodynamic significance of coronary stenosis in patients with coronary artery disease (CAD).

Methods Thirty CAD patients underwent invasive coronary angiography and CT myocardial perfusion (MP) imaging within 2 weeks. Degree of stenosis in each coronary artery and its branches was qualitatively classified from angiogram as non-significantly stenosed (NS, normal, mildly irregular or = 70% narrowed). For the CT MP study, 8.5 mm of the heart was scanned for 30 s using a GE Healthcare Discovery VCT scanner with 140 kV, 50 mA and 0.4 s gantry period after a bolus injection of contrast (Omnipaque 300, 0.7 mgI/mL) at 4 ml/s. The study was repeated at 3 min after a 4-min infusion of dipyridamole (Persantine, 0.56 mg/kg). DCE cardiac images from each scan were corrected for beam hardening using an image-based correction algorithm before analyzed using a model-based deconvolution algorithm (CT Perfusion, GE Healthcare) to generate functional maps of MP and MTT. In each map, myocardium in horizontal long-axis was divided into six segments and assigned to a supply coronary artery according to the AHA schema. Myocardial perfusion reserve (MPR) in each segment was calculated as the ratio of MP at stress to that at rest. Baseline MTT and MPR in segments perfused by NS and SS coronary arteries were averaged over all slices and compared using paired t-tests.
Clinical significance of coronary CT angiography in asymptomatic patients with type 2 diabetes mellitus

Menghua Zhao, Hongsen Tian, Jijaoping Shi, Kai Zhang, Jinjun liu, Yanfei Hua, Yujue Shen
Department of Cardiology, Central Hospital of Handan, Handan, 056001, China

Objective Diabetic patients with coronary artery disease are often asymptomatic, making appropriate care of such patients difficult. The purpose of this study was to investigate the prevalence of coronary lesions in asymptomatic diabetic patients.

Methods Coronary computed tomography (CT) angiography was performed in 240 consecutive diabetic patients. Images from patients whose coronary artery calcium scores (CAC scores) were less than 400 were subjected to stenosis and plaque analysis. Significant stenosis was defined as coronary artery stenosis > 70%. High-risk plaque was defined as plaque having both a CT density < 70 Hounsfield Units (HU) and showing positive remodeling.

Result Significant stenoses were identified in 30.5% of the patients. High-risk plaques were identified in 17.1% of the patients. Less than half of the high-risk plaques were obstructive plaques. There was a statistically significant association between significant stenosis and high-risk plaque by chi-square test (P = 0.013). We found significant stenosis even in patients whose CAC score = 0 at a rate of 5.0%. Using univariate logistic-regression analysis, we found that coronary risk factors associated with significant stenosis and high-risk plaque were dyslipidemia (P = 0.028) and current smoking (P = 0.03), respectively.

Conclusion We found that the higher prevalence of coronary lesions in asymptomatic diabetic patients. We feel that our method of focusing on remodeling and attenuation in plaque analysis has the potential to lead to true identification of vulnerable plaque. However, to confirm this assumption will need to conduct a prospective study.

Assessment of coronary non–calciﬁed and mini–calciﬁed mixed plaque progression in coronary computed tomography angiography

Fangfang Yu, Bin Lu
State key laboratory of cardiovascular disease, Radiology department, Fuwai Hospital, National center for cardiovascular disease, Chinese academy of medical sciences and peking union medical college

Objective Coronary computed tomography angiography (CCTA) can non-invasively visualize the coronary atherosclerotic plaque, especially non-calciﬁed plaques (NCP) and mini-calciﬁed mixed plaque. The changes of those plaques were not clear. We detected NCPs and mini-calciﬁed mixed plaques using original and follow-up CCTAs in order to determine those changes.

Methods Patients suspected coronary artery disease with twice CCTAs consecutively from 2009 Sep. to 2012 Dec. were retrospectively included. Those patients were showed in CCTA with an obvious NCPs or mini-calciﬁed mixed plaque in a branch of coronary artery but no evidence of percutaneous coronary intervention and coronary artery bypass grafting. The informations of those patients was collected by medical record and calling back. The length of plaque, minimum lumen diameter, minimum lumen area, total plaque volume, plaque volume and remodeling index were measured at offshore workstation. The changes
of plaque in length and stenosis in lumen were calculated and analysed. Interobserver and intraobserver agreement for plaque measurement was analyzed.

**Result** Sixty subjects (45 males, mean age 52 ± 8 years) with NCPs or mini-calciﬁed mixed plaque by MSCT were divided into statins group and non-statin group. The risk factors and the interval time of CCTAs between two groups at baseline have no signiﬁcant difference, except the lengths of plaques in statin group are longer than no statins group (18.88 ± 10.04 mm vs 13.42 ± 5.37 mm, P = 0.009). The length of plaques have signiﬁcant difference between twice CCTAs in non-statin group (13.43 ± 5.38 mm vs 15.56 ± 6.24 mm, P = 0.006), while that of statins group without difference (18.88 ± 10.04 mm vs 18.50 ± 10.96 mm, P = 0.56). The length changes of plaques and ratio of length changes in statin group signiﬁcantly differ from that of no statins group (P < 0.05). In multiple linear regression analysis, diabetes mellitus and no statins therapy were independently associated with the length progression of plaque after adjustment for age, sex, and follow-up time interval. Close correlations between the original analysis and re-analysis were found (r = 0.92 for length, r = 0.83 for vessel lumen).

**Conclusion** CCTA can non-invasively assess the progression or regression of coronary atherosclerosis plaque. Diabetes mellitus were independently associated with the length progression of plaque. Lipid-lowering therapy with statins can delay the progression of NCPs or mini-calciﬁed mixed plaque in length.

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**Transthoracic echocardiography for diagnosis of right pulmonary artery to left atrial fistula**

Wei-chun Wu, Jian-rong Li, Wu-gang Wang, Qiong-wen Lin
Department of Echocardiography, State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, Beijing 100337, China

**Background** No overview has been published to date of the transthoracic echocardiography (TTE) signs of the rare cardiovascular anomaly of right pulmonary artery (RPA) to left atrial (LA) fistula (RPA-LAF).

**Objective** To summarize the characteristics of the transthoracic echocardiography (TTE) for diagnosing the rare cardiovascular anomaly of right pulmonary artery to left atrial fistula.

**Methods** Three patients were diagnosed with RPA-LAF at Fuwai Hospital from 2000 to 2010. The patients were all male and were aged 14 years, 7 years and 6 months. All patients underwent clinical examination, chest roentgenogram, laboratory testing, electrocardiography, transthoracic echocardiography (TTE), contrast echocardiography, and cardiac catheterization. We undertook a detailed review of their TTE and contrast echocardiography findings to determine the characteristic findings of this condition.

**Results** TTE was performed in all cases, and in two cases contrast echocardiography was also performed. In two cases, the LA was abnormally shaped and enlarged, the RPA was obviously enlarged and aneurysmal, and the fistula was detectable on TTE. In the other case, there was only mild enlargement of the left heart, and contrast echocardiography led to a misdiagnosis of pulmonary arteriovenous fistula. Successful detection of a fistula may be related to the degree of dilatation of the LA and RPA, the location of the fistula, and the type of RPA-LAF. Cases with a dilated LA and with the fistula located at the proximal and posterior RPA and LA may be easier to diagnose by TTE. The shunt from the RPA to the LA can clearly be seen by color Doppler flow imaging. The preferred imaging planes were the pulmonary artery long-axis, aortic short-axis, and apical four-chamber views, and the subxiphoid coronal view of the right ventricular outflow tract.

**Conclusion** Diagnostic guidelines of TTE can help in the detection of RPA-LAF. With the correct views, echocardiography was effectively able to diagnose RPA-LAF, including diagnosis of the complications and malformations which can guide typing.

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**Congenital anomalies of coronary arteries in complex congenital heart disease: diagnosis with dual-source computed tomography**

Fangfang Yu, Bin Lu, Yang Gao, Zhihui Hou, Huili Cao
Fuwai hospital, national center for cardiovascular disease, Chinese Academy of Medical Sciences and Peking Union Medical College

**Objective** Anomalous origins and course of the coronary arteries can affect the effect of surgical operation in complex congenital heart disease. Dual-source CT (DSCT) seems to be a promising tool for detection of coronary arteries prior to surgical operation. The objective of the study is to explore the clinical value of DSCT in the identiﬁcation of congenital coronary artery anomalies (CAA) in patients with complex congenital heart disease and analysis the incidence of CAA in those patients.

**Methods** 417 patients with complex congenital heart disease at our institution underwent ECG-gated DSCT angiography between the period of Aug. 2009 and Feb. 2012 were involved. The Result were retrospectively analyzed, including the types and proportion of congenital heart disease, incidences of CAA, incidences of abnormal coronary artery crossing right ventricular outflow tract and prognosis. Each subject was analyzed independently by two experienced cardiovascular radiologists. The consensus was achieved by the both when there was a difference in each other's Result. Image quality was assessed by a ﬁve-point score. A score of < 3 represents non-diagnostic.

**Result** Thirty-ﬁve of 417 patients (8.39%) were non-diagnostic with image quality score < 3. 63 cases of patients with congenital coronary artery anomalies were detected. The incidence of anomalous anatomical origin and course of the coronary arteries in our study was 16.49%. 6 cases in 108 Tetralogy of Fallot (TOF, 5.56%) had coronary artery anomalies, 18 in 84 double outlet right ventricle (DORV, 21.43%), 11 in 97 pulmonary atresia (PA, 11.34%), 7 in 36 transposition of great arteries (TGA, 11.76%), 15 in 41 single ventricle (SV, 36.59%), 4 in 12 truncus arteriosus/aortopulmonary window (33.33%), 2 in 39 interruption of aortic arch (IAA, 5.13%). Highest incidence (23 cases, 6.02%) is L-coronary artery, which occupy 36.51% of coronary artery anomalies. 13 (20.63%) cases of abnormal coronary artery artery crossing the right ventricular outflow tract, including 1 cases of TOF, 9 cases of DORV, 2 cases of PA/IVS D, 1 cases of TGA; 18 cases (4.71%) is R-coronary artery, 18 cases (4.71%) is single coronary artery, 1 cases (0.26%) is coronary arterial dilation, 3 cases (0.79%) is coronary artery with anomalous termination with pulmonary artery. The mean effective dose was 1.28 ± 1.05 mSv.

**Conclusion** Prospective ECG-triggering DSCT angiography with a very low effective radiation dose allows the accurate diagnosis of coronary arteries and other structural anomalies in patients with complex CHD before surgical operation. It has great promise to become a commonly used second-line technique for complex CHD.
Prognostic value of myocardial fibrosis in patients with dilated cardiomyopathy detected by contrast-enhanced cardiac magnetic resonance imaging

Changhong Zou, Jian Zhang
Heart Failure Care Unit, Fuwai Hospital, State Key Laboratory of Cardiovascular Disease, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing 100037, Peoples Republic of China

Objective To investigate the characteristics and prognostic importance of fibrosis detected by contrast-enhanced cardiac magnetic resonance imaging (CE-CMR) in Chinese patients with dilated cardiomyopathy (DCM).

Methods 123 hospitalized patients with DCM (age 45 ± 12 years, 98 male) referred for CE-CMR assessment were followed-up for 3–79 months (median 29 months). Major adverse cardiac events (MACE) were defined as all-cause death, or ventricular tachycardia. Left ventricular end-diastolic diameter (LVEDD) and left ventricular ejection fraction (LVEF) were calculated from the short axis cine images of CMR, while late gadolinium enhancement (LGE) was used to assess myocardial fibrosis. Ventricular tachycardia was monitored by means of 24-hour dynamic electrocardiogram (24 h-Holter).

Result Myocardial fibrosis (LGE) was present in 42.3% of patients, the majority of which was mid-myocardial enhancement (84.6%). Both LVEDD and LVEF were similar in patients with or without LGE (LVEDD: 70.4 ± 9.5 mm vs 68.4 ± 8.1 mm, P = 0.200; LVEF: 22.4 ± 7.3% vs 21.8 ± 7.4%, P = 0.634). Compared with patients without LGE, patients with LGE had a greater occurrence of MACE (42.3% vs 25.4%, P = 0.047) after a median follow-up of 29 month. Notably, there was a higher incidence of ventricular tachycardia in patients with LGE (34.6% vs 18.3%, P = 0.040), although there was no significance in all-cause mortality between patients with and without LGE (P = 0.963). In the multivariate Cox proportional hazard model regression, forward stepwise analysis adjusted by age, gender, duration of symptoms, NYHA functional class, LVEDD and LVEF, indicated that presence of LGE was an independent strong risk factor for MACE (HR = 2.621, 95% CI 1.354 – 5.074, P = 0.004).

Conclusion Patients with DCM frequently have myocardial fibrosis detected on CE-CMR and the major pattern is mid-myocardial enhancement. Fibrosis, as reflected by the presence of LGE, is associated with worse outcome in the medium term. The information obtained from CE-CMR may be of incremental prognostic value.

A novel categorization of congenital double-outlet right ventricle diagnosis by echocardiography

Kunjing Pang
State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

Objective The feasibility and reasonability of category methodology for novel and effective DORV echocardiology diagnosis is discussed.

Methods According to artery relations (normal relation: AN; abnormal relation: AA), Vs D location (sub-artery ventricular septal defect A-Vs D; non-co-mitted ventricular septal defect, N-Vs D) pulmonary valve stenosis (Pulmonary valve stenosis PS; pulmonary hypertension PH), the congenital DORV is categorized. After permutation and combination, 8 categories are acquired, that is, type I AN, A-Vs D, PH; type II AN, A-Vs D, PS; type III AN, N-Vs D, PH; type IV AN, N-Vs D, PS; type V AA, A-Vs D, PH; type VI AA, A-Vs D, PS; type VII AA, N-Vs D, PH; Type VIII AA, N-Vs D, PH. Based on this categories, 409 DORV cases are categorized by echocardiology diagnosis, and contrasted with clinic diagnosis Result (cardiac CT cross sectional scanning, cardiac MRI examination, cardiac catheter test, operation), so as to analyze the scientificness of this categorization. Meanwhile, the instructional significance of this categorization to selection of clinic therapy is also summarized. The clinic therapy Result for all the patients who were given operations proved the effectiveness and clinic significance of the categories.

Result 409 DORV cases were categorized in this method. Result are listed as follows: I typed 52 cases, accounts for 12.7%, II typed 87 cases, 21.3%, III typed 27 cases, 6.6%, IV typed 24 cases, 5.9%, V typed 59 cases, 14.4%, VI typed 39 cases, 9.5%, VII typed 35 cases, 8.6%, VIII typed 82 cases, 20.1%. The result of echocardiography diagnosis accord completely to those of clinic final diagnosis. Based on this categorization, by precluding special abnormal influence factors that is considered to affect the choice of operation way, it shows that each type of DORV is corresponding to some type of operation way, which indicates that this novel categorization could instruct the choosing of clinic therapy accurately and effectively.

Conclusion A novel categorization by echocardiography diagnosis can accurately diagnose all the DORV cases, which is considered to be scientifically and effectively instructive to the choosing of clinic therapy.

T1 mapping for detection of left ventricular myocardial fibrosis in hypertrophic cardiomyopathy: a preliminary study

Minjie Lu1, Shihua Zhao1, Gang Yin1, Shiliang Jiang1, Jing An2, Saurabh Shah1
1. State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College
2. Siemens Healthcare

Purpose To investigate the diagnostic value of T1 mapping imaging of evaluating fibrosis in patients with hypertrophic cardiomyopathy (HCM).

Methods 21 subjects with HCM and 18 healthy volunteers underwent conventional late gadolinium enhancement (LGE) imaging and T1 mapping imaging. The region of myocardium in HCM is divided into remote area of LGE, peri-LGE, LGE (halo-like LGE and typical patchy LGE). These regions combined with normal volunteers myocardium were calculated by the reduced percent of T1 value (RPTV).

Result The RPTV in healthy volunteers was no significant difference in pairwise among the remote area of LGE, peri-LGE, LGE (halo-like LGE and typical patchy LGE). These regions combined with normal volunteers myocardium were calculated by the reduced percent of T1 value (RPTV).
LGE technique in detecting fibrosis ROC analysis. T1-mapping showed improved detection of fibrosis compared to LGE (T1-mapping area under the curve 0.975 ± 0.07 vs LGE area under the curve 0.753 ± 0.26, P < 0.0001). According to ROC curve, the best cut-off value for RPTV to detect fibrosis is 7.86% (sensitivity of 90.4% and specificity of 95.3%).

Conclusion HCM has a high prevalence of fibrosis and with varying severity. T1 mapping imaging can be a useful method to evaluate the severity of the fibrosis in HCM.

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Fat deposition in idiopathic dilated cardiomyopathy assessed by magnetic resonance imaging

Minjie Lu1, Shihua Zhao2, Gang Yin1, Shiliang Jiang1, Hui Xue3, Jing An3, Saurabh Shah4
1. State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College
2. Siemens Healthcare

Objective The aim of this study was to prospectively investigate the prevalence of fat deposition in idiopathic dilated cardiomyopathy (DCM) by fat-water separation imaging. An auxiliary aim was to determine the relationship between LV fat deposition and characteristic myocardial fibrosis, as well as cardiac functional parameters.

Background Idiopathic DCM remains the most common cause of heart failure in young people referred for cardiac transplantation; little is known about what the clinical value of fat deposition in DCM.

Methods One hundred and twenty-four patients with DCM were studied after written informed consents were obtained. The MR scan protocols included a series of short-axis LV cine imaging for functional analysis, fat-water separation imaging, and late gadolinium enhanced (LGE) imaging. Fat deposition and fibrosis location were compared to the scar regions on LGE images using 17-segment model. Statistical comparisons of LV global functional parameters, fibrosis volumes, and the scar regions on LGE images using multiple regressions.

Result The patients had a 41.9% (52 of 124) prevalence of positive LGE. And 12.9% (16/124) of fat deposition prevalence was found in this DCM cohort. The patients with fat deposition had larger left ventricular end-diastolic volume (LVEDV) index (140.8 ± 20.2 ml/m² vs 123.4 ± 15.8 ml/m²; P < 0.01), larger left ventricular end-systolic volume (LVESV) index (111.3 ± 19.2 ml/m² vs 87.0 ± 20.3 ml/m²; P < 0.01) and decreased left ventricular ejection fraction (LVEF) (21.1 ± 7.1% vs 30.0 ± 10.7%; P < 0.01). Higher volume of LGE was found in the group of myocardial fat deposition (18.39 ± 9.0 ml vs 13.40 ± 6.54 ml; P = 0.001), as well as a higher percentage of LGE/LV mass (19.11 ± 7.78% vs 13.60 ± 4.58%; P < 0.001). The volume of fat deposition was correlated with scar volume, LVEF, LVEDV index, and LVESV index.

Conclusion Fat deposition is quite a common phenomenon in DCM. And it is associated with DCM characteristics such as fibrosis volume and LV function.

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Metal artifact reduction in computed tomography for assessment of lead extraction in patients with implantable cardiac defibrillator

Aaron So1,2, Simon Modi1, James White1, Raymond Yee4, Ashish Goela3, Ting-Yim Lee1,2
1. Imaging, Roberts Research Institute, London, Ontario, Canada
2. Imaging, Lawson Health Research Institute, London, Ontario, Canada
3. Electrophysiology and Pacing, Liverpool Heart and Chest Hospital, Liverpool, Merseyside, United Kingdom
4. Cardiology, London Health Sciences Centre, London, Ontario, Canada
5. Radiology, London Health Sciences Centre, London, Ontario, Canada

Purpose Patients with implantable cardiac defibrillator (ICD) may require lead extraction if there is presence of lead fibrosis and calcification but such procedure requires specialist equipment and skills and is associated with high mortality. We investigated the effectiveness of several image acquisition, reconstruction and processing Methods for metal artifact reduction in CT to facilitate its use for pre-procedural identification of lead calcification.

Methods A dual coil ICD lead (Medtronic Sprint Quattro Secure 6947M) with radiopaque beads attached was inserted into the right ventricle of an excised pig heart. The heart was filled with water and scanned in approximately the same orientation as in patients with a single energy CT (SECT) protocol using 120 kV, 120 mAs and 0.625 mm collimation on a Discovery 750HD scanner (GE Healthcare). The scan was repeated with a dual energy CT (DECT) protocol using 140/80 kV alternating every 0.2 ms and 210 mAs. Three sets of 0.625-mm-thick cardiac images were generated using the DECT scan data: (1) monochromatic 70 keV, (2) 70 keV plus ASIR (Adaptive Statistical Iterative Reconstruction), (3) 70 keV plus MARS (Metal Artifact Reduction Software, GE). Image set (1) to (3) were used to reduce artifacts from beam hardening, projection noise and projection truncation induced by the lead respectively. Artifacts in each image set were compared against those in the 0.625 mm and 10 mm averaged SECT images.

Result DECT 70 keV and 70 keV + ASIR images manifested intense shading and streaking artifacts that were minimally different from those of the 0.625 mm SECT image and the lead was not visible in all these images. 70 keV + MARS image exhibited less artifacts but the lead was not visible in the 10 mm averaged SECT image showed the least artifacts while restoring the lead image with minimal compromise of the axial resolution. Lead extraction is complicated and associated with significant mortality and morbidity. The proposed method facilitates the use of CT for assessing lead calcification and the need of lead extraction.
Transcatheter echocardiography for diagnosis of right pulmonary artery to left atrial fistula: report of three cases and review of the literature

Weichun Wu, Jianrong Li, Wugang Wang, Qiongwen Lin
Department of Echocardiography, State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, P. R. China

Background No overview has been published to date of the transcatheter echocardiography (TTE) signs of the rare cardiovascular anomaly of right pulmonary artery to left atrial fistula (RPA-LAF).

Objective To summarize the characteristics of the transcatheter echocardiography (TTE) for diagnosing the rare cardiovascular anomaly of right pulmonary artery to left atrial fistula.

Methods Three patients were diagnosed with RPA-LAF at Fuwai Hospital from 2000 to 2010. The patients were all male and were aged 14 years, 7 years and 6 months. All patients underwent clinical examination, chest roentgenogram, laboratory testing, electrocardiography, transthoracic echocardiography (TTE), contrast echocardiography, and cardiac catheterization. We undertook a detailed review of their TTE and contrast echocardiography findings to determine the characteristic findings of this condition.

Result TTE was performed in all cases, and in two cases contrast echocardiography was also performed. In two cases, the LA was abnormally shaped and enlarged, the RPA was obviously enlarged and aneurysmal, and the fistula was detectable on TTE. In the other case, there was only mild enlargement of the left heart, and contrast echocardiography led to a misdiagnosis of pulmonary arteriovenous fistula. Successful detection of a fistula may be related to the degree of dilatation of the LA and RPA, the location of the fistula, and the type of RPA-LAF. Cases with a dilated LA and with the fistula located at the proximal and posterior RPA and LA may be easier to diagnose by TTE. The shunt from the RPA to the LA can clearly be seen by color Doppler flow imaging. The preferred imaging planes were the pulmonary artery long-axis, aortic short-axis, and apical four-chamber views, and the subxiphoid coronal view of the right ventricular outflow tract.

Conclusion Diagnostic guidelines of TTE can help in the detection of RPA-LAF. With the correct views, echocardiography was effectively able to diagnose RPA-LAF, including diagnosis of the complications and malformations which can guide typing.

Electrophysiological characteristic and ablation of epicardial idiopathic ventricular arrhythmias arising around left fibrous triangle

Guitang Yang
Shenyang Northern Hospital

Background The success rate of radiofrequency catheter ablation of ventricular arrhythmias originating from left fibrous triangle (LFT) is not high. This article was to discuss the characteristics of surface electrocardiogram and the strategy of ablation of ventricular arrhythmias originating from LFT.

Methods From Feb. 2002 to Mar. 2012, total 323 patients with outflow ventricular arrhythmias were ablated in our hospital, including 46 patients whose ventricular arrhythmias originated from the LFT. The mean age of the 46 patients was 44 ± 13 years (16 – 87 years), and 24 of them (52.2%) were male. Thirty patients had frequent premature ventricular contractions (PVCs) and 16 patients had both PVCs and nonsustained or sustained ventricular tachyarrhythmia (VT). All the patients were examined with ECG, electrophysiology, active mapping and pace mapping. The computer tomography angiogram (CTA) 3D reconstruction of coronary artery, venous was completed in 20 patients.

Result Successful ablation was achieved in 41 of the 46 patients (89.1%, 41/46) targeting left coronary cusp (LCC, 30 patients), infra aortic valve (infra AV, 6 patients) and great cardiac vein (GCV, 5 patients). The surface ECG in all the three groups presented with inferior axis and R/S-transition in lead V1 and V2. There were no differences in the total QRS duration in the three groups. Most of the patients presented with right bundle branch block (RBBB) morphology in infra AV group and GCV group compared with LCC group (67%, 80% vs 15%, P = 0.002). Regarding to the classification of the LFT according to CTA, the patterns of distribution were as follows: “closed” in 10 (50%, 10/20) hearts; “completely opened” in 2 (10%, 2/20); “inferiorly opened” in 5 (25%, 5/20) hearts and “superiorly opened” in 1 (5%, 1/20) hearts. In the remaining 2 (10%, 2/20), there were not any distances between GCV and left coronary artery. The closest distance between the center of the GCV and LCC is 17.6 ± 4.2 mm (9.1 – 26.3 mm).

Conclusion Ventricular arrhythmias originating from the LFT can be ablated in the nadir of the LCC, infra AV and the GCV. The success rate may be impacted by the distance from the GCV and the LCC.

Evaluation renal function of cardiac transplant patients with glomerular filtration rate imaging

Jiangang Wang, Zuoxiang He
Departments of Nuclear Medicine, Fu Wai Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China

Purpose Evaluation renal function of cardiac transplant patients with glomerular filtration rate imaging

Methods We collected patients underwent heart transplantation and had 3 times GFR (before operation, 1 month after operation, 1 year after operation). Renal function analysis indicators include left kidney GFR, right kidney GFR, total GFR, left renal clearance rate, right renal clearance rate, left renal peak time, right renal peak time.

Result The GFR indicators 1 month after operation are similar with the GFR indicators before operation, the differences were not statistically significant. Left GFR (30.3 ± 12.6), right GFR (31.1 ± 13.0), total GFR (61.2 ± 24.7) 1 year after operation decreased comparing with the Left GFR (35.8 ± 13.3), right GFR (35.9 ± 12.7), total GFR (71.7 ± 24.7) before operation, differences were statistically significant (P values were 0.024, 0.038, 0.026). Left renal clearance rate, right renal clearance rate, left renal peak time, right renal peak time was no significant difference (P > 0.05).

Conclusion There is no significant difference between renal function 1 month after and before heart transplantation. The renal function 1 year after heart transplantation decreased comparing with the renal function before heart transplantation. Protect kidney function after 1 year heart transplantation, and monitor closely the kidney function.
A new algorithm differentiate the septum originated ventricular arrhythmias from the free wall in the right ventricular outflow tract

Fengxiang Zhang, Bing Yang, Hongwu Chen, Weizhu Ju, Kejiang Cao, Minglong Chen
The First Affiliated Hospital with Nanjing Medical University, Nanjing, China.

Background Limited data exists about long term success rate after ablation of right ventricular outflow tract (RVOT) ventricular arrhythmias (VA) guided by the non-contact mapping system (NCM). In this study, we aim to investigate long term outcomes following NCM guided RVOT VA ablation.

Methods From Jun. 2006 to Dec. 2011, consecutive patients with RVOT VA underwent mapping and ablation using NCM (group A, n = 136) or 3-D contact mapping system (control group B, n = 18). Within group A, ablation was randomized to be initiated at either the site of earliest electrical activity (EA site) or the break-out site from which rapid centrifugal electrical propagation originated from (BO site). Clinic visits, ECGs and 24 hour Holters were conducted monthly for the first three months and then in six months intervals.

Result 154 (60 male, mean age 41.8 ± 13.5 years old) consecutive patients were enrolled. With follow up of 36.2 ± 17.5 months, the long term success rate after a single procedure without anti-arrhythmic agents was 86.8% (118/136) in the NCM cohort. Baseline characteristics, acute and long term success rates, complications were similar between Groups A and B. A learning curve of 20 cases was associated with the use of NCM. The initial ablation is more successful when directed at the EA sites rather than the BO sites identified by NCM (P < 0.01).

Conclusion NCM-guided RVOT VA ablation is highly effective and associated with long term clinical outcomes comparable to ablation guided by 3-D mapping systems. Ablation is more successful when directed at the EA sites identified by the NCM.

Magnetic vs manual catheter navigation for mapping and ablation of right ventricular outflow tract ventricular arrhythmias: a randomized controlled study

Fengxiang Zhang, Bing Yang, Hongwu Chen, Weizhu Ju, Kejiang Cao, Minglong Chen
The First Affiliated Hospital with Nanjing Medical University, Nanjing, China.

Background There has been no randomized controlled study to prospectively compare the performance and clinical outcomes of remote magnetic control (RMC) vs manual catheter control (MCC) during ablation of right ventricular outflow tract (RVOT) ventricular premature complexes (VPC) or tachycardia (VT). This study prospectively evaluated the efficacy and safety of using either RMC vs MCC for mapping and ablation of RVOT VPC/VT.

Methods Thirty consecutive patients with idiopathic RVOT VPC/VT were referred for catheter ablation and randomized into either RMC or MCC group. A non-contact mapping system (NCM) was deployed in the RVOT to identify origins of VPC/VT. Conventional activation and pace-mapping was performed to guide ablation. If ablation performed using one mode of catheter control was acutely unsuccessful, the patient crossed over to the other group. The primary endpoints were patients' and physicians' fluoroscopy exposure and times.

Result Mean procedural times were similar between RMC and MCC groups. The fluoroscopy exposure and times for both patients and physicians were much lower in RMC group than in the MCC group. Ablation was acutely successful in 14/15 patients in the MCC group and 10/15 in the RMC group. Following cross-over, acute success was achieved in all patients. No major complications occurred in either group. During 22 months of follow-up, RVOT VPC recurred in 2 RMC patients.

Conclusion RMC navigation significantly reduces patients' and physicians' fluoroscopy times by 50.5% and 68.6% respectively when used in conjunction with a NCM to guide ablation of RVOT VPC/VT.
Catheter ablation of ventricular tachycardia in patients with ischemic cardiomyopathy under the guidance of three-dimensional electroanatomic mapping

Jie Ni¹,², Bing Yang¹, Zhuwei Ju¹, Yujie Zhao³, Yiqiang Yuan¹, Fengxiang Zhang¹, Hongwu Chen¹, Kai Gu¹, Minguang Li¹, Kejiang Cao¹, Minglong Chen¹

1. Department of Cardiology, Jiangsu Province Hospital The first affiliated hospital with Nanjing Medical University
2. Department of Cardiology, Changshu No.1 People’s Hospital
3. Department of Cardiology, Cardiovascular Hospital of Zhengzhou City

Objective To introduce the initial experience of electroanatomic mapping and catheter ablation of VT in patients with ischemic cardiomyopathy (ICM).

Methods 7 ICM patients with VT attack were referred for catheter ablation guided by 3-dimensional electroanatomic mapping. The scar area was identified by voltage map. Activation mapping, pace mapping and entrainment mapping were then performed to localize the reentrant circuit, critical isthmus, slow conduction zone and exit sites, which were the targets for ablation.

Result Among 7 patients, 13 VTs were induced. Catheter ablation successfully eliminated all 8 VTs in 5 patients, partially succeeded in 1 patient with 2 VTs, and failed in 1 patient with 3 VTs. ICD was implanted into that 2 patients.

Conclusion 3-dimensional electroanatomic mapping, combined with activation mapping and pacing maneuvers can help to discover the origin, reentrant circuit, slow conduction zone and the exit of ICM-VT, providing an effective way to eliminate such VTs.
Objective Concentrations of D-dimer, a degradation product of cross-linked fibrin, were found to be raised in patients with AAD by several studies. Admission concentrations of D-dimer have emerged as a complementary diagnostic marker for acute aortic dissecting (AAD). But its prognostic role with in-hospital mortality in patients with Stanford type A AAD was not well elucidated. To clearly elucidate the prognostic role of D-dimer with in-hospital mortality in patients with Stanford type A AAD, we conducted the present study enrolling relatively larger patients with AAD in a single center with abundant source of patients in China.

Methods From Feb. 2012 to Jan. 2013, a total of 268 consecutive patients with chest pain admitted to Fuwai hospital (Beijing, China) was confirmed the diagnosis of AAD. Of these 268 patients, 141 patients were Stanford type A and 127 were Stanford type B. The study enrolled 133 consecutive patients with Stanford type A AAD. Routine laboratory tests, chest X-ray, ultrasonic cardiogram and electrocardiogram were performed for each patient. Aorta angiography with multi-detector computed tomography was performed to confirm the diagnosis. Primary outcome was in-hospital mortality. To determine the predictors of in-hospital mortality, baseline clinical characteristics such as sex, age, Stanford type of AAD, whether or not acute intramural hematoma, interval from onset of symptoms to hospital, smoking and drink habits; previous medical histories including hypertension, diabetes mellitus, coronary artery disease, stroke and hyperlipidemia; baseline parameters of physical examination and laboratory tests including platelet counts, C-reactive protein (CRP), D-dimer; imaging examinations and in-hospital managements were well recorded according to pre-designed case report form. Predictors of in-hospital mortality were determined using univariate and multivariate logistic analyses. Considering of dissection related organ ischemia and platelet counts also affecting the concentration of D-dimer, we constructed two multivariate Models. Model1 included age, sex, DeBakey type, acute intramural hematoma, interval from symptom onset to hospital, hypertension, diabetes mellitus, coronary artery disease, diastolic blood pressure, D-dimer, aortic diameter, B-receptor blocker, calcium channel blocker and surgery. Model 2 which includes Model 1, organ ischemia and platelet counts.

Result Mean age of the entire study population was 52 years. More than 90% AAD was DeBakey type I. The morbidity of acute intramural hematoma was around 10%. Among the 133 patients with Stanford type A AAD, death during hospitalization was observed in 19 patients. In-hospital mortality was 14.3%. 6 patients died from dissection related organ ischemia including acute renal failure, visceral or limb ischemia, cerebral ischemia, multiple organ failure. 2 patients died during perioperative period: one from anesthesia, the other from cardiac arrhythmia. 11 patients died from aortic rupture: one patient with aortic rupture into mediastina, other rupture into pericardial cavity. On univariate analysis, admission concentrations of D-dimer correlated with in-hospital mortality (OR, 1.102; 95% CI, 1.030 – 1.180; P = 0.005). In Model 1, D-dimer still correlated with in-hospital mortality (OR, 1.125; 95% CI, 1.022 – 1.238; P = 0.016). But in Model 2 we found that concentrations of D-dimer did not correlate with in-hospital mortality (OR, 1.026; 95% CI, 0.914 – 1.152; P = 0.659), while platelet counts with OR (95% CI): 0.961 (0.925 – 0.998) and organ ischemia with OR (95% CI): 10.66 (1.43 – 79.68) were independent predictors for in-hospital mortality in Stanford type A AAD.

Conclusion Despite rapid progress in the management of Stanford type A AAD, its in-hospital mortality was still high. Plasma concentrations of admission D-dimer did not correlate with in-hospital mortality. Dissection related organ ischemia and admission platelet counts were independent predictors for in-hospital mortality of Stanford type A AAD. This is supplementary to the existing research evidence regarding to predictors of mortality of AAD.
The plasma concentrations of NT-proBNP were inversely correlated with right ventricular internal diameter ($r = -0.690$, $P = 0.000$) and VO$_2$/kg ($r = -0.496$, $P = 0.0001$). The right ventricular internal diameter ($\beta = 0.583$, $P = 0.000$) and VO$_2$/kg ($\beta = 0.233$, $P = 0.032$) were powerful independent determinants of NT-proBNP.

**Conclusion** Cardiopulmonary exercise testing may be used to evaluate the cardiopulmonary function of CTEPH patients objectively and safely, and could response the pathophysiology of CTEPH.

The relationship between red blood cell distribution width and early warning, risk stratification and short-term prognosis of acute coronary syndrome

Xue Li, Jingyi Ren, Hong Chen
Cardiology of Peking University People's Hospital

**Objective** The aim is to determine the relationship between the red blood cell distribution width and early warning, risk stratification and in-hospital short term prognosis of acute coronary syndrome.

**Methods** A total of 2651 chest pain patients presenting to the Peking University People's hospital who had undergone coronary artery angiography were recruited for this study between Jan. 2008 and Dec. 2010. Patients were divided into 2 groups according to mean of baseline RDW (13.22%); a high RDW group (RDW > 13.22%; n = 1144); and a low RDW group (RDW ≤ 13.22%; n = 1507). The causes of chest pain were compared between groups. Then, a total of 2213 patients diagnosed ACS were divided into 2 groups according to mean of baseline RDW: the low RDW group (RDW < 13.26%, n = 1256) and the high RDW group (RDW ≥ 13.26%, n = 957). The severity of coronary artery lesion, heart function and in-hospital mortality were compared between groups.

**Result** The cumulative incidence of ACS was significantly higher in the high RDW group than in the low RDW group (89.1% vs 79.2%, $P < 0.001$). The multivariate logistic regression analysis found that a high RDW was an independent factor related to ACS (OR = 2.027, 95% CI 1.597 – 2.573, $P < 0.001$). The difference of the severity of coronary artery lesion between two groups were not statistically significant (all $P > 0.05$). However, patients with high RDW had lower LVEF than patients with low RDW (61.65 ± 11.05% vs 62.78 ± 10.59%, $P = 0.03$). In addition, the in-hospital mortality of the high RDW group was significantly higher than the low RDW group (4.8% vs 1.0%, $P = 0.0001$). All deaths were cardiac death. In multivariate analysis, baseline high RDW level (RDW ≥ 13.26%) was an independent predictor of in-hospital mortality of ACS (OR = 3.597, 95% CI 1.720 – 7.522, $P < 0.001$).

**Conclusion** In patients admitted to the hospital because of chest pain, RDW may present as an early warning marker of ACS. Meanwhile, RDW can predict heart function and in-hospital mortality in ACS patients.

**Relationship between acute high altitude response, cardiac function injury and high altitude de-adaptation response after return to lower altitude**

Qiquan Zhou, Hengyue Yang, Enzhi Feng, Ziqiang Yan, Zifu Shi, Yong Fan
1. Department of High Altitude Diseases, College of High Altitude Military Medicine, Third Military Medical University and Key Laboratory of High Altitude Medicine of Ministry of Education Key Laboratory of High Altitude Medicine of PLA, Chongqing, 400038, China;
2. Center of Respiratory Medicine, the 4th Hospital, Lanzhou Command, Xining 810007, China;
3. The 68303 Troop Hospital of People's Liberation Army, Wu Wei, 733000, China.

**Objective** To assess the relationship between acute high altitude response (AHAR), cardiac function injury and high altitude de-adaptation response (HADOR).

**Methods** Ninety-six military personnel of rapid entering into high altitude (3 700 to 4 800 m) with strong physical work were analyzed, all subjects were male, aged 18 – 35 years. According to the symptomatic scores of AHAR were divided into 3 groups: sever AHAR (group A, 24), mild to moderate AHAR (group B, 47) and non-AHAR (group C, 25) at high altitude. According to the symptomatic scores of HADOR were divided into 3 groups: sever HADOR (group E, 19), mild to moderate HADOR (group F, 40) and non-HADOR (group G, 37) after return to lower altitude (1500 m). Mean pulmonary arterial pressure (mPAP), right ventricular internal dimension (RVID), outflow tract of right ventricle (RVOT), left ventricular internal dimension (LVID), left ventricular ejection fraction (LVEF), cardiac muscle work index (Tei index), creatine kinase isoenzymes-MB (CK-MB), lactic dehydrogenase isoenzyme-1 (LDH-1) were measured at high altitude stayed 50 days and after return to lower altitude 12 h, 15 d, and 30 d. Fifty healthy volunteers (group D) at 1500 multitude served as control.

**Result** Level of mPAP, RVID, RVOT, RVID/LVID ratio, Tei index, CK-MB, and LDH-1 were higher, and LVEF was lower in group A than those in group B, C and D, there were significantly differences between group B and C, C and D (all $P < 0.01$). AHAR scores was positively correlated with HADOR scores ($r = 0.863$, $P < 0.001$). 12 h after return to lower altitude, level of mPAP, RVID, RVOT, RVID/LVID ratio, Tei index, CK-MB, and LDH-1 were higher, and LVEF was lower in group E than those in group F, G and D, there were significantly differences between group F and G, G and D (all $P < 0.01$). 15 days after return to lower altitude, level of mPAP, RVID, RVOT, RVID/LVID ratio were higher in group E than those in group F, G, and D, there were significantly differences between group F and G, and D (all $P < 0.05$), there were no significantly differences between group G and D (all $P > 0.05$). LVEF, Tei index, CK-MB, LDH-1 showed no significantly differences among groups (all $P > 0.05$). 30 days after return to lower altitude, these parameters in group E, F, and G showed no significantly differences compared with those of group D (all $P > 0.05$).

**Conclusion** The severity of HADOR is associated with severity of AHAR and cardiac injury, the more serious of AHAR and cardiac injury at high altitude, the more serious of HADOR and cardiac injury after return to lower altitude, the more long of restore of right cardiac structure injury.
Changes of the cardiac structure and function in Han people returning to lower altitude for at least 3 years after long-term exposure to high altitude
Qi-quan Zhou, Yun-hong Wu, Rong Xiao, Shuxi Tang, Zeng-mei Sun, Wei-ting Yin, Xiao-ping Li, Ya-chuan Sun
1. Department of High Altitude Diseases, College of High Altitude Military Medicine, Third Military Medical University and Key Laboratory of High Altitude Medicine of Ministry of Education Key Laboratory of High Altitude Medicine of PLA, Chongqing, 400038, China; 2. Department of Endocrinology, Hospital of Chengdu Office of Peoples Government

Objective To study the changes of cardiac structure and function in Han people returning to the plain after longterm exposure to high altitude.

Methods Echocardiographic examinations were performed in 348 residents who once lived in high altitude and then returned to the plain for at least 3 years (altitude exposure group) and in 86 healthy people without exposure to high altitude (control group). The cardiac function and structure were measured and compared between two groups according to different genders.

Result Compared with the control group, the right atrium short diameter (RAD) was longer in altitude exposure group (male 30.81 ± 3.89 vs 29.39 ± 3.93; female 29.05 ± 3.06 vs 27.40 ± 2.97, P all < 0.05) and left ventricular posterior wall thickness (LPVW) in altitude exposure group was larger than in control group, (P < 0.05). The incidence of tricuspid regurgitation (TR) in altitude exposure group was significantly higher than that of the plain control (44.25% vs 8.13%, P < 0.001). In altitude exposure group the incidence of TR in female was higher than that in male (50.28% vs 38.15%, P = 0.025).

Conclusion Long-term exposure to high altitude is associated with the changes of the structure of right atrium and left ventricular (and the increased incidence of TR) which is higher in female than in male. And these changes mentioned above were hard to recover even after returning to the plain for several years.

Deadadaptation change in cardiac function of laborers engaged in physical labor at high altitude after returning to lower altitude
Qi-quan Zhou, En-zhi Feng, Sheng-yue Yang, Zai-jiang Yan, Zhi-fu Shi
1. Department of High Altitude Diseases, College of High Altitude Military Medicine, Third Military Medical University and Key Laboratory of High Altitude Medicine of Ministry of Education Key Laboratory of High Altitude Medicine of PLA, Chongqing, 400038, China; 2. Center of Respiratory Medicine, the 4th Hospital, Lanzhou Command, Xining 810007, China; 3. The 68303 Troop Hospital of People’s Liberation Army, Wu Wei, 733000, China.

Objective To assess the effects of physical labor on cardiac function of laborers at high altitude and changes in cardiac function after returning to lower altitude.

Methods According to symptomatic scores on Chinese acute high altitude reaction (AHAR) 96 male officers and soldiers who rapidly entered high altitude areas (3 700 m altitude), and engaged in heavy physical work for 50 days were be scored and graded. Levels of creatine kinase isoenzymes-MB (CK-MB) and lactic dehydrogenase isoenzyme-1 (LDH-1) in the serum, Tei index, left ventricular ejection fraction (LVEF) and left ventricular fractional shortening (LVFS) were measured in the 96 servicemen at the 50th day of residing at high altitude, and the 2nd and 15th day after returning to lower altitude (1 500 m altitude), and the result were compared with that of 50 healthy controls residing at 1 500 m.

Result Among the 96 male service men, 71 developed AHAR and 24 of them had Severe AHAR, 47 mild to moderate AHAR and the rest 25 had no AHAR. Levels of serum CK-MB, LDH-1 and Tei index were higher in the severe AHAR group than in the mild to moderate AHAR group, higher in the mild to moderate AHAR group than in the no AHAR group, and higher in the no AHAR group than in the healthy group. As far as the values of LVEF and LVFS were concerned, the severe AHAR group < mild to moderate AHAR group < no AHAR group < control group. Significant difference was found in these levels between every two successive groups (P < 0.01). Linear correlation analysis showed that levels of CK-MB and LDH-1 of persons staying at 3700 m altitude for 50 days were positively correlated with Tei index (r = 0.625, 0.598, respectively, P < 0.01), and negatively correlated with LVEF (r = -0.716, -0.658, respectively, P < 0.01) and also negatively correlated with LVFS (r = -0.639, -0.727, respectively, P < 0.01). Level of serum CK-MB, LDH-1 and Tei index at 3700 m altitude for 50 days were significantly higher than those 2 days and 15 days after returning to 1 500 m altitude and those in control group (P < 0.01) and were significantly higher on the 2nd day than on the 15th day. Moreover, the values of LVEF and LVFS were significantly lower than those at 2 and 15 days after returning to 1 500 m altitude and those in control group (P < 0.01) and significantly lower on the 2nd day than on the 1st day. All parameters after 15 days returning to low altitude showed no significant difference compared with control group (P < 0.05).

Conclusion Heavy physical work at high altitude could obviously impair human cardiac function. The impairment may aggravate along with increase in severity of AHAR. However, cardiac function may be improved significantly after returning to low altitude for 2 days, and recover to normal status 15 days later.

The research of heart rate variability in children with viral myocarditis
Yan Zhou
The First Affiliated Hospital of Jilin University

Objective The aim of this study was to evaluate autonomic nervous activity in children with VMC by analysis of HRV. Then to discuss the value of HRV analysis regarding to diagnosis, therapy and prognosis in children with VMC.

Methods We collected 600 (305 males and 295 females, aged 3 – 14 years, mean age 7.5 years old) children with VMC who were acute period patients as researching objects in our hospital. 590 (300 males and 290 females, aged 3 – 14 years, mean age 7.1 years old) healthy children served as control group. They hadn't catched diseases which can affect autonomic nerve activity, such as cardiac diseases, diabetes mellitus, hyperthyreosis, and infectious diseases. All the children's body weight was in the range of X ± 2SD. We monitored all the children for 50 days were positively correlated with Tei index (r = 0.625, 0.598, respectively, P < 0.01), and negatively correlated with LVEF (r = -0.716, -0.658, respectively, P < 0.01) and also negatively correlated with LVFS (r = -0.639, -0.727, respectively, P < 0.01). Level of serum CK-MB, LDH-1 and Tei index at 3700 m altitude for 50 days were significantly higher than those 2 days and 15 days after returning to 1 500 m altitude and those in control group (P < 0.01) and were significantly higher on the 2nd day than on the 15th day. Moreover, the values of LVEF and LVFS were significantly lower than those at 2 and 15 days after returning to 1 500 m altitude and those in control group (P < 0.01) and significantly lower on the 2nd day than on the 1st day. All parameters after 15 days returning to low altitude showed no significant difference compared with control group (P > 0.05).

Conclusion Heavy physical work at high altitude could obviously impair human cardiac function. The impairment may aggravate along with increase in severity of AHAR. However, cardiac function may be improved significantly after returning to low altitude for 2 days, and recover to normal status 15 days later.

The research of heart rate variability in children with viral myocarditis
Yan Zhou
The First Affiliated Hospital of Jilin University

Objective The aim of this study was to evaluate autonomic nervous activity in children with VMC by analysis of HRV. Then to discuss the value of HRV analysis regarding to diagnosis, therapy and prognosis in children with VMC.

Methods We collected 600 (305 males and 295 females, aged 3 – 14 years, mean age 7.5 years old) children with VMC who were acute period patients as researching objects in our hospital. 590 (300 males and 290 females, aged 3 – 14 years, mean age 7.1 years old) healthy children served as control group. They hadn't catched diseases which can affect autonomic nerve activity, such as cardiac diseases, diabetes mellitus, hyperthyreosis, and infectious diseases. All the children's body weight was in the range of X ± 2SD. We monitored all the children for 50 days were positively correlated with Tei index (r = 0.625, 0.598, respectively, P < 0.01), and negatively correlated with LVEF (r = -0.716, -0.658, respectively, P < 0.01) and also negatively correlated with LVFS (r = -0.639, -0.727, respectively, P < 0.01). Level of serum CK-MB, LDH-1 and Tei index at 3700 m altitude for 50 days were significantly higher than those 2 days and 15 days after returning to 1 500 m altitude and those in control group (P < 0.01) and were significantly higher on the 2nd day than on the 15th day. Moreover, the values of LVEF and LVFS were significantly lower than those at 2 and 15 days after returning to 1 500 m altitude and those in control group (P < 0.01) and significantly lower on the 2nd day than on the 1st day. All parameters after 15 days returning to low altitude showed no significant difference compared with control group (P > 0.05).

Conclusion Heavy physical work at high altitude could obviously impair human cardiac function. The impairment may aggravate along with increase in severity of AHAR. However, cardiac function may be improved significantly after returning to low altitude for 2 days, and recover to normal status 15 days later.
of the R-R interval (RR). SDANN: SD of the mean of RR intervals in all 5-minute segments of the 24-hour ECG; SDNN Index: the average of SD of RR intervals in all 5-minute segments of the 24-hour ECG, RMSSD: the root mean square of successive differences in RR intervals, PNN50: the percentage between the pieces of RR intervals' phase difference were above 50 ms and all the RR intervals' pieces in the 24-hour ECG. The recording time included 24 hour-period, waking hours (8:00 – 21:00), sleeping hours (21:00 – 06:00). The HRV numeric value per hour is made into diagram of curve. We also calculated the abnormal result of SDNN, creatine kinase-MB, action-X, Doppler and dynamic electrocardiogram.

Result (1) The HRV indexes during 24-hour period is significantly difference between control group and VMC group. (2) The HRV indexes during waking hours in children with VMC was significantly smaller compared with that in control group. (3) The HRV indexes during sleeping hours in children with VMC was significantly smaller compared with that in control group. (4) The changeable breadth of circadian rhythm in patients with VMC is significantly smaller compared with that in control group, and the PNN50 and R RmSD were the most sensitive indexes. (5) The most highest percentage of abnormal index was SDNN.

Conclusion (1) The autonomic nervous system activity in children with VMC is changed, especially the vagus nerve was damaged mostly, so the indexes of HRV was reduced. HRV indexes can become sensitive marker. (2) The circadin rhythm of antonomic nerve was almost disappeared. HRV indexes can become one marker which can predict the prognosis of ventricular arrhythmia in children with VMC. (3) In the future, the medicine of alterate HRV is one of investigate direction.

Significance of cardio-ankle vascular index in diagnosis of senile aorta atherosclerosis
Chengguo Lin, Liansheng Ruan
Putuo People’s Hospital in Zhoushang 316100, China

Objective To investigate the clinical significance of a new indicator for diagnosing aorta atherosclerosis: cardio-ankle vascular index (CAVI) in old patients.

Methods CAVI was detected by applying VS -1000 Atherosclerosis Detective System in 115 old patients (male 92 and female 32). The ankle brachial index (ABI), carotid intima-media thickness (IMT) and relevant indexes of biochemistry were determined at the same time.

Result The average age of 115 old patients was 75.6 ± 4.8 and their average CAVI was 10.70 ± 4.32. The abnormal rate of CAVI was 88.1% (CAVI ≥ 9 defined as abnormal), which was similar to the detectable rate of senile aorta atherosclerosis (89.7%, when IMT ≥ 9 mm). In the group of aorta atherosclerosis accompanied by peripheral artery disease (PAD) CAVI was 12.0 ± 19.44 and that was 10.38 ± 1.19 in the group without PAD. There was a significant difference between two groups (P < 0.01). The Correlative Coefficient between CAVI and ABI was -0.247 (P < 0.05). There was no significant difference in CAVI between hypertension group and non-hypertension group, diabetes group and non-diabetes group, or smoking group and non-smoking group respectively. CAVI was no correlated to age (P > 0.05).

Conclusion CAVI can be taken as one of indicators for screening aorta atherosclerosis non-invasively, while which should be combined with multiple noninvasive indicators used in senile patients in order to clinical comprehensive analysis and diagnosis.

Usefulness of temporary pacemaker surrounding of non cardiac operation period
Xichui Chen, Xiaopin Huang
Department of Cardiology Second Peoples Hospital of FuTian District ShenZhen

Objective To evaluate the safety and importance of temporary artificial cardiac pacemaker during non-cardia perioperative period of lin patients with bradyarrhythmia.

Methods Temporary cardiac pacemakers were installed preoperatively in 108 patients with bradyarrhythmia. The patientswere
cardiac index are analyzed in IPAH.

pro-brain natriuretic peptide (NT-proBNP), 6 minute walking distance (6MWD), oxygen pulse, New York Heart Association (NYHA) class, N-terminal pro-B-type natriuretic peptide (NT-proBNP) were compared between patients with IPAH and controls. Correlations after adjusting age, sex and weight.

balances in NYHA [97% (30/31) vs 48% (29/61), \( \chi^2 = 26.731, P = 0.000 \)] and UCG [97% (30/31) vs 46% (28/61), \( \chi^2 = 26.076, P < 0.001 \)].

Conclusion

Temporary cardiac pacemaker can enhance the perioperative safety and reduce the incidence of cardiovascular complications in patients with bradyarrhythmia. Overall assessments of clinical setting were needed before implantation. The indications for temporary cardiac pacing include bradyarrhythmia with myocardium ischemia, which is confirmed by UCG, advanced age, as well as history of syncope. Positive result of atropine test is not one of the significant indications.

Clinical observation of cardiopulmonary exercise test of patients with idiopathic pulmonary arterial hypertension

Qin Luo, Zhihong Liu, Xiuping Ma, Zhuhui Zhao, Qing Gu, Changming Xiong, Xinhe Ni, Jianguo He, Qing Zhao

State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

Objective

To explore the exercise characteristics of patients with idiopathic pulmonary arterial hypertension.

Methods

From Nov. 2010 to Sep. 2012, 76 consecutive patients with idiopathic pulmonary arterial hypertension (IPAH) and 24 healthy controls from Fuwai Cardiovascular Hospital were enrolled, who completed cardiopulmonary exercise testing. The exercise parameters were compared between patients with IPAH and controls. Correlations among peak oxygen consumption, anaerobic threshold, peak oxygen pulse, New York Heart Association (NYHA) class, N-terminal pro-brain natriuretic peptide (NT-proBNP), 6 minute walking distance (6MWD) and cardiac index are analyzed in IPAH.

Conclusion

Peak oxygen consumption and anaerobic threshold decrease ventilator efficiency increases in patients with IPAH.

Cardiopulmonary exercise testing as an invasive measurement may assess safely the function of patients with IPAH.

Serum big endothelin-1 predicts non-responder to cardiac resynchronization therapy

Xinwei Yang, Chi Cai, Wei Hua, Jing Wang, Liqang Ding, Zhimin Liu, Chongqiang Li, Keping Chen, Shu Zhang

Center of Arrhythmia Diagnosis and Treatment, Fuwai Cardiovascular Disease Hospital, CAMS and PUMC, Beijing 100037, China

Aims

To assess the predictive potency of big endothelin-1 (big ET-1) to response to cardiac resynchronization therapy (CRT).

Methods

We retrospectively analyzed data of patients who underwent CRT-P/Dimplantation in our single center from Jan 2009 to Dec 2011. Plasma big ET-1 and NT-proBNP were examined by ELISA kit at baseline. NYHA functional class and echocardiography were evaluated both at baseline and follow-up. Simpson method was applied to measure left ventricular ejection fraction (LVEF). Improvement of LVEF by 5% and reduction in NYHA class ≥ 1 grade was defined as responders. Improvement of LVEF by twice or the absolute value ≥ 50% and NYHA class I or II grade was defined as super-responders. Improvement of LVEF <5% or reduction in NYHA class<1 grade or the patient died or received heart transplantation for failing heart was defined as non-responders.

Conclusion

Overall 93 patients average age of 60.8 ± 11 years old included in this observational study. During 27 ± 11 (12 – 50) months follow-up, there were 34 non-responders, 24 responders and 35 super-responders. Concentration of big ET-1 (fmol/ml) in three groups were 1.2 ± 0.9, 0.8 ± 0.4 and 0.8 ± 0.6 (P = 0.029) respectively. Correlation between big ET-1 and NT-proBNP and between big ET-1 and response to CRT was r = 0.469 (P = 0.001) and r = -0.237 (P = 0.022) respectively.

Prostacyclin therapy for pulmonary arterial hypertension: a meta-analysis

Yaguo Zheng, Tao Yang, Guo Chen, Enci Hu, Qing Gu, Changming Xiong, Jianguo He

State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardio-Vascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing 100037, China

Background

Prostacyclin has played an important role in the treatment of pulmonary arterial hypertension (PAH). However, whether it provides a survival advantage is still not clear. The aim of the present meta-analysis was to evaluate the efficacy and safety of prostacyclin in PAH, focusing on the improvement of short-term survival.

Methods

Trials were identified from the Cochrane Library, EMBASE, and PUBMED databases. We calculated risk ratios for dichotomous data and weighted mean differences, with 95% confidence intervals for continuous data.

Result

14 trials with a total of 2 244 patients (1 189 patients in the prostacyclin treatment group and 1 055 patients in the placebo group) were included in the meta-analysis. All-cause mortality rate in the control
group was 4.17%. In a 13.4-week follow-up, prostacyclin treatment was associated with a reduction in mortality of 44% (RR 0.56; 95% CI 0.35 – 0.88; P = 0.01). Compared with placebo, prostacyclin reduced clinical worsening significantly (RR 0.60; 95% CI 0.46 – 0.80; P = 0.0003), increased the 6-min walk distance by 27.95 m, reduced mean pulmonary arterial pressure and pulmonary vascular resistance, and increased the cardiac index and mixed venous oxygen saturation. However, prostacyclin treatment showed a much higher incidence (RR 3.25; 95% CI 2.07 – 5.10; P < 0.00001) of withdrawn due to it's adverse effects.

**Conclusion** The Result of this meta-analysis suggest an improvement of survival in the patients treated with the prostacyclin and its analogues for pulmonary arterial hypertension.

The effects of adenosine triphosphate on inducing atrial fibrillation after circumferential pulmonary vein isolation in paroxysmal atrial fibrillation: an insight into the mechanism and implication for ablation

Jinlin Zhang
Wuhan Asian Heart Hospital

Introduction Adenosine triphosphate (ATP) has been widely used to provoke dormant pulmonary vein (PV) conduction after circumferential pulmonary vein isolation (CPVI). However, there has been no systematic study examining the incidence and the mechanism of ATP-induced atrial fibrillation (AF) after CPVI in paroxysmal AF. In this case series study, we explore the mechanism of ATP-induced AF and assess the feasibility of eliminating this response by additional radiofrequency (RF) ablation.

Methods and Result A total of 300 consecutive patients with paroxysmal AF underwent CPVI. After all PVs were isolated, intravenous ATP injection was administered during isoproterenol infusion. AF was reproducibly induced by ATP in 39 patients (13%; 32 transient, 7 persistent). Non-PV foci were confirmed and located in 29 of these patients at the onset of AF provoked by ATP, including 27 foci in the superior vena cava (SVC). 1 foci in the middle portion of the cristal terminais, and 1 foci near the antrum of the PV outside the ablation circle. In all these cases, ATP-induced AF was eliminated after the non-PV foci were successfully ablated. For the other 10 patients with ATP-induced AF, the foci triggering AF could not be confirmed and located due to the transient effect of ATP, thus no further ablation were performed. During a follow-up period of 18.7 ± 6.4 (6 – 24) months after the index procedure, 31 of 39 patients (79.5%) in the ATP induced AF group were free from any recurrence of atrial tachyarrhythmias.

Conclusion A high proportion of the ATP-induced AF post CPVI were initiated by rapid firing in the SVC. Eliminating this response by additional ablation may have an influence on clinical Result of paroxysmal AF ablation.

Mapping and ablation of idiopathic ventricular arrhythmias from within coronary vein system

Teng Li
Guangdong Cardiovascular Institute, Guangdong General Hospital

Objective The purpose of this study was to determine the safety and efficacy of radiofrequency catheter ablation (RFCA) of frequent premature ventricular contractions (PVCs) or ventricular tachycardia (VT) originating from Coronary vein system (CVs).

Methods 11 patients (7 men; age, 47.08 ± 15.16 years) were found to have an CVs origin who were diagnosed as PVCs or VT by electrocardiogram or Holter. Radiofrequency application could not abolish PVCs/VT during endocardial mapping and ablation. Then, we considered that PVCs or VT may originated from CVs, so multiple electrode catheter was introduced into great cardiac vein (GCV) or anterior interventricular vein (AIV). After CVs origin for PVCs/VT have been determined by activation mapping and pace mapping, Radiofrequency energy was delivered with the irrigated-tip catheter at a power of 15 to 30 W and a flow rate of 17 to 30 ml/min. Finally, the characteristics of electrocardiogram and result of ablation were analyzed.

Result 9 of 11 patients underwent successful ablation within the CVs. In 9 of 11 patients, the site of origin (SOO) of the ventricular arrhythmias was identified from within the GCV (n = 7), the AIV (n = 2). The mean earliest activation preceding the onset of the QRS complex was 29.67 ± 4.35 ms, and the mean impendance was 216.8 ± 47.2 Ω. In the 2 patients with unsuccessful ablation, failure was because the ablation catheter could not be advanced to the SOO within the AIV. No complications occurred. QRS duration of PVCs/VT was 158.33 ± 12.09 ms, pseudo-delta wave was present in 4 patients. Maximum deflection index was 0.67 ± 0.27. A q wave in lead I (QWL 1) were seen in 5 patients with PVCs/VT were successful eliminated in the GCV. SOO within the GCV precordial R-wave transition in lead V1 exhibited right bundle branch block QRS morphology; SOO within the AIV precordial R-wave transition in V5, exhibited left bundle branch block QRS morphology. During a follow-up period of 1 to 10 months, 1 PVCs originating from GCV recurrd.

Conclusion The presence of a q wave in lead I and MDI ≥ 0.6 maybe an important morphology criteria for ventricular arrhythmias originating from the GCV.

Comparison of the SinoSCORE and the EuroSCORE for predicting in-hospital mortality in patients undergoing coronary artery bypass grafting

Pinming Liu, Ximei Sang, Guiyi Yuan, Ping Hua, Yanqing Yang, Jingfeng Wang Pinming Liu1, Ximei Sang2, Guiyi Yuan1, Ping Hua2, Yanqi Yang3, Jingfeng Wang2
1. Departments of Cardiology, Sun Yat-sen Memorial Hospital, The Second Affiliated Hospital of Sun Yat-sen University, Guangzhou 510120, China
2. Departments of Cardiac Surgery, Sun Yat-sen Memorial Hospital, The Second Affiliated Hospital of Sun Yat-sen University, Guangzhou 510120, China

Objective The European System for Cardiac Operative Risk Evaluation (EuroSCORE) is a co mmonly used risk model worldwide for the predicting mortality after cardiac surgery and the Sino System for Coronary Operative Risk Evaluation (SinoSCORE) is a new risk stratification model developed using Chinese multicenter database. We compared the Sinoscore and the Euroscore with regard to their validity to predict in-hospital mortality after coronary bypass grafting (CABG) in a single-centre patient population of China.

Methods Detailed data for the EuroSCORE and the SinoSCORE risk factors were collected for 386 patients undergoing CABG or CABG combined other cardiac surgery at this institution between Jan. 2006 and Dec. 2012. All patients were scored according to the additive EuroSCORE and the SinoSCORE model respectively, and the mortality
The electrophysiologic characteristics and radiofrequency catheter ablation of ventricular arrhythmias in patients with cardiomyopathy

Yumei Dong, Zulu Wang, Yanchun Liang, Shibei Li, Ming Liang, Guitang Yang, Zhiqing Jin, Yaling Han
Department of Cardiology, Institute of Cardiovascular Research of People's Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background Recently most studies about the electrocardiographic and electrophysiological characteristics of ARVC, but rare big sample of case report about electrocardiographic and electrophysiological characteristics and the Result of radiofrequency catheter ablation of Ventricular Arrhythmias (VA) in patients with cardiomyopathy.

Methods 35 patients with cardiomyopathy and Ventricular Arrhythmias underwent cardiac electrophysiological examination and radiofrequency catheter ablation, among whom, 2 patients with hypertrophic cardiomyopathy (HCM) (both male), 6 patients with dilated cardiomyopathy (DCM) (3 male), 24 patients with arrhythmogenic right ventricular cardiomyopathy (ARVC) (17 male and 7 female), 3 patients with left ventricular cardiomyopathy (2 female). Following up the symptom, surface electrocardiogram and/or 24 h Holter electrocardiogram and cardiac ultrasound after ablation.

Result 31 patients received radiofrequency catheter ablation of VA. The acute success rate was 68.3%, the effective rate was 22.0% and the unsuccessful rate was 9.7%. There were no serious complications in perioperative periods. During a period of 5 – 114 months of follow-up: (1) both two HCM cases had no recurrence; (2) In 4 of the 6 patients with DCM underwent radiofrequency catheter ablation, 2 patients had no VA recurrence; (3) among the 24 ARVC cases, 12 patients had no VT recurrence after the last catheter ablation procedures, 9 patients had VT recurrence, 1 patient died of cardiac sudden death, and 2 patients lost follow-up; (4) among the 3 left ventricular cardiomyopathy patients, one had no VT recurrence but with few premature ventricular contractions. The other two patients had VT recurrence but felt much improving under anti-arrhythmic drugs.

Conclusion Ventricular arrhythmias (VA) in patients with cardiomyopathy are not unco mmon. ICD implantation is the preferred treatment in these patients, especially in patients with hemodynamic unstable ventricular tachycardia (VT). Radiofrequency catheter ablation of these VA is more difficult, usually with lower success and higher recurrence. To use the cardiac three dimensional mapping systems, saline irrigated ablation catheter, and to combine the endocardial approach and the epicardial approaches for mapping and ablating VA might improve the successful rate and decrease the recurrence.

Localization of the origin of outflow tract ventricular arrhythmias by surface electrocardiogram

Shibei Li, Yanchun Liang, Zulu Wang, Huina Wei, Yaling Han, Xuan Wang
Department of Cardiology, Institute of Cardiovascular Research of People's Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background It has been reported that the origin site of idiopathic ventricular arrhythmias from left or right outflow tract (LRVOT) can be...
judged from the transition of R/S on precordial lead of surface ECG, but its value still need to be confirmed in more studies. This study reports the relationship between surface ECG and the origin of the premature ventricular contractions (PVCs) or ventricular tachycardia (VT) in a large series.

**Methods** The ECG characteristics in 207 consecutive patients who underwent radiofrequency catheter ablation of LVOT or RVOT origin of VT/PVCs were analysis respectively. All the patients had no significant structural heart diseases.

**Result** The number of patients whose transition of R/S on precordial leads was before lead V2, in lead V1 and after lead V2 were 18 (47.6 ± 8.8 years old on the average), 75 (45.5 ± 13.1 years), and 114 ((42.25 ± 13.69), respectively. In the 18 cases of R/S wave transition before lead V2, LVOT origin was defined in all the patients, with the specificity of 100% and sensitivity of 72.00%. In the 75 cases of R/S wave transition in lead V1, the lead V2 R/S transition during sinus rhythm was earlier than that during PVCs or VT in 66 patients, and RVOT origin was determined in all of them. In the other 9 patients with lead V1 R/S transition, 7 of them had a LVOT origin with a later R/S transition in lead V2 during sinus rhythm other than during PVCs or VT. Therefore, in patients with lead V1 R/S transition, if lead V2 R/S transition during sinus rhythm was later than that during PVCs or VT, the specificity and the sensitivity of LVOT origin were 97.06% and 100% separately. In the 114 cases of R/S transition after (≥) lead V2, RVOT origin was defined in all the patients, with the specificity of 100% and sensitivity of 62.63%.

**Conclusion** There is a high specificity of identifying the origin of ventricular arrhythmias from LVOT by R/S transition before lead V2, a high specificity and sensitivity of identifying origin from RVOT by R/S transition after lead V2. The specificity and sensitivity are high to define the PVCs or VT origin from LVOT or RVOT by measuring the R/S ratio on lead V2 between sinus rhythm and PVCs.

The feasibility and curative effect of cardiac resynchronization therapy by targeted left ventricular lead placement to the latest ventricular electrical activating site mapped in the coronary sinus branches

Yanchun Liang, Haibo Yu, Yi Sun, Zhiqing Jin, Yaling Han
Department of Cardiology, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

**Background** A nonoptimal left ventricular (LV) pacing lead position may be a potential cause for nonresponse to cardiac resynchronization therapy (CRT). The aim of the current study was to investigate the feasibility and curative effect of CRT by targeted LV lead placement to the latest ventricular electrical activating site mapped in the coronary sinus (CS) branches.

**Methods** Ten patients with moderate to severe congestive heart failure, depressed left ventricular ejection fraction (LVEF) < 35%, and wide QRS complex ≥ 120 ms were included for implantation of a CRT device. LV lead placement and LV lead was successfully placed at the latest LV electrical activating site in all 10 patients. There was 116 ± 28 ms activating time delay at the latest LV electrical activating site than the QRS onset of ECG. QRS complex were significantly narrowed immediately after CRT than before CRT (121 ± 17 ms vs 153 ± 30 ms, P < 0.01). The period after CRT procedure exceeded 3 months in 9 of 10 patients. Eight of these 9 patients were classified as responders to CRT (89, 89%) and 3 patients as super responders (39, 33%), the other 1 ischemic cardiomyopathy patient who died of acute myocardial infarction 2 months after CRT procedure was classified as non-responder to CRT (1, 9, 11%). The following clinical variables 3 months after CRT procedure were markedly improved than variables before CRT in these 8 responders (all P < 0.01). NYHA class was improved (1.6 ± 0.5 vs 3.3 ± 0.5) and the 6-min walk test was increased (405 ± 92 m vs 307 ± 82 m). Echocardiography demonstrated LVEF was improved (0.42 ± 0.06 vs 0.30 ± 0.04), left ventricular end-systolic volume (LVESV) was reduced (121 ± 38 ml vs 153 ± 44 ml) and mitral regurgitation velocity (MRV) was decreased (3.9 ± 1.2 m/s vs 4.5 ± 1.5 m/s).

**Conclusion** Targeted left ventricular lead placement to the latest ventricular electrical activating site guided by electrophysiological mapping in the CS branches was feasible. This CRT method was effective for improving heart function of heart failure patients during short-term follow-up.

Clinical characteristics of 4 cases of polymorphic ventricular tachycardia / ventricular fibrillation initiated by idiopathic premature ventricular contraction originating from right ventricular outflow tract

Yanchun Liang, Zulu Wang, Ming Linag, Shibei Li, Zhiqing Jin, Yaling Han
Department of Cardiology, Institute of Cardiovascular Research of People's Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

**Background** Ventricular fibrillation and/or polymorphic ventricular tachycardia are occasionally initiated by ventricular extrasystoles originating from the right ventricular outflow tract (RVOT) in patients without structural heart disease. The aim of this study was to report clinical characteristics of 4 cases of polymorphic ventricular tachycardia / ventricular fibrillation (PVT/VF) initiated by idiopathic premature ventricular contraction (PVC) originating from RVOT.

**Methods** Among 76 patients with ventricular tachycardia (VT) arising from RVOT, the clinical characteristics of 4 patients with PVT/VF triggered by PVC originating from RVOT were investigated and compared with the clinical characteristics of the other 72 patients.

**Result** The same PVC morphology was shown in triggering PVCs which initiated PVT/VF and in isolated PVCs. The coupling intervals of the above two kinds of PVCs were markedly different. The coupling intervals of triggering PVCs were shortened in 2 cases and prolonged in the remain 2 cases compared with those of isolated PVCs, and the variation magnitude of the coupling interval in every case was more than 70 ms. The coupling intervals of isolated PVCs were not fixed in 1 case. The number of PVCs per day, the coupling interval of isolated PVC and the baseline QT interval were 15427 ± 1109, 419 ± 22 ms and 404 ± 15 ms respectively in 72 monomorphic VT patients. The numbers of PVCs per day of 3 of the 4 PVT/VF patients were equivalent to those of 72 VT patients, and the same equivalence was found in the coupling intervals of isolated PVC and the baseline QT intervals of the 4 patients. The cycle lengths of PVT/VF were all less than 280 ms which was shorter than...
Effect of radiofrequency catheter ablation of left bundle potential on cardiac electrical and mechanical functions in canines

Yanchun Liang, Liujing Fu, Haibo Yu, Shibei Li, Goqing Xu, Zulu Wang, Yaling Han
Department of Cardiology, Institute of Cardiovascular Research of People's Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background Animal model of left bundle branch block (LBBB) is very important for basic study about cardiac resynchronization therapy (CRT). But the preparation of LBBB model was difficult. This study was to explore the effect of radiofrequency catheter ablation of left bundle potential (LBP) on cardiac conduction and mechanical function in canines and evaluate the preparation method of LBBB model by RF catheter ablation.

Methods LBP was mapped and ablated by radiofrequency catheter in the left ventricular endocardium in 10 canines. The influence of LBP ablation on cardiac conduction and whether canine LBBB model was successfully created were divided into three groups with equal patient numbers according to the PR intervals, AH and HV intervals after LBP ablation. In the remained 2 canines, a similar LBP potential was identified with LBP-V 30 and 32 msec, in PR intervals, AH and HV intervals after LBP ablation. In the remaining 2 canines, the successful rates at 1 year were 38/86 (44.2%), 26/86 (30.2%) and 21/86 (24.4%), respectively.

Result After LBP ablation, LBBB was successfully created in 8 (80%) canines. Atrial and ventricular amplitude ratio (A/V) was less than 1:1 at successful ablation site and the interval of LBP to local ventricular potential (LBP-V) was 17.1 ± 3.2 msec, range from 12 to 22 msec. The QRS duration increased from 52.8 ± 4.8 ms to 100.5 ± 11.1 ms (P < 0.001) after LBBB created in these 8 canines, but there were no significant changes in PR intervals, AH and HV intervals after LBP ablation. In the remain 2 canines, a similar LBP potential was identified with LBP-V 30 and 32 msec, but complete AV block was produced during or after RF energy application. In 8 LBBB canines, echocardiography showed that systolic and diastolic functions were all decreased, including left ventricular ejection fraction and aortic blood flow velocity time integral reducing (P < 0.05), E/A lowering to < 1, E wave deceleration time and isovolumetric relaxation time prolonging (P < 0.05). Significant prolongation of septal-to-posterior wall motion delay and the increased difference of pre-ejection time (P < 0.001) implied intraventricular and interventricular desynchronization after LBBB.

Conclusion Radiofrequency catheter ablation of LBP can made a high success rate of LBBB model in canine, but the risk of complete AV block exists. Immediately after isolated LBBB model was created, intraventricular and interventricular desynchronization and left ventricular electrical activation delay occurred, which resulted in decreased cardiac systolic and diastolic functions.

Background CARTO anatomical mapping system and circumferential pulmonary vein isolation (CPVI) technique has been used to cure paroxysmal atrial fibrillation (PAF) in most hospitals in China, and have achieved a high success rate. But whether the success rate was related to learning cure is still unclear.

Methods From Dec. 2004 to Dec. 2010, 258 consecutive patients who underwent CPVI for PAF in our hospital were collected. The patients were divided into three groups with equal patient numbers according to the time sequences. Group I consisted of the first 86 cases, Group II consisted of the second 86 patients, and Group III consisted of the last 86 cases. Age, gender, course of disease, echocardiography, other atrial arrhythmias, and basic diseases were analyzed statistically. The operation X-ray exposure time, recent recurrence, late recurrence and re-ablation procedures were also analyzed. In addition, the learning curve of CPVI for PAF and its relationship with peri-operative period complications, and the risk factors to predict the recurrence of atrial arrhythmias were analyzed, too.

Result There were no significant differences in patients' age, gender, basic diseases and LAD among three groups. The rates of early recurrence in Group I, Group II and Group III were 38/86 (44.2%), 26/86 (30.2%) and 21/86 (24.4%) respectively. The successful rates at 1 year were 44.2%, 51.2%, 64.0% respectively. The incidence of general complications was 12.8% in Group I, 4.7% in Group II, and 2.3% in group III. There were statistically significant differences between the total complication rates among the three groups. In many variables, left atrium dimension (LAD) enlargement and early recurrence were the risk factors of recurrent AF (P < 0.01 and P < 0.05, respectively).

Conclusion For an experienced operator, CPVI has a higher success rate, a lower recurrence and a lower complication rate for radiofrequency catheter ablation of PAF. However, for a beginning operator, the success rate was relatively lower, both the recurrence and the complication rate were higher, and the X-ray exposure time was longer. The strengthened training of CPVI technique for PAF may be very important for the new operator to increase the success and to avoid or decrease the incidence of complications.

Background Because radiofrequency catheter ablation of macro-reentrant atrial tachycardia (AT) following cardiac surgery of structural...
heart disease had a low successful rate and a high recurrence, we aimed to explore a successful method to solve this problem. This study was to investigate the electrophysiological mechanisms and radiofrequency catheter ablation of macro-reentrant atrial tachycardia (AT) following cardiac surgery of structural heart disease, and to test the success rate by using CARTO electroanatomical mapping.

Methods A total of 20 patients (16 men, aged 35 ± 13.5 years) in Shenyang Northern Hospital were studied. After determining the mechanism of macro-reentrant AT, the electroanatomical structures of the right or/and left atrium during AT were constructed by using CARTO electroanatomical mapping system. To combine the Result of entrainment mapping, the possible reentrant circuits of AT were analyzed and the ablation lines were defined. The saline irrigated radiofrequency ablation catheter was used for ablation in all the 20 patients.

Result In the 20 patients, 16 patients had 1 form of AT and 4 patients had 2 forms. Twenty-four forms were all macro-reentrant AT confirmed by CARTO system electroanatomical mapping and entrainment. Among the 24 forms of AT, 18 forms were typical atrial flutter of the right atrium, 5 forms were incisional reentrant AT of the right atrium, and 1 form was macro-reentrant AT around the mitral annulus. Eighteen of the 20 patients had a successful ablation, including 17 of 18 forms of typical atrial flutter of the right atrium and 4 of 5 forms of incisional reentrant AT of the right atrium. During the follow-up of 12 months on the average, 17 patients with a successful ablation had no recurrence, and only 1 patient recurrent as atrial fibrillation.

Conclusion CARTO three-dimensional mapping system guided catheter ablation of macro-reentrant atrial tachycardia following cardiac surgery in patients with structural heart disease had a high success rate and a low recurrence rate.

Electrophysiological characteristic and ablation of epicardial idiopathic ventricular arrhythmias arising around left fibrous triangle

Guitang Yang, Zulu Wang, Yanchun Liang, Haibo Yu, Shipei Li, Zhiqing Jin, Yaling Han
Department of Cardiology, Institute of Cardiovascular Research of People's Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background The success rate of radiofrequency catheter ablation of ventricular arrhythmias originating from left fibrous triangle (LFT) is not high. This article was to discuss the characteristics of surface electrocardiogram and the strategy of ablation of ventricular arrhythmias originating from LFT.

Methods From Feb. 2002 to Mar. 2012, total 323 patients with outflow ventricular arrhythmias were ablated in our hospital, including 46 patients whose ventricular arrhythmias originated from the LFT. The mean age of the 46 patients was 44 ± 13 years (16 – 87 years), and 24 of them (52.2%) were male. Thirty patients had frequent premature ventricular contractions (PVCs) and 16 patients had both PVCs and nonsustained or sustained ventricular tachycardia (VT). All the patients were examined with ECG, electrophysiology, active mapping and pace mapping. The computer tomography angiogram (CTA) 3D reconstruction of coronary artery, venous was completed in 20 patients.

Result Successful ablation was achieved in 41 of the 46 patients (89.1%), 41/46 targeting left coronary cusp (LCC, 30 patients), infra aortic valve (infra AV, 6 patients) and great cardiac vein (GCV, 5 patients). The surface ECG in all the three groups presented with inferior axis and R/S-transition in lead V₁ and V₂. There were no differences in the total QRS duration in the three groups. Most of the patients presented with right bundle branch block (RBBB) morphology in infra AV group and GCV group compared with LCC group (67%, 80% vs 15%, P = 0.002). Regarding to the classification of the LFT according to CTA, the patterns of distribution were as follows: “closed” in 10 (50%, 10/20) hearts; “completely opened” in 2 (10%, 2/20); “inferiorly opened” in 5 (25%, 5/20) hearts and “superiorly opened” in 1 (5%, 1/20) hearts. In the remaining 2 (10%, 2/20), there were not any distances between cardiac vein and artery. The closest distance between the corner of the GCV and LCC is 17.6 ± 4.2 mm (9.1 – 26.3 mm).

Conclusion Ventricular arrhythmias originating from the LFT can be ablated in the nadir of the LCC, infra AV and the GCV. The success rate may be impacted by the distance from the GCV and the LCC.

Radiofrequency catheter ablation of superior ventricular tachycardia in patients with persistent left superior vena cava

Guitang Yang, Zulu Wang, Yanchun Liang, Haibo Yu, Shipei Li, Zhiqing Jin, Yaling Han
Department of Cardiology, Institute of Cardiovascular Research of People's Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background Radiofrequency catheter ablation of superior ventricular tachycardia (SVT) is unusual because of the anatomy. The aim of this study is to discuss the strategy of radiofrequency catheter ablation of SVT in patients with persistent left superior vena cava (PLSVC).

Methods From Jun. 2008 to Jun. 2011, 17 patients with PLSVC and SVT underwent one of the following RFCA: AV node modification (8 patients), left accessory pathway (6 patients), paroxysmal atrial fibrillation (3 patients).

Result Coronary sinus access through left subclavian vein in each patient. AV node modification was carried out in 8 patients. Four patients with left accessory pathway were ablated through aortic retrograde approach, and the other two patients with left side accessory pathway were accomplished through transseptal approach. Three patients with PAF were cured through circumferential pulmonary vein isolation after atrium septum puncture. The success rate was 100%, and complication was not occurred.

Conclusion Even though the success rate of RFCA with PLSVC and SVT was high and the complication rate was low, the recognition of PLSVA, the skills of ablation and the precaution of complications should be paid attention.

Application of a novel pacing guide wire in cardiac resynchronization therapy

Haibo Yu, Yanchun Liang, Zulu Wang, Yi Sun, Guoqing Xu, Zhiqing Jin, Shipei Li, Liujing Fu, Yaling Han
Department of Cardiology, Institute of Cardiovascular Research of People's Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background The implantation of left ventricular (LV) lead was the most complicated process in the cardiac resynchronization therapy (CRT), the aim of this study was to investigate the availability of a novel Vision wire guide wire in the implantation of LV lead in CRT.

Methods Five heart failure patients selected for CRT were involved
in the study. The pacing threshold, R-wave sensing, phrenic nerve stimulation at local coronary sinus (CS) branch were measured by the Vision wire guide wire and LV lead separately.

**Result** The pacing parameters were analyzed through the Vision wire guide wire and LV lead separately at the 16 CS branches in 5 patients. There was no significant difference between the pacing parameters measured by the two Methods. Significant correlation was found between LV pacing threshold assessed by the Vision wire guide wire and LV lead (r = 0.90, P < 0.01). Correlation for R wave sensing was also significant (r = 0.67, P < 0.01). The pacing sites accompanied with phrenic nerve stimulation while pacing at 10 V/0.42 ms were similar by the two Methods. Vision wire guide wire could be used for local potential electrical mapping. The procedure time for pacing test in a single coronary sinus branch by Vision wire guide wire was much less than that by LV lead. (12.4 ± 7.5 min vs 18.3 ± 12.2 min, P < 0.01).

**Conclusion** Vision wire guide wire facilitated transvenous LV lead implantation by prediction of pacing parameter and locates the target CS branch quickly. The electrophysiological mapping function of Visionwire guide wire as a unipolar lead might have further potential usefulness.

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**Long-term performance of active fixation pacing leads in right atrium**

Haibo Yu, Yanchun Liang, Guoqing Xu, Rong Liu, Zulu Wang, Yaling Han

Department of Cardiology, Institute of Cardiovascular Research of People’s Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

**Background** More and more active-fixation leads were used in the right atrium during the implantation of pacemaker, the aim of this study was to explore the feasibility of active-fixation right atrial leads in the application of pacemaker and observe the changes of long-term pacing parameters.

**Methods** Sixty patients (32 males and 28 females, mean aged 65.25 ± 13.95 years) were involved in this study, 4 cases implanted with single-chamber pacemaker (AAIR) and 56 cases implanted with dual-chamber pacemaker (DDDR), who underwent the active-fixation leads implantation in the right atrium for permanent pacing. The follow-up period was 12 months after implantation.

**Result** The active-fixation atrial leads were successful implanted in all patients and there were no complication during the operation, 52 leads implanted in the right atrial appendage, 3 in the right atrial septum and 5 in the right atrial lateral wall. The pacing thresholds at the implanted moment were obviously higher and declined rapidly. No thresholds change occurred at the end of the operation, in 48 hours, 3 months, 6 months, 12 months after operation. The impedances were quickly decreased at the end of the operation and 48 hours after the operation, no obvious sense parameters changed. 1 patient (1.7%) with acute atrial electrode dislodgment at 2 hours after the operation, we resettled the active-fixation lead successfully. No complications such as lead perforation and cardiac tamponade occurred.

**Conclusion** It was safe and feasible in the implantation of active-fixation leads in right atrium. The pacing parameters of active-fixation leads in right atrium were stable during the periods of 12 months after operation.

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The comparison between the active-fixation leads and passive-fixation leads in right ventricular apical pacing

Haibo Yu, Yanchun Liang, Guoqing Xu, Rong Liu, Zulu Wang, Yaling Han

Department of Cardiology, Institute of Cardiovascular Research of People’s Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

**Background** More and more active-fixation leads were used in the implantation of pacemaker, but compared with the traditional passive-fixation leads, the differences of the pacing parameter were not clearly known. The aim of this study was to compare the pacing parameters of active-fixation leads and passive-fixation leads in right ventricular apical pacing.

**Methods** There were 54 patients implanted with single or dual chamber pacemaker involved in this study from Jan. 2010 to May 2010 followed up for 3 months after operation. In these patients 21 with passive-fixation lead (Group I) and 33 with active-fixation lead (Group II). All the leads were implanted in right ventricle apex, the average age was 66.23 ± 13.90 years old, 21 patients with single chamber pacemaker and 33 with dual chamber pacemaker.

**Result** There were no obvious changes in the pacing parameters between the two groups not only during the operation (thresholds: 0.56 ± 0.20 vs 0.57 ± 0.21; pacing impedances: 818.25 ± 267.71 vs 823.59 ± 284.46; R Wave: 10.64 ± 3.08 vs 10.47 ± 3.10) but also at 1 month (thresholds: 0.55 ± 0.18 vs 0.55 ± 0.18; pacing impedances: 542.72 ± 190.30 vs 531.91 ± 189.48; R Wave: 10.53 ± 3.60 vs 10.22 ± 3.63) and 3 months after the operation (thresholds: 0.57 ± 0.17 vs 0.56 ± 0.17; pacing impedances: 499.80 ± 190.30 vs 494.29 ± 135.74; R Wave: 10.72 ± 3.48 vs 10.47 ± 3.53) (P > 0.05). But there were 1 of 33 patients in Group II (1/33, 3%) with higher pacing threshold after operation. The threshold reached to 6.0 V at the second day after operation and the patient was dealt with dexamethasone for 1week, and there was no change of the higher pacing threshold, so we had to implant the new passive-fixation lead in the right ventricular apex and extract the old active-fixation lead simultaneously. The pacing thresholds were stable followed for 3 months. No patients with severely higher pacing thresholds in Group I.

**Conclusion** There were no obvious differences in the pacing parameters between the passive-fixation leads and active-fixation leads in right ventricular apical pacing. But it was possible that the stimulation thresholds were individually higher in patients with active-fixation leads than those with passive-fixation leads (3.3% vs 0). The long-term parameter changes still were observed.

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Initial experience of valve repair for rheumatic mitral valve diseases

Xuhua Jian, Jinsong Huang, Sheng Wang, Oudi Chen, Xuejun Xiao, Min Wu, Jian Zhuang

Department of Cardiovascular Surgery, Guangdong Provincial Cardiovascular Institute, Guangzhou, P.R. China.

**Background** To investigate the feasibility of valve repair for rheumatic mitral valve disease.

**Methods** From Aug. 2011 to Jan. 2013, fifteen patients (thirteen females and two males), with average age of 42 years, underwent mitral valve repair with clinical diagnosis of rheumatic mitral valve...
abnormality. Among them, eight were stenotic predominated cases, six were regurgitated predominated, the remaining one was mixed stenosis and regurgitation. Comorbidities included aortic regurgitation in four cases (three were minimal), tricuspid regurgitation in seven (two minimal, five moderate), cerebral infarction in two, and pulmonary arteriovenous fistula in one. Valvuloplasty was carried out according to Carpentier's classification of mitral valve disease with manipulations for the mitral co mmisures, leaflets, subvalvular apparatus and mitral annulus. The Result were analyzed by using SPSS13.0. Significance was set at a P value less than 0.05.

Result Various repair techniques had been used for different pathological lesions, including co mmisurotomy in 12 cases, co mmisurorrhaphy in 2, leaflet thinning in 10, papillotomy in 7, chordal shortening in 1. one patient had his posterior leaflet enlarged with autologous pericardium. Two patients had leaflet deficit at anterior-lateral co mmisure after radical decalcification, one repaired with autologous posterior tricuspid leaflet, another with glutaraldehyde-tanned autologous pericardium. All patients except one early case received annuloplasty, of them, 13 with Carpentier – Edwards Physio 4450, two with posterior annuloplasty of Paneth type. Concomitant procedures included tricuspid valvuloplasty in 5 cases (Kay's method in two cases, De Vega's in one, bicuspidization in one, and co mmisurotomy with concomitant anterior leaflet enlargement and MC3 annuloplasty in one), isolation of left atrial appendage from left atrium in 5 cases (four with suture technique, one with ligature method), occlusion of pulmonary arteriovenous fistula in one, radiofrequency atrial fibrillation ablation in four cases, aortic valve replacement in one case. All patients survived the operations with average cardipulmonary bypass time of 149 minutes and aortic cross clamp time of 108 minutes. The average hospital stay time is 8.8 days and all patients recovered uneventfully. The mitral valve area increased significantly from 1.07 ± 0.41 to 2.04 ± 0.29 cm² (P < 0.01) in stenotic predominated cases. Five patients had minimal regurgitation and ten with no regurgitation echocardiographically before discharge. The blood flow velocity of the mitral valve orifice decreased significantly from 1.77 ± 0.50 m/s to 1.48 ± 0.24 m/s (P < 0.05) with decreases of left ventricular end diastolic and systolic dimension from 51.53 ± 10.89 and 32.67 ± 8.78 cm to 43.68 ± 6.38 cm (P < 0.01) and 27.80 ± 7.18 cm (P < 0.01) respectively. All patients show an improvement in the grade of NYHA classification with postoperative value of 1.07 ± 0.26 from preoperative value of 2.33 ± 0.72 (P < 0.01). Although the left ventricular ejection fraction did not demonstrate an obvious increase (63.73 ± 6.02 preoperative and 61.60 ± 5.78 postoperative, P > 0.05), the postoperative value had revealed a preserved left ventricular function after the rheumatic valve repair.

Conclusion Although the repair for rheumatic mitral valve disease is technically demanding, advantage of preservation of ventricular function and avoidance of complications of artificial valves mandate any attempts to restore the normal valve function, whenever repair is technically and anatomically feasible.

Oral sildenafil therapy for eisenmenger syndrome: A prospective, open-label, multicentre study
Qinhua Zhao, Xin Jiang, Rui Zhang, XinLi Li, Bingxiang Wu, Yong Wang, LihuiDai, Lei Pan, Mardi Gomberg-Maitland, Zhicheng Jing, Jingmin Liu
Department of Cardio-Pulmonary Circulation, Shanghai Pulmonary Hospital, Tongji University School of Medicine

Objective Sildenafil is a phosphodiesterase-5 inhibitor and pulmonary vasodilator effective for oral therapy of idiopathic pulmonary arterial hypertension (PAH). Eisenmenger syndrome has similar pathology to idiopathic PAH but has less defined treatment evidence. We investigated whether twelve months of sildenafil therapy improves clinical and hemodynamic parameters in patients with Eisenmenger physiology.

Methods The effect of long time treatment with sildenafil (20 mg tid) on 6-minutes walking distance (6MWD) and systemic arterial blood oxygen saturation (SaO₂) was evaluated in a prospective, open-label, multicentre study in 84 patients with Eisenmenger syndrome who were in WHO functional classes II-IV. Other endpoints included hemodynamic parameters assessed by right-heart catheterization, serum biochemical markers, and safety/tolerability.

Result The overall treatment effects (expressed as mean and 95% confidence intervals) were 56 m (42 to 69, P < 0.0001) in 6MWD and 2.4% (1.8 to 2.9, P < 0.0001) in SaO₂. Statistically significant improvements were also noted in mean pulmonary arterial pressure and pulmonary vascular resistance index [-4.7 mm Hg (-7.5 to -1.9)], P = 0.001 and -474 dyne s cm⁻⁵ [-634 to -314], P < 0.0001, respectively). Sildenafil was well tolerated. Most adverse events were mild and transient and occurred in the first two weeks of treatment.

Conclusion Twelve month therapy of sildenafil improved exercise capacity, arterial oxygen saturation and hemodynamics in patients with Eisenmenger syndrome.

Usefulness of intravenous adenosine in idiopathic pulmonary arterial hypertension as a screening agent for identifying long-term responders to calcium channel blockers
Rui Zhang, Xiangrong Zuo, Xin Jiang, Zhicheng Jing, Jingmin Liu
Department of Cardio-Pulmonary Circulation, Shanghai Pulmonary Hospital, Tongji University School of Medicine

Objective Although intravenous adenosine is recommended for acute vasodilator testing in patients with pulmonary hypertension, the long-term outcomes in acute responders treated with calcium channel blockers (CCBs) who are identified by adenosine remain unknown. In this study, the value of adenosine for identifying long-term responders to CCBs was investigated in patients with idiopathic pulmonary arterial hypertension (IPAH).

Methods All acute responders were subsequently treated with high-dose CCB monotherapy, and 6-minute walk distances, hemodynamic data, and WHO functional classifications were followed. Nine of 104 patients presented an acute response with intravenous adenosine (8.7%; 95% CI 3.2% – 14.2%).

Result After 12 months of follow-up, all acute responders were still alive; however, only 6 patients showed sustained hemodynamic improvement (5.8%; 95% CI 2% – 13%). Three patients failed on CCB monotherapy and bosentan was added to their treatment. The mean tolerated dose of intravenous adenosine was 142 ± 49 mg/kg/min. No life-threatening adverse events were observed and only 2 patients among the non-responders exhibited a 20% reduction in mean systemic arterial pressure. In non-responders, the 1- and 3-year survival rates were 89% and 75%, respectively.

Conclusion Acute vasodilator testing with intravenous adenosine was safe and was able to screen responders to CCB therapy in patients with IPAH, and long-term CCB responders account for about 5.8%.
Clinical study of the left ventricular function for atrial septal defect in adult with pulmonary arterial hypertension

Huoyuan Chen, Xianyang Zhu, Xiumin Han, Chuanju Hou, Duanzhen Zhang, Qiguang Wang, Xiaotang Sheng, Chunshe Cui
Department of Congenital Heart Disease, General Hospital of Shenyang Military Region, Shenyang, China 110016

Background To assess the left ventricular function of ASD with PAH patients and to determine whether the left ventricular function and pulmonary pressure could run better after transcatheter closure by echocardiography.

Method There were 75 patients with ASD aged ≥ 40 years, 15 males and 60 females, divided them two groups. (1) PAH group: 36 patients with ASD associated with PAH, 6 males and 30 females, aged from 41 to 74 (mean age 51.7 ± 9.3) years, ASD diameter aged from 15 to 37 (mean 22.9 ± 8.1) mm by using transhoracic echocardiography (TTE). Systolic pulmonary artery pressure (sPAP) 40 – 107 (57.8 ± 16.0) mm Hg, diastolic pulmonary artery pressure (dPAP) 10 – 40 (22.0 ± 5.8) mm Hg, mean pulmonary artery pressure (mPAP) 31 – 62 (37.1 ± 7.7) mm Hg were measured by using cardiac catheterization. (2) No PAH group (control group): there were 39 patients, 9 males and 30 females, aged from 40 to 63 (mean age 49.3 ± 6.0) years, ASD diameter aged from 8 to 33 (mean 20.6 ± 6.8) mm by using TTE. The sPAP 22 – 38 (28.9 ± 3.9) mm Hg, dPAP3 – 20 (10 ± 3.8) mm Hg, mPAP10 – 19 (15.9 ± 2.8) mm Hg were measured by using cardiac catheterization.

Before operation, left ventricular end-diastolic diameter (LVEDD), left ventricular end-systolic diameter (LVESD), left ventricular end-diastolic volume (LVEDV), left ventricular stroke volume (LVSV) and left ventricular ejection fraction (LVEF) were measured by using TTE. The sPAP obtained by echocardiography Doppler according to the tricuspid regurgitation pressure gradient pressure of the ASD with PAH patients. Cardiac catheterization was performed before interventional therapy, sPAP, dPAP, mPAP, Qp/ Qs were measured. ASO with a diameter ranging from 18 to 42 (30.8 ± 9.1) mm were placed in PAH group, 3 patients of them with severe PAH required a fenestrated device. The immediate sPAP were measured 28 – 95 (42.7 ± 15.4) mm Hg after transcatheter closure, mPAP were 24 – 58 (30.1 ± 6.7) mm Hg, ASO with a diameter ranging from 9 to 40 (27.5 ± 7.4) mm were placed in control group. Echocardiography were made at 1 day, 1, 3 months after the procedure.

Result The LVDD, LVEDV, LVSV and LVEF of PAH group were all smaller than those of no PAH group. The immediate sPAP, mPAP decreased significant after transcatheter closure. The LVDD, LVEDV, LVSV and LVEF increased significantly after operation 1 day, whereas LVEDV, LVESV were unchanged. The LVDD, LVEDV, LVSV and LVEF improved 1 – 3 months follow-up. The sPAP decreased significant of the patients with severe PAH, who had the indication could implant a fenestrated ASO, and left ventricular function improved at 1 day, 1 – 3 months after the procedure.

Conclusion The left ventricular function lesion of the ASD patients with PAH were more severe than the ASD patients, the left ventricular function improved after transcatheter closure, so interventional therapy could prevent the left ventricular function from deterioration.
The acute hemodynamic responses of pulmonary arterial hypertension associated with congenital heart disease to iloprost

Duanzhen Zhang, Xianyang Zhu, Hong Wang, Chunsheng Cui, Qiuqiang Wang, Zhang Po, Huoyuan Chen
Department of Congenital Heart Disease, the General Hospital of Shenyang Military Command (110840), Shenyang 110016

Background Pulmonary arterial hypertension (PAH) is the commonest complication of left-to-right shunt congenital heart disease (CHD). Detection of pulmonary vascular reactivity is important for the evaluation of patient with PAH. This study aimed to investigate the acute hemodynamic responses to iloprost in patients with idiopathic PAH (IPAH) and PAH associated with systemic-to – pulmonary shunt CHD (PAH-CHD).

Method This study included a cohort of patients with IPAH and PAH-CHD. The inclusion criteria were: (1) IPAH with pulmonary artery systolic pressure > 70 mm Hg measured by catheter and (2) PAH-CHD with pulmonary artery systolic pressure > 70 mm Hg and pulmonary-to-systemic flow ratio (Qp/Qs) < 1.5. After determination of baseline haemodynamic parameters by cardiac catheterization, 10 μg of aerosol iloprost was inhaled and right heart catheterization was repeated.

Result A total of 165 patients (118 females) aged 29 ± 13 years were recruited, including 24 with IPAH and 141 with PAH-CHD. There were 2 acute positive responders (8.3%) in patients with IPAH who benefited from the treatment of calcium antagonist thereafter. No positive responder was found in patients with PAH-CHD. Inhalation of aerosol iloprost induced significant decrease in pulmonary artery pressure (P > 0.01), pulmonary vascular resistance (P < 0.01) and pulmonary-to-systemic vascular resistance ratio (P < 0.05) in patients with both IPAH and PAH-CHD. However, significant increase in oxygen saturation of femoral blood was only observed in patient with PAH-CHD. A ≥ 10% decrease in both pulmonary vascular resistance and pulmonary-to-systemic vascular resistance ratio at the end of drug exposure was observed in 58.9% of patients with PAH-CHD had but only in 45.8% of patients with IPAH.

Conclusion There are 8.3% of acute positive responders in patients with IPAH but no positive response in patients with PAH-CHD. Although iloprost induces decrease in pulmonary artery pressure and pulmonary vascular resistance in patients with IPAH and PAH-CHD, the acute hemodynamic changes were different.
play key roles in diverse biological and pathological processes. Recently, miRNAs have been reported to be present in the blood of humans and suggested as promising biomarkers for various pathologic conditions. However, its value in the evaluation of perioperative myocardial injury has not yet been assessed. In the present study, we aim to determine the potential of cardiac-specific miRNAs in circulation to serve as biomarkers for identifying perioperative myocardial injury in cardiac surgery.

**Methods** Thirty two consecutive patients undergoing on pump coronary artery bypass grafting (CABG) were included in a prospective, randomized study using standardized operative procedures and myocardial protection. Serial plasma samples from patients were collected at 7 perioperative time points (Preoperatively, 1, 3, 6, 12, 24, 48 h after declamping), and were tested for miRNAs and cardiac troponin I (cTnI). Total RNA were extracted from plasma with mirVana PARIS Kit. Muscle-enriched miR-499 and cardiac-specific miR-208a were selected as candidates for this study. The levels of circulating miRNAs were measured by TaqMan quantitative reverse transcription-PCR (qRT-PCR). Plasma cardiac troponin I (cTnI) concentrations were measured by electrochemiluminescence based Methods on the Beckman ACCESS2 Analyzer.

**Result** Our study revealed the peak levels of the muscle-enriched miR-499 (150-fold; PP Importantly, miR-499 levels peaked 3 h after declamping, whereas TnI peaked 6 h after declamping

**Conclusion** In this study, we reported the expression of circulating miRs in CABG patients. In comparison to the preoperative, interestingly, plasma levels of miR-499 and miR-208a were up-regulated after the declamping. Importantly, an outstanding finding in this study is that both miRNAs and cTnI exhibited the same trend. Thus, our Result clearly hold out that miR-499 and miR-208a can be new biomarkers for identifying perioperative myocardial injury in CABG patients.

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**Permanent pacemakers implantation and follow-up** in 23 infants and children with perioperative complete atrioventricular block

Huili Zhang1, Shoujun Li1, Zhongdong Hua1, Keming Yang1, Shenghui Bi1. 1. Department of Cardiac Surgery, Cardiovascular Institute and Fuwai Hospital, National Center for Cardiovascular Disease, Chinese Academy of Medical Sciences and Peking Union Medical College

**Objective** We analyzed the Result of 23 children with congenital heart diseases (CHD) who underwent pacemaker (PM) implantation at our center with a retrospective analysis and tried to evaluate the clinical outcome of PM implantation for CHD associated complete atrioventricular block (AVB).

**Methods** Between Jan. 2007 and Jul. 2012, 23 children with CHD (13 males, 10 females, aged from 4 months to 8 yrs, average 2.8 ± 2.5 yrs. Weight from 5 to 27 kg, average10.7 ± 6.8 kg) underwent PM implantation for high degree or complete A VB at our center. Endocardial (ENDO) or epicardial (EPI) pacing systems are implanted via the right (3 cases) or left (16 cases) midline thoracotomy and the pulse makers.

**Conclusion** In this study, we reported the expression of circulating miRs in CABG patients. In comparison to the preoperative, interestingly, plasma levels of miR-499 and miR-208a were up-regulated after the declamping. Importantly, an outstanding finding in this study is that both miRNAs and cTnI exhibited the same trend. Thus, our Result clearly hold out that miR-499 and miR-208a can be new biomarkers for identifying perioperative myocardial injury in CABG patients.

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**Arterial switch operation in children over 6 months**

Xianyu Wang, Weida Zhang, Xiaowu Wang, Shenghui Bi

**Objective** To investigate effects of arterial switch operation in children.

**Methods** Children scheduled for arterial switch operation (ASO) were grouped as a group (24 cases) and B group (18 cases) by ≥ 6 months or not, and arterial switch operation performed. Effects of arterial switch operation and follow up examinations were observed.

**Result** Two infants died in the first day post operation in group A, the others were clinically cured. Sudden death occurred to 1 case in group B in hospital, 7 cases had satisfactory follow-up 3 months later, and 1 case suffered sudden death at home. There was no statistical difference between the two groups as to operating time, cardiopulmonary bypass time. Compared with group A, children in group B had higher PAP, CVP (P < 0.05).

**Conclusion** Arterial switch operation in children over 6 months can gain a satisfactory effect, and those children still complicate with pulmonary hypertension, the elder children may be suffered from sudden death.
Prolonged mechanical ventilation increase long-term cardiac deaths after CABG
Hui Wu, Shengzhou Hu, Zhe Zheng, Zujun Chen, Xin Yuan, Jianfeng Hou
Department of Cardiovascular Surgery ICU, Fuwai Hospital & Cardiovascular Institute, Peking Union Medical College, Chinese Academy of Medical Sciences, Beijing, 100037, China

Objective To analyze the effects on long-term outcomes of prolonged mechanical ventilation after isolated coronary artery bypass grafting.

Methods 4,022 consecutive patients undergoing isolated coronary artery bypass grafting from Jan. 2006 to Dec. 2008 were analyzed retrospectively. The patients were divided into two groups by the time: conventional mechanical ventilation group \( \leq 12 \) hours \((n = 1,783)\) and prolonged mechanical ventilation group \( > 12 \) hours \((n = 2,239)\). All-cause deaths, cardiac deaths, major adverse cardiac and cerebrovascular events (MACCE), angina, rehospitalization for any cardiovascular disease were defined as long-term endpoint events, and multivariate Cox proportional hazard method was used to examine the difference in long-term prognosis.

Result The rates of cardiac deaths \((HR = 2.54, 95\% CI, 1.14 – 5.66)\) and rehospitalization for any cardiovascular disease \((HR = 1.36, 95\% CI, 1.10 – 1.69)\) were significantly higher in the PMV patients, and there were no significant difference in the rates of all-cause deaths \((HR = 1.38, 95\% CI, 0.83 – 2.29)\), MACCE \((HR = 1.20, 95\% CI, 0.93 – 1.55)\), angina \((HR = 1.29, 95\% CI, 0.99 – 1.68)\).

Conclusion PMV increased the events of long-term cardiac deaths and rehospitalization for any cardiovascular disease.

Effects of B-type natriuretic peptide on plasma NT-proBNP, C - reaction protein in patients with chronic heart failure
Weizhong Huangfu
Geriatric Ward, the Affiliated Hospital of Inner Mongolia Medical University, Inner Mongolia 010050, China

Objective To evaluate the efficacy and safety of B-type natriuretic peptide in the treatment of chronic heart failure (CHF) through objective values of NT-proBNP, C - reaction protein on plasma.

Methods Randomized, open, control clinical trial was conducted in 61 patients with CHF. Vital signs, dyspnea, ejection fraction (EF), NT-proBNP and C - reaction protein in blood biochemical index before and after drug administration were observed.

Result There were significant differences in the increase of the EF, in the decrease of NT-proBNP and C - reaction protein between the trial group and control group.

Conclusion Levosimendan is effective in treating CHF and it can relieve dyspnea, improve the general condition, increase EF, decrease NT-proBNP and C - reaction protein.

Significance of abnormal potentials for guiding successful target of catheter ablation from the aortic sinus cusp ventricular arrhythmia
Xiaoyan Liu, Jing Wang, Jianmin Chu, Yingjie Zhao, Qi Guo, Jielin Pu, Shu Zhang
Department of Arrhythmia, State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, Peoples Republic of China

Objective To investigate the significance of abnormal potentials in predicting target site of ASC-IVAs.

Methods Electroanatomical mapping was performed during IVAs/sinus rhythm in 29 patients with ASC-IVAs and 10 control subjects. The characteristics of abnormal potentials were analyzed.

Result The incidence and amplitude of pre-potential (PP) and late potential (LP) and QRS-LP interval in IVAs group were greater than those of controls \((P < 0.05)\). In IVAs groups, the amplitude of PP at the target site was smaller than that of unsuccessful site \((P = 0.004)\). LP was more often recorded than unsuccessful sites before and after RF application \((P < 0.05)\). After ablation, the amplitude of LP was decreased \((P = 0.016)\) and the QRS-LP interval was longer in 21 patients \((P = 0.026)\) at the target site.

Conclusion LP has greater significance for guiding ablation in ASC-IVAs, and the increased of QRS-LP interval might be a maker for predicting target site.

Analysis of short term postoperative prognostic factors in patients with severe pulmonary hypertension related to congenital heart disease
Xiaofeng Wang1, Hong Gu2, Chen Zhang2, Bangjun Wu2, Baojing Guo1, Hui Zhang2, Pei Cheng2, Yinglong Liu2
1. State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, Peoples Republic of China
2. Beijing Anzhen Hospital

Objective To analyses the short term postoperative prognostic factors in patients with severe pulmonary hypertension (PAH) related to congenital heart disease (CHD).

Methods The clinical data of 34 patients who experienced total repair were retrospectively analyzed. According to their postoperative recovery, patients were separated into two groups. Compared the preoperative clinical data between the two groups and drew the ROC curve to find the data related to the short term postoperative prognostic factors.

Result The ROC curve indicated that CTR more than 0.615, BNP more than 391.6 pg/ml and PVRi at vasodilator testing with inhaled iloprost less than 4.915 wood unit m² may predict good short term postoperative prognosis.

Conclusion The CTR, BNP and PVRi at acute pulmonary vasodilator testing with inhaled iloprost were competent evaluations to predict the short term postoperative prognosis in patients with severe PAH related to CHD.
**Beneficial effects of catheter ablation on left ventricular function in patients with frequent premature ventricular complexes:**

Tuo Zhang, Minhua Zhang, Jialiang Mao, Ben He
Department of Cardiology, Renji Hospital, Shanghai Jiaotong University School of Medicine, Shanghai, China

**Background** Frequent premature ventricular complexes (PVC) are associated with a reversible form of cardiomyopathy.

**Aims** To evaluate the effects of catheter ablation on left ventricular function in patients with frequent PVC.

**Methods** We searched MEDLINE for cohort studies of patients who underwent catheter ablation of PVC. Left ventricular ejection fraction (LVEF) before and after ablation was reported. The primary endpoint was the change in LVEF improvement after ablation. Quantitative analysis of continuous variables was performed according to random-effect Methods by Meta-analyst beta3.13 software. A subgroup analysis of patients with left ventricular dysfunction at baseline was performed.

**Result** 14 studies with 724 patients were ultimately included. The mean burden of PVC before ablation was 24.5% (95% CI: 18.5% – 30.5%). Long-term success rate of PVC ablation was ranged from 81 – 88% among included studies. The mean duration of echocardiogram follow-up was ranged from 4 month to 13 month. The pooled mean change of LVEF improvement was 7.489% (95% CI: 5.777% – 9.201%). Subgroup analysis showed that mean change of LVEF improvement in patients with left ventricular dysfunction at baseline was 10.771% (95% CI: 7.521% – 14.021%).

**Conclusion** Ablation of PVC is associated with an improvement in left ventricular function, especially for patient with left ventricular dysfunction at baseline.

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**Effect of right ventricular different pacing site on QRS complex duration**

Xiaoqing Ren, Min Tang, Pihua Fang, Fangzheng Wang, Shu Zhang
Cardiac Arrhythmia Center, State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

**Objective** To investigate the effect of right ventricular different pacing site on QRS complex width, and provide a reference for lead location.

**Methods** 216 patients (mean age, 69 ± 13 years) scheduled for a permanent pacemaker, that met the class I or II a pacemaker installed indications, were enrolled for study. Pacing and electrocardiography recording were undergone at right ventricular apex, right ventricular inflow tract (RVIT), mid septum, high septum and right ventricular outflow tract (RVOT), respectively. Then the duration and morphology of QRS complex paced in different right ventricular locations were analysis and compared.

**Result** QRS duration at all different right ventricular pacing sites were significant lengthened compared with baseline electrocardiography (P < 0.001). QRS duration with right ventricular apex pacing was most broad (168 ± 16 ms), QRS duration with RVIT pacing was 166 ± 15 ms, and QRS duration with RVOT pacing was 165 ± 15 ms. There were not significant different in QRS duration with apex, RVIT and RVOT (P > 0.05). QRS duration at septum pacing was significant narrower (P < 0.001), QRS morphology and electrical axis was normal compared with other right ventricular pacing sites. QRS duration with mid-septum pacing was most narrow (139 ± 19 ms), and shorter than high septum (153 ± 14 ms).

**Conclusion** QRS duration at mid-septum pacing was most narrow, QRS morphology and electrical axis was normal compared with any other right ventricular pacing sites. Mid-septum may be an ideal choice for right ventricular pacing site.

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**The efficacy and safety of transradial approach PCI vs femoral approach PCI for coronary artery disease**

Jun Pang1, Na Li1, Ming Bai1, Qiang Li1, Jin Zhang1, Bo Zhang1, Peng Yu1, Jing Zhang1, Zheng Zhang1
1 Center of heart, The First Affiliated Hospital of Lanzhou University, Lanzhou 730000, China
2. Fu Wai Hospital, CAMS & PUMC, Beijing 100037, China

**Objective** To evaluate the efficacy and safety of transradial approach PCI vs femoral approach PCI for coronary artery disease.

**Methods** We searched databases, and include the RCT trials and combine data by Revman software.

**Result** We finally included 27 English RCT. In the index of PCI success rate all-cause mortality, the recurrence of myocardial infarction within one year after PCI, PCI operative time, and stroke, the incidence of thrombosis, the radial PCI group is similar with femoral PCI group. However, the postoperative vascular complications and hospital stay, the radial PCI group is better than the femoral PCI group, with a statistically significant difference.

**Conclusion** Radial PCI can be effective and safe method in the treatment of coronary heart disease.

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**The training and learning process of transseptal puncture using a modified technique**

Ligang Ding, Yan Yao, Wensheng Chen, Jun Guo, Gang Chen, Wei Hua, Shu Zhang
Cardiac Arrhythmia Center, State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

**Introduction** As the transseptal (TS) puncture has become an integral part of many types of cardiac interventional procedures, its technique that was initial reported for measurement of left atrial pressure in 1950s, continue to evolve. Our laboratory adopted a modified technique which uses only coronary sinus catheter as the landmark to accomplishing TS punctures under fluoroscopy. The aim of this study is prospectively to evaluate the training and learning process for TS puncture guided by this modified technique.

**Methods** Guided by the training protocol, transseptal puncture was performed in 120 consecutive patients by 3 trainees without previous personal experience in transseptal catheterization and one experienced trainer as a controller. We analyzed the following parameters: one puncture success rate, total procedure time, fluoroscopic time, and radiation dose. The learning curve was analyzed using curve-fitting.
Ibutilide enhances conversion of permanent atrial fibrillation during valve replacement procedure

Nengxin Fang, Yuntai Yao, Jinsong Gong, Lihuan Li, Qijian Yu, Chunxia Shi, Jianhui Wang, Qinghua Xue
Department of Anesthesiology, Fuwai Hospital, National Center for Cardiovascular Disease, Chinese Academy of Medical Sciences and Peking Union Medical College

Background Patients with rheumatic heart disease scheduled for valve replacement surgery often suffer from permanent atrial fibrillation, which caused hemodynamic deterioration after discontinuation of cardiopulmonary bypass significantly. Ibutilide was used as a first-line agent in chemical cardioversion of recent-onset atrial fibrillation with high success rate. However, the conversion rate of permanent atrial fibrillation was not reported. The aim of this study was to investigate the efficacy and safety of ibutilide for cardioversion of permanent atrial fibrillation during valve replacement procedure.

Methods One hundred and twenty patients with permanent atrial fibrillation underwent valve replacement surgery were randomly divided into three groups: controlled group (intravenous infusion of 10 ml 0.9% saline for 10 minutes), ibutilide group (intravenous infusion of 1 mg for 10 minutes), and amiodarone group (intravenous infusion of 150 mg for 10 minutes). There were 40 patients in each group. All preparations were pumped intravenously 10 minutes prior to removing the aortic cross clamping and a second intravenous infusion of 1 mg for another 10 minutes if atrial fibrillation still existed, with a 10-minute interval between the 2 infusions. Termination time of atrial fibrillation was recorded until transferring to ICU. If prior to leaving operating room, sinus rhythm was not achieved, the case was recorded as a failure of ibutilide.

Result Of the 40 patients in ibutilide group, 23 cases were converted to sinus rhythm, with a conversion rate of 57.5%. Of the 23 cases, 4 cases received second dose of ibutilide. The average conversion time was (14 ± 3.8) minutes. 15 patients in the amiodarone group were converted to sinus rhythm, with a conversion rate of 37.5%. The average conversion time was (13 ± 3.5) minutes. 9 cases in the controlled group were converted to sinus rhythm, with a conversion rate of 22.5%. The average conversion time was (12 ± 2.7) minutes. Comparing the efficacy of intravenous ibutilide to intravenous amiodarone in the conversion of permanent atrial fibrillation, the conversion rate was significant higher with ibutilide (57.5% vs 37.5%; P < 0.05). Ibutilide was well tolerated with no episodes of torsade de pointes.

Conclusion Although the use of ibutilide in the conversion of permanent atrial fibrillation is not as effective as the data about use of ibutilide for recent onset fibrillation, administration of ibutilide on patients with permanent atrial fibrillation underwent valve replacement surgery resulted in greater conversion rate compared to amiodarone or placebo treatment. Ibutilide was more effective than amiodarone in converting permanent atrial fibrillation to sinus rhythm.

Case report: Takotsubo cardiomyopathy
Xiao Guo, Bingqi Wei, Jian Zhang
Fuwai Hospital & CAMS, Heart Failure Care Unit

A 71-year-old woman presented to the emergency department with a 2 day history of chest pain. An electrocardiogram of local hospital showed elevated ST-segment of V2 – V5 leads. Cardiac enzymes were negative. She was diagnosed of “acute myocardial infarction of anterior wall” by local hospital and was transferred to ER. The patient had a 20 years history of hypertension and 10 years history of type 2 diabetes mellitus. ECG showed sinus tachycardia with frequent ventricular premature beat and 1 – 3 mm ST elevation in leads V2 through V5. Emergent CAG was normal. Left ventriculography was hypokinesis of apical segments with anterior and inferior wall in a Takotsubo pattern. LVEF was 36.2%. Repeat left ventriculography 4 weeks later showed improvement of previously-noted wall motion abnormalities with a normal ejection fraction of 63.6%. Takotsubo cardiomyopathy, or stress cardiomyopathy, a seemingly rare but in fact underrecognized transient left ventricular dysfunction, is a clinical entity mimicking an acute coronary syndrome. The clinical picture and electrocardiographic findings usually are indistinguishable from those of an acute coronary syndrome. Cardiac imaging studies usually reveal extensive apical and mid-ventricular akinesis or hypokinesis with basal sparing, discordant with minimally increased cardiac enzymes. These wall motion abnormalities typically extend beyond the vascular territory of a single coronary artery. Coronary angiography is necessary to differentiate ACS. The prognosis of TTS is good, with full recovery of cardiac function within 2 – 4 weeks in most of the cases.
Diabetes does not affect acute kidney injury in patients undergoing on-pump coronary artery bypass graft

Gang Cheng, Lei Chen, Lihuan Li
Department of Anesthesiology, Fuwai Hospital, 10037, Beijing, China

Objective We investigate the incidence of acute kidney injury (AKI) after cardiopulmonary bypass (CPB) in no-diabetes and diabetes patients undergoing on-pump coronary artery bypass graft (CABG).

Methods We retrospectively reviewed patients disease undergoing CABG with CPB in Fuwai hospital from 2011 – 2012. Among 1004 patients, 302 patients had diabetes and 702 were nondiabetic. They were assessed according to the definition of acute kidney injury (AKI) by the Acute Kidney Injury Network.

Result Among the 302 diabetes patients 76 had AKI, with the incidence of 26.1%, with was distributed from stage I to III at the percentage of 21.8%, 39.7% and 39.3%, respectively. Among 702 nondiabetic patients, 140 (19.9%) developed AKI stage I, 3.7% developed AKI stage II and 0.14% developed AKI stage III. There were no significant difference in diabetes and nondiabetic group.

Conclusion Compared with nondiabetic group, diabetes does not affect acute kidney injury in patients undergoing on-pump CABG.

The effects of sufentanil and fentanyl on blood glucose and lactate in patients undergoing on-pump coronary artery bypass graft

Gang Cheng, Lei Chen, Lihuan Li
Department of Anesthesiology, State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, Peoples Republic of China

Objective We evaluated effects of sufentanil compared with fentanyl on the blood glucose during CPB in patients undergoing CABG.

Method 580 patients were divided into nondiabetic sufentanil (NS) group, nondiabetic fentanyl (NF) group, diabetes sufentanil (DS) group and diabetes fentanyl (DF) group. Data on glucose and lactate were collected at the following points: before CPB (T1), 10 min after CPB (T2), 10 min after rewarming (T3), 10 min after CPB (T4), reaching at ICU (T5), 6 h after operation (T6), 12 h after operation (T7), and 24 h after operation (T8).

Result The blood glucose levels on T1 – T8 were significantly increased in each group as compared with T0. Blood glucose in NS group were significantly lower than NF group on T1 – T8 points. In DS group, blood glucose levels were significantly lower than DF group on T1 and T2 points.

Conclusion Compared with fentanyl, sufentanil can significantly decreased the level of blood glucose during the CPB for diabetes and nondiabetic patients underwent CABG.

Diabetes does not affect acute kidney injury in patients undergoing on-pump coronary artery bypass graft

Gang Cheng, Lei Chen, Lihuan Li
Department of Anesthesiology, Fuwai Hospital, 10037, Beijing, China

Objective We investigate the incidence of acute kidney injury (AKI) after cardiopulmonary bypass (CPB) in no-diabetes and diabetes patients undergoing on-pump coronary artery bypass graft (CABG).

Methods We retrospectively reviewed patients with no history of chronic kidney disease undergoing first-time CABG with CPB in Fuwai hospital from 2010 – 2011. Among 1 004 patients, 302 patients had diabetes and 702 were nondiabetic. They were assessed and classified according to the definition of acute kidney injury (AKI) by the Acute Kidney Injury Network. Changes in serum creatinine levels and urine output were used to define and stage three levels of renal dysfunction.

Result The blood glucose levels of diabetes group before surgery and cardiopulmonary bypass were 7.36 ± 2.30 and 7.04 ± 1.95 mmol/L, nondiabetic group were 5.52 ± 1.32 and 5.17 ± 1.28 mmol/L. Among the 302 diabetes patients 76 had AKI, with the incidence of 26.1%, with was distributed from stage I to III at the percentage of 21.8%, 39.7% and 39.3%, respectively. Among 702 nondiabetic patients, 140 (19.9%) developed AKI stage I, 3.7% developed AKI stage II and 0.14% developed AKI stage III (0.14%) (P < 0.001). There were no significant difference in diabetes and nondiabetic group.

Conclusion Compared with nondiabetic group, diabetes group has higher blood glucose levels before surgery and cardiopulmonary bypass and does not affect acute kidney injury in patients undergoing on-pump coronary artery bypass graft.

The acute kidney injury in patients undergoing coronary artery bypass graft with cardiopulmonary bypass

Gang Cheng, Lei Chen, Lihuan Li
Department of Anesthesiology, Fuwai Hospital, 10037, Beijing, China

Objective To investigate the incidence, implicating factors and outcome of acute kidney injury (AKI) after cardiopulmonary bypass (CPB) in patients admitted to intensive care unit (ICU).

Methods We retrospectively reviewed 1004 patients with no history of chronic kidney disease undergoing first-time CABG with CPB in Fuwai hospital from Jul. 2010 to Jun. 2011. The patients were assessed and classified according to the definition of acute kidney injury (AKI) by the Acute Kidney Injury Network in Sep. 2005. Changes in serum creatinine levels and urine output were used to define and stage three levels of renal dysfunction.

Result Among the 1004 patients, 240 had AKI, with the incidence of 23.9%, with was distributed from stage I to III at the percentage of 19.9% (200), 3.78 (38)% and 0.2 (2)% respectively. Only 6 patients required renal replacement therapy. Compared with non-AKI patients, there were longer pump time and ascending aorta blockage time in AKI patients. All patients with AKI had a longer stay in ICU and hospital.

Conclusion The disadvantages leading to AKI include prolonged duration of CPB and ascending aorta blockage time. AKI is common and occurred in 23.9% of our patients following CPB; however, AKI requiring renal replacement therapy is uncommon. We should evaluate outcome of AKI and development of strategies to improve outcomes.
Impact of onset and duration of diabetes on short- and long-term outcomes after primaryelective percutaneous coronary intervention (PCI): a 5-year follow-up study
Haiyang Gao, Erli Zhang, Yuejin Yang, Bo Xu, Shubing Qiao, Min Yao, Haibo Liu, Shijie You, Yu Chen, Xuewen Qin, Yongjian Wu
CHD, Fu Wai Hospital, CAMS & PUMC, Beijing 100037, China

Objective To evaluate the impact of diabetes onset and duration on short- (1-year) and long-term (5-year) clinical outcomes after primary elective percutaneous coronary intervention (PCI) in patients with stable coronary artery disease (CAD).

Methods A total of 1743 patients undergoing primary elective PCI for stable CAD in Fuwai hospital were consecutively included in this study. They were divided into two groups: 1292 patients (74.13%) with diabetes (DM group) and 451 patients (25.87%) without diabetes (non-DM group). Subsequently the diabetes group was further stratified into two subgroups by duration of diabetes: < 5 years (subgroup A, with 223 patients) and ≥ 5 years (subgroup B, with 228 patients). The rates of major adverse cardiovascular events (MACEs), defined as the need for revascularization, non-fatal myocardial infarction, or cardiovascular death, were measured at 1- and 5-year time points, respectively. Multivariate Cox regression analysis was employed to evaluate the independent effect of diabetes onset and duration on MACE rates.

Result Baseline analysis showed that patients in DM group were older, more likely to be female, nonsmokers, with higher prevalence of hypertension, hypercholesterolemia, and multivessel disease (all P < 0.001), but without any difference in rates of previous chronic heart failure or myocardial infarction. However, the baseline characteristics between the two diabetic subgroups were much similar (P > 0.05), except that they were significantly different in hypercholesterolemia, smoking, and gender statuses (all P < 0.05). At 1-year follow-up (356 ± 16 days), diabetes was associated with significantly higher rates of MACEs (8.31% vs 4.86%; P < 0.001) in comparison to control patients. Similar Result were also observed at 5-year follow-up (2123 ± 93 days). In subgroup analysis, subgroup B had a higher rate of MACEs at 1-year time point, but it did not approach statistical significance (9.61% vs 6.10%; P = 0.20). However, at 5-year follow-up, the rate of MACEs in subgroup B became significantly higher than that of subgroup A (29.94% vs 18.24%; P = 0.015). Multivariate Cox regression analysis revealed that the onset and duration of diabetes (≥ 5 years) were independent predictors for the incidence of MACEs at 5-year follow-up (HR = 1.61, 95% CI 1.03 – 2.50, P = 0.04, and HR = 1.85, 95% CI 1.02 – 3.34, P = 0.04, respectively).

Conclusion Diabetes is associated with worse clinical outcomes following primary elective PCI. A longer duration of diabetes (≥ 5 years) was associated with higher rates of MACEs during a long-term (5-year) follow-up.

Surgical treatment of right atrial myxoma and pulmonary embolism
Song Gu, Yan Liu, Jun Yan, Xiaoyi Zhang, Jie Gao, Pixiong Su
Beijing ChaoYang Hospital Capital medical university

Myxomas are rare benign tumor, with an estimated incidence of 0.5 per million populations per year. It is most common of left atrial origin (75% to 90%), less common right atrial (10% to 25%), and rarely ventricular (1% to 4%). Right atrial myxoma generally present as right sided cardiac failure, with signs of atrio-ventricular valve disease. The association of pulmonary embolism with right atrial myxoma has been recognized at necropsy for many years. Chiari et al. reported the first case in 1931.

We report a case of a 33-year-old man admitted to the hospital with sudden episode of moderate dyspnea and fever 2 days previously. An echocardiogram and pulmonary computed tomography angiography showed right atrial myxoma complicated with bilateral pulmonary embolism. Complete surgical resection of the right atrial myxoma and pulmonary tumor embolectomy was successfully performed with moderate hypothermia and low circulatory flow. Histologic investigations of the primary tumor as well as the emboly revealed benign myxoma. The patient has had complete recovery with no evidence of recurrence over a 1-year period.

In conclusion, we suggest that right atrial myxoma associated with pulmonary embolism treatment should aim at total removal of masses both from the atrium and pulmonary arteries. Pulmonary embolectomy should be conducted under moderate or deep hypothermia, low circulatory flow or total circulatory arrest on the basis of the sites and the extent of the thrombi. Postoperative V/Q scan, echocardiogram and computed tomography pulmonary angiography for long-term surveillance should be followed up to detect eventual recurrence of new myxoma and pulmonary embolism.

Ascending aortic cannulation in acute stanford type A aortic dissection
Hongbing Wu, Zhixiong Wang, Zhifu Mao, Shangzhi Gao, Xiaoping Hu
Cardiovascular Surgery, Renmin Hospital of Wuhan University, Wuhan 430060, China

Objective To summarize the clinical experience of ascending aortic cannulation in acute Stanford type A aortic dissection.

Methods 45 patients with acute Stanford type A aortic dissection underwent operation with ascending aortic cannulation. Cardiopulmonary bypass was installed through ascending aortic cannula and the right artrium with a two-stage cannula.

Result No malperfusion and aortic rupture occurred. The inhospital mortality was 6.7% (3/45). The complications included transient neurologic deficit in 6 (13.3%), Cerebrovascular accidents in 2 (4.4%), hemorrhage of anastomose which was treated by reoperation in 3, hoarseness in 1, Renal failure in 1. One case died of the cerebral hemorrhage after 4 months due to inappropriate anticoagulation.

Conclusion Cardiopulmonary bypass is established quickly via ascending aortic cannulation in acute Stanford type A aortic dissection, which can provide antegrade perfusion and attain satisfactory organism protection.

Application of central venous oxygen saturation monitoring during off-pump coronary artery bypass graft surgery
Kuan Wu1, Tao Guo1, YiJin Wang2
1. Department of anesthesiology, Beijing Haidian hospital, 1000, China
2. Capital medical university affiliated Beijing Anzhen hospital anesthesiology

Objective To analyze the alterations of ScvO2 and SvO2 and the hemodynamic changes during off-pump coronary artery bypass graft (OPCABG) surgery, detect the correlation and consistency between...
is some feasibility to replace SvO\textsubscript{2} with ScvO\textsubscript{2} for patients undergoing OPCABG. Methods 37 patients undergoing selective OPCABG were included in this study. The central venous catheter and pulmonary artery catheter were inserted into the right internal jugular vein after anesthesia induction. The variables were measured after the anesthesia induction (basic value, T\textsubscript{0}), 5 min after the tissue stabilization was positioned for the LAD, LCX and RCA anastomosis (T\textsubscript{1}, T\textsubscript{2}, T\textsubscript{3} and T\textsubscript{4}, respectively) and after the sternum was closed (T\textsubscript{5}). Following data were collected: central venous oxygen saturation (ScvO\textsubscript{2}), mixed venous oxygen saturation (SvO\textsubscript{2}), oxygen delivery (DO\textsubscript{2}), oxygen consumption (VO\textsubscript{2}), oxygen extraction rate (O\textsubscript{2}ER), heart rate (HR), cardiac output (CO), cardiac index (CI), mean arterial pressure (MAP), mean pulmonary arterial pressure (MPAP), central venous pressure (CVP), pulmonary arterial wedge pressure (PAWP). The ECG changes and the using of positive inotropic drug were recorded at each time point.

Result The tendencies of ScvO\textsubscript{2} and SvO\textsubscript{2} during OPCABG were same, the values of ScvO\textsubscript{2} were lower than the SvO\textsubscript{2} at each time point. When LAD was anastomosed, oxygen metabolism was changed with significant increase of CI, VO\textsubscript{2}, O\textsubscript{2}ER, significant decrease of ScvO\textsubscript{2}, and CI and Hb decreased while O\textsubscript{2}ER increased (P < 0.05). When LCX and PDA were anastomosed, oxygen metabolism was changed with significant decrease of ScvO\textsubscript{2}, SvO\textsubscript{2}, DO\textsubscript{2}, P\textsubscript{vO}2, CI, Hb, significant increase of O\textsubscript{2}ER, and significant increase of VO\textsubscript{2} during LCX (P < 0.05). After the sternum was closed, oxygen metabolism was changed significantly: ScvO\textsubscript{2} and Hb were increasing, but still lower than the basic value; SvO\textsubscript{2}, DO\textsubscript{2} and VO\textsubscript{2} were increasing and higher than both basic value and PDA; O\textsubscript{2}ER was decreasing, but still higher than basic value (P < 0.05). Correlation index of ScvO\textsubscript{2} and SvO\textsubscript{2} were 0.35, 0.169, 0.76, 0.568, 0.311 and 0.446, respectively. The correlation of ScvO\textsubscript{2} and CI was better compared to ScvO\textsubscript{2}, the correlation of ScvO\textsubscript{2} and Hb was better compared to SvO\textsubscript{2}. The bias range between ScvO\textsubscript{2} and SvO\textsubscript{2} were (-5.46 ± 4.97)%, (-7.84 ± 6.50)%, (-8.52 ± 5.62)%, (-9.73 ± 7.96)% and (-10.5 ± 5.96)% respectively.

Conclusion When LAD, LCX and PDA were anastomosed, DO\textsubscript{2}, ScvO\textsubscript{2} and SvO\textsubscript{2} decreased significantly, and CI and Hb decreased simultaneously, O\textsubscript{2}ER increased significantly, VO\textsubscript{2} was nearly unchangeable. The tendencies of ScvO\textsubscript{2} and SvO\textsubscript{2} during OPCABG were unanimous, their correlation and consistency were moderate. There is some feasibility to replace SvO\textsubscript{2} with ScvO\textsubscript{2} for patients undergoing OPCABG.

Application of central venous oxygen saturation monitoring during off-pump coronary artery bypass graft surgery
Kuan Wu\textsuperscript{1}, Tao Guo\textsuperscript{1}, Yijun Wang\textsuperscript{2}
\textsuperscript{1} Department of Anesthesiology, Haidian Hospital
\textsuperscript{2} Department of Anesthesiology, Anzhen Hospital

Objective To investigate the possibility of replace SvO\textsubscript{2} with ScvO\textsubscript{2}, and to guide the management of the mismatch of oxygen demand and consumption during OPCABG.

Methods 37 patient's undergoing selective OPCABG were included. The variables (ScvO\textsubscript{2}, SvO\textsubscript{2}, CI et al) were measured after the anesthesia induction (T\textsubscript{0}), 5 min after LAD, LCX and RCA anastomosis (T\textsubscript{1}, T\textsubscript{2} and T\textsubscript{4}, respectively) and after the sternum was closed (T\textsubscript{5}).

Result The tendencies of ScvO\textsubscript{2} and SvO\textsubscript{2} during OPCABG were same, the values of ScvO\textsubscript{2} were lower than the SvO\textsubscript{2} at each time point. At T\textsubscript{5}, ScvO\textsubscript{2} decreased significantly (P < 0.05). At T\textsubscript{1} and T\textsubscript{3}, SvO\textsubscript{2}, ScvO\textsubscript{2}, DO\textsubscript{2}, CI and Hb decreased, O\textsubscript{2}ER increased (P < 0.05). At T\textsubscript{5}, ScvO\textsubscript{2} and Hb increased; SvO\textsubscript{2}, DO\textsubscript{2} and VO\textsubscript{2} increased (P < 0.05). There were good correlation index between ScvO\textsubscript{2} and SvO\textsubscript{2}.

Conclusion The tendencies of ScvO\textsubscript{2} and SvO\textsubscript{2} during OPCABG were unanimous, their correlation and consistency were moderate. There is some feasibility to replace SvO\textsubscript{2} with ScvO\textsubscript{2} for patients undergoing OPCABG.

Long-term Result of tetralogy of fallot and treatment for the complications
Xuan Li, Rui Jiang, Dianyuan Li, Jun Yan
Cardiovascular surgery, Fu Wai Hospital, CAMS & PUMC, Beijing 100037, China

Purpose The long-term postoperative result of treatment for the Tetralogy of Fallot (TOF) are disappointing. Based on the retrospective study of TOF after radical surgery, the long-term Result and complications of the disease are discussed.

Methods We have retrieved articles reported within 10 years on long-term Result of TOF. The patients of TOF who have received radical surgery at Fu Wai Hospital over 10 years have been followed up.

Result The survival rates of TOF after radical surgery at 10, 20, and 25 years are 94.8%, 92.8% and 92.8%, 5-, 10- and 20-year freedom from reoperation rates are 81.5%, 68.9% and 46.6%. The main issues include: pulmonary valve regurgitation, right ventricular dilatation, tricuspid regurgitation, right ventricular outflow tract/pulmonary residual stenosis, heart failure, decreased activity, arrhythmias and sudden death.

Conclusion The long-term Result of TOF are not good. These patients may need lifelong follow-up and repeated therapy intervention.

The experience of left ventricle retraining for transposition of the great arteries
Rui Jiang, Jun Yan, Shoujun Li, Yongbo Wu, Qiang Wang
State Key Laboratory of cardiovascular Disease, Fu Wai Hospital, CAMS & PUMC, Beijing 100037, China

Objective To explore the clinical Result of left ventricle retraining procedure.

Methods From Jan. 2001 to Dec. 2011 atotal of 38 cases of TGA underwent left ventricle retraining procedure, which was composed of aorto-pulmonary shunt and pulmonary artery banding. At the operation, the ratio of systolic pulmonary/systemic pressure increased from 0.34 to 0.76. Contemporary atrial septum excision was performed in 3 cases.

Result The oxygen saturation increased from preoperative 72.6% ± 9.1% to 83.9% ± 8.1, left and right ventricular pressure ratio increased from preoperatively to 0.36 ± 0.04 to 0.75 ± 0.09. There was 3 died in the series. 23 cases underwent second stage arteries switch operation (ASO) successfully after primary retraining procedure.

Conclusion Left ventricle retraining is safe and necessary preparation for ASO in case of simple TGA beyond the neonatal period. The surgical Result of rapid two-stage ASO are satisfactory.
Effects of statins on preventing paroxysmal atrial fibrillation after pacemaker implantation

Yu Chang1, Xiuwei Wang2, Changhong Lu3, Bin Zhang4, Songtzao Wang5, Xiaoqing Ren6, Kuijun Zhang7  
1. Center of Cardiology, Qingdao Fuwai Hospital  
2. Department of Cardiology, the Eighth Peoples Hospital of Qingdao  
3. Center of Arrhythmia Diagnosis and Treatment, Fuwai Hospital and Cardiovascular Institute

**Objective** To observe the effects of statins on preventing paroxysmal atrial fibrillation (PAF) after pacemaker implantation in patients with sick sinus syndrome.

**Material and Method** 68 patients were selected in which the pacemakers had been implanted due to sick sinus syndrome, and were randomly divided into a treatment group and a control group. After the pacemaker implantation, only the patients in treatment group were given 20 mg atorvastatin once per night, with other conditions basically similar to those in the control group. At the 3rd, 9th, 15th, and 21st months after the implantation, the pacemakers were progra mmed, and the PAF-related information stored in the pacemaker were recalled and analyzed statistically.

**Result** After administration of statins for 9 months since the implantation, the occurrence rates of PAF in the treatment group were relatively lower than those in the control group; after further administration of statins for 15 months, both the occurrence rate of PAF and the burden of atrial fibrillation in the treatment group had significantly declined; after continuous administration of statins for 21 months, both the occurrence rates of PAF and the burden of atrial fibrillation in the treatment group were significantly lower than those in the control group.

**Conclusion** Long-term administration of statins can reduce the risk of PAF after implantation of a pacemaker in patients with sick sinus syndrome.

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Assessing the rationality of treatment strategy for CAD patients in single center

Chenfei Rao  
Cardiovascular Institute and Fuwai Hospital, Chinese Academy of Medical Sciences & Peking Union Medical College

**Objective** To assess the rationality of treatment strategy for 3-vessel and/or left main coronary artery disease in single center.

**Method** Consecutively registered patients diagnosed by elective coronary angiography as 3-vessel and/or left main (≥ 50% luminal diameter narrowing) CAD from Jul. 2011 to Sep. 2012 in Fuwai hospital. The rationality of treatment strategy was adjudicated using Appropriate Use Criteria 2012 for Coronary Revascularization Focused Update.

**Result** The study registered 2240 3VD/LM CAD patients. According to AUC, 81.0% (n = 1814) were classified as appropriate for revascularization, 426 (19.0%) actually undertook revascularization strategy, mostly PCI (n = 285).

**Conclusion** For patients with stable 3VD and/or LM CAD and appropriate for revascularization, 61.7% received rational CABG or PCI, 14.9% chose irrational medical therapy, 23.5% undertook irrational PCI treatment. For patients who were uncertain or inappropriate for revascularization, 85.2% undertook revascularization strategy.

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Surgical treatment for aortic dissection manifesting simple aortic insufficiency

Yi Chang, Hui Xiong, Wei Wang, Qian Chang, Cuntao Yu, Shuijun Wang, Xiaqi Wang  
Surgical department, Fushen Hospital, CAMS & PUMC, Beijing 100037, China

**Objective** To discuss clinical features and treatment of aortic dissection manifesting aortic insufficiency.

**Methods** Retrospectively analyses 5 cases and summarize the clinical manifestation, assistant examination, intro-operative findings, surgical options and follow-up Result.

**Result** All cases were diagnosed as aortic dissection during operation. 1 patient underwent aortic valvuloplasty, 1 underwent Wheat procedure, 3 underwent Bentall procedure. The 5 patients all survive when following up after 2 – 5 years. The echocardiography of the patient undergoing aortic valvuloplasty demonstrating mild aortic regurgitation, and the other 4 patients all have normal function of mechanical prostheses.

**Conclusion** Aortic dissection manifesting aortic insufficiency is rare and easily misdiagnosed. Analysing history and examination contribute to avoiding misdiagnosis. It is appropriate to choose surgical method according to the degree of intimal tear and damage of aortic sinus.

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Clinical analysis of Ensite–NavX system and conventional mapping of catheter ablation for PSVT

Yangbo Xing, Hangyuan Guo  
Shaoxing People’s Hospital, Zhejiang Province, 312000, China

**Objective** To assess the clinical efficacy and safety of catheter ablation for PSVT guided by Ensite-NavX system.

**Methods** 80 patients with PSVT were enrolled into this study. The procedure time, fluoroscopic time, the number of energy application, the effective rate of energy application, the success rate and 1-year recurred rate were compared between these two groups.

**Result** All cases were ablated successfully, no complication occurred in two groups. There were no significant difference in the success rate and 1-year recurred rate between two groups. The Ensite-NavX system group had shorter mapping fluoroscopic time than the control group.

**Conclusion** Comparing with the control group, the procedure time, the number of energy application, the effective rate of energy application were better in right pathways/AVNRT ablation; while comparing with left pathway ablation, these were better in the control group.
Objective To discuss the feasibility and safety of nonfluoroscopic radiofrequency catheter ablation (RFCA) for paroxysmal supraventricular tachycardia (PSVT) by tri-dimensional electronic navigation system (NavX).

Methods 78 PSVT patients were enrolled in the research and received RFCA guided by NavX system.

Result 45 patients were found atrioventricular node reentrant tachycardia (AVNRT) and 33 were atrioventricular reentrant tachycardia (AVRT) (10 cases of right pathway, 22 cases of left pathway, 1 case of bi-pathways). All procedures were successful without serious complications. 6 cases of left pathway need transthoracic fluoroscopy during the procedure, 2 cases need fluoroscopic guidance for atrial septal puncture. 1 case of left pathway repalsed during 6-month follow-ups.

Conclusion Nonfluoroscopic RFCA for PSVT with NavX is feasible and safe.

The changes of heart function, TIMP-1, ADM, IL-6, hs-CRP and NT–proBNP after advanced echo-guided cardiac resynchronization therapy in patients with heart failure

Hailong Dai¹, Chengyang Ding¹, Xuefeng Guang¹, Mingxian Zuo¹, Qi-ming Gai¹, Yunchuan Ding², Qinghui Wang²
1. Department of cardiology, Yenan Affiliated Hospital of Kunming Medical University
2. Department of function, Yenan Affiliated Hospital of Kunming Medical University

Objective To observe the improvement degree of cardiac function on advanced echo-guided cardiac resynchronization therapy (CRT) in patients with chronic heart failure (CHF), to measure of concentration of NT–proBNP, TIMP-1, ADM, IL-6, hs-CRP in the serum and try to explore whether we can predict the effect of CRT in patients with CHF and investigated the correlation of left ventricular ejection fraction (LVEF) and the serum level of NT–proBNP and analysis the difference of survival index in patients with a widened QRS complex group or not.

Methods ① We evaluated mechanical dyssynchrony with the DTI, the STI and the RT-3DE. The patients chosen by adoption standards are divided into 3 groups: control group (20 cases), chronic heart failure divided into 3 groups: control group (20 cases), chronic heart failure (CHF), and the serum level of NT–proBNP and analysis the difference of survival index in patients with a widened QRS complex group or not.

Result ① In CHF groups (including narrow QRS group and broad QRS group), the mean levels of serum NT–proBNP, TIMP-1, ADM, IL-6, hs-CRP in Preoperation were greater than them in postoperation (P < 0.05). ④ In postoperation, the concentration of NT–proBNP, TIMP-1, ADM, IL-6, hs-CRP in the serum showed no statistically significant difference between the broad QRS group and the narrow QRS group (P > 0.05). ⑤ There are significant negative correlations between the LVEF and the level of Serum NT–proBNP (P < 0.001).

Conclusion ① Serum NT–proBNP, TIMP-1, ADM, IL-6, hs-CRP related with Left ventricular remodeling and initiation, process and outcome of cardiac dysfunction. ② Echocardiography can be used to screen patients, improve the effect of CRT, and left ventricular synchronous (including narrow QRS) can be also benefited from CRT.

Efficacy and safety of clopidogrel added proton pump inhibitors vs clopidogrel in the treatment of cardiovascular patients after PCI

Jun Pang
The First Affiliated Hospital of Lanzhou University, Gansu 730000, China

Objective To evaluate the efficacy and safety of clopidogrel added proton pump inhibitors vs clopidogrel in the treatment of cardiovascular patients after PCI.

Methods We search databanks; the retrieval time is ended until Oct. 2012. We selected the clinical trials, evaluate the quality of clinical trials following the Cochrane Handbook 5.0, And the datas are solved by the RevMan 5.0 software.

Result Our review included 13 RCT covering 55 592 patients. Meta-analysis Result show there is no statistical difference among incidence of MACE, the rate of All-cause mortality, and the rate of gastrointestinal bleeding in clopidogrel added Proton Pump Inhibitor (PPI) group or clopidogrel group. While there is low incidence rates of myocardial infarction, stent thrombosis, Target Vessel Revascularization (TVR).

Conclusion the incidence rate of MACE, stent thrombosis, and gastrointestinal bleeding is similar in added or not added PPI patients.

Video—assisted thoracoscopic left atrial segregation for non—valvular atrial fibrillation

Fang Fang, Zhe Zheng, Hansong Sun, Xianqiang Wang, Fujian Duan
Video—assisted thoracoscopic left atrial segregation for non—valvular atrial fibrillation

Objective To explore the feasibility and security of video—assisted thoracoscopic left atrial segregation for non-valvular atrial fibrillation.

Methods Patients who undergoing video-assisted thoracoscopic left atrial segregation for non-valvular atrial fibrillation in Fuwai Hospital from Sep. 2010 to May 2013 were enrolled in our study. The video-assisted thoracoscopic left atrial segregation is routinely performed under general anesthesia with double lumen endotracheal intubation and 3-port incisions both sides of chest. In the surgery, the epicardial radiofrequency ablation for atrial fibrillation was done under the monitoring of thoracoscope. And bipolar radiofrequency ablation clamps and ablation pen was used to isolate left pulmonary vein openings, right pulmonary vein openings and left room wall. We melted the ceiling and bottom of atrium to form big circle in order to completely isolate the back of the left atrium. The dragon and warfarin were used in these patients until to...
In total 44 participants who undergoing video—assisted thoracoscopic left atrial segregation for non-valvular atrial fibrillation from Sep. 2010 to May 2013 were enrolled in this study, average age 59.9 ± 6.0 years, 28 male patients, 12 patients with hypertension, average fibrillation persistent time is 6.8 ± 4.1 years, All patients no death. These patients included 26 patients with paroxysmal atrial fibrillation, 14 patients with persistent atrial fibrillation. The average left atrial diameter was 42.1 ± 5.3 mm and in all patients 24 had done the intervention radiofrequency catheter ablation before surgery. The average postoperative respiratory machine use time was 10.5 ± 2.1 hours, the average ICU stay time was 29.4 ± 21.9 hours and the average postoperative hospitalization time was 6.9 ± 1.5 days. 40 patients discharged alive from hospital with sinus rhythm and no complications. 44 patients have been followed up ranged from 1 to 24 months. Just 1 patient got stroke, another one got acute pericarditis, 40 patients were sinus rhythm by the examination of 24 hours dynamic electrocardiogram.

Conclusion Video-assisted thoracoscopic left atrial segregation is feasible and safe minimally invasive treatment operation method for patients with non-valvular atrial fibrillation.

Surgical strategies for aortic insufficiency for patients less than 12 years of age

Bo Kong, Jun Yan, Shoujun Li, Qiang Wang, Xu Wang
Pediatric surgery centers, Fu Wai Hospital, CAMS & PUMC, Beijing 100037, China

Objective To discuss the surgical strategies of aortic insufficiency (AI) by summarizing the surgical experience of fuwai hospital for patients with congenital or acquired AI less than 12 years of age.

Methods From Jan. 2008 to Dec. 2012, aortic valve surgery were performed in 40 patients of AI. AVR were performed in 11 cases, Ross procedures were performed in 3 cases, and Aortic valve plasty (AVP) were performed in 26 cases.

Result There was no operative death. All patients under the age of 3 underwent AVP. For patients of 3 – 6 years, AVP were performed in 18 and and AVR were in 4 cases. For the patients of 7 – 12 years, AVR were performed in 7 cases, Ross were adopted in 3 cases and AVP were performed in 4 cases.

Conclusion For patients of Vs D + AI less than 6 years, AVP should be the first choice whereas for patients older than 7 years of Vs D + AI, AVR is preferred. For patients of AS + AI, more surgeons tend to adopt AVR. For patients of Iatrogenic AI, AVP is preferred.

The clinical characteristics and treatment for pacemaker devices related infection in 23 patients

Xianhui Zhou, Jinxin Li, Yu Zhang, Guojun Xu, Jiahua Zhang, Yanzi Zhang, Ling Sun, Qiang Xing, Baopeng Tao
The first teaching hospital of Xijiang Medical University, Xinjiang 830011, China

Objective Retrospectively analyze the clinical characteristics of cardiac pacemaker devices related infections.

Methods 23 patients have cardiac pacemaker devices related infections were enrollment in this retrospective study.

Result Pocket infection in 21 cases, systemic infection in 2 cases. The incidence of pacemaker devices related infection was 0.77%. The incidence of infection was 0.69% for the implant patients vs 1.36% for replacement patients, there were no statistical difference in two groups (P = 0.17). For the treatment, 2 patients only intravenous antibiotics and local treatment; 3 patients underwent local debridement; 18 patients remove and reimplemented pacemaker. There are 2 cases of recurrence infection in local debridement group and 1 case of recurrence in device removal group (5.6%).

Conclusion Pacemaker related infection is a serious complications after implantation, the best treatment for this situation is remove the pacemaker device.

Catheter ablation of epicardial accessory pathway associated with coronary sinus musculature: single—center clinical experience

Weizhu Ju, Minglong Chen, Bing Yang, Fengxiang Zhang, Hongwu Chen, Junbo Yu, Kai Gu, Qijun Shan, Jiangang Zou, Chun Chen, Xiaofeng Hou, Kejiang Cao
Department of Cardiology, Jiangsu Province Hospital The first affiliated hospital with Nanjing Medical University

Objective To report the single-center clinical experience of catheter ablation of epicardial accessory pathway (AP) associated with coronary sinus (CS) musculature.

Methods The data of 721 cases of left sided AP were analyzed. Ablation in the CS was performed in 17 (2.4%) cases [11 males, mean age (37 ± 11) years]

Result Among the 17 cases, the AP was ablated in middle cardiac vein and posterior lateral CS in 11 and 6 cases, respectively. Deverticulum of middle cardiac vein was seen in 2 cases. Mean time required to block the AP was 4.7 ± 2.7 s. An AP potential could be recorded at the target site in 10 (59%). During a mean 21 ± 16 months follow up, only one patient experienced recurrence who was successfully cured by a second ablation session. No procedure related complication was reported.

Conclusion About 2.4% of left AP may have epicardial connection locating at CS. The epicardial ablation is safe and effective, warrants an excellent long-term Result.

Long—term effect of right ventricular outflow tract vs apical pacing on cardiac function and synchrony

Jun Yu, Keping Chen, Ruohan Chen, Shu Zhang
Cardiovascular Institute and FuWai Hospital, Chinese Academy of Medical Sciences, Peking Union Medical College

Background Right ventricular outflow tract (RVOT) has been encouraged as an alternative pacing site to avoid long-time detrimental effect induced by right ventricular apical (RVA) pacing, but there hasn’t been definitely evidence on the benefit of RVOT pacing. This study aimed to evaluate the long-term impact of RVOT vs RVA pacing on cardiac function and synchrony.

Methods 42 patients with inclusion criterion were randomly assigned to receive a screw-in lead either in RVA (n = 14) or in RVOT (n = 28). 3D-Echocardiography, electrocardiogram, and X-ray were used to
determine the pacing sites. Cardiac function, inter-and intra-ventricular dyssynchrony were evaluated. Patients with VP% > 10% were enrolled to determine the pacing sites.

**Result** After mean follow-up of 7.1 ± 0.4 years, paced QRS interval for RVA pacing was longer than RVOT pacing (155.8 ± 7.1 ms vs 143.8 ± 14.4 ms, p < 0.05). LV end-diastolic diameter (44.5 ± 5.5 mm vs 47.6 ± 1.8 mm, p > 0.05), LV ejection fraction (66.1 ± 5.0% vs 67.0 ± 4.1%, P > 0.05), and intraventricular dyssynchrony (29.9 ± 15.6 ms vs 27.3 ± 14.1 ms, P > 0.05) showed no significant difference between the two groups. Tei index and interventricular dyssynchrony were worse in RVAP than in RVOT (0.7 ± 0.2 vs 0.5 ± 0.2, -15.9 ± 20.5 ms vs -9.1 ± 19.0 ms, respectively). Compared with baseline, Tei index in RVA pacing was impaired significantly (0.7 ± 0.2 vs 0.5 ± 0.08, P < 0.01) but not RVOT pacing (0.5 ± 0.2 vs 0.4 ± 0.03, P > 0.05); both RVA and RVOT pacing were associated with impaired interventricular (-15.9 ± 20.5 ms vs 11.3 ± 4.9 ms, -9.1 ± 19.0 ms vs 9.3 ± 6.3 ms, respectively, P < 0.05) and intraventricular synchrony (29.9 ± 15.6 ms vs 9.7 ± 1.1 ms, 27.3 ± 14.1 ms vs 8.5 ± 2.5 ms, respectively, P < 0.05).

**Conclusion** RVOT pacing didn't show much superiority over RVA pacing in cardiac function and synchrony. Both pacing groups showed worse dyssynchrony than baseline.

**The application of intra-aortic balloon pump in cardiac surgery: Result of a survey**

Hongyan Zhou, Yu Du, Xue Feng, Fangfang Cao, Haitao Zhang

Department of Surgery Intensive Care Unit, National Center for Cardiovascular Disease, Fuwai Hospital, Chinese Academy of Medical Sciences & Peking Union Medical College, Beijing, The Peoples Republic of China

**Objective** Intra-aortic balloon pump (IABP) is an established tool in the management of cardiac dysfunction in cardiac surgery. In 2010, the number of cardiac surgery procedures reached 170 000 in china, meanwhile IABP application increased. In order to generate baseline data describing clinical practice of intra-aortic balloon pump (IABP) in cardiac surgery of china, China Critical-care Medicine of Chinese Medical Doctor Association performed this survey.

**Methods** A questionnaire consisted of IABP indications, anticoagulation therapy, and weaning, was mailed in Nov. 2012 to 60 surgical intensive care units in china.

**Result** The top three indications in these centers for IABP were postoperative low cardiac output syndrome, weaning from cardiopulmonary bypass and Cardiogenic shock. As the increasing early use and effectiveness of the IABP in the world, the proportion using IABP of prophylactic preoperatively in high-risk coronary bypass was low (13%) in this survey. In 98% SICU, heparin or low molecular heparin was routinely given as standard anticoagulation therapy, and weaning, was mailed in Nov. 2012 to 60 surgical intensive care units in china.

**Conclusion** We conclude that the management of IABP is homogeneous in this survey. The indications of IABP, not only in therapeutic but also prophylactic in high risk coronary bypass need more attention.
Design and animal experiment for remote-controlled pulmonary artery banding device
Maozhou Tian, Weijian Huang, Wenyi Liu
Department of Cardiac surgery, Yu Huang Ding hospital of Yantai, Shandong 26400, China

**Purpose** We invented the remote-controlled pulmonary artery banding device, to make the PA banding operation safer and more facile.

**Methods** We designed the device, which had got the national invention patent certificate issued by the national Patent Office. Patent number: ZL 2011 1 0074076.5. Using two experimental beagles, we freed pulmonary artery and placed the device. Then we adjust PA banding bilaterally in vitro.

**Result** Before and after operation, we tested the PA diameter and pressure change around the PA artificial narrow. 10 days after operation, the physiological index levels of right ventricle and pulmonary artery, such as PA diameter, pressure around the PA artificial narrow, RV diameter, right ventricular anterior wall and interventricular septum thickness, all heightened obviously (P < 0.01). The RV myocardial thicken could be observed under optical microscope.

**Conclusion** The reasonable design with many advantages is stable and reliable.

The strategies in the rehabilitation of gastrointestinal motility of the non-postpone extubation patients after cardiac surgery
Yan Cui, Ya Gao, Juan Du, Zujiun Chen
Fuwai Hospital, CAMS&PUMC, Beijing, 100037, China

**Objective** Due to the latest study on the importance of enteral nutrition in critically ill adult, the early usage and recovery of the gastrointestinal function could result in the decrease of total time of hospitalization, ICU hospitalization, ICU infections, the time of mechanical ventilation, the time of duration of renal replacement therapy, and the cost in the health care. But for the patients after cardiac surgery the situation is completely different. Before surgery, the patient with rheumatic heart disease may have the congestion of the gastrointestinal system, for the patients with coronary heart disease; the usage of the anti-platelet drug could result in the bleeding of the gastrointestinal mucosa. During the surgery, the applications of cardiopulmonary bypass may result in the low perfusion, the embolisms, and a great amount of inflammation mediators of the gastrointestinal organs. And the usage of sedative drugs and muscle relaxants could also lead the paralysis of the gastrointestinal muscles. After the surgery, any mechanical assistant machine could lead to the damage of the gastrointestinal systems. These reasons make the patients special in the gastrointestinal function recovery process and hamper the early enteral nutrition. So we compared 3 different ways of enhancing the motility of the gastrointestinal systems and observe the efficacy.

**Methods** 60 patients' extubated within 1 – 2 days after cardiac surgery from Jan. to May 2013 in our hospital were included. They all got the conventional oral or enteral gastric therapy of enhancing gastrointestinal functions the day after surgery. These patients who didn't have bowel sound, no fart, no defecation on the 3 day post-operative were divided into 3 groups randomly, each group 20 patients. The basic data of the patients, the amount of vasoactive drugs during the operation and post-operative don't have any difference among the 3 groups. We treated 3 groups of patients in 3 different ways until they defecated: group A, only the conventional gastrointestinal active drug; group B, besides administering the conventional gastrointestinal active drug, we used anal entry of glycerin enema 110 ml twice a day; group C, the special treatment of this group of patients is muscle injecting 0.5 mg neostigmine in the acupuncture point of zusanli at both sides of the legs besides the conventional drugs, twice a day.

**Result** In the group A patients, the hours till the first appearance of bowel sound, bowel fart and defecation are 1.47 ± 0.17 h, 2.00 ± 0.96 h, and 30.80 ± 8.28 h respectively. B group are 1.41 ± 0.16 h, 1.57 ± 0.18 h, and 33.9 ± 7.75 h respectively. C group are 0.56 ± 0.24 h, 0.68 ± 0.27 h, and 9.95 ± 9.74 h respectively. The recovering time of the bowel sounds and farts in group A is longer than group B, but no significant variation (P1 = 0.216, P2 = 0.057). The recovering time of defecating in group A is shorter than group B, but no significant variation (P = 0.229). The recovering time of the bowel sounds, fart and defecating in the group C are shorter than group A and B patients, the variation is significant (P < 0.05).

**Conclusion** Among the 3 recipes enhancing the mobility of gastrointestinal systems in non-postpone extubation patients after cardiac surgery, the conventional drug recipes and anal entry of glycerin enema don't have the definite efficacy in enhancing the motility of the gut. Comparing with the other 2 therapy, the injecting of neostigmine in the acupuncture point of zusanli at both sides of the legs has the definite efficacy in enhancing the recovery of the gastrointestinal functions.

Modified ultrafiltration combined with conventional ultrafiltration used for the evaluation of the effect of severe valvular heart disease valve replacement surgery
Xu Sun, Dongjin Wang, Yang Chen
Department of Cardiothoracic Surgery, Nanjing Drum Tower Hospital
The Affiliated Hospital of Nanjing University Medical School

**Objective** To investigate the effect of modified ultrafiltration combined with conventional ultrafiltration for severe valvular heart disease valve replacement surgery.

**Methods** 100 cases of patients with severe heart valve patients were randomly divided into a control group and the observation group during 2006.07 – 2012.07, the control group using conventional ultrafiltration method, the observation group combined with routine use of modified ultrafiltration ultrafiltration method to compare the early postoperative.

**Result** The two groups of patients in the control group and the observation group, the preoperative and ultrafiltration hematocrit (Hct) difference was not statistically significant (P > 0.05), the observation group was significantly higher Hct level after ultrafiltration, and two significant by the difference was significant (P < 0.01); postoperative bleeding, and the use of banked blood volume of the observation group than in the control group, and the difference was statistically significant (P < 0.05); observation group postoperative blood flow dynamics relatively stable, shorter ventilator support and 24 h after urine output was significantly reduced. The postoperative ICU residence time, patient ambulation time after discharge time was no significant difference (P > 0.05), and 3 months after surgery, the patient's overall quality of life score was no significant difference (P > 0.05).

**Conclusion** Modified ultrafiltration technology postoperative shorter blood play better concentrate role, Hct levels, improve lung function, and has considerably reduced the amount of bleeding with the use of banked blood, but can not be significantly improved the patient's
Surgical treatment for ventricular septal defect with pulmonary hypertension

Ying Lu, Jun Wang
Department of cardiac surgery, The First Hospital of Hebei Medical University, Hebei 050031, China

Objective To evaluate the effectiveness of urgent surgical correction for ventricular septal defect with pulmonary hypertension in infants and children.

Methods 525 (284 males, 241 females) with VSD and PH received surgical correction in our department. The age ranged from 1 month to 39 months, the mean body weight was 6.3 ± 3.4 kg (1.2 – 10 kg). 73 patients were associated with ASD, 59 with PFO, 48 with PDA, 34 with PS, the pressure of pulmonary artery was 4.73 – 12.23 kpa. All patients were discharged with cardiopulmonary bypass.

Result Urgent operations were performed and 7 early deaths occurred surgery. Complications included low cardiac output syndrome (21 cases), 5 cases was dead. Inhalation of nitric oxide was given to 8 cases for the management of significant Postoperative pulmonary hypertension, 2 cases was dead. Pneumothorax (8 cases), atelectasis (5 cases). RBBB (43 cases), SVT (13 cases), transient AVB of grade 3 occurred in 7.

Conclusion Operation for VSD with PH on urgent basis may provide favorable outcomes.

Female and off-pump patients may have better cardiac function preservation effect of Sevoflurane compared with Propofol: the result of a meta-analysis

Bing Gong¹,², Shan Zhou³, Weipeng Wang⁴,⁵, Yanhua Sun⁴,⁵, Guan Wang⁴,⁵, Ruofan Liu⁴,⁵, Guo Chen⁶, Liuan Li⁶, Xiubin Yang⁶
¹. Department of Surgery
². Department of Anesthesiology
³. Department of Extracorporeal Circulation
⁴. Department of internal medicine
⁵. State Key Laboratory of Cardiovascular Medicine, FuWai Hospital, National Center for Cardiovascular Disease, Chinese Academy of Medical Sciences and Peking Union Medical College

Objective We sought to perform a systematic review and meta-analysis to compare propofol and sevoflurane on cardioprotective effects and explore potential relevant factors for patients undergoing coronary artery bypass grafting (CABG).

Methods The MEDLINE, EMBASE, and the Cochrane Central Register of Controlled Trials were searched for relevant randomized controlled trials (RCTs) published in English from their inception up to Nov. 1, 2012. Data on cardiac index (CI), mean arterial pressure (MAP), central venous pressure (CVP), pulmonary capillary wedge pressures (PCWP), systemic vascular resistance index (SVRI), troponin I level (cTnI), mechanical ventilation time, postoperative inotropic requirement, length of stay (LOS) in intensive care unit (ICU) and hospital stay, postoperative complications, major adverse cardiovascular and cerebrovascular events (MACCE) were analyzed.

Result Seventeen studies of 1253 patients were included out of 1 010 retrieved citations. Sevoflurane group had higher post-bypass CI (WMD, -0.55, 95% CI: -0.63 to -0.47), less postoperative inotropic requirement (RR, 2.08, 95% CI: 1.72 to 2.51), higher CVP (WMD, 0.45; 95% CI, 0.1 to 0.79; P = 0.011) and PCWP (WMD, 0.85; 95% CI, 0.32 to 1.37; P = 0.002). Univariate meta-regression analysis suggested the major sources of significant heterogeneity for CI were male proportion (coefficient = -0.018; P = 0.091; adjusted R² = 30.47%) and CPB application (coefficient = -0.413; P = 0.06; adjusted R² = 42.51%).

Conclusion Sevoflurane was associated with higher post-bypass CI and less postoperative inotropic drug requirement. The cardiac function preservation effects of sevoflurane were more pronounced among female and off-pump patients in CABG.

Surgical treatment of functional tricuspid valve regurgitation after left ventricle valve replacement

Yi Shi, Jianping Xu, Chao Dong, Yan Yang, Yongbo Wu, Feng Lu, HuaJin Zhang
Department of Cardiovascular Surgery, Cardiovascular Institute & FuWai Hospital, National Center for Cardiovascular Disease

Objective To explore the best operation time and the etiological features of the functional tricuspid regurgitation (FTR) after left ventricle valve replacement.

Methods From 2005 to 2013, 73 patients (mean age 52.1 ± 8.4 years) underwent tricuspid valve annuloplasty or tricuspid valve replacement for FTR. There were New York Heart Association (NYHA) functional class II in 15 patients, NYHA III in 50 patients, NYHA IV in 8 patients. And there were 71 cases of rheumatic heart disease, 1 case of congenital heart disease, 1 case of infective endocarditis. Before operation, there 40 cases complicated with atrial fibrillation. Pulmonary hypertension was mild in 4 cases, 9 cases of moderate and severe in 1 case.

Result There were re-TVP in 51 cases, and 22 cases with re-TVR. At the same time, 5 patients were done with re-BVR, 16 patients with re-MVR, and 11 patients with re-AVR. 6 patients were dead after operation, including 2 severe TR cases with preoperative BVR and 4 severe TR cases with preoperative MVR. All patients died of right ventricular dysfunction. There were 23 cases with right ventricular dysfunction after operation, and 12 cases combined with acute renal insufficiency. 15 cases need to use venous - venous blood filter.

Conclusion Aggressive surgical treatment can reduce the mortality of the patients with functional tricuspid regurgitation after left ventricle valve replacement. Right heart failure is the common complication and the main risk of death after operation. Positive blood filtration treatment after operation can improve clinical outcomes. Rheumatic heart disease, atrial fibrillation and pulmonary hypertension may be the relevant risk factors with the occurrence of functional tricuspid regurgitation.

Surgical correction of atrioventricular septal defect in the first year of life

Min Du, Shoujun Li, Jun Yan, Xiangdong Shen, Xu Wang, Zhongdong Hua, Kening Yang
Surgical department, Fu Wai Hospital, Beijing 100037, China

Objective We try to analyze surgical result of Atrioventricular septal defect (AVs D) in our institute in young infants, and discuss the long-term prognosis.
 timing of this procedure.

Methods From Jun. 2007 to Jan. 2013, 65 consecutive AVs D infants younger than 12 months of age were operated in our institute. Infants were divided into two groups, group A includes patients whose age was no more than 6 months, and group B consists of patients whose age was over 6 months.

Result There were 65 cases, 27 boys and 38 girls, aged 7.5 ± 1.9 months, weighted 6.2 ± 1.0 Kg, cross-clamp time was 89.3 ± 18.5 minutes, CPB time was 126.5 ± 24.7 minutes, ventilation time was 41.8 ± 38.3 hours, the in-hospital stay was 19.9 ± 7.3 days, there were 5 in-hospital death, and the mortality was 7.7%. No significance was found in the parameters between the two groups except body weight (P < 0.01).

Conclusion The early mortality was comparable with other institutions. There was no significant difference between the two age groups.

Circulating microRNAs associated with perilead impact of QRS duration on the relationship between electrical delay and clinical response after cardiac resynchronization therapy
Xiaohan Fan, Wei Hua, Keping Chen, Xin Sun, Xinwei Yang, Lihui Zheng, Shu Zhang
Department of Arrhythmia, State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, China

Purpose The impact of QRS duration on the relationship between left ventricle lead electrical delay (LVLED) and clinical response of cardiac resynchronization therapy (CRT) has not been defined.

Methods We studied 81 consecutive patients undergoing CRT implantation according to standard techniques and clinical indications during a 15 ± 3 months follow-up. Patients were separated by the QRS duration ≥ 150 ms or < 150 ms, as wide (n = 61) or narrow (n = 20) QRS groups.

Result After adjustment for bundle-branch block, ischemia cardiomyopathy, sex, and age by multivariate logistic regression analysis, wide QRS patients in the highest quartile of LVLED had a 4.12 fold increase (OR: 4.12, 95% CI: 2.17 to 8.68, P = 0.012) in odds ratio of clinical response. But LVLED was irrespective to LV ejection fraction after CRT only in patients with QRS ≥ 150 ms, but not in patients with QRS < 150 ms.

Conclusion LVLED is strongly associated with improvement in LV ejection fraction after CRT only in patients with QRS ≥ 150 ms, but not in patients with QRS < 150 ms.

Administration of fibrinogen on perioperative blood protection and clinical recovery for severe cyanotic patients undergoing complex cardiac surgery
Yongli Cui, Cun Long, Feilong Hei, Yi Zheng, Fenjug Zhao, Jingping Liu
Department of CPB, Surgery, Fuwai Cardiovascular Hospital Chinese Association of Medical Science, Peking Union Medical College Beijing, 100037, China

Objective To assess the effects of a new transfusion therapy using fibrinogen administration on blood protection and clinical recovery during cardiac surgery.

Methods Forty severe cyanotic children (hematocrit HCT ≥ 54%), undergoing arterial switch operation (ASO) or double roots transplantation (DRT) were divided into two groups: in group I (n = 20), after cardiopulmonary bypass (CPB) fibrinogen administration guided by TEG combined with traditional transfusion was performed; in group II (n = 20) only traditional transfusion was performed.

Result Compared with group II, the patients in the group I had significant reductions in the amount of first 24 hrs FFP usage in the ICU, total perioperative FFP usage and the time of using mechanical ventilator supporting, ICU stay, hospitalization were significantly reduced in the group F (P = 0.06, P = 0.06, P = 0.09, P = 0.09, P = 0.06 respectively).

Conclusion Fibrinogen could be a useful substitute for FFP to restore perioperative hemostasis and improve the prognosis for the severe cyanotic pediatric patients after complex cardiac surgery.

Peri-operative monitoring on haemostasis and therapy for cyanotic infants undergoing complex cardiac surgery
Yongli Cui, Cun Long, Feilong Hei, Yi Zheng, Fenjug Zhao, Jingping Liu
Department of CPB, Surgery, Fuwai Cardiovascular Hospital Chinese Association of Medical Science, Peking Union Medical College Beijing, 100037, China

Objective This study investigated features and treatments of perioperative coagulopathies in cyanotic infants with complex congenital heart disease (CCHD).

Methods Thirty six infants with cyanotic CCHD were involved and divided into two groups: In group H (n = 20), hematocrit (HCT) > 54%, and in group L (n = 16), HCT < 54%. Blood was sampled at anesthesia induction (T1), rewarming to 36°C (T2), after heparin neutralization (T3), and 4 hours after operation (T4). The haemostatic changes were evaluated by thromboelastograph (TEG). After surgery, the group H was treated with fibrinogen combined platelet (PLT), while group L was only with PLT.

Result We observed the effect at T4. At T1, the haemostatic function in group H, deteriorating with the increase of HCT (P < 0.01), was obviously lower than that in group L (P < 0.01), but the PLT function was still complete. In group H, the haemostatic function at T4, decreased with a significant drop of PLT function (P < 0.01) and had little change of functional fibrinogen (Ffg) (P > 0.05). At T4, compared with T1, there were improvements in haemostatic function and Ffg (P < 0.01 respectively) without increase of PLT (P > 0.05) in group H. After therapy, PLT function in both groups restored to T1 level (P > 0.05), Ffg at T4 was significantly better than it at T1 (P < 0.01) in group H, but Ffg at T4 with still normal function was lower than it at T1 in group L (P < 0.01). Whole haemostatic function at T4 was back to normal and had no differences between two groups.

Conclusion So we proposed fibrinogen combined PLT should be better for high HCT CCHD infants, but PLT alone might be enough for low HCT ones.
Extracorporeal membrane oxygenation for primary graft failure after heart transplantation

Feilong Hei, Bei Wu, Cun Long, Shilei Wang, Chunni Qin, Kun Yu
Cardiopulmonary bypass department, Fuwai Cardiovascular Hospital Chinese Association of Medical Science, Peking Union Medical College Beijing, 100037, China

Objective To analyze the clinical effectiveness of the application of ECMO to the patients who suffered primary graft failure. To summarize the ECMO administration experience during heart transplantation.

Methods From Jan. 2008 to Dec. 2011, 181 heart transplantation cases were studied retrospectively. 16 cases of them had received ECMO treatment after the transplantation. Data of the relevant parameters during ECMO, mechanism assistance duration and complications of the patients were collected. The lactic acid (LA) level at the onset and 24 hours of ECMO were measured. The dosages of dopamine and adrenergic pre and after 24 hours of ECMO were recorded.

Result 14 patients (87.5%) were successfully weaned from ECMO and 13 (81.3%) survived to hospital discharge. Among the 16 cases of ECMO, 2 cases abandoned therapy for no cardiac function promotion was obtained. 1 of them died of multiple organ failure (MOF) and chronic rejection were the main cause of death. All patients had received artery-vein (A-V) ECMO. The average level of LA at before, 24 hours and the end of ECMO were 8.36 ± 3.41, 2.42 ± 1.53, 2.25 ± 2.17 mmol/L, respectively. The LA level was significantly decreased at the 24 hours and the end of ECMO, compared with pre ECMO period (P < 0.05). The dosage of dopamine pre and after 24 hours of ECMO were 7.38 ± 3.42, 5.29 ± 1.93 μg/min/kg, no significant differences were observed. However, after 24 hours of ECMO, the dosage of adrenergic significantly decreased 0.17 ± 0.11, 0.02 ± 0.03 μg/min/kg, (P < 0.05).

Conclusion ECMO is an effective mechanism support treatment for circulation and respiration failure. It could significantly decrease the early postoperative mortality rate of the patients who were at the terminal stage of cardiac diseases and received heart transplantation.

The effect of delayed recovery of normal rhythm and hyponatremia induced by HTK solution on short-term outcomes in children undergoing congenital heart surgery

Yan Chen, Cun Long, Jingping Liu
Department of CPB, Surgery, Fuwai Cardiovascular Hospital Chinese Association of Medical Science, Peking Union Medical College Beijing, 100037, China

Objective The effect of HTK-induced delayed cardiac rhythm restoration and hyponatremia on postoperative outcome of children undergoing congenital heart surgery remains unclear. This retrospective investigation was designed to determine whether or not delayed rhythm restoration and hyponatremia induced by HTK solution influence the short-term outcome of pediatric patients after cardiac surgery.

Methods Group I: From Jun. to Dec. in 2012, there were 169 pediatric patients who underwent selective complex congenital heart surgery with CPB. HTK solution was used as cardioplegia during operations in all children. The cardiac resuscitation after declamping was observed. The correlation between recovery time of normal heart rate/ rhythm and perioperative factors were analyzed. The risk factors of using pacemaker after surgery were also determined by Logistic regression. Group II: From Feb. to Dec. in 2012, HTK solution was applied to 322 children with congenital heart disease during cardiac surgery. Perioperative factors, including age, gender, weight, surgical type, prime volume, HTK volume, ventricular fibrillation after declamping, antegrade cerebral perfusion duration, lowest nasopharynx temperature, ACC and CPB duration, change of blood sodium concentrations above 15 mmol/L, highest sodium concentration, lowest sodium concentration, highest glucose, lowest glucose, using pacemaker after surgery, accumulated thoracic drainage on postoperative 1 day, mechanical ventilation time, intensive care unit lengths of stay, were used to analyze the risk factors of postoperative cerebral morbidity such as dysphoria and seizure.

Result Group I: The incidence of ventricular fibrillation after declamping was significantly higher in children above 3-year-old than that in infants. The recovery time of normal rhythm is positively correlated to cardiothoracic ratio, ACC and CPB time, postoperative 24 h milrinone dose, and ICU length of stay in infants undergoing congenital heart surgery, respectively. Moreover, the recovery time is negatively correlated to nasopharynx temperature at aortic declamping. Surgical type (TGA), milrinone dose, and adrenaline dose were independent factors of using pacemaker after surgery in infants. Group II: the incidence of hyponatremia was 71.9% (220/306), ≤ 125 mmol/L was 4.2%, ≤ 130 mmol/L was 18%, ≤ 135 mmol/L was 49.7%. Compared with the baseline levels, sodium concentrations decreased at early after aortic clamping (P = 0.000). Sodium concentrations at PICU and postoperative 12 h significantly higher than that before operation (P = 0.000). The incidence of postoperative sodium concentrations > 146 mmol/L was 38.9% (119/306), ≥ 150 mmol/L was 10.1% (31/306). Change of plasma osmolarity is consistent with the changes in sodium concentrations. However, osmolarity was lower than normal values during and immediately after CPB, and returned to normal levels after entering PICU. The incidence of seizure and dysphoria were 0.9% (3/306) and 18% (55/306), respectively. The highest sodium concentration was the independent factor of postoperative brain morbidity.

Conclusion Larger cardiothoracic ratio, longer ACC and CPB duration, and lower nasopharynx temperature make the restoration of normal cardiac rhythm prolonged in infants undergoing congenital heart surgery. There are correlations between the recovery time of normal rhythm and postoperative milrinone dose or ICU length of stay, suggesting that elevated temperature at declamping may be helpful to improve the early outcome of the pediatric patients. Atrioventricular block and delayed rhythm restoration induced by HTK are not the independent factors predicting the use of pacemaker in children after cardiac surgery. However, for some surgical types such as TAPVC and TEC, ACC length of stay in children with atrioventricular block is longer than that in children without cardiac block. Postoperative hyponatremia is associated with the incidence of seizure and dysphoria in pediatric patients. Moreover, plasma sodium concentrations at postoperative 12 h have predictive values in the incidence of brain morbidity.
Myocardial protection of HTK added by Ebselen on immature heart during cardiopulmonary bypass

Yan Chen, Cun Long, Jingping Liu
Department of CPB, Surgery, Fuwai Cardiovascular Hospital Chinese Association of Medical Science, Peking Union Medical College Beijing, 100037, China

Objective Modified HTK solution giving better myocardial protection to mature heart has been documented. However, the role of HTK added by antioxidant Ebselen on immature heart is unknown. The purpose of this study was to compare myocardial protection using Histidine-tryptophan-ketoglutarate (HTK) added by Ebselen and HTK in a neonatal piglet model.

Materials and Methods Fifteen piglets were randomized to three groups: the control group (C group, n = 5), a single dose of HTK group (HTK group, n = 5), a single dose of HTK added by Ebselen (10 nM) group (HTK+E group, n = 5). Animals in the two experimental groups were placed on hypothermic cardiopulmonary bypass, after which the ascending aorta was clamped for 2 h. The control animals underwent normothermic CPB without cardiac arrest. Oxidative stress biomarkers, antioxidant activity, and mitochondrial structures were assessed. Myocardial ATP content was measured. TUNEL positive myocytes were also counted. The release of cytochrome c and the expression of HSP72 in myocardium were examined by using western blotting. The expression of HSP72 mRNA was also detected by RT-PCR.

Result Transfusion requirement was no significant differences between the HTK group and the HTK + E group (P = 0.01). HTK+E group showed increased superoxide dismutase (SOD) content and higher Mn-SOD activity (P = 0.021 and P = 0.020) compared with the HTK group. Increased MDA in myocardium in the HTK group was observed compared to the control group (P = 0.038). Meanwhile, myocardial TUNEL positive cells and the release of cytochrome c were reduced in the HTK+E group as compared to the HTK group (P = 0.045 and P = 0.010, respectively). The Bax/Bcl-2 ratio in the HTK group were significantly higher than those in the control group (P = 0.024 and P = 0.028, respectively). The expression of HSP72 protein and mRNA increased in the HTK+E group when compared to the HTK group (P = 0.039 and P = 0.035, respectively). There was positive correlation between the HSP72 and Mn-SOD content (r = 0.581, P = 0.023). Mitochondrial score under electronic microscopy in the HTK+E group was lower than that in the HTK group when compared to the control group (P = 0.011).

Conclusion Reduced myocardial oxidative stress and apoptosis, as well as better preserved myocardial mitochondrial structure were observed in the HTK+E group, and the release of cytochrome c decreased in the HTK+E group compared with the HTK group. Moreover, increased expression of HSP72 in the HTK+E group suggests improved antioxidant defense. HTK solution added by Ebselen provides better myocardial protection to HTK solution for the neonatal heart with equivalent transfusion requirement. Therefore, HTK+E solution would be a better alternative cardioplegia to blood cardioplegic solution for the immature heart.

A pseudo–decremental accessory pathway: where did it block?

Yu Qiao, Guodong Niu, Yan Yao, Kuijun Zhang, Shu Zhang
Cardiovascular Institute and Fuwai Hospital, Clinical EP Lab. & Arrhythmia Center, Chinese Academy of Medical Sciences, Peking Union Medical College, 167 Beilishi Road, Xicheng District, Beijing, 100037, China.

A 47-year-old woman was admitted for paroxysmal palpitations, with the wide QRS complex tachycardia (WCT) characterized by a cycle length (CL) of 390 ms, RBBB morphology and an RP relationship of 1:1. Atrial pacing could readily entrain and terminate the tachycardia, and a premature ventricular contraction (PVC) with a coupling interval (CI) of 370 ms, which fell into the effective refractory period (ERP) of the His bundle, could reset the tachycardia. Thus, the diagnosis of ventricular tachycardia, atrial tachycardia or atrioventricular node reentrant tachycardia was precluded.

During ventricular programe stimulation, the VA interval in the coronary sinus (CS) gradually prolonged, which seemingly indicated the diagnosis of the permanent junctional reciprocating tachycardia (PJRT), with the atrioventricular node (AVN) as the anterograde limb of the circuit and the decremental accessory pathway (AP) as the retrograde one. However, the target, which was localized to the 7 o’clock of the tricuspid valve annulus (TVA), showed a VA-fusion pattern, which was paradoxical to the “decremental conduction”. A single application of radiofrequency energy interrupted AP conduction permanently.

After ablation, the retrograde ERP of the His-Purkinje system was determined as 600 ms, which meant that the retrograde pathway during previous ventricular pacing did always be the AP sole, without the participation of the AVN. Surprisingly, such phenomenon was found to be no decrement conduction at all, with the critical reason being the delay and block at the region of cavo-tricuspid isthmus (CTI) when the baseline data was reanalyzed. The right atrium was activated along the TVA from both clockwise and counter-clockwise directions simultaneously during a relatively long CI, with the A wave in coronary sinus orifice (CSO) ahead of that in His Bundle electrogram (HBE). During a shorter CI, however, the activation appeared to gradually delay and eventually block at the region of CTI, leading to a significantly delayed A wave in CSO and an unchanged timing of A wave in HBE.

We describe a pseudo-decremental AP due to the delay and block at the region of CTI, which could be misleading only according to the sequence of A wave and VA relationship in the CS. Therefore, to determine where the delay or block appears, a simultaneous recording of HBE is essential in such cases.

Comparative expression of proteins in serum from patients with sinus rhythm and atrial fibrillation

Yunzi Zhao, Lan Ren, Zheng Liu, Shu Zhang, Yuhe Jia
Academy of Medical Sciences, Peking Union Medical College, 167 Beilishi Road, Xicheng District, Beijing, 100037, China.

Purpose Proteomics is an emerging field that has the potential to uncover new therapeutic targets for the treatment and prevention of cardiovascular disease, as well as new diagnostic biomarkers for early disease detection. We believe that the two-dimensional electrophoresis
reduce the amount of atrial fibrosis.

Materials and Methods Sera from 5 patients with atrial fibrillation and controls with sinus rhythm was investigated using two-dimensional polyacrylamide gel electrophoresis (2-DE) and nanoliquid chromatography coupled to tandem mass spectrometry (nano LC-MS/MS).

Result 13 differentially expressed proteins were successfully identified, of which, transthyretin (TTR) Val30Met Variant was expressed significantly and constantly only in atrial fibrillation patients. Haptoglobin Hp2 was down-regulated in atrial fibrillation group compared with the sinus rhythm group, and serum dermcidin preproprotein and transferrin (TRF) were up-regulated in rheumatic heart disease (RHD) patients compared with the patients with non-valvular diseases. Furthermore, increased expression levels of glutathione peroxidase 3, plasma glutathione peroxidase, plasma GSHPx, peroxiredoxin-2 isoform a, complement component C4A and complement C4B precursor were observed in RHD patients compared with non-valvular diseases.

Conclusion During atrial fibrillation, TTR or TTR variant may be involved in the maintenance of development of atrial fibrillation. The course of rheumatic heart disease is accompanied by the oxidative stress and activation of the complement system.

The association between atrial amyloidosis and atrial fibrillation

Yunzi Zhao, Yonghe Jia, Lan Ren, Zheng Liu, Shu Zhang
Academy of Medical Sciences, Peking Union Medical College, 167 Beilishi Road, Xicheng District, Beijing, 100037, China.

Background Structural changes, like atrial fibrosis, may increase the likelihood of atrial fibrillation (AF) occur in response to triggering events. The influence of atrial amyloidosis is largely unknown.

Methods and Result Right atrial appendages (1 or 2 entire cross sections) were obtained from 27 patients undergoing open-heart surgery. Atrial amyloid was identified by Congo red staining and classified by immunohistochemistry. Amyloid was found in every patient, significant amyloidosis (the Amyloidosis area accounted for more than 50% of the total area) was found in 20 (74.1%) of 27 patients, and all deposits were immunoreactive for transthyretin (TTR) and tria natriuretic peptide (ANP), of which TTR is more significant. Fourteen (51.9%) patients suffered from persistent AF. The presence of amyloid correlated with age and P-wave duration and was related to sex, valve diseases, and the presence of AF (P = 0.043). The association between atrial amyloid, AF, and P-wave duration was independent of age and sex. According to multiple logistic regression analysis, amyloid was the only age- and sex-independent predictor for the presence of AF. Atrial fibrosis was not a predictor for AF, but the amount of atrial fibrosis was related with atrial fibrillation.

Conclusion Our study provides evidence that atrial amyloidosis affects atrial conduction and increases the risk of AF. The occurrence of atrial amyloidosis depends on age leading to the formation of an amyloid nidus. The progression and consequences of atrial amyloidosis are then influenced by pathological conditions, such as valve diseases. The correlation between atrial amyloidosis and atrial fibrillation suggests that these patients may not benefit from treatment with ACE inhibitors to reduce the amount of atrial fibrosis.

Mitral valvuloplasty in infective endocarditis with mitral insufficiency

Yi Chang, Hui Xiong, Jianping Xu, Wei Wang, Hansong Sun, Xiaoqi Wang
FuWai Hospital, Cardiovascular Institute, Chinese Academy of Medical Science & Peking Union Medical College, Beijing 100037, P. R. China.

Objective To discuss clinical outcomes of mitral valvuloplasty in infective endocarditis with mitral insufficiency.

Method During 2002 – 2012, 34 patients of infective endocarditis with mitral insufficiency underwent mitral valvuloplasty. There were 25 male and 9 female patients, with an average age of 36 ± 16 years old. 7 patients had previous heart disease. 23 patients had severe mitral regurgitation, 9 patients had moderate and 2 patients had mild regurgitation assessed by echocardiography. There were 5 patients in NYHA functional class, I, 24 patients in class II, 3 patients in class III and 1 patient in class IV. 2 operations were performed in acute phase and other 32 operations were in subacute and chronic phase. There were 7 patients underwent aortic valve replacement, 5 patients received tricuspid valvuloplasty, 1 patient received CABG and 1 patient had resection of myxoma at the same time. The surgery consisted of complex Methods, including pericardial patch closure of leaflet perforation in 5 patients, wedge shape excision and suturing in 15 patients, double-orifice method in 5 patients, chordae transference and artificial chordae in 4 patients.
and quadrangular resection in 5 patients. 15 annuloplastic rings were used.

**Result** 1 patient died in perioperative period and other 33 patients survived when following up after 75 ± 38 months. The echocardiography of postoperation and follow-up showed an increase in LVEDD (from 62 ± 8 mm to 50 ± 7 mm and 49 ± 5 mm, P < 0.05) and LAD (from 44 ± 12 mm to 33 ± 8 mm and 36 ± 9 mm, P < 0.05). 30 patients had no and 2 patients had mild mitral regurgitation. 1 patient received mitral valve replacement 3 years later due to mitral stenosis and other patients survived free of reoperation. There were 28 patients in NYHA functional class, I, 4 patients in class II, 1 patients in class III.

**Conclusion** The outcomes of mitral valvuloplasty in infective endocarditis with mitral insufficiency are reliable. The diameter of LV and LA decreased and cardiac function improved obviously.

**Coronary CT analysis of 150 heart transplants**

Chunyong Han 1,2, Yunhu Song 2, Shenghou Hu 1,2, Jie Huang 2, Zhongkai Liao 2, Yong Wang 2

State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences & Peking Union Medical College, Beijing 100037, China.

1. Research Center for Cardiac Regenerative Medicine of the Ministry of Health, Cardiovascular Institute & Fuwai Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College
2. Department of Surgery, State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College
3. Heart Transplantation Center, Cardiovascular Institute and Fu Wai Hospital, Chinese Academy of Medical Science and Peking Union Medical College

**Objective** Retrospective analysis of cardiac allograft vasculopathy (CAV) in patients after heart transplantation by coronary CT in our hospital.

**Method** As a single center, in Jun. 2004 to Oct. 2011, we completed a total of 272 heart transplants, in which postoperative coronary CT Result of 150 orthotopic heart transplants were retrospectively analyzed. According to the presence or absence of CAV, these patients were divided into CAV group and normal group. Preoperative and intraoperative status was compared, and to explore the possible risk factors related to the incidence of CAV.

**Result** 150 donors were brain dead. Recipients with panel reaction antibody (PRA) > 10% accounted for 5.3% (8/150). The cold ischemic time, total cardiopulmonary bypass time and aortic clamping time were (4.66 ± 1.94), (3.06 ± 0.86) and (1.34 ± 0.31) hours, respectively.

According to the international CAV definition on CT images, CAV was defined as the presence of any coronary plaque. 18 cardiac allografts were suffered from CAV in the 150 orthotopic heart transplants through carefully analysis of their postoperative coronary CT Result, including 11 cases of calcification, 3 cases of coronary intimal thickening, 2 cases of stenosis, 1 case of artifact, 1 case of coronary wall irregularity. Thus, the morbidity was 12.0%. In normal group, there were a higher percentage of patients whose mean pulmonary artery pressure (mPAP) > 30 mm Hg than CAV group, 68 (59.1%) and 3 (23.1%), respectively (P = 0.01). So were patients of mPAP > 50 mm Hg, 52 (44.8%) and 2 (15.4%), respectively (P = 0.04). The donor age of patients in CAV group was 33.1 ± 7.4 years, the normal group 28.1 ± 7.5 years, with a significant difference (P = 0.043). There were no significant differences between the two groups about other intraoperative status. Compared with normal group, there was a higher fraction of patients of left ventricular noncompaction in CAV group, 1.5% and 11.1%, respectively. We did not detect any significant differences among other heart diseases between two groups.

**Conclusion** This study found a lower postoperative pulmonary artery pressure and an older donor are the risk factors of CAV. However, other international reports found high pulmonary artery pressure was the risk factor of CAV after heart transplantation, which is somewhat inconsistent with our study. Taking the incomplete clinical follow-up data, the dis-matched sample size and only part of patients underwent coronary CT examination into account; it is still difficult to identify all the risk factors of CAV in Chinese heart transplants. A further detailed study is needed.

**Analysis on outcome of 3537 patients with coronary artery disease: integrative medicine for cardiovascular events**

Zhiyu Gao 1, Yu Qiu 2, Yang Jiao 3, Qinghua Shang 1, Hao Xu 1, Dazhuo Shi 3

1 Cardiovascular Department, Xiyuan Hospital, China Academy of Medical Sciences, Beijing 100091, PR China
2 Chinese Journal of Integrated Traditional and Western medicine, Beijing 100091, PR China
3 Beijing University of Chinese Medicine, Beijing 100029, PR China

**Objective** To investigate the treatment of hospitalized patients with coronary artery disease (CAD) and the prognostic factors in Beijing, China.

**Methods** This is a multicenter prospective study. By means of a unified clinical and research information platform, we collected clinical information of hospitalized patients with CAD in cardiovascular department of 12 hospitals in Beijing from Sep. 2009 to May 2011. Then, we evaluate the effect of secondary prevention in patients with CAD through the clinical information and cardiovascular events during one-year follow-up. Meanwhile, a logistic regression analysis with standard technique was used to identify independent prognostic factors.

**Result** The average age of these 3537 patients is (64.88 ± 11.97), and 65.42% of these patients is male. The usage of drugs is as follows: Anti-platelet drugs accounting for 91.97%, statin accounting for 83.66%, β-blockers accounting for 72.55%, ACEI/ARB accounting for 58.92% and revascularization (including PCI and CABG) accounting for 40.29%. The overall incidence of cardiovascular events was 13.26% (469/3537). The logistic stepwise regress analysis showed that heart failure (OR, 3.07, 95% CI: 2.756 - 4.986), age ≥ 65 years old (OR, 2.007, 95% CI: 1.587 - 2.53), and myocardial infarction (OR, 1.649, 95% CI: 1.322 - 2.057) were independent risk factors for one-year follow-up cardiovascular events. Integrative medicine (IM) therapy showed the trend of decreasing incidence of cardiovascular events, but no statistical significance (OR, 0.797, 95% CI: 0.613 - 1.036).

**Conclusion** Heart failure, age ≥ 65 years old, myocardial infarction increased the incidence of cardiovascular events. IM therapy showed a trend of decreasing incidence of cardiovascular events, but it need to further study.
Objective “toxin syndrome” is a special pattern in traditional Chinese medicine (TCM) diagnosis, which has been extensively investigated in multiple diseases. According to a recent hypothesis, “toxin syndrome” might be related to the relapse of cardiovascular events in stable coronary heart disease (CHD) patients. However, the biologic basis underlying TCM “toxin syndrome” in CHD patients remains unclear. This trial aims to look for the protein biomarker of “toxin syndrome” of CHD patients, which is anticipated to help early identification of high-risk CHD patients in stable period.

Methods We have performed two trials in this paper. The first trial was a randomized controlled trial (RCT) of the plasma proteome in unstable angina (UA) patients by Moldi-Tof Mass. We compared plasma differential protein between 31 patients in activating-blood-circulation & detoxicating group (Xiongshao capsule, group A) and 30 patients in activating-blood-circulation & detoxicating group (Xiongshao capsule and Huanglian capsule, group B) to identify the potential biomarker of “toxin syndrome”. The second trial was a nested case-control study in 1503 stable CHD patients with one-year follow-up for acute cardiovascular events (ACEs). We selected 10 patients with follow-up ACEs and another 10 patients with no ACEs matched in a 1:1 ratio by sex, age (± 5 years), hypertension history, diabetes history and myocardial infarction history. All the sera at the admission of these 20 patients were adopted for verifying the differential protein of “toxin syndrome” obtained from RCT by Western blot method.

Result In the RCT study, 12 protein spots were found that displayed significant differences in difference before-after treatment in group A and group B, 2 of them (3207.37Da and 4279.95Da) was considered to be unique to “toxin syndrome” for being differential proteins of group B but not group A. These 2 spots were identified as Isoform 1 of Fibrinogen alpha chain precursor (FGA, 3207.37Da) and Isoform 2 of inter-alpha-trypsin inhibitor heavy chain H4 (ITIH4, 4279.95Da) respectively. In the nested case-control study, the result of Western blot demonstrated that protein expression of ITIH4 in the group with follow-up ACEs was significantly lower than the matched group without follow-up ACEs (P = 0.027).

Conclusion ITIH4 might be a new biomarker of CHD “toxin syndrome” in TCM, indicating the potential role in early identifying high-risk CHD patients in stable period.
commonly used to treat angina pectoris, and many relevant systematic reviews/meta-analyses were available so far. However, these reviews haven't been systematically summarized and evaluated. Therefore we conducted an overview of these reviews, and explored their methodological and reporting quality.

Methods We included systematic reviews/meta-analyses on oral CPM in treating angina until March 2013 by searching PubMed, Embase, the Cochrane Library and four Chinese databases. We extracted data according to a pre-designed form, and assessed the methodological and reporting characteristics of the reviews in terms of AMSTAR and PRISMA respectively. Most of the data analyses were descriptive.

Result 36 systematic reviews/meta-analyses involving 82, 105 participants with angina reviewing 13 kinds of oral CPM were included. The main outcomes assessed in the reviews were surrogate outcomes (34/36, 94.4%), adverse events (31/36, 86.1%), and symptoms (30/36, 83.3%). Six reviews (6/36, 16.7%) drew definitely positive Conclusion, while the others suggested potential benefits in the symptoms, electrocardiogram and adverse events. The overall methodological and reporting quality of the reviews was limited, with many serious flaws such as the lack of a protocol and incomplete literature search.

Conclusion Though many systematic reviews/meta-analyses on oral CPM for angina suggested potential benefits or definitely positive effects, authors should interpreted the findings of these reviews cautiously, considering the overall limited methodological and reporting quality. The further researchers should appropriately conduct and report relevant systematic reviews according to international standards or recommendations such as AMSTAR and PRISMA.

Optimizing prescription of Chinese herbal medicine for unstable angina based on partially observable markov decision process

Yan Feng 1, Yu Qiu 2, Xuezhong Zhou 1, Yixin Wang 2, Hao Xu 1, Baoyan Liu 1
1 Department of General Practice, Anzhen Hospital, Capital Medical University, Beijing 100029, China
2 Department of Cardiology, Xiyuan Hospital, China Academy of Chinese Medical Sciences, Beijng 100091, China

Objective Initial optimized prescription of Chinese herb medicine for unstable angina (UA).

Methods Based on partially observable Markov decision process model (POMDP), we choose hospitalized patients of 3 syndrome elements, such as qi deficiency, blood stasis and turbid phlegm for the data mining, analysis, and objective evaluation of the diagnosis and treatment of UA at a deep level in order to optimize the prescription of Chinese herb medicine for UA.

Result The recommended treatment options of UA for qi deficiency, blood stasis, and phlegm syndrome patients were as follows: Milkvetch Root + Tang shen+ Milkvetch Root + Largehead Atractyloides Rhizome (ADR = 0.96630); Danshen Root + Chinese Angelica + Safflower + Red Peony Root + Szechwan Lovage Rhizome Orange Fruit (ADR = 0.76); Snakegourd Fruit + Long stamen Onion Bulb + Pinellia Tuber + Dried Tangerine peel + Large head Atractyloides Rhizome + Platycodon Root (ADR = 0.658568).

Conclusion This study initially optimized prescriptions for UA based on POMDP, which can be used as a reference for further development of UA prescription in Chinese herb medicine.

The progress of kidney–nourishing herbal medicine for treating hypertension with insulin resistance

Xiaochen Yang, Xingjiang Xiong, Jie Wang
Guang'anmen Hospital, China Academy of Chinese Medical Sciences

Hypertension with insulin resistance is becoming focus of study both in cardiovascular and endocrine field. A variety of drug combination therapy can be used for lower blood pressure while improving insulin resistance. However, there are still a considerable number of patients with hypertension and insulin resistance that cannot be treated well. Traditional Chinese medicine is needed to enhance the therapeutic efficacy. Recently, it has been proved that kidney-nourishing herbal medicine has good effects on treating hypertension with insulin resistance. This paper reviewed the clinical and experimental studies of kidney-nourishing herbal medicine for treating hypertension with insulin resistance, and explored its mechanism in order to provide a new strategy for future rational antihypertensive treatment.

Chinese herbal medicine Qi Ju Di Huang Wan for the treatment of essential hypertension: a systematic review of randomized controlled trials

Xiaochen Yang, Xingjiang Xiong, Jie Wang
Guang'anmen Hospital, China Academy of Chinese Medical Sciences

Background To assess the effectiveness and safety of QIDHW for essential hypertension (EH).

Methods Pubmed, CBM, CNKI, VIP, and online clinical trial registry websites were searched for published and unpublished randomized controlled trials (RCTs) of QIDHW for EH up to January 2013 with no language restrictions.

Result A total of 10 randomized trials involving 1 024 patients were included. Meta-analysis showed that QIDHW combined with antihypertensive drugs was more effective in lowering blood pressure and improving TCM syndrome for the treatment of essential hypertension than that antihypertensive drugs used alone. No trials reported severe adverse events related to QIDHW.

Conclusion Our review suggests that QIDHW combined with antihypertensive drugs might be an effective treatment for lowering blood pressure and improving symptoms in patients with EH. However, the finding should be interpreted with caution because of the poor methodological quality of included trials.

Changes of plasma ADMa levels and intervention of irbesartan in patients with essential hypertension and stroke

Dongli Chen, Caojin Zhang, Yongheng Fu, Furong Chen, Yujing Mo
Department of Cardiology, Guangdong Provincial People's Hospital and Guangdong Cardiovascular Institute, Guangzhou 510080, China

Objective To study the levels of plasma asymmetric dimethylarginine in patients with essential hypertension and stroke.
Moreover, the effects of irbesartan were investigated.

Methods 289 cases with essential hypertension and ischemic stroke were randomly divided into two groups: amlodipine group (146 cases) and irbesartan group (143 cases). In 1 year's follow-up, the plasma ADMA levels, blood pressures and cerebrovascular events were observed.

Result The blood pressure of the patients significantly decreased, with a statistically significant difference (P < 0.05). But the blood pressure levels between the two groups has no statistically significant difference (P > 0.05). In irbesartan group, the plasma ADMA levels were significantly lower (P < 0.05). While the amlodipine group showed no significant difference (P > 0.05). There was statistically significant difference in the incidence of cerebrovascular events between the two groups (P < 0.05).

Conclusion It's may be one of the beneficial mechanisms of irbesartan to patients with hypertension and stroke that it can reduce recurrence of cerebrovascular events and decreased plasma ADMA levels.

Relationship between the polymorphism of the ACE2 gene and the response to ACE inhibitor in hypertensive patients

Huimin Yu, Shuguang Lin, Lijun Jin, Caojin Zhang
Department of Cardiology, Guangdong Provincial People’s Hospital and Guangdong Cardiovascular Institute, Guangzhou 510080, China

Objective The polymorphic angiotensin converting enzyme 2 (ACE2) genes is one of the most promising candidates for essential hypertension. The aim of this study was to examine the association between the G8790A variant of the ACE2 gene and the blood pressure, pulse pressure, and mean arterial pressure response to angiotensin-converting enzyme (ACE) inhibitor in hypertensive subjects.

Methods Benazepril (10 – 20 mg/day) was administered for 6 weeks to 215 essential hypertensive. ACE2 genotyping was performed by direct polymerase chain reaction amplification and DNA nucleotide sequencing from peripheral blood. Genotype data were analyzed in relation to interindividual differences in the response to ACE inhibitor therapy.

Result The relationship between the polymorphism and the drug response was found in male patients. After 6 weeks of treatment the reductions in mean arterial pressure response were significantly greater in male subjects carrying G allelic variant compared to male subjects carrying A allelic variant (14.7 ± 7.5 mm Hg vs 10.1 ± 7.4 mm Hg, respectively; P < 0.05, ANOVA).

Conclusion These findings suggest that the G8790A variant of the ACE2 gene was related to blood pressure lowering response in hypertensive patients treated with ACE inhibitor.

Left radial artery approach for coronary angiography and percutaneous coronary interventions in 2135 case

Zhao Xizhe, Ma Fengyun, Luo Wei, Wang Feng, Guo Xumei, Chu Xiaowen, Sun Shuhong, Tian Ting, Wang Fang, Yang Yun, Ruan Jianhong
Department of Cardiology, Beijing Electric Power Hospital, 100073, China

Objective To evaluate the clinical efficacy and methodology of coronary angiography and percutaneous coronary intervention via left radial artery approach.

Methods From Jan. 2007 to Dec. 2011, A total of 2 135 patients underwent coronary angiography and/or percutaneous coronary interventions via left radial artery approach were retrospectively reviewed. The success rate and related complications were recorded and analyzed.

Result The success rate of coronary angiography was 97.7% and the success rate of percutaneous coronary interventions was 96.68%. The failed 30 cases were satisfied via right radial artery approach. The failed 19 cases were satisfied via alternate femoral artery approach. No serious complications occurred except 22 local hematomas, 9 arterial occlusion but without hand ischemia.

Conclusion Coronary angiography and coronary intervention therapy through left radial artery are safe and feasible. It is worth using in clinic.

Meta-analysis of randomized controlled trials of intracoronary vs intravenous administration of tirofiban during percutaneous coronary intervention for acute coronary syndrome

Xiaomei Li1, Dongze Li2, Yining Yang1, Yitong Ma3, Qingjie Chen1, Xiangmei Li1
1. Department of Cardiology, The First Affiliated Hospital of Xinjiang Medical University, Urumqi, 830054, People's Republic, China.
2. Xinjiang Key Laboratory of Cardiovascular Disease Research, Urumqi, 830054, P. R. China.

Background It remains unclear whether intracoronary (IC) or intravenous (IV) administration of Tirofiban is superior for patients with acute coronary syndrome (ACS) undergoing percutaneous coronary intervention (PCI).

Methods A meta-analysis of randomized controlled clinical trials (RCTs) was conducted based on the identification of relevant trials (n = 8). Primary end-points were short-term (1 – 3 months) major adverse cardiovascular events (MACEs) [e.g., mortality, reinfarction, target vessel revascularization (TVR)]. Secondary end-points included thrombolysis in myocardial infarction (TIMI) grade flow and TIMI myocardial perfusion grade (TMPG) flow. Bleeding complications were evaluated as safety end-points.

Result IC administration of Tirofiban was found to decrease short-term MACEs, including mortality, reinfarction, and target vessel revascularization (OR: 0.24, 95% CI: 0.13 – 0.44, P < 0.0001). Short-term mortality (OR: 0.40, 95% CI: 0.12 – 1.33, P = 0.13), reinfarction rate (OR: 0.48, 95% CI: 0.18 – 1.27, P = 0.14), and TVR rate (OR: 0.46, 95% CI: 0.10 – 2.03, P = 0.30) also showed an apparent decrease with IC vs IV administration of Tirofiban, although the differences were not statistically significant. However, a significant increase in TIMI grade 3 flow (OR: 3.67, 95% CI: 2.26 – 5.95, P < 0.0001) and TMPG grade 2 – 3 flow (OR: 3.88, 95% CI: 2.44 – 6.15, P < 0.0001) were observed for IC vs IV administration. In contrast, no significant difference was observed in bleeding complications reported for the two groups.

Conclusion IC administration of Tirofiban in patients with ACS undergoing PCI can significantly increase target coronary flow and myocardial reperfusion without increasing the risk of bleeding complications. It can also decrease total short-term MACEs, yet does not improve clinical outcome compared with IV administration.
Study on the efficacy and safety of transradial approach for primary coronary angioplasty in acute myocardial infarction with power antithrombotic therapy

Shihong Wang, Aibin Xu, Yanling Zhang
Department of Cardiovascular Medicine, General Hospital of Beijing Military Region of PLA

Objective To evaluate the efficacy and complications of transradial approach and transfemoral approach in the treatment of acute myocardial infarction with primary percutaneous coronary intervention (PCI) with power antithrombotic therapy and to explore whether transradial approach could be the first approach.

Methods A prospective study was conducted with the data of 89 patients (group A) with acute myocardial infarction (AMI) who underwent transfemoral primary PCI, 88 patients (group B) underwent transfemoral primary PCI compressing to stop bleeding by hand and 80 patients (group C) underwent transfemoral primary PCI compressing to stop bleeding by stapler. The incidence of major adverse cardiovascular events (MACE), including death, myocardial infarction, target lesion revascularization, moderate or severe percutaneous coronary intervention (PCI) in the two groups. The complications were compared among the three groups.

Result No significant differences in baseline characteristics were observed among the three groups. PCI was successfully accomplished in all patients. After 3 month follow-up, no significant difference was found in the MACE rate among the three groups (P > 0.05). The complications were compared among the three groups.

Conclusion The transradial approach primary PCI in the treatment of acute myocardial infarction has a similar efficiency in group A with that of group B and C. The complications were much less in group A than that of group B and C. The transradial approach primary PCI in the treatment of acute myocardial infarction should be the first selection of approach.

Study on the efficacy and safety of transbrachial approach for complex coronary lesions

Shihong Wang, Aibin Xu, Xiaohong Fu, Bing Zhao
Cardiovascular Dep. General Hospital of Beijing Military Region of PLA

Objective To explore the possibility of percutaneous coronary interventions (PCI) for Complex coronary lesions transbrachial approach.

Methods 100 patients with Complex coronary lesions were divided into two groups randomly. Fifty patients of group A will take PCI with transbrachial approach; fifty patients of group B will take PCI with transfemoral approach. Success rate of operation, operation and X-ray time, average hospitalizing time, the complications and fee were compared between the two groups.

Result No significant differences in baseline characteristics were observed between the two groups. PCI was successfully accomplished in all patients. No significant difference was found in the success rate of operation, operation and X-ray time (P > 0.05). The complications, average hospitalizing time and fee in group A were less than that of group B (P < 0.05-0.01).

Conclusion The transbrachial approach PCI for Complex coronary lesions which not suit for transradial approach could be the first selection of approach.

Affection for selective percutaneous coronary intervention with high dose clopidogrel

Shihong Wang, Aibin Xu, Xi Wang
Cardiovascular Dep. General Hospital of Beijing Military Region of PLA

Objective To study therapeutic efficacy and safety of high dose clopidogrel in patients with coronary heart diseases (CHD) who underwent selective percutaneous coronary intervention (PCI).

Methods A total of 173 CHD patients underwent PCI were divided into strong clopidogrel group (received 600 mg of plavix, n = 87) and standard clopidogrel group (received 300 mg of plavix, n = 86). Before PCI, the two groups were respectively given 600 mg and 300 mg of plavix. They were respectively given 150 and 75 mg every day for 7 days after PCI. Then they were all given 75 mg every day over one year. Therapeutic efficacy and occurrence of adverse reactions were observed in the two groups.

Result There were significant difference in complete revascularization rate (93.8% vs 87.2%, P < 0.05) major adverse cardiovascular-cerebral events (MACCE) (2.0% vs 6.8%, P < 0.01), There were no differences in bleeding and vascular complications (1.6% vs 1.7%, P > 0.05) between strong clopidogrel group and standard clopidogrel group.

Conclusion Strong clopidogrel is more effective and safe than standard clopidogrel in selective PCI of CHD.

Effects of regularly clinic follow-up on prognosis and cost–benefit of outpatients with chronic heart failure

Yiming Zhong1, Xiaoping Wang1, Kejun Tian1
The First Affiliated Hospital of Ganzhou Medical University

Objective To study the efficacy of regularly clinic follow-up for outpatients with chronic heart failure (CHF) on prognosis and cost–benefit

Methods All patients diagnosed as CHF in our cardiovascular department between Jan. 2011 to Jun. 2012 were included in this study. They were divided into regularly follow-up (RF) and usual care (UC) groups. Investigating the Endpoints including death or rehospitalization, medication, cost-benefit with the data collected through hospital records or by telephone and post survey.

Result A total of 264 patients were enrolled (102 patients in RF group and 162 in UC group). The mean follow-up duration was 392 days for RF group and 428 days for UC group. Mortality and rehospitalization rate (37.41% vs 68.1%, P < 0.01) and mortality rate (1.92% vs 12.75%, P < 0.01) were significantly higher in UC group than in RF group. The percentage of patients receiving ACEI/ARB (64.70% vs 34.72%, P < 0.01; 15.49% vs 9.28%, P < 0.05) and beta-adrenergic receptor blocker (90.13% vs 29.83%, P < 0.01) were higher in RF group than in the UC group. Hospital cost (4218.16 RMB less per patient in this period) was significantly lower in RF group than in UC group.

Conclusion Regularly clinic follow-up can decrease the mortality rate and the readmission rate of patients with heart failure. And improve the application of drugs which can improve the prognosis of patients with CHF, furthermore, can reduce health care costs.
Impact on QTc interval and safety evaluation after amiodarone injection in hospitalized patients

Xiaoxing Zhang, Liming Zhang, Qingmin Zheng, Liwei Ji, Qingming Ding, Yuqing Liu, Ying Lou, Yishi Li
1. Key Laboratory of Clinical Trial Research in Cardiovascular Drugs, Ministry of Health, Cardiovascular Institute and Fuwai Hospital, CAMS & PUMC, Beijing 100037, China
2. Beijing Center for ADR Monitoring, Beijing 100024, China
3. Beijing an Zhen Hospital of the Capital University of Medical Sciences, Beijing 100029, China
4. Beijing Hospital of the Ministry of Health, Beijing 100005, China
5. China–Japan Friendship Hospital of the Ministry of Health, Beijing 100029, China

Objective To evaluate the impact on QTc interval and relevant adverse drug reaction after amiodarone injection in hospitalized patients.

Methods 1111 hospitalized patients from 4 upper first class hospitals in Beijing were enrolled from May 2011 to Jul. 2012. The QTc intervals were measured to evaluate whether there would be change before and after amiodarone injection within 24 hours, and suspected proarrhythmia adverse effects due to study drug were monitored during the entire period of administration.

Result The average heart rate was slowed (87.4 ± 21.2 bpm vs 99.6 ± 27.9 bpm, P < 0.001) and QT interval was prolonged (388.5 ± 55.9 ms vs 366.0 ± 55.9 ms, P < 0.001) significantly after amiodarone administration compared with the baseline, but QTc interval was not changed with statistical significance (456.8 ± 51.0 ms vs 457.8 ± 50.2 ms, P = 0.554). One patient with atrial tachycardia experienced TdP after 54 hours amiodarone injection concomitant with oral amiodarone showed a prolonged QTc interval up to 756 ms previously, TdP was not occurred 54 hours amiodarone injection concomitant with oral amiodarone showed a prolonged QTc interval up to 756 ms previously, TdP was not occurred again after amiodarone discontinuation and appropriate treatment.

Conclusion Amiodarone injection within 24 hours does not impact on QTc interval with statistical significance in hospitalized patients. Electrocardiograph should be monitored in a continuous amiodarone injection to avoid the relevant adverse drug reaction, especially when using concomitant amiodarone orally.

The impact of hypertension history and baseline blood pressure levels on the cardiovascular outcomes in patients with atrial fibrillation

Juan Wang, Xinghui Shao, Han Zhang, Bi Huang, Li Tian, Yanniu Yang, Jun Zhu, Yan Liang, Huiqiong Tan
Department of Emergency and Intensive Care Center, Fuwai Hospital, Chinese Academy of Medical Science and Peking Union Medical College, Beijing 100037, China

Objective To explore the hypertension history and baseline blood pressure levels on the treatment of atrial fibrillation patients and the impact on one year follow-up cardiovascular outcomes.

Methods This prospective study consecutively enrolled patients presenting to an emergency department with atrial fibrillation at 20 hospitals in China from 2009 to 2011. Baseline data and treatment were recorded, all patients were followed up for one year, and major cardiovascular outcomes were recorded. A total of 2015 atrial fibrillation patients were enrolled, and all the patients were divided into 4 groups according to the previous history of hypertension and baseline blood pressure levels: group 1: patients have previous hypertension history and baseline blood pressure greater than 140/90 mm Hg; group 2: patients have previous hypertension history and normal baseline blood pressure; group 3: patients have no hypertension history but baseline blood pressure greater than 140/90 mm Hg; group 4: patients have no hypertension history and normal baseline blood pressure.

Result The average age of all patients was 68.5 ± 13.3 years, average systolic blood pressure and diastolic blood pressure were 131.9 ± 23.3, 79.9 ± 14.7 respectively. 1118 patients (55.5%) had a history of hypertension, and about 91.1% hypertension patient received antihypertensive treatment. The difference of mortality, non central nervous system embolism incidence and major bleeding incidence in the 4 groups was not statistically significant (P values were 0.685, 0.893, 0.204 respectively). The stroke incidences of group 1, 2, 3, 4 were 8.3%, 9.4%, 6.2% and 5.2% (χ² = 8.721, P = 0.033). Univariate Cox regression analysis of risk factors for stroke, group 1 and 2 were the risk factors for stroke (HR 1.613, 95% CI 1.054 – 2.469, P = 0.028) HR 1.83, 95% CI 1.179 – 2.864, P = 0.007) compared to group 4. The variables included in the multivariate Cox regression model was based on the baseline data and univariate analysis of meaningful factors as well as some co mmon clinical risk factors, including hypertension groups, age, sex, history of coronary artery disease, history of heart failure, myocardial infarction history, history of rheumatic heart disease, a history of left ventricular hypertrophy, COPD history, history of stroke, history of diabetes, history of dementia, major bleeding history, diuretics, digoxin, beta-blockers, ACE inhibitors, ARB, clopidogrel, aspirin, warfarin, anti-arrhythmic drugs, statins. After adjusting the other risk factors, showed that hypertension and baseline blood pressure levels did not have independent predictive value (P = 0.737). And multivariate Cox regression analysis showed that age, sex, history of stroke, dementia/cognitive defects history were independent risk factor for one year follow-up of stroke in atrial fibrillation patients.

Conclusion History of hypertension and baseline blood pressure levels was not the risk factors for one year cardiovascular outcomes of atrial fibrillation patients. Elderly female atrial fibrillation patients with previous stroke and dementia history had a higher risk of stroke incidence.

The analysis of Chinese atrial fibrillation patients presenting to the emergency department during 1 year follow-up

Xinghui Shao, Yanniu Yang, Jun Zhu
State Key Laboratory of Cardiovascular Diseases, Fuwai Hospital, National Center for Cardiovascular Disease, Chinese Academy of Medical Sciences, and Peking Union Medical College, Beijing, China

Objective Atrial fibrillation (AF) is the most common serious cardiac arrhythmia, and its prevalence is expected to increase. There is lack of data about patient characteristics, practice patterns, and outcomes of AF in Chinese patients.

Methods The Chinese AF registry is a prospective, observational registry of AF patients which present to emergency department (ED) either as primary or secondary diagnosis. Data collected included patient demographics, medical history, treatment and outcomes of emergency visit. For admitted patients, a follow-up was completed to obtain the major adverse events during 1 year.

Result From Nov. 2008 to Oct. 2011, 2016 consecutive patients were enrolled from twenty representative centers of China. The mean age was 68.5 years and 54.8% was female. AF was the primary reason
for this ED visit in 40.9% and 80.9% had a known prior diagnosis of atrial fibrillation before. The most common comorbidity condition was hypertension, present in 1118 (55.5%) patients. At enrollment, the rates of permanent, persistent and paroxysmal AF was 47%, 22.3%, and 30.7%, respectively. 1992 AF patients (98.8%) had completed 1 year follow-up. Of these, all cause mortality was 288 (14.5%) cases, stroke/non-CNS systemic embolism was 159 (8.0%) cases, and major bleeding was 26 (1.3%) cases. Heart failure was the major cause of mortality, which accounted for 42.4% of death. Of 375 (18.6%) users used warfarin at baseline, only 217 patients was stuck to anticoagulation therapy during 1 year follow-up. Compared with anti-coagulation patients, the mortality rate of non-anti-coagulation patients was much higher (15.7% vs 5.5%, P < 0.001), and the risk of stroke was also higher in those without anti-coagulation although it was not statistically significant (8.4% vs 6.0%, P = 0.29).

**Conclusion** The annual rates of mortality and stroke were high in AF patients who presenting to the emergency department, and heart failure was the major cause of death. Patients may benefit more from anti-coagulant treatment and the anti-coagulation rate was low in China.

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**Risk factors and incidence of stroke and MACE in Chinese atrial fibrillation patients – A nationwide database analysis**

Xinghui Shao, Yanmin Yang
Fu Wai Hospital

**Objective** Atrial fibrillation is the most common cardiac rhythm disorder, which is associated with a substantial risk of stroke and mortality. Contemporary clinical risk stratification schemata for predicting stroke and thromboembolism in patients with atrial fibrillation are largely derived from western cohorts. The purpose of the present study is to assess the risk factors of stroke and MACE in a group of large-scale Chinese AF patients.

**Methods** We enrolled patients who present to an emergency department (ED) with atrial fibrillation or atrial flutter from Nov. 2008 to Oct. 2011, either as the primary or secondary diagnosis. A follow-up was performed to assess stroke and incidence of major adverse cardiac events (MACE) during 1 year. The major adverse cardiac events included all cause mortality, stroke, non-central nervous systemic embolism and major bleeds.

**Result** A total of 2,016 AF patients (1,104 women) were included in the final analysis. 33.7% of the subjects aged < 65 years, 28.3% aged 65 – 74 years and 38.0% aged over 75 years. The mean age was 68.5 years. AF was the primary reason for this ED visit in 40.9% and 80.9% had a known prior diagnosis of atrial fibrillation before. Hypertension was the most prevalent comorbidity (55.5%), followed by coronary artery disease (41.8%). Of the 1,108 patients with hypertension, 101 (9.1%) was untreated. During 1 year follow-up, stroke was 148 (7.4%) cases, and MACE was 436 (21.9%) cases. Cox regression analysis showed that the risk factors for ischemic stroke were female gender (HR 1.470, 95% CI 1.048 – 2.063, P = 0.026), age over 75 years (HR, 2.717, 95% CI 1.690 – 4.367, P < 0.001), prior stroke/TIA (HR, 2.021, 95% CI 1.408 – 2.900, P < 0.001), left ventricular systolic dysfunction (LVSD) (HR, 1.701, 95% CI 1.024 – 2.827, P = 0.040), prior major bleeding (HR, 2.506, 95% CI 1.162 – 5.406, P = 0.019), hypertension without medically treated (HR, 1.948, 95% CI 1.101 – 3.446, P = 0.022). For MACE, age over 75 years (HR, 3.451, 95% CI 2.623 – 4.540, P < 0.001), heart failure (HR, 1.356, 95% CI 1.078 – 1.706, P = 0.009), prior stroke/TIA (HR, 1.531, 95% CI 1.221 – 1.918, P < 0.001), LVSD (HR, 1.444, 95% CI 1.101 – 1.893, P = 0.008), hypertension without medically treated (HR,1.752, 95% CI 1.228 – 2.500, P = 0.002) were the independent predictors. The c-statistics for predicting stroke was 0.671 (95% CI: 0.625 – 0.716) and for MACE was 0.703 (0.675 – 0.730), respectively.

**Conclusion** In Chinese AF patients presenting to the emergency department, the stroke and MACE rates were high, 7.4% and 21.9% respectively. The Cox regression prediction models show that the risk factors for stroke and MACE were similar to CHADS2 scheme. In addition, clinicians should pay more attention to patients with prior major bleeding.

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**Meta analysis of acute myocardial infarction following drug-eluting and bare stents implantation**

Xiaoxia Li¹, Xiaomei Li¹, Fang Wei¹, Yitong Ma¹, Yining Yang¹, Yu Liu¹, Bangchang Chen¹, Fen Liu²
1. Department of Cardiology, First Affiliated Hospital of Xinjiang Medical University, Urumqi, P.R. China 830054
2. Department of Cardiology, Jinan Central Hospital of Shandong Province 250003
3. Institute for Evidence-Based Medicine of Xinjiang Uygur Autonomous Region 830054
4. Clinical Institute of Fundamental Research, First Affiliated Hospital of Xinjiang Medical University, Urumqi, P.R. China 830054

**Objective** To explore the difference in incidence of acute myocardial infarction between coronary drug stents and bare-stent after implantation.

**Methods** Computer-based online search of Cochrane Library CNKI, PubMed, EMBas, CBM and VIP were performed to collected related articles. Retrieval time up to Apr. 2012. Article screening, data collected and quality evaluation were performed by two authors. The included studies were reviewed and analyzed.

**Result** A total of 10 articles were in accordance with the inclusion criteria, involving 2,477 cases, including 1,652 cases undergoing drug-eluting stents and 825 cases undergoing bare stents. Meta analysis of 10 studies showed that incidence of acute myocardial infarction endovascular restenosis in patients with coronary atherosclerotic heart disease 0.5 to 4 years after drug-eluting stent was lower than bare stent group [edge ratio = 0.27, 95% CI (0.21 – 0.34), P < 0.05]; significant difference was found between two groups in intervention related complications [edge ratio = 0.50, 95% CI (0.38 – 0.67), P > 0.05].

**Conclusion** After 0.5 – 4 years of implantation, drug-eluting stent for the acute myocardial infarction of coronary atherosclerotic heart disease has reduced incidence of in-stent restenosis, but there is significant difference was found in intervention related complications compared with bare stents.

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**First-in-human use of the V2 renal denervation System™ in China**

Tuo Liang, Xiongqing Jiang, Hui Dong, Meng Peng, Ting Guan, Wenjun Ma, Haiying Wu, Bo Xu, Runlin Gao
Department of Cardiology, Fu Wai Hospital, Chinese Academy of medical sciences, Peking Union Medical College

Catheter-based renal artery denervation (RDN) is a novel treatment for patients with resistant hypertension (HTN) who have been proved...
effective and safe in clinical research. Besides the reduction of blood pressure, RDN can also improve glycemic control, renal function, sleep apnea, heart failure and reverse left ventricular hypertrophy. This report describes the first patient treated by the V2 Renal Denervation System™ (Boston Scientific Corporation) in China. 6-month follow-up showed that the procedure was safe and effective, blood pressure and symptoms were remarkable improved, office blood pressure had fallen by 38/43 mm Hg, medication had also been reduced compared with baseline, and no complications are observed.
thrombolysis in myocardial infarction (TIMI) flow and/or myocardial blush grade (MBG) are independent predictors of mortality in patients with ST-elevation myocardial infarction (STEMI). Several studies with thrombus aspiration (TA) showed different Result, mainly due to use of TA as an additional device not instead of balloon predilatation (BP). The aim of the present study was to assess impact of TA followed by direct stenting during primary percutaneous coronary intervention (PCI).

Methods Between Dec. 2008 and Jun. 2011, a total of 429 patients (107 patients in TA group and 322 patients in BP group) were eligible for the observation criteria, admitted with STEMI (within 9 h from symptoms onset) and candidates for PCI were enrolled. Exclusion criteria were a previous PCI on infarct-related artery, infarct-related artery balloon predilatation and TA simultaneously, and calcium or tortuous infarct-related lesion. The main indexes of this study were the TIMI flow grade, MBG, and the rate of 60-min ST-segment resolution > 50% after PCI and in-hospital major adverse cardiac events (MACE). Secondary indexes included distal embolizations of infarct-related artery, peak CK-MB release, and MACE after one year.

Result Baseline clinical and angiographic characteristics, initial TIMI flow and initial MBG did not differ between the two groups. Procedural success was obtained in all patients. Stent length, number of stents per patient, and stent/vessel ratio were similar between the two groups. The rate of 60-min ST-segment resolution > 50% was significantly more frequent in TA group than in BP group (69.2% vs 48.5%, P flow grade after PCI was significantly higher among patients in TA group compared with BP group (2.65 ± 0.49 vs 2.44 ± 0.61, P = 0.34 vs 2.41 ± 0.56, PP ± 144 U/L vs 711 ± 165 U/L, PThere was no difference in between the groups in in-hospital MACE (0.9% vs 2.8%, P > 0.05), in 12-month cardiac mortality (1.2% vs 2.2%, P > 0.05), reinfarction rate (0.9% vs 3.1%, P > 0.05) and target vessel revascularization (2.8% vs 6.5%, P > 0.05). But total MACE was significantly higher in BP group compared with the TA group (6.5% vs 14.5%, P < 0.05).

Conclusion Compared with conventional PCI, TA and direct stenting before primary PCI improved final myocardial reperfusion and the long-term outcome for STEMI patients.

Clinical investigation of effects of intravenous vs intra–coronary injection of tirofiban during primary PCI

Yingyan Ma, Yaling Han, Quamin Jing, Kai Xu, Haiwei Liu, Geng Wang, Xiaozeng Wang, Xin Zhao
Department of Cardiology, Institute of Cardiovascular Research of People's Liberation Army, Shenyang, Liaoning 110840, China

Background To investigate effects of intravenous vs intra-coronary injection of tirofiban on myocardial reperfusion during primary PCI in patients with STEMI.

Methods A total of 314 patients admitted to our hospital with myocardial infarction within 12 hours were enrolled in this study. Three hundred milligrams aspirin and 600 mg clopidogrel were given before PCI. Patients were randomized into intra-coronary injection or intravenous injection of tirofiban (10 μg/kg). Primary endpoints included disappearance of ST segments elevation, myocardial reperfusion grade, infarction size by cardiac biomarker and major adverse cardiac events within 30 days. Second endpoints include clinical events of bleeding.

Result There was no difference in rate of disappearance of ST segments elevation (57% vs 58%). TIMI flow was better in intra-coronary group (84% vs 67%) and there was more myocardial reperfusion grade 2 (81% vs 63%). There was no difference in cardiac bio-marker level. There was no difference in rate of thrombocytopenia or major organ bleeding.

Conclusion Intra-coronary injection of tirofiban during primary PCI in patients with STEMI can Result in better myocardial reperfusion grade, smaller infarction size, and better reperfusion, but has no effects on short-term prognosis. There was no increase of major clinical bleeding, so it is safe.

Retrospective study on the relation between the level of thyroid hormone and coronary atherosclerotic heart disease

Yingyan Ma, Yanxia Wang, Wei Dong, Yabin Liu, Yaling Han
Department of Cardiology, Institute of Cardiovascular Research of People's Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background To observe the changes of the level of thyroid hormone in the patients with coronary atherosclerotic heart disease (CHD).

Methods According to the Result of coronary artery angiography, 299 patients were divided into experimental group (n = 208) and control group (n = 91). And the experimental group were divided into three groups: the single vessel disease group (n = 72), the double vessel disease group (n = 87) and the triple vessel disease group (n = 49). The levels of thyroid hormone were measured by radio-immunity method before coronary artery angiography, and then the levels of FT3, FT4, TT3, TT4 and TSH were compared between the two groups.

Result Comparison with the control group, the plasma level of FT3 of experimental group was significantly lower (P < 0.05), but no significant difference of the plasma levels of TT4, FT4, TT3, TSH and TSH was found between the two groups. And the plasma level of FT3 in the triple vessel disease group was significantly lower than double vessel group and single vessel group (P < 0.05).

Conclusion The plasma level of FT3 was in low levels in patients with coronary atherosclerotic heart disease, which may have clinical significance for the treatment and prevention of CHD.

Strengthening the reversal effect of lipid-lowering on patients with stable angina plaque

Liyou Sui, Quamin Jing, Haiwei Liu, Bin Wang, Shaoyi Guan, Yaling Han, Yingyan Ma, Xiaozeng Wang, Bing Tian
Department of Cardiology, Institute of Cardiovascular Research of People's Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background To explore atorvastatin, a lipid-lowering therapy, and its reversal effect and safety on patients with stable angina plaques.

Methods In 50 cases of patients with stable angina whose coronary artery CT display plaque narrow area were below 70%, in contrast with coronary artery angiography and intravascular ultrasound, some patients chose only and coronary artery imaging contrast, patients whose coronary artery imaging hemal stricture and intravascular ultrasound display plaque narrow area were under 70% were chosen as study objects. They were divided into two groups, atorvastatin with 20 mg and 40 mg respectively. They received followed-up survey. Half a year's later, their coronary artery CT were checked again, a few patients with frequent angina pectoris mobility rate received the examination of...
coronary angiography and intravascular ultrasound.

**Result** The chosen patients aged 40 to 77 years old, including 38 men and 12 women. Their cardiac functions were normal. Besides, there were 37 cases of line intravascular ultrasound, 26 cases of coronary artery lesions of the left anterior descending branch (LAD), 7 cases of left cyclotron branch (LCX), and 17 cases of right coronary artery (RCA), nearly 47 patients with middle lesions, 3 cases for far segment lesions in 3 patients. In the postoperative period, they received liver function examination every one, three and 6 month, and the blood fat examination 6 month later. There were 1 (atorvastatin 20 mg group) patients, due to frequent mobility of angina, whose plaque area increased from 62% to 75%, his minimum pipe cavity area decreased from 6.6 mm$^2$ to 4.03 mm$^2$. This patient no longer suffered from angina symptoms after taking the operation of implanting coronary artery stent. The blood fat total cholesterol (TC) of who received follow-up examination decreased to 1.76 mmol/L on average, while their low density lipoprotein (LDL-C) to 1.83 mmol/L on average, their liver functions are in the normal range, gao min c-reactive protein (HS - CRP) are also in the normal range. At present, they are receiving the continuing follow-up examinations, which is about to end in 2 months.

**Conclusion** The coronary artery CT examination for plaque volume showed that, after half a year's intensive lipid-lowering therapy, the intensive lipid-lowering therapy can reverse plaque volume, improve symptoms, and prevent cardiovascular adverse events.

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**Comparison of the clinical characters of the early and median stage after the systemic–pulmonary shunts and the right ventricular to pulmonary artery connection for pulmonary atresia with ventricular septal defect**

Zhongyun Lu, Xu Wang, Shoujun Li, Keming Yang
PICU, Pediatric Cardiac Center, Fuwai Hospital, National Center for Cardiovascular Disease

**Objective** Comparing the clinical characters of the early and median stage after the systemic-pulmonary shunts and the right ventricular to pulmonary artery connection (RV-PA connection)for pulmonary atresia with ventricular septal defect (PAVs D), we try to assess the effects of the two different palliative procedures.

**Methods** We retrospectively analyzed the clinical data of the 89 patients with PAVs D who had undergone the systemic-pulmonary shunts or the RV-PA connection in Fu Wai Hospital from Jan. 2009 to Dec. 2011. Compare the clinical characters including the time with ventilator, the time in ICU, the complication, the improvement on oxygen saturation (SpO2), the improvement on Nakata index, the rate of complete repair and the mortality in two groups, with the desire to obtain the effects respectively.

**Result** 59 patients performed systemic-pulmonary shunts, 30 patients performed RV-PA connection. There was no statistically difference at age and weight of the two groups when they got operations. The time with ventilator after operation was 34.8 ± 33.5 h and 44.3 ± 39.6 h (P > 0.05); The time in ICU was 3.6 ± 2.5 d and 4.2 ± 5.1 d (P > 0.05); The incidence of the complication was 37.2% and 30% (P > 0.05); The rate of reoperation was 15.3% and 13.3% (P > 0.05); The incidence of the severe complication was 25.4% and 66.7% (P < 0.05); The improvement on percentage of the oxygen saturation was 22.2 ± 21.4 and 31.7 ± 28.3 (P < 0.05); The Nakata index increased was 74.1 ± 23.4 mm$^2$/m$^2$ and 84.2 ± 48.7 mm$^2$/m$^2$ (P > 0.05); The rate of complete repair was 37.2% and 36.7% (P > 0.05). The interphase between initial palliative procedure and complete repair was 15.2 ± 4.7 m and 14.3 ± 4.7 m (P > 0.05); the mortality was 8.5% and 0 (P = 0.248).

**Conclusion** Patients who underwent RV-PA connection can have a relative stable period after operation. The improvement on oxygen saturation is significant, which may better promote the diminutive pulmonary rehabilitation. The mortality under this procedure is subsequently low. As a result, the RV-PA connection can be taken as the first palliative management for PAVs D. Numerous cases and longer follow-up are still needed.

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**A meta-analysis of npercutaneous coronary intervention for chronic total coronary occlusions recanalization**

Long Jiang
The Second Affiliated Hospital of Nanchang University

**Objective** To perform an evaluation (meta-analysis) on short-term and long-term prognosis of percutaneous coronary intervention (PCI) for patients with chronic total occlusions (CTO) recanalization.

**Background** Despite advances in procedural techniques and expertise, PCI for CTO recanalization in select patients remains a challenge.

**Methods** Data sources include published studies from a search of PUBMED, ELSEVIER, and CLINICAL.COM from Jan. 2000 to Jul. 2012. Selected studies were either observational studies or randomized clinical trials that compared PCI treatment of CTO recanalization to medical management. The endpoints were analyzed using pooled estimates for death, myocardial infarction (MI), coronary artery bypass surgery (CABG), angina symptoms, repeat revascularization, and major adverse cardiac events (MACE).

**Result** Sixteen observational studies comparing outcomes after failed or successful CTO recanalization with PCI were included in the current analysis. Collectively, these studies enrolled 10 256 patients who were observed at an average follow-up period of 5 years. Patients with successful CTO recanalization demonstrated significantly reduced rates of all-cause death (P < 0.00001), cardiac death (P < 0.00001), MACE (P < 0.0001), MI (P = 0.003), subsequent CABG (P < 0.0001), and long-term repeat revascularization (P = 0.03). In addition, successful CTO improved quality of life (P < 0.0001), reduced both MACE (P < 0.0001) and mortality (P = 0.004) in patients with multivessel disease; although there was no difference in the rates of death and MACE in patients with SAD.

**Conclusion** PCI should be considered an effective option for the patients with CTO lesions.

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**Efficacy and safety of bivalirudin vs heparin plus glycoprotein IIb/IIIa inhibitors in patients undergoing percutaneous coronary intervention: a meta-analysis of randomized trials**

Long Jiang1, Xiaoshu Cheng1, Rengqiang Yang1, Lijuan Hu2, Yingli Fan1, Rui Zhan1
1. The Second Affiliated Hospital of Nanchang University
2. The First Affiliated Hospital of Nanchang University

**Background** Recently, several randomized trials which compared bivalirudin with heparin plus glycoprotein IIb/IIIa inhibitors (GPBs) in patients undergoing percutaneous coronary intervention (PCI) have been published. The purpose of this study was to perform an up-to-date meta-analysis of randomized trials on the effectiveness and safety of bivalirudin vs heparin plus GPBs in patients undergoing PCI.

**Methods** All published clinical randomized trials which compared heparin plus GPBs with bivalirudin in patients undergoing PCI were included in the current analysis. They were selected as observational studies or randomized clinical trials that compared PCI treatment of CTO recanalization to medical management. The endpoints were analyzed using pooled estimates for death, myocardial infarction (MI), coronary artery bypass surgery (CABG), angina symptoms, repeat revascularization, and major adverse cardiac events (MACE).
Interventional treatment in maintenance hemodialysis patients with acute coronary syndrome

Geng Wang, Yaling Han, Quanmin Jing, Yingyan Ma,
Xiaoqang Wang, Bin Wang, Xin Zhao
Department of Cardiology, Institute of Cardiovascular Research of People’s Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background To observe the efficacy of percutaneous coronary intervention (PCI) in maintenance hemodialysis (MHD) patients with acute coronary syndrome (ACS).

Methods From Jan. 2008 to Oct. 2011, we completed PCI in the 38 MHD patients with ACS in our hospital hemodialysis Division, including 23 males and 15 females, aged 48 – 74 (mean 64.2 ± 8.2) years old. Preparations were diabetic nephropathy in 25 cases, hypertensive renal disease in 11 cases, chronic glomerulonephritis in 2 cases; 33 patients were unstable angina, 4 patients were acute non-ST-elevation myocardial infarction, and 1 patient was acute ST-elevation myocardial infarction. 1 day before PCI, all patients took aspirin 300 mg and clopidogrel 300 mg then took clopidogrel 75 mg/d for 1 year and aspirin 100 mg/d for lifetime. The major adverse cardiac events (MACE) rate decreased to 25% (2/8) and MACE rate was 50% (4/8). If follow-up after PCI was 12 months, MACE rate decreased to 25% (2/8). The remaining 3 patients had no restenosis within the stent. Only one patient showed LAD stent restenosis and received target vessel revascularization. The remaining 17 patients were effectively treated, while no patients died in PCI. During follow-up of 0.6 – 67 months (mean 35.3 ± 25.1 months), 2 patients died. Nineteen days after PCI, one patient died of multiple organ failure due to lung infection. Thirteen months after PCI, another patient died of cardiac sudden death. One patient was hospitalized with angina pectoris for 53 months, and the symptoms were relieved. The imaging was not reviewed. After 6 months one patient received multi-slice CT examination, and no restenosis was found. He was currently asymptomatic. The remaining four patients were reviewed coronary angiography after 15 – 67 months. Only one patient showed LAD stent restenosis and received target vessel revascularization. The remaining 3 patients had no restenosis within the stent. During the entire follow-up, restenosis rate was 20% (1/5), mortality rate was 25% (2/8) and MACE rate was 50% (4/8). If follow-up after PCI was 12 months, MACE rate decreased to 25% (2/8).

Conclusion Treatment of covered stent to coronary perforation can achieve good long-term efficacy. Two-year dual antiplatelet drugs can be effective in preventing covered stent thrombosis.
Effects of intracoronary sodium nitroprusside compared with adenosine on fractional flow reserve measurement

Xiaozeng Wang, Yaling Han, Shangsheng Li, Xin Zhao, Kai Xu, Fanfei Wang, Jin Zhang, Yansong Peng
1. Department of Cardiology, Institute of Cardiovascular Research of People’s Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China
2. Department of Cardiology, the 230th Hospital of PLA, Dandong, Liaoning 118000

Background At present, adenosine (AD) is the most widely used agents in fractional flow reserve (FFR) measurement but has the disadvantages of higher rate of complications including atrioventricular block. So it's necessary to explore other stimuli equivalent to or better than AD in effects on FFR measurement with less complications and lower costs.

Methods In 40 patients with 53 moderate coronary stenosis, intracoronary (IC) AD in 2 serial doses (A1: 40 μg; A2: 60 μg) was administered in the standard bolus to calculate FFR, followed by a repeat FFR measurement with IC Sodium Nitroprusside (SNP) in 3 serial doses (S1: 0.3 μg/kg; S2: 0.6 μg/kg; S3: 0.9 μg/kg).

Result ① Target lesions were located in the left anterior descending (n = 24), left circumflex (n = 13) and right coronary artery (n = 16). The mean stenosis rate was 62.8 ± 8.6%. ② FFR value decreased significantly from 0.90 ± 0.05 at baseline to 0.83 ± 0.07, 0.82 ± 0.07, 0.83 ± 0.07, 0.81 ± 0.07 and 0.81 ± 0.07 in A1, A2, S1, S2 and S3 (F = 16.877, P < 0.001). ③ Systolic blood pressure decreased by 3.99%, 6.64%, 6.87%, 10.56% and 15.55% in A1, A2, S1, S2 and S3. ④ Heart rate was increased by 2.01%, 0.84%, 1.23%, 1.34% and 3.11% in A1, A2, S1, S2 and S3. ⑤ The mean time to peak value of FFR in delayed in S1, S2 and S3 compared with A2 (F = 15.593, P < 0.001). ⑥ The mean duration of the plateau phase was longer in S1, S2 and S3 compared with A2 (F = 34.445, P < 0.001), and longer in S3 than S1 (F = 7.392, P = 0.008). ⑦ Immediate complications occurred in 15.1% of patients, including transient atrioventricular block (6 patients), chest pain (1 patient) and stomachache (1 patient) after the 60 μg dose of IC AD bolus was administered. No adverse events were found after 3 serial doses IC SNP were used (χ² = 8.171, P = 0.004).

Conclusion Compared with IC AD, IC SNP has equivalent effects on FFR measurement as well as the advantage of lower rate of complications and cost. But duration of the plateau phase by IC SNP is twice as much by IC AD, and time to peak FFR value was delayed 50%.

Safety and long–term efficacy of left subclavian artery coverage during thoracic endovascular aortic repair

Xiaozeng Wang, Quannin Jing, Yaling Han, Haiwei Liu, Fanfei Wang
Department of Cardiology, Institute of Cardiovascular Research of People’s Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background To observe the safety and long-term efficacy of left subclavian artery (LSA) coverage during thoracic endovascular aortic repair (TEVAR).

Methods Retrospectively analyzed the clinical data and outcomes perioperatively and during follow-up in 278 patients who were suffered from Stanford B aortic dissection and accepted TEVAR between Apr. 2002 and Jul. 2011. Among those patients, 77 had lesions that required LSA coverage and 201 had their LSA uncovered.

Result The patients with coronary artery disease and hypertension were more often seen in LSA-uncovered group, while those with penetrating atherosclerotic ulcer were less seen in this group (P < 0.05). The other clinical baseline data had no statistics differences between two groups. The success ratios of TEVAR were both 100% in two groups. The proximal landing zones were shorter (8.0 ± 6.5 mm vs 28.3 ± 10.1 mm, P = 0.000) while the aortas covered by stent grafts were longer (132.6 ± 24.7 mm vs 122.0 ± 38.9 mm, P = 0.011) in LSA-covered group compared with those in LSA-uncovered group. The postoperative systolic pressures of left and right upper limbs were (80.5 ± 37.3) mm Hg and (128.7 ± 22.6) mm Hg (P = 0.000) in patients with LSA covered completely and were (115.8 ± 25.7) mm Hg and (125.5 ± 27.4) mm Hg in those with LSA covered partially (P = 1.805). No statistics differences occurred between two groups referring to the mean aortic diameters, incidences of endovascular leakage, post-implantation syndrome (transient elevations of body temperature, C-reactive protein and mild leukocytosis) and incision infection. Transient movement disorder of both lower extremities occurred in two patients in the LSA-uncovered group within the first 24 hours postoperatively, while paraplegia developed in neither group during hospital stay. Patients presented with cooling, discoloration, pain and weakness of left upper extremity and paresisness of left brachial artery were more often seen in LSA-covered group during perioperative and follow up period. The incidence of cooling, discoloration, pain and weakness of left upper extremity and stroke, together with the mortality had no statistics differences between patients with LSA covered completely or partially. The pulslessness of left brachial dance presented more often (P = 0.000) while the weakness of that presented less often (P = 0.001) in patients with LSA covered completely compared with those with LSA covered partially. No blood vessel by-pass grafting was performed on account of severe left arm ischemia.

Conclusion It is safe and feasible to cover LSA for managing the insufficiency of proximal landing zone in patients with Stanford B AD during TEVAR. Better long-term efficacy could be achieved in this way.

Correlation between blood uric acid level and severity of coronary lesions

Quanyu Zhang, Lei Zhang, Yaling Han
Department of Cardiology, Institute of Cardiovascular Research of People’s Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background To investigate the characteristics of intravascular ultrasound (IVUS) image of target borderline lesion in the proximal anterior descending artery (LAD) for finding the basement to treating these patients with the lesions.

Methods The borderline lesions with 30% – 70% dimension stenosis in the proximal LAD were found in 10 patients from Jun. 2010 to Oct. 2011. All the 10 patients had some discomfort in the precordium, including 7 males, 1 with diabetes, 3 with hypertension, 2 smokers and 2 with infarct history. The intervention was done in the patient with the typical syndrome after IVUS. For the atypical patients, the exercise test was done. The intervention was done in the positive patient after IVUS.

Result The discomfort in the precordium disappeared in all the 10 patients. The minimal lumen area (MLA) of them in the proximal LAD was 4.85 ± 1.49 mm². MLA in the 7 patients was more than 4 mm². The
The efficacy and security analysis of interventional therapy supported by intra-aortic balloon pump for patients with high risk coronary heart disease

Xin Zhao, Yaling Han, Xiaozeng Wang, Baige Xu
Department of Cardiology, Institute of Cardiovascular Research of People's Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background To evaluate the efficacy and security of percutaneous coronary intervention (PCI) supported by intra-aortic balloon pump (IABP) for patients with high risk coronary heart disease.

Methods We retrospectively reviewed immediate success rate of PCI, in-hospital survival rate and complications of 624 patients with high risk coronary heart disease who underwent PCI supported by IABP in our institution from January 2000 to October 2011.

Result Out of all the 624 patients, 71% were ST-elevation myocardial infarction (STEMI), 21% were none ST-elevation myocardial infarction (NSTEMI) and 8% were unstable angina pectoris (UAP). The patients (averagely aged 68 years and 71% were males) suffered from hypertension (78%), family history of coronary heart disease (34%), abnormal metabolism of serum lipids (69%) and diabetes (45%). The latter two seemed presenting more frequently in patients with acute myocardial infarction (AMI). The incidence of major adverse cardiovascular events (MACE) in STEMI and NSTEMI group was significantly higher than that in UAP group (3.1% and 2.9% vs 0.01%, P < 0.01). So was the mortality rate (1.7% and 1.1% vs 0.4%, P < 0.01). Before hospital discharge, a majority of patients received antplatelet therapy and evidence based drug therapy, including angiotensin converting enzyme inhibitor (ACEI)/angiotensin receptor blockers (ARBs), beta-blockers, calcium channel blockers and statins. With the support of IABP, immediate success of PCI was achieved in 323 cases with an immediate success rate up to 97.6% (609/624); in-hospital survival in 576 cases with a survival rate up to 92.3% (576/624); IABP success rate was 100%; total incidence of IABP complications needed to be handled was 4.5% (28/624).

Conclusion The success rate of PCI for patients with high risk coronary heart disease is extremely high when IABP support was applied, with an ideal prognosis and decreased complications. This method is clinically safe and efficient with high feasibility. The advantages become more evident when treating patients with AMI complicated by high risk of cardiogenic shock.

Cardioprotective effects of single oral dose of nicorandil before selective percutaneous coronary intervention

Jidong Zhang, Wei Cui, Jing Yang, Fan Liu, Ruiqin Xie, Xiaohong Yang, Guoqiang Gu, Hongmei Zheng, Jingchao Lu, Xiuchun Yang, Guangming Zhang, Qian Wang, Xue Geng
Department of Cardiology, The Second Hospital of Hebei Medical University, Shijiazhuang City 050000, P.R. China

Background Nicorandil, an opener of ATP-sensitive K+ channels, was used to treat angina in patients with coronary artery disease. In this study, we aim to investigate the cardioprotective effects of single oral dose of nicorandil in patients undergoing selective percutaneous coronary intervention (PCI).

Methods One hundred and thirty-eight patients with acute coronary syndrome undergoing PCI from Jul. 2011 to Oct. 2012 were randomly divided into control group (group 1, n = 47), 10 mg oral nicorandil group (group 2, n = 45), and 20 mg oral nicorandil group (group 3, n = 46) about 2 hours before procedure, respectively. Cardiac troponin I (cTnI) levels were determined at 20 – 24 hours after PCI.

Result There was a significant difference in the rate of any cTnI elevation among the three groups (group 1: 36.17%, group 2: 20.00%, group 3: 15.22%, P = 0.0176). With respect to the frequency of cTnI elevation ≥ 3 and ≥ 5 × the upper limit of normal (ULN), there also had statistical difference among the three groups (17.02% in group 1, 8.89% in group 2, and 4.35% in group 3, respectively for cTnI elevation ≥ 3 × ULN, 78.00% in group 1, 66.67% in group 2, and 2.17% in group 3, respectively, for cTnI elevation ≥ 5 × ULN, P = 0.0487). Logistic regression analysis showed that
LVEF (OR = 0.915, 95% CI = 0.856 – 0.978) and the use of nicorandil (OR = 0.519, 95% CI = 0.295 – 0.912) before PCI were independent protective factors of myocardial injury.

Conclusion Single oral dose of nicorandil (10 mg, 20 mg) 2 hours before the PCI procedure could decrease the incidence of peri-procedure myocardial injury and PCI-related myocardial infarction.

Is being an elderly woman a risk factor for worse outcomes after percutaneous coronary intervention? A large cohort study from one center
Zhan Gao
State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

Background Females, as compared to males have more risk factors and comorbidities, whose severity increases with age. While it has remained undefined because of conflicting result in previous studies whether female gender is a risk factor for worse outcomes after percutaneous coronary intervention (PCI), the combination of being elderly (i.e., > 75 years old) and female may be a risk factor. There are thus far no solid data in this area.

Methods 29211 consecutive patients who underwent PCI [521 elderly females (> 75 years old); 5 666 young females (< 75 years old); 1 098 elderly males and 21 926 young males] at the Fu Wai Hospital in Beijing, were analyzed.

Result During hospitalization, elderly females had significantly higher rates of cardiac death and MACE (P < 0.05). Kaplan-Meier estimated 3-year rate of cardiac death was significantly higher in elderly females in comparison with all other groups (P < 0.05). Using Cox proportional hazard models, being an elderly female was a significant risk factor for cardiac death, cardiac death/MI in comparison with being a young female [OR (95% CI): 2.53 (1.15 – 5.59), 2.26 (1.27 – 4.03)] or young male [OR (95% CI): 2.22 (1.26 – 3.91), 2.25 (1.44 – 3.51)]; however, it was not a significant risk factor in comparison with being elderly male [OR (95% CI): 1.30 (0.97 – 1.71), 1.21 (0.94 – 1.55)].

Conclusion Elderly females had worse in-hospital and long-term outcomes after PCI therapy than other gender and age groups, but being an elderly female not an independent risk factor for worse PCI outcomes.

Long-term efficacy of PCI vs CABG for patients with multiple coronary chronic total occlusions
Jian Zhang, Ya-ting Han, Quan-min Jing, Xiao-zeng Wang, Ying-yan Ma, Geng Wang, Bin Wang
Department of Cardiology, Institute of Cardiovascular Research of People’s Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background Data on the efficacy of percutaneous coronary intervention (PCI) for treatment of multiple coronary chronic total occlusion (CTO) lesions are scanty. The optimal revascularization strategy for multiple coronary CTO disease in the era of drug-eluting stents (DES) has become more controversial between coronary artery bypass grafting (CABG) and PCI. The aim of the present study is to compare the long-term outcomes of DES implantation for multiple coronary CTO lesions compared with CABG.

Methods We analyzed 261 patients who underwent coronary angiography for at least two de novo CTO lesions in our center from Nov. 2000 to Nov. 2006. Among them, 118 patients (45.2%) received DES implantation after recanalization for CTO lesions and 143 patients (54.8%) received CABG. Major adverse cardiac and cerebrovascular events (MACCE: death, acute myocardial infarction, stroke and repeat revascularization) and hospitalization costs were compared. Long-term
survival rates were estimated with the Kaplan-Meier method.

**Result** Patients in the CABG group were likely to have hyperlipidemia, diabetes mellitus, multivessel disease and higher euroSCORE. The mean follow-up was 4.2 ± 0.7 years in the CABG group and 4.3 ± 0.5 years in the DES group. Total hospitalization costs were lower (P = 0.017) in the CABG group (median: 107 thousand Yuan) than in the DES group (median: 156 thousand Yuan). Rates of MACCE at 12 months were higher in the PCI group (16.9%) vs. 11.2% for CABG; P = 0.179), but not statistically significant, in large part because of an increased rate of repeat revascularization (15.3% vs. 7.0%, P = 0.016). The overall survival rate (CABG: 73.4% and DES: 76.2% at 5 years, P = 0.599) and the TVR-free survival rate did not differ between the groups.

**Conclusion** This study demonstrates the long-term (up to 5 years) efficacy and safety of DES for treatment of multiple coronary CTO lesions. The long-term survival rate of PCI with DES was comparable to that of CABG for the treatment of multiple coronary CTO. PCI with DES was more costly than CABG. PCI using DES might be an alternative to CABG in selected patients with multiple coronary CTO disease.

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The efficacy and safety of ivabradine hydrochloride tablets vs atenolol tablets in patients with chronic stable angina pectoris – a randomized, double blind, double-du mmy, multicenter active-controlled, parallel-arm phase II clinical trial

Yan Li, Yishi Li, Youhong Jia
Key Laboratory of Clinical Trial Research in Cardiovascular Drugs, Ministry of Health, FuWai Hospital, National center for Cardiovascular Disease,

**Objective** To evaluate the efficacy and safety of Ivabradine Hydrochloride Tablets in patients with chronic stable angina pectoris.

**Methods** This is a randomized, double-blind, double-du mmy, multicentered, active-controlled, parallel-arm phase II clinical trial, conducted between Oct. 2009 and Jul. 2012. We compared Ivabradine Hydrochloride with Atenolol in patients with evidence of coronary artery disease (CAD) and chronic stable angina pectoris for at least 3 months before study entry. Briefly, we included 334 male and female patients aged between 18 and 70 years. All the patients in accordance with the inclusion criteria should withdraw the medicine that can affect heart rate. After -7 – 0 days the patients with positive Exercise tolerance test (ETT) were randomized into two groups (if not treated with similar drugs can be directly tested ETT): IVA-HCL group (treated with Ivabradine Hydrochloride tablets 5 mg bid) or Atenolol group (treated with Atenolol 12.5 mg bid) for 4 weeks. Adjusted the dose according to ETT test Result and heart rate after 4 weeks, either continued to use the original dose (IVA-HCL group, 5 mg bid; Atenolol group, 12.5 mg bid) or increased the dose (IVA-HCL group, 7.5 mg bid; Atenolol group, 25 mg bid) and then continue the treatment for 8 weeks. Compare the ETT value changes at three time points (before taking the medicine, just 4 weeks and 8 weeks after) between the two groups. Meanwhile, evaluated the drug related mortality, cardiac death, myocardial infarction and other adverse events in the process of drug use and within 7 days of medicine treatment.

**Result** Actually 334 patients enrolled in this study, but 2 persons in the IVA-HCL group did not take medicine. Therefore, there were 332 patients (IVA-HCL group n = 166; Atenolol group n = 166) included in the final statistics. Clinical and ETT characteristic at baseline were similar between patients randomized to the IVA-HCL and Atenolol group (P > 0.05). After 4 weeks of treatment, the primary efficacy criterion, change in total exercise duration (TED), increased by 54.28 ± 120.11 s (P < 0.05) in the IVA-HCL group compared with 58.77 ± 114.87 s (P < 0.05) in the Atenolol group (P > 0.05). Patients experienced an improvement in TED of 84.12 ± 174.42 s (P < 0.05) in the IVA-HCL group after 8 weeks of treatment. There were also improvements with Atenolol treatment, relative to baseline, in TED value (increased by 77.76 ± 126.60 s, P < 0.05) at the end of 8th week. The TED had increased in both groups but there was no difference (P > 0.05). There were small, non-significant changes in adverse events between the two groups (P > 0.05). In the IVA-HCL group the number was 66, and 73 in the Atenolol group. Phosphenes (luminous phenomena described as increased brightness in limited areas of visual field) and blurred vision, which have been associated with Ivabradine treatment in previous studies, were reported by 9 patients (5.42%) in the IVA-HCL group (P < 0.05). And one patient (0.6%) experienced moderate bronchospasm in the Atenolol group with none in the IVA-HCL group.

**Conclusion** Coronary patients can enjoy a number of clinical benefits from pure heart rate reduction. Ivabradine Hydrochloride Tablets have similar efficacy and safety in treat of patients with chronic stable angina pectoris vs Atenolol, as reported previously. Ivabradine is well tolerated in the study.

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Angiographic features of patients with atherosclerosis in the segments proximal to the myocardial bridge

Jian Zhang, Yaling Han, Quanmin Jing, Xiaozeng Wang, Yingyan Ma, Geng Wang, Bin Wang
Department of Cardiology, Institute of Cardiovascular Research of People’s Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110040, China

**Background** By studying the clinical and imaging features of myocardial bridge and severe atherosclerosis lesions in the segments proximal to the myocardial bridge, compared with that of pure myocardial bridge retrospectively, to analyze the clinical and imaging characteristics of these patients.

**Methods** The study population consisted of 2 groups (192 patients). The CHD Group included 92 patients with severe atherosclerosis lesion of luminal narrowing of ≥ 70% in the segments proximal to the myocardial bridge. The bridge group included 100 patients with symptomatic myocardial bridge lesion of systolic luminal narrow. All lesions were successfully treated with stent by standard interventional techniques. Quantitative coronary bridge lesion of systolic luminal narrow. All lesions were successfully treated with stent by standard interventional techniques. Quantitative coronary angiography was performed before and immediately after stent deployment.

**Result** The mean age and systolic pressure in the CHD patients were more than that in the pure bridge group (58 ± 11 vs 42 ± 10 vs and 157.8 ± 9.8 vs 146.1 ± 10.2 mm Hg, respectively), (P < 0.05). No significant difference was found between two groups such as gender, DM, smoking, hyperlipidemia, old myocardial infarction percentage. There was a significant difference in the extent of diameter stenosis during systolic stage between CHD and bridge groups (95 ± 5% vs 90 ± 7%). But the average length from the proximal end of myocardial bridge to the ostium of LAD and the average length of myocardial bridge did not difference between two groups.

**Conclusion** The patients with severe atherosclerosis lesion in the segments proximal to the myocardial bridge have more risk factors of CHD, the extent of diameter stenosis during systolic stage has some
promotive effect on CHD.

Features and treatments of hypertension in elderly patients with Stanford B aortic dissection

Mingyu Sun, Xiaozeng Wang, Quanmin Jing, Zulu Wang, Yaling Han
Department of Cardiology, Institute of Cardiovascular Research of People's Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background To summarize the features and treatments of hypertension in elderly patients with Stanford B aortic dissection.

Methods Retrospectively analyzed the features and treatments of hypertension between the elderly patients (≥ 60 years, n = 91) and the non-elderly patients (< 60 years, n = 187) who were suffered from Stanford B aortic dissection and hospitalized between April 2002 and July 2011.

Result The proportion of male in elderly group was higher than that in non-elderly group (P < 0.05). Smoking was similarly common in both groups. The proportions of patients accompanied with diabetes mellitus, hyperlipidemia, hypertension and renal inadequacy had no statistics differences between two groups. Coronary artery disease, atherosclerotic ulcer, cardiac insufficiency were more often seen in elderly group (P < 0.05). The awareness rate of hypertension was higher and the first-time diagnosis of hypertension was made less frequently in elderly group (P < 0.05). Isolated systolic hypertensions were seen with greater frequency in the elderly group (P < 0.05). The courses of hypertension were longer in the elderly group than those in the non-elderly group (P < 0.05). The proportions of family history of hypertension and hypertension of grade 1, grade 2 and grade 3 had no statistics differences between two groups. The highest systolic pressures, diastolic pressures and pulse pressures on admission were higher in elderly female than those in elderly male (P < 0.05). The combined treatments were applied frequently in both groups. The usages of intravenous drugs had no differences between two groups. The highest systolic pressures on admission were higher in elderly female than those in elderly male (P < 0.05). The rates of reaching standard blood pressure, total mortalities and mortalities related to aortic dissection during follow up had no differences in two groups.

Conclusion The elderly female with Stanford B aortic dissection were characterized with less awareness of hypertension and higher diastolic pressures on admission. Ideal blood pressures reaching the standard could be achieved after normal anti-hypertension therapy. Emphasis should be put on the early diagnosis of elderly female population. Hypotensive drugs should be applied reasonably and blood pressures should be controlled strictly in order to lower mortalities and improve prognosis.

Features and treatments of hypertension in elderly female with Stanford B aortic dissection

Mingyu Sun, Xiaozeng Wang, Quanmin Jing, Zulu Wang, Yaling Han
Department of Cardiology, Institute of Cardiovascular Research of People's Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Background To summarize the features and treatments of hypertension in elderly female with Stanford B aortic dissection.

Methods Retrospectively analyzed the features and treatments of hypertension in the elderly male group (≥ 60 years, n = 67) and the elderly female group (≥ 60 years, n = 41) who were suffered from Stanford B aortic dissection and hospitalized between April 2002 and July 2011. The average ages were (66.8 ± 5.3) and (65.5 ± 4.6) respectively.

Result The average ages were similar in the two groups. The proportions of patients accompanied with smoking history, diabetes mellitus, coronary artery disease, hyperlipidemia, hypertension, atherosclerotic ulcer, cardiac insufficiency, renal inadequacy and hypoxemia had no statistics differences between two groups. The histories of hypertension were less aware of while the first-time diagnosis of hypertension were made more frequently in elderly female group (P < 0.05). The proportions of grade 1, grade 2 and grade 3 hypertension and the courses of the disease had no statistics differences between two groups. The highest diastolic pressures on admission were higher in elderly female than those in elderly male (P < 0.05). The combined treatments were applied frequently in both groups. The usages of intravenous drugs and types of oral hypotensive drugs had no differences between two groups. Calcium-channel blocker, β-receptor blocker, angiotensin-converting enzyme inhibitor, diureticum, angiotensin receptor blocker, angiotensin receptor blocker+diureticum and α1+β receptor blocker were adopted in turn as hypotensive drugs in elderly female group. Diureticum was used more often in the elderly female group (P < 0.05). The rates of reaching standard blood pressure, total mortalities and mortalities related to aortic dissection during follow up had no differences in two groups.

Conclusion The elderly female with Stanford B aortic dissection were characterized with less awareness of hypertension and higher diastolic pressures on admission. Ideal blood pressures reaching the standard could be achieved after normal anti-hypertension therapy. Emphasis should be put on the early diagnosis of elderly female population. Hypotensive drugs should be applied reasonably and blood pressures should be controlled strictly in order to lower mortalities and improve prognosis.
Conclusion To use Deanxit combined anti-heart failure drugs could gain better synergic effect in the patients of heart failure secondary to valvular heart disease with anxiety and depression.

Effect of CYP2C19*2 and *3, ABCB1 C3435T, and PON1 Q192R alleles on platelet reactivity and adverse clinical events in Chinese people treated with clopidogrel after percutaneous coronary intervention
Xiaofang Tang, Jinqing Yuan, Yuejin Yang
Department of cardiology, Fuwai Hospital

Objective Chinese people carry more often CYP2C19 loss-of-function alleles than Caucasian. Effect of the ABCB1 and PON1 variants on platelet reactivity and clinical outcomes of clopidogrel has not been reported in Chinese patients after percutaneous coronary intervention. The aim of this study was to investigate the effect of the CYP2C19, ABCB1, and PON1 variants on pharmacodynamics and clinical outcomes of clopidogrel in these patients.

Methods 670 Patients after angioplasty and stenting were enrolled in a single-center registry. The antiplatelet effect of clopidogrel was assessed by thrombelastography and the CYP2C19, ABCB1, and PON1 genotypes were detected by the ligase detection reaction. Primary clinical endpoints included cardiovascular death, nonfatal myocardial infarction, target vessel revascularization, and stent thrombosis. The secondary clinical endpoints were TIMI major or minor bleeding. The follow-up period was 12 months.

Result The frequency of the CYP2C19 LOF alleles was relatively high (57.3%, n = 384; *2/*17 = 2, *3/*17 = 1, *1/*2 = 249, *1/*3 = 56, *2/*2 = 60, *2/*3 = 15, and *3/*3 = 1), and the CYP2C19 gain-of-function allele frequency was relatively low (0.925%, *1/*17 = 10). Platelet reactivity increased proportionally with the number of CYP2C19 LOF alleles. The risk of clopidogrel low response (CLR) also increased with the number of CYP2C19 LOF alleles [1 LOF allele: odds ratio (OR) 1.9, 95% confidence interval (CI) 1.2 – 3.0, P = 0.008; 2 LOF alleles: OR 3.7, 95% CI 2.0 – 6.8, P < 0.001]. Platelet reactivity and the rate of CLR did not differ between the CYP2C19*2 and *3 alleles. In addition, primary clinical events increased with the number of CYP2C19 LOF alleles: compared with noncarriers, carriers of 1 LOF allele [hazard ratio (HR) 2.7, 95% CI 0.96 – 7.42, P = 0.061] and 2 LOF alleles [HR 5.2, 95% CI 1.64 – 16.35, P = 0.005] were associated with primary clinical events. The clinical impacts of the CYP2C19*2 and *3 alleles were not different. The ABCB1 C3435T and PON1 Q192R alleles were not related to clopidogrel response and primary clinical events. Bleeding was not significantly different across the CYP2C19, ABCB1, and PON1 genotype groups.

Conclusion The CYP2C19 loss-of-function alleles had a gene–dose effect on the pharmacodynamics and adverse clinical events of clopidogrel in Chinese population after percutaneous coronary intervention. Neither ABCB1 nor PON1 genotypes significantly influenced on antiplatelet effect or clinical outcomes of clopidogrel in these patients.

Clinical feature of cor triatriatum in 23 cases
Po Zhang, Xianyang Zhu
Department of Congenital Heart Disease, Cardiovascular research institute of PLA, General Hospital of Shenyang Military Command, Shenyang City, China. 110016

Background To summarize the data of clinical feature, accompanied abnormalities and imaging diagnosis of cor triatriatum in 23 cases enlisted in the study.

Methods From Jan. 1993 to Jun. 2005, twenty-three patients, 13 males and 10 females with a mean age of (9.6 ± 10.0) years (range 0.3 from 38 years) were studied. All cases were cor triatriatum laeux. Twenty-one of 23 patients were identified in surgery. Complete cor triatriatum in 15 case and incomplete cor triatriatum in 6.

Result Echocardiogram diagnosed 12 in 23 cases before surgery. Heart catheter exam diagnosed 10 cases. Sixteen of 21 cases accompanied other abnormalities. Main malformations included atrial septal defect (n = 14), partial anomalous pulmonary venous drainage (n = 6), pulmonary stenosis (n = 3), persistent left superior vena cava (n = 3). Seven of 21 patients had no atrial septal defect.

Conclusion Cor triatriatum had great variation in clinical feature and complicated other malformations in high ratio. Color doppler imaging has high worthiness of diagnosis of cor triatriatum, but misdiagnosis and missed diagnosis rate is high in cor triatriatum accompanied other malformations. Heart catheter exam have missed diagnosis to cor triatriatum, but have higher diagnosis rate to accompanied abnormalities. Surgical exploration is very important in cor triatriatum accompanied other malformations.

Effect of coexisting polymorphisms of CYP2C19 and P2Y12 on pharmacodynamics and adverse clinical events of clopidogrel in Chinese patients with acute coronary syndromes after percutaneous coronary intervention
Xiaofang Tang, Jinqing Yuan, Yuejin Yang
Department of cardiology, Fuwai Hospital

Background CYP2C19 G681A single polymorphism had been proved to effect on clopidogrel responsiveness. However, the effect of coexisting polymorphisms of the genes has not yet been reported in Chinese population. The present study investigated the effect of coexisting polymorphisms of CYP2C19 and P2Y12 on clopidogrel pharmacodynamics and adverse clinical events in Chinese patients with acute coronary syndromes (ACS) undergoing percutaneous coronary intervention (PCI).

Methods 577 Chinese Han patients with ACS undergoing PCI were enrolled in a single-center registry. The platelet reactivity was assessed by thrombelastography and the CYP2C19 G681A and P2Y12 C34T polymorphisms were detected by the ligase detection reaction. Primary clinical endpoints included cardiovascular death, nonfatal myocardial infarction, target vessel revascularization, and stent thrombosis. The secondary clinical endpoints were thrombolysis in myocardial infarction bleeding. The follow-up period was 12 months.

Result Genotyping revealed 194 carriers of the wild GG genotype of
CYP2C19 and the wild CC genotype of P2Y12 (group 1), 102 carriers of the wild GG genotype of CYP2C19 and the mutational T allele of P2Y12 (group 2), 163 carriers of the mutational A allele of CYP2C19 and the wild CC genotype of P2Y12 (group 3) and 118 carriers of the mutational A allele of CYP2C19 and the mutational T allele of P2Y12 (group 4). Group 4 had the lowest ADP-inhibition (49.74 ± 32.61) and the highest prevalence of clopidogrel low response (29.7%) than other groups. The rate of the composite primary endpoints increased more significantly in group 4 (8.5%) than in other groups; the rate of composite primary endpoints in group 2 (2.9%) and 3 (3.7%) had no significant compared with group 1 (1.5%).

Conclusion Coexisting, better than single polymorphisms of different genes affected on clopidogrel pharmacodynamics and adverse clinical events in Chinese patients with pts undergoing PCI.

Initial experience of occluding special type patent ductus arteriosus using the Amplatzer vascular plug

Po Zhang, Xianyang Zhu
Department of Congenital Heart Disease, Cardiovascular research institute of PLA, General Hospital of Shenyang Military Co mmend, Shenyang Cty, China. 110016

Background Occluders licensed for clinical use are not fit for some special Krichenko E patent ductus arteriosus (PDA). The Amplatzer vascular plug I (Plug I) has not been licensed for use for closure of PDA. We report our initial experience to occluding special type PDA with the Plug I.

Methods Patients referred with small and long Krichenko E PDA 1-3 mm in diameter underwent occlusion using this Plug I, this is a single lobe device of single layer Nitinol mesh for short vessel landing zones. All cases underwent pre-, intra- and post-procedural echocardiography at the completion of the procedure the next day and at a 30-day follow-up visit. Device sizing for device waist diameter and length was based on aortography.

Result 26 patients with a median age of 5 years (range 6 months – 32 years) and a median weight of 19 kg (range 7 – 67 kg) underwent successful PDA closure. The median ductus diameter was 2.2 mm (range 1 – 3 mm). Both transpulmonary (22/26) and transaortic approaches (4/26) were used. No persistent patency was observed after 24 hours and one month.

Conclusion The Plug I makes it easy to close some Krichenko E PDAs. Smaller delivery catheter profile and symmectric cylindrical device shape allow for use for small and long Krichenko E PDA 1 – 3 mm in diameter and small patients through transaortic approaches. Broader experience is required to further delineate device and patient selection as well as to document its long-term efficacy and safety.

Clinical analysis of treatment for 1149 cases of membranous ventricular septal defect by interventional therapy in children

Xianyang Zhu, Chunsheng Cui, Duanzhen Zhang, Qiguang Wang, Huoyuan Chen, Xiaotang Sheng, Junjun Gu, Po Zhang, Chuanju Hou
General Hospital of Shenyang military region, Department of congenital heart disease

Background To assess the characteristics and clinical experience of treatment for pediatric ventricular septal defect by interventional therapy.

Methods We collected 1149 children with Vs D who received interventional therapy from 2001 June to 2012 February. There were 578 males and 571 females, age 2.5 – 16 (6.8 ± 3.1) years old and weight 8-54 (24.7 ± 10.6) kg. III – IV systolic regurgitant murmur could be heard at left sternal border between 3-4 intercostal space, pulmonic second sound enhanced or split. UCG showed the diameter of Vs D was 2 – 8 (4.3 ± 1.1) mm. Left ventricular angiography showed the left ventricular surface is 4 – 20 (6.38 ± 3.17) mm, right ventricular surface is 3 – 10 (3.81 ± 1.75) mm and the distance from upper Vs D margin to aortic valve is 0 – 6 (2.67 ± 1.61) mm. 464 patients combined with membranous ventricular septal aneurysm, 15 patients combined with patent ductus arteriosus, 16 patients combined with atrial septal defect and 4 patients combined with muscular Vs D.

Result The closure was successful conducted in 1125 patients and the success rate was 98.2%. The diameters of occluder were 4-16 (7.56 ± 2.12) mm. The patients who combined with PDA or ASD, Vs D was fisted closed and then PDA or ASD. The patients combined with muscular Vs D received occlusion simultaneously. 1061 patients (94.3%) had no shunt instantly, 38 patients (3.4%) had a small shunt and 26 patients (2.3%) had a trace of shunt. 1 cases of postoperative occluder shedding and the occluder was removed and patient received surgical repair of ventricular septal defect. 11 cases of postoperative closure AVB, 1 patient underwent surgical operation and the rest recovered. 1 patient had AVB degree AVB 3 years after the occlusion and returned to normal after treatment. 75 cases of complete left bundle branch block, 3 patients did not recovered in the follow up and the rest became normal or not complete left bundle branch block. 1 cases of postoperative hematuria and the symptom disappeared after treatment.

Conclusion Strictly indications, standardized operation, proficient skill are the keys to reduce complications and improve the success rate in interventional therapy of Vs D. Occlusion of pediatric membrane Vs D is a safe, reliable, effective treatment. But its long-term efficacy still need long-term follow-up.

Association between P2Y12 platelet receptor (C34T and G52T) polymorphisms and risk of cardiovascular events in coronary heart disease with clopidogrel in Chinese

Xiaofang Tang, Jingjing Yuan, Yuejin Yang
Department of cardiology, Fu wai Hospital

Background Recent datas have implicated a haplotype of P2Y12 platelet receptor, as potential risk determinant for atherothrombosis. We wanted to investigate whether the platelet P2Y12 receptor polymorphisms affected long-term prognosis of Chinese patients who were treated with clopidogrel after percutaneous coronary intervention (PCI).

Methods Between Nov. 1, 2008 and Nov. 31, 2009, 268 Patients who received PCI and were exposed to clopidogrel treatment for almost 12 months, were enrolled in Hospital and underwent P2Y12 (G52T and C34T) determination. Follow-up was 12 months. The primary endpoint was a composite of death, myocardial infarction, urgent coronary revascularisation and stent thrombosis occurring during exposure to clopidogrel.

Result The patients were grouped H1/H1 (n = 195) and H2 carriers (H1/H2 and H2/H2, n = 73) by P2Y12 G52T genotype. Baseline characteristics were balanced between the two groups, except the proportion of H1/H1 is higher than H2 carriers in two vessel lesions (P < 0.05). The combined end points also occurred more frequently in H2
carriers than in H1/H1 (10 vs 9, P < 0.05). There were no significant difference between two groups with myocardial infarction, stent thrombosis, Urgent coronary revascularization and death (P > 0.05). During the following time, cumulative survival of H2 carriers was lower than H1 (HR = 2.543, 95% CI: 1.033 – 6.259, P = 0.042). The patients were also grouped CC genotype (n = 174) and T carriers (CT and TT, n = 94) by P2Y12 C34T genotype. Baseline characteristics were balanced between the two groups. There were no significant difference between two groups with the combined end points and cumulative survival (HR = 1.081, 95% CI: 0.426 – 2.746, P = 0.870).

Conclusion P2Y12 platelet receptor H2 haplotype (G52T) is a major determinant of prognosis in Chinese patients with cardiac heart disease (CHD) who are receiving clopidogrel treatment after PCI. But there is not a strong association between C34T and an increased risk of cardiovascular events in patients with CHD receiving clopidogrel.

Cytochrome P450 2C19 681G > A polymorphism in coronary heart disease patients treated with clopidogrel in Chinese

Xiaofang Tang, Jinjing Yuan, Yuejin Yang
Key Laboratory of Clinical Trial Research in Cardiovascular Drugs, Ministry of Health, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing 100037, P. R. China.

Background The frequent genetic functional variant 681 G>A (*2) of cytochrome P450 2C19 (CYP2C19) is an important contributor to the wide variability between individuals of the antiplatelet effect of clopidogrel. We wanted to investigate whether the CYP2C19*2 polymorphism affected long-term prognosis of Chinese patients who were treated with clopidogrel after percutaneous coronary intervention (PCI).

Methods Between Jan. 1, 2008 and Dec. 31, 2009, 267 Patients who received PCI and were exposed to clopidogrel treatment for almost 12 months, were enrolled in Fu Wai Hospital and underwent CYP2C19*2 determination. Follow-up was 12 months. The primary endpoint was a composite of death, myocardial infarction, urgent coronary revascularisation and stent thrombosis. Occurring during exposure to clopidogrel.

Result The patients were grouped CYP2C19*1/*1 (n = 130), CYP2C19*1/*2 (n = 111) and CYP2C19*2/*2 (n = 26) by genotype, and baseline characteristics were balanced among the three groups. Urgent coronary revascularization occurred more frequently in CYP2C19*2/*2 and CYP2C19*1/*2 than in CYP2C19*1/*1 (3 vs 7 vs 2, P < 0.05). There were no significant difference among three groups with myocardial infarction, stent thrombosis and death (P > 0.05). The combined end points also occurred more frequently in CYP2C19*2/*2 and CYP2C19*1/*2 than in CYP2C19*1/*1 (4 vs 7 vs 3, P < 0.05). During the following time, cumulative survival of CYP2C19*2/*2 was lower than CYP2C19*1/*1 (HR = 5.65, 95% CI: 1.63 – 19.49, P = 0.006). Comparing Cumulative survival of CYP2C19*1/*2 with CYP2C19*1/*1, there were no significant difference (HR = 1.69, 95% CI: 0.53 – 5.36, P = 0.376).

Conclusion CYP2C19*2 genetic variant is a major determinant of prognosis in Chinese patients with cardiac heart disease (CHD) who are receiving clopidogrel treatment after PCI. CYP2C19*2/*2 (homozygous) brings a worse influence than CYP2C19*1/*2 (heterozygous).
percutaneous coronary intervention (PCI), so as to provide a reference to help reduce the risk of its use.

**Methods** By searching the clinical database of Beijing Fuwai CardiovascularHospital, we retrospectively investigated the incidence of iodine contrast induced anaphylactic reaction during PCI, including coronary angiography, in recent 5 years. We described the relationships between the use of the agent and gender, age, clinical manifestation, and the type of the agent, respectively.

**Result** In all of the 79,102 patients who received PCI, 48 patients (0.061%) ended up with anaphylactic reaction. Among them, 44 (0.056%) were males and 4 (0.02%) were females. The risk ratio between male and female was 11. In addition, among all the 5 co mmonly used non-ion iodinated agent, including lohexol, Ioversol, Iopamidol, Iodixanol and Iopromide induced most of the anaphylactic reaction. The clinical manifestation of the anaphylactic reaction varied broadly; in which rash was the most observed and shock was the severest drug adverse reaction. Two patients eventually died of severe anaphylactic reaction.

**Conclusion** In general, non-ion iodinated contrast is safe to use in PCI. However, it is still necessary to carefully monitor the occurrence of its anaphylactic reaction. Early recognition and intervention of its manifestation is very critical to improve the safety of both drug use and PCI.
Conclusion Endovascular repairing combined with prosthesis bypass was a safe and effective method for complex Stanford type B aortic dissection involving the distal arch.

The role of secreted protein NBL1 in pulmonary arterial hypertension associated with systemic–to–pulmonary shunts

Liukun Meng, Xiaoyan Liu, Zhe Zheng, Jun Li, Yingjie Wei, Shenghou Hu
1. State Key Laboratory of Cardiovascular Diseases, Fuwai Hospital, National Center for Cardiovascular Disease, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, Peoples Republic of China
2. Department of Surgery, Fuwai Hospital & Cardiovascular Institute, Chinese Academy of Medical Sciences, Peking Union Medical College, Beijing, Peoples R China

Background Proteins mainly expressed in normal lungs and characterizedly changed in lungs suffering from systemic-to-pulmonary shunts will be useful research targets for pulmonary arterial hypertension in patients with congenital heart diseases (PAH/CHD). Thus, this study aimed to identify secreted proteins that significantly altered during the genesis and progression of PAH/CHD.

Methods An antibody microarray procedure was performed to detect proteins whose plasma levels specifically changed in patients with congenital intracardiac shunts. Then, significantly changed proteins were identified and the target protein NBL1 was determined. Real-time quantitative PCR (RT-PCR), western-blot analysis and immunohistochemistry were performed to further examine the expression changes and location of NBL1 in lungs from patients with systemic-to-pulmonary shunts; the potentially biological role of NBL1 on HPASMCs and HPAECs proliferation were also explored. The plasma NBL1 concentration in a set of 120 patients with or without PAH was assessed by a commercially available enzyme-linked immunosorbent assay.

Result The antibody microarray procedure derived several proteins with a statistically significant difference between patients with or without PAH. Secreted protein NBL1, which appeared as a valuable candidate for molecular markers of PAH, was selected for validation. Quantitative RT-PCR analysis revealed that NBL1 was expressed with much higher specificity in normal lung tissues than in other systemic organs tissues, and the mRAN level was down regulated in a time-related modus in lungs suffering from systemic-to-pulmonary shunts; the potentially biological role of NBL1 on HPASMCs and HPAECs proliferation were also explored. The plasma NBL1 concentration in a set of 120 patients with or without PAH was assessed by a commercially available enzyme-linked immunosorbent assay.

Conclusion NBL1 is a secreted protein that is highly and mainly expressed in lungs. Down regulation of NBL1 correlated with the severity of PAH. NBL1 might be a candidate biomarker and a novel therapeutic target for PAH/CHD.

Objective To study retrospectively 50 children with anomalous origin of the left coronary artery from the pulmonary artery (ALCAPA) and to try to find the practical indexes that may predict myocardial viability and the possible risk factors that may affect the choice of operation and the recovery after surgery.

Methods A retrospective study was performed in 50 children with ALCAPA between April 1999 and March 2013. The extent of myocardial viability was classified by myocardial 18F-FDG imaging and the global clinical scores calculated by the deviations of clinical manifestations at 15 patients with myocardial 18F-FDG imaging. The relationships between them were evaluated. Then all patients were divided into two groups by the global clinical scores and the pre-, peri- and post operative clinical manifestations were compared between them.

Result The extent of myocardial viability of 15 patients with myocardial 18F-FDG imaging was classified into four grades. Meanwhile, the global clinical scores were calculated and their relationship was analyzed. The global clinical scores showed high correlation with the extent of myocardial viability. All patients then were divided into two groups (group 1: scores ≤ 3, group 2: scores > 3), and the pre-, peri- and post operative clinical manifestations were compared between them. More infants and toddlers, abnormal Q waves, ICC dysplasia, RCA/AO.

Conclusion In children with ALCAPA, the extent of myocardial viability evaluated by myocardial 18F-FDG imaging is related closely to the global clinical scores. Even in young children with severely depressed left ventricular function, higher global clinical scores, median and long-term follow-up showed satisfactory recovery of cardiac function after successful restoration of a dual coronary arterial system.

Objective To summarize the arterial switch operation surgical Methods and Result analysis

Xing Zhang
Department of Ward 2, Pediatric Cardiac Surgery, cardiovascular institute and Fuwai Hospital, CAMS, Beijing, 100037, China

Children with 230 cases of arterial switch operation surgical Methods and Result analysis

To study retrospectively 50 children with anomalous origin of the left coronary artery from the pulmonary artery and follow-up after surgery

Huilizhang, Shoujun Li, Shenghou Hu, Xiangdan Shen, Jun Yan, Xu Wang, Zhongdong Hua
Department of Cardiac Surgery, Cardiovascular Institute and Fuwai Hospital, National Center for Cardiovascular Disease, Chinese Academy of Medical Science and Peking Union Medical College

Preoperative evaluation of 50 children with anomalous origin of the left coronary artery from the pulmonary artery and follow-up after surgery

Children with 230 cases of arterial switch operation surgical Methods and Result analysis

Xing Zhang
Department of Ward 2, Pediatric Cardiac Surgery, cardiovascular institute and Fuwai Hospital, CAMS, Beijing, 100037, China

Objective To summarize the arterial switch operation surgical Methods and Result analysis

Children with 230 cases of arterial switch operation surgical Methods and Result analysis

Xing Zhang
Department of Ward 2, Pediatric Cardiac Surgery, cardiovascular institute and Fuwai Hospital, CAMS, Beijing, 100037, China

Objective To summarize the arterial switch operation surgical Methods and Result analysis

Methods Retrospective analysis between August 2008 and October 2008, 230 underwent arterial switch operation, male 172 cases, 58 cases were female. 3 d – 11 years old; 2.1 – 25 kg weight. Simple arteries transposition of 75 cases, 105 cases complicated arteries transposition, Taussing - Bing deformity 50 cases. Using Leiden coronary artery type method, ILCx2R as coronary artery normal distribution, a total of 198 cases, and other types of coronary artery anomaly distribution, a total of 32 cases, including 4 cases of Intramural course of coronary artery. In most patients the"open trap door" and "double button" technique for coronary ostia transfer. Children are applying The Lecompte maneuver was used in all cases.
Result 20 cases (8.7%) died operation mortality. Normal coronary death 15 cases (7.6%, 15/198), coronary artery anomalies distribution in 5 cases died (15.6%, 5/32). Simple TGA death 6 cases, 4 cases of coronary events, including 2 cases of coronary artery variation and complex TGA died 9 cases, 7 cases of coronary events, including 2 cases of coronary artery variations, Taussing - Bing malformation in 4 of 5 cases died coronary events, including 1 case of coronary artery variation.

Conclusion With the progress of surgical technique and experience accumulation, improve surgical mortality compared with the previous, but complex coronary artery type is still the independent risk factors of surgical death.

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Clinical characteristics of patients with left ventricular thrombus after acute myocardial infarction

Yuexin Jiang, Youhong Jia
Key Laboratory of Clinical Trial Research in Cardiovascular Drugs, Ministry of Health, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Science and Peking Union Medical College, Beijing, 100037, P. R. China

Purpose To investigate clinical outcome of left ventricular thrombus (LVT) after acute myocardial infarction (AMI).

Methods We retrospectively assessed all cases with LVT after AMI in Fuwai Hospital from January 2007 to February 2012. During this period, 8220 patients were diagnose with STEMI, 82 of which had a definitive diagnosis of LVT, detected by imaging or operative findings. Adverse events were followed-up by phone calls (69.2%).

Result LVT was detected in 82 of 8220 AMI patients (0.998%). Those 82 patients, of which 76 were men and 6 were women, were averagely aged 54.68 ± 11.63 y. Killip classification: 14 patients (17.1%) in Killip class I, 10 patients (12.2%) in Killip class II, 23 patients (28.0%) in Killip class III, and 35 patients (42.7%) in Killip class IV. Eighty-two patients had a LVT detected in the first week of acute phase of AMI, 13 of which were occur in the first 48 hours, while the farthest we could detect was at the 101 day after AMI. The shapes of LVT were all dense mural mass or trabs, except for 1 was rarefaction, and 1 was moyamoya. All of the thrombus (95.6%, 68) was located in apex of left ventricle, 80% patients (24, 60) patients with a LVEF lower than 40%.

Conclusion With the progress of surgical technique and experience accumulation, improve surgical mortality compared with the previous, but complex coronary artery type is still the independent risk factors of surgical death.

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Thyroid status, cardiac function and mortality in patients with idiopathic dilated cardiomyopathy

Wenyao Wang, Yi-Da Tang, Yang Guo, Xun Yuan, Min Yang, Xuan Zhang, Mu Mu, Yuejin Yang
State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China

Background Previous studies claiming the relationship between thyroid dysfunction and poor prognosis of heart failure had a major limitation that they included patients with different etiology. With full information of thyroid function profile from four hundred and fifty eight consecutive patients with idiopathic dilated cardiomyopathy, we tested the hypothesis that thyroid status can independently influence the mortality in patients with heart failure.

Methods The original cohort consisted of 532 consecutive patients with idiopathic dilated cardiomyopathy. All the patients took thyroid function test and other regular examinations in hospital, and we perform the follow-up through phone contact with patients, examining patients' hospital records or periodically review of patients in outpatient clinic. The risk of mortality was evaluated based on T3, TSH, and the whole thyroid function profile, respectively.

Result At the end of follow-up, 458 patients remained in the cohort. The most frequent thyroid dysfunction was subclinical hypothyroidism (Schypo, n = 41), followed by subclinical hyperthyroidism (Schypo, n = 35), euthyroid sick syndrome (ESS, n = 17), and hypothyroidism (Hypo, n = 12). Compared with NYHA class I group, FT3 was lower in class II group (2.89 ± 0.45 vs 2.67 ± 0.55, P = 0.035) and log-TSH was higher (2.17 ± 0.36 vs 2.30 ± 0.45, P = 0.005). Logistic analysis showed log-TSH and fT3 as independent predictors of exacerbated cardiac function (NYHA III - IV vs NYHA I - II ). During the follow-up (17 ± 8 months), there were 111 cumulative deaths. Hypothyroidism was the strongest predictor of mortality (HR, 4.189; 95% CI, 2.118 – 8.283), followed by ESS (HR, 3.147; 95% CI, 1.558 – 6.355) and Schypo (HR, 2.869; 95% CI, 1.817 – 4.532). Schypo showed no significant impact.

Conclusion We found clear association between an increased risk of death in HF caused by IDCM and thyroid dysfunction (ESS, Schypo, and Hypo). These result suggest that monitoring thyroid function in HF patients is necessary and further study about treatment is warranted.
Effects of statin on serum markers and cardiac dyssynchrony in patients with chronic nonischemic heart failure

Rongcheng Zhang, Yuhui Zhang, Tao An, Tian Wang, Jian Zhang
1. State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China
2. Shandong Jiaotong Hospital, Jinan, China
3. Fu Wai Hospital, National Center for Cardiovascular Disease, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, China
4. Lanzhou Jiaotong University, Lanzhou 730000, China

Objective To explore a new treatment of heart failure, we investigated the effects of statin on serum markers and parameters of cardiac dyssynchrony in patients with chronic nonischemic heart failure.

Methods 85 patients with chronic nonischemic heart failure were enrolled in this study and were randomized into statin group (29 males and 13 females) and control group (31 males and 12 females). All of the patients received conventional treatment with digitalis, diuretic, nitrates, β-blocker and angiotensin converting enzyme inhibitor according to heart failure treatment guideline. Patients in statin group were additionally given simvastatin 40 mg or atorvastatin 10 mg when they met the inclusion criteria. N-terminal pro-brain natriuretic peptide (NT-proBNP), C-reactive protein (CRP), and echocardiography parameters including left ventricular ejection fraction (LVEF), left ventricular end-diastolic dimension (LVEDd) and ventricular dyssynchrony were evaluated at baseline, 1st month and 6th month after enrollment.

Result Statin therapy exerted no effects on the concentrations of NT-proBNP and CRP after 6 months follow up. Systolic velocities (Sm) and early diastolic mitral annulus velocities (Ea) at lateral annulus in statin group were significantly higher compared with those in control group at 6th month (P < 0.05). Interventricular mechanical delay (IVMD), standard deviation of time to peak myocardial systolic velocity of all 12 left ventricular segments (Ts−12SD) in statin group were significantly lower than those in control group at 6th month (P < 0.05).

Conclusion Statin therapy can improve the long-term effects on synchronization of inter-and intra-ventricular in patients with chronic nonischemic heart failure.

The efficacy and safety of transradial approach PCI Vs femoral approach PCI for coronary heart disease

Jun Pang, Na Li, Min Bai, Xianmin Meng, Zengyin Wu, Yali Yao, Jin Zhang, Qiang Li, Yu Peng, Zheng Zhang
1. Department of Cardiology, the First Hospital of Lanzhou University, Lanzhou 730000, China
2. Fu Wai Hospital, National Center for Cardiovascular Disease, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, China

Objective To evaluate the efficacy and safety of transradial approach PCI Vs femoral approach PCI for coronary artery disease.

Methods We searched PubMed, Embase, Cochrane Library, CNKI, VIPHI and Wanfang database, the deadline of retrieval time is March 2013. We include the RCT trials that report transradial approach PCI Vs femoral approach PCI for acute myocardial infarction. Two researchers included extracted data and evaluate the quality of the included studies according to the Cochrane Handbook 5.0.2 Quality evaluation criteria.

Result we finally included 26 English RCT (total 678 175 patients, covering 54 322 cases of radial PCI and 623, 853 cases of femoral PCI. Meta-analysis shows: In the index of PCI success rate (OR = 1.46, 95% CI: 0.60 – 3.58), all-cause mortality (OR = 1.01, 95% CI: 0.58 – 1.75), the recurrence of myocardial infarction within one year after PCI (OR = 0.68, 95% CI: 0.44 – 1.03), PCI operative time (radial PCI group means (40.5 ± 19.3) min, femoral PCI group means (51.3 ± 28.7) min, OR = -1.29, 95% CI: -2.95 – 0.38), and stroke (OR = 0.87, 95% CI: 0.73 – 1.03), the incidence of thrombosis (OR = 0.60, 95% CI: 0.33 – 1.09), the radial PCI group is similar with femoral PCI group. However, in the index that the postoperative vascular complications (OR = 0.52, 95% CI: 0.36 – 0.76) and hospital stay [radial PCI group means (3.0 ± 1.6) days, femoral PCI group means (6.1 ± 3.1) days, OR = -3.32, 95% CI: -6.52 – -0.13], the radial PCI group is better than the femoral PCI group, with a statistically significant difference (P < 0.05).

Conclusion Compared with the traditional femoral PCI, radial PCI have less postoperative vascular complications, shorter hospital stays, and at the same time, have similar effects in PCI success rate, all-cause mortality and less cardiovascular events incidence than femoral PCI. So radial PCI can be effective and safe method in the treatment of coronary heart disease. Taking into account the limitations of the meta-analysis, multi-center, double-blind and large sample RCTs are needed to provide a higher level of evidence.

Efficacy and safety of clopidogrel added proton pump inhibitors vs clopidogrel in the treatment of cardiovascular patients after PCI

Jun Pang1, Qiqi He2, Hongling Zhang1, Na Li3, Zhongyuan Mu1, Min Bai1, Dun Qian1, Zheng Zhang1
1. Department of Cardiology, the First Hospital of Lanzhou University, Lanzhou 730000, China
2. The Second Hospital of Lanzhou University, Lanzhou 730000, China
3. Fu Wai Hospital, National Center for Cardiovascular Disease, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, China

Objective To evaluate the efficacy and safety of clopidogrel added proton pump inhibitors vs clopidogrel in the treatment of cardiovascular patients after PCI.

Methods We search MEDLINE, EMBASE, Cochrane Library and conference databanks, the retrieval time is ended until October 2012. We selected the clinical trials which is evaluated efficacy and safety of clopidogrel added proton pump inhibitors vs clopidogrel in the treatment of cardiovascular patients after PCI and evaluate the quality of clinical trials following the Cochrane Handbook 5.0.2 the quality evaluation criteria of evaluation included in the research quality. And the datas are solved by the RevMan 5.0 software.

Result Our review included 13 RCT covering 55592 patients. meta-analysis Result show there is no statistical difference among incidence of MACE (OR = 1.19, 95% CI: 0.92 – 1.55), the rate of All-cause mortality (OR = 1.13, 95% CI: 0.83 – 1.52), and the rate of gastrointestinal bleeding (OR = 1.11, 95% CI: 0.48 – 2.55) in clopidogrel added Proton Pump Inhibitor (PPI) group or clopidogrel group. While there is low incidence rates of myocardial infarction, stent thrombosis, Target Vessel Revascularization (TVR).

Conclusion The incidence rate of MACE, stent thrombosis, and gastrointestinal bleeding is similar in added or not added PPI patients. Considering population limitations of our research, better evidence
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should be offered by multicenter, large sample and double blind RCT researches in the future.

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**Infective endocarditis caused by a heart-breaking needle: a case report**

Shaodong Ye, Lin Li, Lei Feng, Shiyun Wang, Guogan Wang
Cardiovascular Institute & Fuwai Hospital Department of Cardiovascular Medicine

Endocarditis is often caused by severe infection and defect structure of heart, which is difficult to control and most of the patients need surgical treatment. Here is infective endocarditis caused by foreign body, developing cerebral infarction, which have many clinical contradictions in the therapeutic process.

A 48 years old female patient was admitted complaining of persistent productive cough with fever in 3 months. She was diagnosed by local hospital with upper respiratory tract infection, and was administered with anti-virus and anti-bacterium drug. She had lost consciousness in a short time with encephalitis and left skewing lips 20 days ago, and regained consciousness in 4 minutes.

Cerebral CT were repeat to determine a enlarging infarction area. Chest CT performs a foreign body in the base of lopus inferior pulmonis sinister and left ventricle, inflamation of lopus inferior pulmonis sinister. She had a history of sporadic encephalitis and anti body piercing history of prothorax. Echocardiogram shows medium echogenic mass in left ventricle, 21 × 11 mm, attaching to the anterolateral papillary muscle attachment points, without a clear border but uneven echo and some calcifications, which have a big mobility. Chest X ray shows a metal short rod-like foreign body in left inferior pulmonary and heart shadow. Chest CT scan shows stick-like metal shadow in left inferior pulmonary beside the border of the heart. During hospitalization, the patient present a numbness of left arm and left skewing lips. Cerebral CT shows multiple new infarction areas.

5 days after the infarction, surgery was taken to take off the foreign body. In the process, the metal foreign body was showed to present at the bottom of the anterior papillary muscle and go throw the left ventricular free wall to the lung, performing a calcified sinus. Vegetation located at the bottom of papillary muscle and the pericardium side of the heart. There were 3 segments of metal foreign body totally. The patients have a difficulty in anesthesia recovery, which took three days to regain consciousness. The antibiotic therapy continued after 1 month of the surgery. The patient had a satisfied recovery and was discharged.

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**The effects of fractional flow reserve guided percutaneous coronary intervention: a systematic review and meta-analysis from comparative studies**

Jichui Li, Kun Hua, Xiubin Yang
Department of Cardiac Surgery, Fuwai Hospital, National Center for Cardiovascular Diseases, Peking Union Medical College and Chinese Academy of Medical Sciences

Myocardial fractional flow reserve has performed more and more popular at present. Clinicians use it to guide the percutaneous coronary intervention. The effect of FFR in the therapy of coronary artery disease needs to evaluate. We intend to perform a systematic review and meta-analysis of studies reporting clinical outcomes of FFR-guided PCI vs angiography-guided PCI.

**Methods** We searched PubMed from the beginning of this century to March, 2010, and also identified abstracts published at this period. Prospective and retrospective studies were all included in for analysis if data for two strategies guided PCI were available.

**Result** In published data from 4 trials (9 203 patients, 1 874 for FFR-guided PCI, 7 329 for angiography), we could conclude that the FFR-guided strategy of PCI could reduce the rate of MACE (OR = 0.53, 95% CI, 0.39 – 0.73)) and its components such as death (OR = 0.71, 95% CI, 0.45 – 1.12), myocardial ischemia (OR = 0.51, 95% CI, 0.36 – 0.71), and repeat revascularization (OR = 0.53, 95% CI, 0.39 – 0.73). We could conclude that the FFR-guided strategy of PCI could also limit the usage of stents and reduce the cost of hospitalization relatively.

**Conclusion** The FFR-guided strategy performs much better than angiograph-guided. Being the examination guiding the myocardial revascularization at present, although it has several aspects to improve and refine, FFR has open a new era of incomplete revascularization of the interventions to coronary artery disease. And its systematic use will make PCI more effective and appropriate than at present.

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**Distribution of clopidogrel metabolism related gene polymorphisms among Chinese ACS patients**

Tao Chen, Ying Bai, Guangxun Feng, Yan Liang, Jun Zhu
Emergency Department, Fuwai Hospital and Cardiovascular Institute, Peking Union Medical University and Chinese Academy of Medical Science, 137 Beilishi Road, Beijing, China

**Objective** To detect distribution of clopidogrel metabolism related gene polymorphisms CYP2C19, ABCB1 and PON1 in Chinese ACS patients.

**Methods** Patients admitted to Fuwai Hospital from 2005 to 2008 with ACS within 4 weeks (30 days) were enrolled. All had informed consents for gene samples. The detection of gene polymorphisms was performed by Tquman Systems through PCR-RFLP. The alleles genotyped were CYP2C19 *2-*8, *17, ABCB1 and PON1. Patients were classified as one of the 5 categories by metabolizer phenotypes as Extensive [without any “loss-of-function” (LOF) allele *2-*8 or “gain-of-function” (GOF) allele *17], Intermediate (with only one LOF allele), Poor (with two or more LOF alleles), Ultra (with one or two GOF alleles) or Unknown (with one LOF allele and one GOF allele).

**Result** A total of 2800 Chinese ACS patients were enrolled with age of 59.0 ± 12.3 years and 79.9% males. The diagnosis proportion was STEMI in 74% enrolled patients, NSTEMI in 22.0% and UA in 4.0%. The minor allele frequency (MAF) for each genotype of CYP 2C19 *2, *3, *4, *17 were 28.7%, 4.6%, 0.1% and 1.2%, respectively. No LOF allele *5-*8 were found in this population. The MAF for ABCB1 and PON1 Q192R were 39.4% and 37.8%. Patient clopidogrel metabolism groups were defined as Extensive in 41.7% enrolled patients, Intermediate in 45.6%, Poor in 10.3%, Ultra in 1.9% and Unknown in 0.6% respectively. There were no significant differences for all genotypes between males and females. Total LOF carriers of CYP 2C19 were 56.4% and GOF carriers were 2.5%.

**Conclusion** Our study reflected the distribution of CYP 2C19, ABCB1 and PON1 gene polymorphisms in Chinese ACS patients. Compared to the Caucasians, it seems LOF genotypes of CYP 2C19 alleles more co mmon in Chinese. Further exploration is needed to clarify the relation between genotypes and clinical outcomes in Chinese patients.
Case report: takotsubo cardiomyopathy
Xiao Guo, Bingqi Wei, Jian Zhang
Fuwai Hospital & CAMS, Heart Failure Care Unit

Case report: A 71-year-old woman presented to the emergency department with a 2 day history of chest pain. An electrocardiogram of local hospital showed elevated ST-segment of V2 – V5 leads. Cardiac enzymes were negative. She was diagnosed of “acute myocardial infarction of anterior wall” by local hospital and was transferred to ER. The patient had a 20 years history of hypertension and 10 years history of type 2 diabetes mellitus. ECG showed sinus tachycardia with frequent ventricular premature beat and 1 – 3 mm ST elevation in leads V2 through V5. Emergent CAG was normal. Left ventriculography was hypokinesis of apical segments with anterior and inferior wall in a Takotsubo pattern. LVEF was 36.2%. Repeat left ventriculography 4 weeks later showed improvement of previously-noted wall motion abnormalities with a normal ejection fraction of 63.6%. Takotsubo cardiomyopathy, or stress cardiomyopathy, a seemingly rare but in fact underrecognized transient left ventricular dysfunction, is a clinical entity mimicking an acute coronary syndrome. The clinical picture and electrocardiographic findings usually are indistinguishable from those of an acute coronary syndrome. Cardiac imaging studies usually reveal extensive apical and mid-ventricular akinesis or hypokinesis with basal sparing, discordant with minimally increased cardiac enzymes. These wall motion abnormalities typically extend beyond the vascular territory of a single coronary artery. Coronary angiography is necessary to differentiate ACS. The prognosis of TTC is good, with full recovery of cardiac function within 2 – 4 weeks in most of the cases.

External carotid artery stenting in patients with ipsilateral internal carotid artery occlusion: early and long-term Result
Hui Dong, Xiongqing Jiang, Yu-bao Zou, Ting Guan, Tuo Liang, Meng Peng, Yuejin Yang, Runlin Gao
Hypertension Center, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing 100037

Objective External carotid artery (ECA) remains one of the most important sources of collateral circulation to brain in patients with ipsilateral carotid artery occlusion (ICA) and the impairment of this collateral due to atherosclerotic stenosis may exacerbate preexisting neurological ischemia. ECA revascularization to normalize ECA collaterals to cerebral could alleviate neurological symptoms and provide conditions for subsequent additional procedures. The purpose of this study was to evaluate the safety and clinical efficacy of ECA stenting in patients with ipsilateral ICA.

Methods From January 2008 to December 2012, the clinical data of 237 consecutive patients with coexistent carotid and coronary artery disease undergoing CAS in Fuwai hospital from January 2005 to June 2010 were collected and analyzed retrospectively. Indication for CAS was defined as carotid artery diameter reduction of > 60% (symptomatic) or > 80% (asymptomatic). 30-day rates of stroke, death and myocardial infarction after CAS were assessed.

Result The patients were 43 – 82 (66.1 ± 7.7) years old, there were 189 (79.7%) male. All patients suffered from coronary artery disease, of whom 87 (36.7%) had unstable angina pectoris and 82 (34.6%) had recent myocardial infarction ( < 30 d). The procedural success rate of CAS was 99.2% (235/237). Cerebral protection devices were used in 234 patients (99.6%). Among them, 36 (15.2%) patients received simultaneous bilateral CAS and 79 (33.3%) patients underwent simultaneous percutaneous intervention of other arteries. Within 30 days after CAS, 127 (53.6%) patients underwent coronary revascularization, including 118 (49.6%) coronary artery bypass grafting and 9 (3.8%) percutaneous coronary intervention. The rate of major stroke, minor stroke, death and MI from time of CAS to 30 days was 2.1%, 3.0%, 0.4% and 0.4% respectively.

Conclusion This study indicated that CAS was safe and effective with a low incidence of periprocedural complications in patients with coexistent carotid and coronary artery disease.

In ECA stenting procedures, 2 (12.5%) patients suffered from hemodynamic depression during balloon dilation and recovered completely within 2 days after receiving additional fluids and vasoppressor drugs. 10 (62.5%) patients underwent percutaneous intervention of other arteries, including 7 (43.8%) contralateral internal carotid arteries, 4 (25.0%) vertebral arteries, 5 (31.3%) renal arteries simultaneously. There were no severe adverse events occurring in perioperative period. After ECA stenting, 5 patients underwent CABG within 30 days with no sequelae. During an average of 46 months follow-up, one patient suffered from contralateral minor stroke and the other 15 patients remain asymptomatic. There were no other adverse events occurring at follow up. In addition, carotid ultrasonography was examined in all patients and showed that two patients developed a 50% in-stent restenosis in ipsilateral ECA, which did not result in recurrent neurological symptoms.

Conclusion ECA stenting may improve neurological symptoms including signs of transient ischemic attack, stroke, and amaurosis fugax in a follow-up of 46 months, and provide conditions for subsequent cardiac surgery, with a favorable mortality and morbidity. ECA stenting may be a promising therapeutic strategy for patients with ipsilateral ICA occlusion.

Safety and feasibility of carotid artery stenting in patients with coexistent carotid and coronary artery disease
Hui Dong, Xiongqing Jiang, Yu-bao Zou, Ting Guan, Tuo Liang, Meng Peng, Yuejin Yang, Runlin Gao
Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing 100037

Objective To evaluate the safety and feasibility of carotid artery stenting (CAS) for treating patients with coexistent carotid and coronary artery disease.

Methods The clinical data of 237 consecutive patients with coexistent carotid and coronary artery disease undergoing CAS in Fuwai hospital from January 2005 to June 2010 were collected and analyzed retrospectively. Indication for CAS was defined as carotid artery diameter reduction of > 60% (symptomatic) or > 80% (asymptomatic). 30-day rates of stroke, death and myocardial infarction after CAS were assessed.

Result The patients were 43 – 82 (66.1 ± 7.7) years old, there were 189 (79.7%) male. All patients suffered from coronary artery disease, of whom 87 (36.7%) had unstable angina pectoris and 82 (34.6%) had recent myocardial infarction ( < 30 d). The procedural success rate of CAS was 99.2% (235/237). Cerebral protection devices were used in 234 patients (99.6%). Among them, 36 (15.2%) patients received simultaneous bilateral CAS and 79 (33.3%) patients underwent simultaneous percutaneous intervention of other arteries. Within 30 days after CAS, 127 (53.6%) patients underwent coronary revascularization, including 118 (49.6%) coronary artery bypass grafting and 9 (3.8%) percutaneous coronary intervention. The rate of major stroke, minor stroke, death and MI from time of CAS to 30 days was 2.1%, 3.0%, 0.4% and 0.4% respectively.

Conclusion This study indicated that CAS was safe and effective with a low incidence of periprocedural complications in patients with coexistent carotid and coronary artery disease, comparable to reported Result from carotid endarterectomy.
Renal sympathetic hyperactivity plays a crucial pathogenetic role in the maintenance and progression of arterial hypertension. As a novel device-based approach targeting the renal sympathetic nerves, renal denervation (RDN) has been shown to be effective and safe in reducing sympathetic nerve activity, norepinephrine spillover as well as blood pressure. Currently, the femoral artery is the most widely used as an access site for RDN. However, this approach may be difficult or impossible in certain patients with an acute angle between the infrarenal aorta and the renal arteries, the aorta-iliaic occlusive disease and severe tortuosity of abdominal aorta and (or) iliac arteries. In a case report, Goncalves et al reported the feasibility of transradial RDN in a short female guided by a “Customized” Judkins right catheter. However, due to the unavailability of longer radiofrequency ablation catheter, RDN via forearm access was difficult and even impracticable in relative tall people. Here, we describe a case of RDN for resistant hypertension to the unavailability of longer radiofrequency ablation catheter, RDN female guided by a “Customized” Judkins right catheter. However, due to the unavailability of longer radiofrequency ablation catheter after transfemoral and transradial approach failure due to an acute aorto-renal angle and severe tortuosity of the radial artery respectively. Transulnar RDN was performed successfully with no any complications. Transulnar access might represent a technical alternative for RDN in certain patients after transfemoral and transradial approach failure when longer ablation catheter is available.

Prognosis of clinical outcomes in Chinese patients receiving XIENCE V everolimus-eluting stent with baseline and residual syntax score: one-year Result from the prospective multicenter SEEDS study

Bo Xu1, Yuejin Yang1, Yalin Han1, Bao Li2, Qiang Liu2, Guoying Zhu2, Junyu Cui2, Lang Li2, Yelin Zhao2, Shuzheng Lu8
1. Fu Wai Hospital, National Center for Cardiovascular Diseases
2. Shenyang Northern Hospital
3. Shenzhen Sun Yat-Sen Cardiovascular Institute
4. Wuhan Asia Heart Hospital
5. Wuhen Asia Heart Hospital
6. Beijing Military General Hospital, Beijing
7. First Affiliated Hospital of Guangxi Medical University
8. Affiliated Anzhen Hospital of Capital Medical University

Background Previous studies demonstrated the safety and efficacy of everolimus-eluting stent in patients with simple to complex coronary lesions. The Syntax score has been proposed as a valuable tool to characterize the coronary anatomy prospectively with respect to its complexity. However, the safety and efficacy of XIENCE V stent in patients with small vessel, long lesion or multivessel disease stratified by Syntax score in Chinese population hasn't been addressed yet.

Methods This was a prospective, multicenter registry designed to enroll up to 1900 patients with small vessel (reference vessel diameter ≤ 2.75 mm), long lesion (length ≥ 25 mm), or multivessel disease (≥ 2 target vessels) suitable for treatment with XIENCE V at 48 centers in China mainland, Macao and Taiwan. The primary outcome was ischemia-driven target vessel failure (ID-TVF), defined as the composite of cardiac death, MI (Q and non-Q wave), or ID-TVR) at 12 months. The baseline Syntax score (bSSlow ≤ 6, 6 < bSSmid ≤ 12, bSShigh > 12) and residual Syntax score (rSSlow ≤ 0, 0 < rSSmid ≤ 4, rSShigh > 4) were applied in all enrolled patients.

Result A total of 368 (19.37%) small vessel patients, 807 (42.47%) long lesion patients, and 725 (38.16%) multivessel patients with 2849 lesions were treated. The primary outcome ID-TVF at 1 year was 5.57% in all patients, and 2.89%, 4.59% and 8.00% in patients with small vessel, long lesion and multivessel disease respectively. ARC defined definite or probable stent thrombosis in all patients through 1 year was 0.58%. ID-TVF and each component were all significantly higher in patients in the highest bSS or rSS tertile. The cumulative ID-TVF at 1 year was 19.6% in bSShigh patients, 13.3% in bSSmid patients and 2.68% in bSSlow patients (Log-rank, P < 0.0001). When patients stratified by rSS, the primary endpoint was 8.94% in bSShigh patients, 6.10% in bSSmid patients and 4.15% in bSSlow patients (Log-rank, P = 0.0008).

Conclusion Low rates of ID-TVF and stent thrombosis were observed in this large-scale, multicenter, “real-world” study of XIENCE V stent on Chinese population, which demonstrated its safety and effectiveness in high risk cohorts with small vessel, long lesion, and multivessel disease. A significantly higher rate of 1 year ID-TVF was observed in the highest baseline and residual Syntax score groups, indicating that baseline and residual Syntax Score might be a useful tool to predict clinical outcomes in complex patients treating with 2nd generation XIENCE V stent.

Policosanol attenuates statin-induced increasing in serum proprotein convertase subtilisin/kexin type 9 when combination with atorvastatin

Yuanlin Guo, Ruxia Xu, Yanjun Jia, Xiaolin Li, Jun Liu, Chenggang Zhu, Naqiong Wu, Lixin Jiang, Jianjun Li
Division of Dyslipidemia, State Key Laboratory of Cardiovascular Disease, Fu Wai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences, Peking Union Medical College

Objective It has been demonstrated that statin treatment alone significant increases plasma proprotein convertase subtilisin/kexin type 9 (PCSK9) levels, which limited its lipid-lowering effect. Policosanol is a natural nutritional supplement used primarily for cholesterol lowering which has little side-effects. The effect of policosanol combined with statin on lipid profile as well as PCSK9 in Chinese patients with atherosclerosis is still unknown.

Methods This is a randomized, open-label controlled study with 2 protocols. In protocol I, 27 patients with atherosclerosis were enrolled and randomly divided to atorvastatin 20 mg/d (n = 13) and atorvastatin 20 mg/d + policosanol 20 mg/d (n = 14) for 8 weeks. Serum PCSK9 and lipid profile were determined at day 0 and week 8 respectively. In protocol II, 14 healthy volunteers were randomized to policosanol 20 mg/d (n = 7) and blank control group (n = 8) for 12 weeks. Serum PCSK9 and lipid profile were determined at day 0 and week 12 respectively.

Result In protocol I, upon 8 weeks of treatment, LDL-C was decreased by 38% with atorvastatin 20 mg/d and by 37% with atorvastatin 20 mg/d + policosanol 20 mg/d. There was no significant difference in the percent of LDL-C lowering between the two treatment
groups. Atorvastatin 20 mg/d significantly increased serum PCSK9 by 35% (255 ± 81 ng/mL vs 345 ± 97 ng/mL, P = 0.002). However, atorvastatin 20 mg/d + policosanol 20 mg/d increased serum PCSK9 only by 17% (264 ± 60 ng/mL vs 310 ± 86 ng/mL, P = 0.184). In protocol II, upon 12 weeks of treatment, there is a trend of decreasing serum PCSK9 level by 19% in policosanol group but it doesn't reach the statistical significance yet (289 ± 71 ng/mL vs 235 ± 46 ng/mL, P = 0.069).

**Conclusion** Policosanol combined with statin attenuated statin-induced increasing in serum PCSK9 levels, however, the combination treatment didn't further lower serum cholesterol levels. It indicated that policosanol might have a modest effect of lowering serum PCSK9, and this might be a more attractive effect than its lipid lowering effect.

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**Perioperative fondaparinux vs nadroparin in non-ST-elevation acute coronary syndrome patients receiving higher-dose unfractionated heparin during percutaneous coronary intervention**

Hongbing Yan¹, Li Song¹, Chen Liu¹, Peng Zhou¹, Hanjun Zhao¹, Ran Liu²

¹. Cardiovascular Institute and Fu-Wai Hospital, PUMC and CAMS, Beijing
². Beijing Anzhen Hospital, Capital Medical University, Beijing

**Background** Current guidelines gave fondaparinux a class I recommendation for use in non-ST-elevation acute coronary syndromes (NSTE-ACS) undergoing invasive strategies. Nadroparin is still one of the most common anticoagulants used in NSTE-ACS and crossover anticoagulation regimens are common in patients undergoing percutaneous coronary intervention (PCI) in China. This study compared the safety and efficacy between perioperative fondaparinux and nadroparin in patients with NSTE-ACS who received higher-dose unfractionated heparin (UFH) during PCI.

**Methods** A total of 340 patients with NSTE-ACS were randomized to receive either fondaparinux (2.5 mg/d) or nadroparin (0.1 ml/10 kg/12 h) upstream of PCI. We excluded 42 patients not receiving PCI. For the two groups, the dose of UFH during PCI was 7 000 – 10 000 units (120 – 140 units/kg) or 5 000 – 7 000 units (85 – 100 units/kg) with tirofiban. The primary safety endpoint was the composite of major or minor bleeding at 9 days and major vascular access-site complications within 48 hours after PCI. The primary efficacy endpoints included death, myocardial infarction, or target vessel revascularization at 9 days.

**Result** The primary safety endpoint occurred in 5.5% of the patients in fondaparinux group and 7.2% in nadroparin group (hazard ratio [HR], 0.63; 95% confidence interval [CI], 0.30 – 1.30; P = 0.67). All bleeding events occurred during PCI or within 24 hours after PCI, and the majority occurred within 6 hours after PCI. The incidence of major (2.7% vs 2.6%, HR:1.04, 95% CI 0.27 – 4.98; P = 0.96) or minor (2.7% vs 4.6%, HR:0.51, 95% CI 0.25 – 2.02; P = 0.39) bleeding was similar between the two groups. Fondaparinux group had similar incidence of the primary efficacy endpoints compared with nadroparin group (2.7% vs 4.6%, HR 0.68, 95% CI 0.21 – 2.64; P = 0.59).

**Conclusion** Perioperative fondaparinux was comparable to nadroparin in patients with NSTE-ACS receiving higher-dose UFH during PCI. Reduced dose of UFH during PCI may decrease perioperative bleeding events and vascular access-site complications.

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**Association between CYP2C19 gene polymorphisms and short-term clinical endpoints of Chinese ACS patients**

Tao Chen, Ying Bai, Guangxun Feng, Yan Liang, Jun Zhu

Emergency Department, FuWai Hospital and Cardiovascular Institute, Peking Union Medical University and Chinese Academy of Medical Science, 167 Beilishi Road, Beijing, China


**Methods** Based on previous parts about genotyping Result and prespecified inclusion and exclusion criteria, we collected clinical information of enrolled patients such as age, gender, past history of disease, in-hospital medications and reperfusion Methods, and then combined them with gene Result to analyze associations between different gene polymorphism and short-term ischemic clinical events like death, myocardial Infarction, stent thrombosis. First we analyze impact of single gene on single clinical endpoint and composite endpoint of death, myocardial infarction, stroke, stent thrombosis, repeated revascularization and recurrent angina, subsequently we integrate CYP2C19 *2-*4 as a whole gene (CYP2C19 LOF gene) to evaluate associations between CYP2C19 LOF gene and single clinical endpoint and composite endpoint of death, myocardial infarction, stroke, stent thrombosis, repeated revascularization and recurrent angina. We use Cox regression models as statistical Methods and the Result were presented as HR as well as 95% confidence intervals.

**Result** 2569 patients entered this part of study about impact of different gene polymorphisms on short-term prognosis eventually. Among them 485 females (18.9%), median age 58 years. Multivariable regression models had disclosed only CYP2C19 *3 and *4 were associated with repeated revascularization (HR 8.86, 95% CI 1.76 – 44.76 and HR 0.003, 95% CI 0.000 – 0.13). CYP2C19 *17 was not associated with risk of bleeding, other genes were not associated with single endpoint and composite endpoint of death, myocardial infarction, stroke, stent thrombosis, repeated revascularization and recurrent angina (all with P > 0.05). CYP2C19 LOF gene were not associated with single endpoint and composite endpoint of death, myocardial infarction, stroke, stent thrombosis, repeated revascularization and recurrent angina (all with P > 0.05).

**Conclusion** There were no significant associations between clopidogrel metabolism related genes CYP2C19 *2, *3, *4, *17 and short-term adverse clinical endpoints like death, myocardial infarction and stent thrombosis. Only CYP2C19 *3 and *4 were associated with repeated revascularization. These Result reminded us that there were no associations between gene polymorphisms and short-term ischemic clinical endpoint, routine genotyping of above genes are not recommended in clinical practice.
Association between ABCB1, PON-1 gene polymorphisms and short-term clinical endpoints of Chinese ACS patients

Tao Chen, Ying Bai, Guangxin Feng, Yan Liang, Jun Zhu
Emergency Department, FuWai Hospital and Cardiovascular Institute, Peking Union Medical University and Chinese Academy of Medical Science, 167 Beilishi Road, Beijing, China

Objective To investigate associations between clopidogrel metabolism related genes ABCB1 C3435T and PON-1 Q192R and short-term adverse clinical endpoints like death, myocardial infarction and stent thrombosis among Chinese patients with ACS (acute coronary syndrome).

Methods Based on previous parts about genotyping Result and prespecified inclusion and exclusion criteria, we collected clinical information of enrolled patients such as age, gender, past history of disease, in-hospital medications and reperfusion Methods, and then combined them with gene Result to analyze associations between different gene polymorphism and short-term ischemic clinical events like death, myocardial infarction, stent thrombosis. First we analyze impact of single gene on single clinical endpoint and composite endpoint of death, myocardial infarction, stroke, stent thrombosis, repeated revascularization and recurrent angina. These Result reminded us that ABCB1 can predict short-term risk of MACE.

Conclusion Among them 485 females (18.9%), median age 58 years. Multivariable regression models had disclosed only ABCB1 associated with composite endpoint of death, myocardial infarction, stroke, stent thrombosis, repeated revascularization and recurrent angina. Subsequently we integrate CYP2C19, ABCB1 and PON-1 as a whole gene to evaluate associations between CYP2C19 LOF gene and single clinical endpoint and composite endpoint of death, myocardial infarction, stroke, stent thrombosis, repeated revascularization and recurrent angina, last we evaluate associations between multiple genes and single clinical endpoint and composite endpoint of death, myocardial infarction, stroke, stent thrombosis, repeated revascularization and recurrent angina. We use Cox regression models as statistical Methods and the Result were presented as HR as well as 95% confidence intervals.

Result 2569 patients entered this part of study about impact of different gene polymorphisms on short-term prognosis eventually. Among them 485 females (18.9%), median age 58 years. Multivariable regression models had disclosed only ABCB1 associated with composite endpoint of death, myocardial infarction, stroke, stent thrombosis, repeated revascularization and recurrent angina (HR 1.97, 95% CI 1.09 –3.55), other genes were not associated with single endpoint and composite endpoint of death, myocardial infarction, stroke, stent thrombosis, repeated revascularization and recurrent angina (all with P > 0.05). CYP2C19, ABCB1 and PON-1 LOF gene were not associated with single endpoint and composite endpoint of death, myocardial infarction, stroke, stent thrombosis, repeated revascularization and recurrent angina (all with P > 0.05). Multiple genes were not associated with single endpoint and composite endpoint of death, myocardial infarction, stroke, stent thrombosis, repeated revascularization and recurrent angina (all with P > 0.05).

Conclusion There were no significant associations between clopidogrel metabolism related genes ABCB1 C3435T and PON-1 Q192R and short-term adverse clinical endpoints like death, myocardial infarction and stent thrombosis. Only ABCB1 associated with composite endpoint of death, myocardial infarction, stroke, stent thrombosis, repeated revascularization and recurrent angina. These Result reminded us that ABCB1 can predict short-term risk of MACE.

Evaluate the effects of APACHE II in intensive care patients of heart specialist hospital

Tao An, Yuhui Zhang, Jian Zhang
Heart Failure Center, State Key Laboratory of Cardiovascular Diseases, FuWai Hospital, National Center for Cardiovascular Disease, Chinese Academy of Medical Sciences, and Peking Union Medical College, Beijing, China

Objective To evaluate the effects of APACHE II in intensive care patients of Heart specialist hospital and analyse its deficiencies.

Methods A retrospective study was performed in 345 patients admitted into ICU from December 1, 2009 to April 31, 2010. Calculate their APACHE II score and in hospital mortality rate. Compare it with the actual mortality rate, and to explore the parameters which correlate with the in hospital mortality of intensive care patients.

Result The actual death rate was 4.93% (n = 17), the predicted death rate was 7.85%, and there was no significant difference between them (P > 0.05). The area under the ROC curve is 0.832. The analysis of model fitting index shows good (P = 0.794). But the SMR value (the actual death rate/the predicted death rate) is 0.63, meaning that the predicted death rate needs to be calibrated by a factor of 0.63 to give an accurate representation of actual death rate. Through the comparison between survival and unsurvival group, we found that: except for WBC (P = 0.004) and Cr (P < 0.01), other acute physiology parameters have no difference between the two groups. Other commonly used parameters were transformed into APACHE II score, then do the Univariate regression analysis shows that Na (OR 0.846, 95% CI 0.74 – 0.968, P = 0.015), Mechanical ventilation (OR 358.7, 95% CI 27.2 – 4 731.7, P < 0.01) correlated with death. After the acute physiology parameters were transformed into APACHE II score, then do the Univariate regression analysis shows that BR, Na, Cr, WBC were correlated with death, and for other commonly used parameters: TB, ALB, AST, ALT, NT-pro BNP, big-ET, mechanical ventilation were correlated with death. The multivariate regression analysis shows that Na (OR 0.846, 95% CI 0.74 – 0.968, P = 0.015), Mechanical ventilation (OR 358.7, 95% CI 27.2 – 4 731.7, P < 0.01) correlated with death. After the acute physiology parameters were transformed into APACHE II score, then do the Univariate regression analysis shows that BR, WBC were not any longer correlated with mortality, but K, which wasn't correlated with mortality before transforming, was correlated with mortality.

Conclusion APACHE II can be continuous to predict cardiac intensive care patients' prognosis, but still exist some deficiencies.

The effect of fructose consumption on plasma cholesterol in adults: a meta–analysis of controlled feeding trials

Tao An, Yuhui Zhang, Jian Zhang
Heart Failure Center, State Key Laboratory of Cardiovascular Diseases, FuWai Hospital, National Center for Cardiovascular Disease, Chinese Academy of Medical Sciences, and Peking Union Medical College, Beijing, China

Fructose is widely used as a sweetener in production of many foods, yet the relation between fructose intake and cholesterol remains uncertain. We performed a systematic review and meta-analysis of human controlled feeding trials of isocaloric fructose exchange for other carbohydrates to quantify the effects of fructose on total cholesterol (TC), LDL cholesterol (LDL-C), and HDL cholesterol (HDL-C) in adult humans. Weighted mean differences were calculated for changes from baseline in total cholesterol, LDL cholesterol, and HDL cholesterol in adults. Weighted mean differences were calculated for changes from baseline in total cholesterol, LDL cholesterol, and HDL cholesterol in adults. Weighted mean differences were calculated for changes from baseline in total cholesterol, LDL cholesterol, and HDL cholesterol in adults. Weighted mean differences were calculated for changes from baseline in total cholesterol, LDL cholesterol, and HDL cholesterol in adults.
baseline cholesterol concentrations by using generic inverse variance random-effects models. The Heyland Methodological Quality was used to assess study quality. Subgroup analyses and meta-regression were conducted to explore possible influence of study characteristics. Twenty-four trials (with a total of 474 subjects) were included in our meta-analysis. In an overall pooled estimate, fructose exerted no effect on TC, LDL-C and HDL-C. Meta-regression analysis indicated that fructose dose was positively correlated with the effect sizes of TC and LDL-C. Subgroup analyses showed that isocaloric fructose exchange for carbohydrates could significantly increase TC by 12.97 mg/dL (95% CI: 4.66 – 21.29; P = 0.002) and LDL-C by 11.59 mg/dL (95% CI: 4.39 – 18.78; P = 0.002) at > 100 g fructose/d but had no effect on TC and LDL-C when fructose intake was ≤ 100 g/d. In conclusion, very high fructose intake (> 100 g/d) could lead to significantly increase in serum LDL-C and TC. Larger, longer and higher-quality human controlled feeding trials are needed to confirm these result.

**Conclusion**

Admission high blood pressure can predict short-term prognosis of patients with ST-segment elevation myocardial infarction without cardiogenic shock and history of hypertension

Tao Chen, Ying Bai, Yan-min Yang, Hui-qiong Tan, Yan Liang, Jun Zhu
Emergency Department, Fuwai Hospital and Cardiovascular Institute, Peking Union Medical University and Chinese Academy of Medical Science, 167 Beilishi Road, Beijing, China

Introduction Several studies have demonstrated an inverse relationship between systolic blood pressure at admission and mortality in patients presenting with acute myocardial infarction (AMI). However, data on the relation between admission blood pressure and short-term prognosis in AMI patients without cardiogenic shock are still lacking.

Methods ST-segment elevation myocardial infarction (STEMI) patients without cardiogenic shock enrolled in this study were divided into 4 groups based on history of hypertension and admission blood pressure values (140/90 mm Hg as the cut-off value). The primary endpoint was incidence of all-cause mortality at day 7 and 30 after admission to emergency department. After baseline adjustment with Cox proportional hazards regression model, we explored whether high admission blood pressure was a risk factor that influence the short-term prognosis for the cohort.

Result A total of 7298 patients without cardiogenic shock at admission were enrolled in our study. The risk of mortality at day 30 increased in patients with high admission blood pressure (≥ 140/90 mm Hg) but without history of hypertension or cardiogenic shock at admission compared with patients with normal admission blood pressure (< 140/90 mm Hg) (HR 1.41, 95% CI 1.03 – 1.94). The same findings were not seen in patients with a history of hypertension. History of hypertension was not associated with short-term prognosis for the entire cohort.

Conclusion Attention should be paid to AMI patients with admission blood pressure beyond 140/90 mm Hg and without history of hypertension as well as admission cardiogenic shock in order to improve the short-term survival for the subpopulation.
The main issues include: pulmonary valve regurgitation and right ventricular dilatation, tricuspid regurgitation, right ventricular outflow tract/pulmonary residual stenosis, heart failure and decreased activity, arrhythmias and sudden death. For pulmonary valve regurgitation, pulmonary valve replacement surgery or percutaneous pulmonary valve replacement approach can be taken. If right ventricular outflow tract aneurysm is large enough, complete removal of the original patch and the akiinesis myocardial fibrosis surrounding the area is necessary. Reconstruct the right ventricular outflow tract, if combined with moderate to severe pulmonary regurgitation and cardiac dysfunction, implanted valve conduit at the same time. Right ventricular outflow tract obstruction can be removed by secondary surgery, balloon dilatation and stent implantation, or self-expanding stents. Severe tricuspid regurgitation, should be actively treated, the preferred approach is tricuspid valvuloplasty, If it is repaired difficulty or badly, possible tricuspid valve replacement surgery should be taken. The basic treatment strategy of TOF at Fu Wai Hospital is that, for children less than six months, if there are no symptoms, clinical observations may be the best strategy. If it is repaired difficulty or badly, possible tricuspid valvuloplasty, If it is repaired difficulty or badly, possible tricuspid valve replacement surgery should be taken. The basic treatment strategy of TOF at Fu Wai Hospital is that, for children less than six months, if there are no symptoms, clinical observations may be the best choice. If there are symptoms, palliative surgery should be taken for the children with poor developed pulmonary arteries. If the pulmonary artery development is good, some experts prefer to immediately perform radical surgery, while the other experts prefer to perform the surgery later. For the children six months or more, according to their preoperative assessment Result to determine radical surgery or palliative surgery.

Conclusion The early surgical Result of TOF are good. And for the pulmonary valve ring and pulmonary artery well developed cases, reserving the right ventricular outflow tract intact can lead to satisfactory long-term Result. But for transannular patch or external conduit repair, its long-term Result and complications should be aware by the surgeons. And these patients may need lifelong follow-up and repeated surgical or interventional therapy intervention. Besides, the treatment strategies of TOF need further clinical studies.

Increased plasma levels of erythropoietin after renal denervation in patients with resistant hypertension

Jianzhong Xu1, 2, Nina Eikels3, Dagamara Hering1, 3, Petra Marnsic1, Carolina Sari1, Tony Walton4, Murray Esler1, Markus Schlaich1, 3

1. Neurovascular Hypertension & Kidney Disease Laboratory, Baker IDI Heart & Diabetes Institute, Melbourne, Australia
2. Department of Hypertension, Renji hospital, Shanghai Jiaotong University school of Medicine, Shanghai, China
3. Department of Hypertension and Diabetology, Medical University of Gdansk, Gdansk, Poland
4. Heart Centre Alfred Hospital, Melbourne, Australia

Objective Erythropoietin (Epo) plays a crucial role in the formation and maturation of erythrocytes and is produced primarily by peritubular cells in the renal cortex. Previous studies suggest that renal sympathetic nerve activity (RSNA) may influence Epo regulation. Catheter-based renal denervation (RDN) has been shown to reduce renal noradrenaline spillover and blood pressure in patients with resistant hypertension. We therefore aimed to investigate whether RDN influences Epo levels.

Method 33 patients with resistant hypertension (age 61 ± 12 yrs; baseline office blood pressure (BP) 165 ± 16/85 ± 18 mm Hg despite treatment with an average of 4.9 ± 1.7 antihypertensive medications) underwent bilateral RDN. Plasma levels of Epo, office blood pressure, twenty-four hour ambulatory blood pressure monitoring (ABPM), muscle sympathetic nerve activity (MSNA), renal function and haemoglobin were measured before the procedure and at 3 months follow-up. Antihypertensive medication was not changed during the first 3 months after RDN.

Result Office blood pressure was reduced by 15 ± 19/5 ± 12 mm Hg at 3 months after denervation (P < 0.001 for systolic BP; P = 0.03 for diastolic BP). 24 h-mean systolic and diastolic BP were also reduced (from 145 ± 16 to 140 ± 18 mm Hg; P = 0.036, and from 80 ± 11 to 77 ± 12 mm Hg; P = 0.024), respectively. While haemoglobin levels remained unchanged, a significant increase in plasma Epo levels was observed at 3 months after RDN (7.81 ± 3.68 vs 9.88 ± 5.06 mIU/mL; P = 0.025). Changes in Epo levels correlated with baseline MSNA (r = 0.580, P = 0.004 for burst frequency; r = 0.471, P = 0.023 for burst incidence), such that the increase in Epo was most pronounced in patients with high baseline MSNA. The RDN induced changes in MSNA tended to correlate inversely with changes in Epo levels (r = -0.402; P = 0.064).

Conclusion Our findings suggest that RDN is associated with increased plasma levels of Epo in the absence of changes in hemoglobin, and that these effects are possibly mediated via a reduction in sympathetic nerve activity.

Admission high blood pressure can predict short–term prognosis of patients with ST–segment elevation myocardial infarction without cardiogenic shock and history of hypertension

Tao Chen, Ying Bai, Yan–min Yang, Hui–qiong Tan, Yan Liang, Jun Zhu

Emergency Department, Fu Wai Hospital and Cardiovascular Institute, Peking Union Medical University and Chinese Academy of Medical Science, 167 Beilishi Road, Beijing, China

Introduction Several studies have demonstrated an inverse relationship between systolic blood pressure at admission and mortality in patients presenting with acute myocardial infarction (AMI). However, data on the relation between admission blood pressure and short-term prognosis in AMI patients without cardiogenic shock are still lacking.

Methods ST-segment elevation myocardial infarction (STEMI) patients without cardiogenic shock enrolled in this study were divided into 4 groups based on history of hypertension and admission blood pressure values (140/90 mm Hg as the cut-off value). The primary endpoint was incidence of all-cause mortality at day 7 and 30 after admission to emergency department. After baseline adjustment with Cox proportional hazards regression model, we explored whether high admission blood pressure was a risk factor that influence the short-term prognosis for the cohort.

Result A total of 7 298 patients without cardiogenic shock at admission were enrolled in our study. The risk of mortality at day 30 increased in patients with high admission blood pressure (≥ 140/90 mm Hg) but without history of hypertension or cardiogenic shock at admission compared with patients with normal admission blood pressure (< 140/90 mm Hg) (HR 1.41, 95% CI 1.03 – 1.94). The same findings were not seen in patients with a history of hypertension. History of hypertension was not associated with short-term prognosis for the entire cohort.

Conclusion Attention should be paid to AMI patients with admission blood pressure beyond 140/90 mm Hg and without history of hypertension as well as admission cardiogenic shock in order to improve...
the short-term survival for the subpopulation.

Comparison of procedural and long-term outcomes between transradial and transfemoral approach for triple vessel coronary artery disease intervention

Dong Zhang, Kefei Dou, Bo Xu, Yuejin Yang, Jilin Chen, Shubin Qiao, Yang Wang, Jianjun Li, Xuewen Qin, Min Yao, Haibo Liu, Yongjian Wu, Jue Chen, Jinqing Yuan, Shijie You, Wei Li, Runlin Gao
Peking Union Medical College; Chinese Academy of Medical Sciences; Fuwai Hospital; National Center for Cardiovascular Diseases of China, Beijing, China

Objective The aim of the present study was to evaluate the safety, feasibility, procedural variables and long-term outcome by transradial (TR) approach compared with the transfemoral (TF) access in triple vessel coronary artery disease undergoing percutaneous coronary intervention.

Background The feasibility, safety and efficacy between TR and TF approach for coronary interventional treatment have been compared in some complicated situations including AMI, unprotected left main coronary artery disease. However, in terms of triple vessel disease intervention, there is still no comparison regarding procedural and long-term outcomes between TR and TF approach.

Methods Totally 4 974 consecutive patients (TR: 3856, TF1118), who were diagnosed as triple vessel disease without LM involved by angiography and underwent percutaneous revascularization, were prospectively enrolled in the study. Procedural Result (including success rate, hospitalization duration, fluoro time, bleeding event etc) were recorded specifically in database. Over a mean follow-up period of 22 months, we obtained clinical outcome including death, myocardial infarction (MI), thrombosis, target lesion revascularization (TLR), target vessel revascularization (TVR), and major adverse cardiac events (MACE, the composite of death, MI, and TVR). We used Cox’s proportional-hazard models to assess relative risks of all the outcome measures after propensity match.

Result At 24 months, patients in the hybrid stent implantation group showed a significantly higher risk of TLR (8.39% vs 3.28%, HR 2.38, 95% CI: 1.50 – 3.70), TVR (11.07% vs 6.32%, HR 1.61, 95% CI: 1.15 – 2.27) and MACE (13.75% vs 8.75%, HR 1.37, 95% CI: 1.02 – 1.85). No significant difference was apparent in terms of mortality (1.22% vs 1.15 – 2.27) and MACE (13.75% vs 8.75%, HR 1.37, 95% CI: 1.02 – 1.85).

Conclusion As compared to TFI, TRI for triple vessel disease intervention is feasible, safe and associated with similar procedural success, abbreviated hospitalization, reduced bleeding, lower incidence of death and MACE, and comparable long term efficacy.

Can “hybrid stent implantation” improve long-term safety without adversely affecting efficacy when treating multilesion coronary artery disease in the drug-eluting stent era?

Dong Zhang, Kefei Dou, Bo Xu, Yuejin Yang, Jilin Chen, Shubin Qiao, Yang Wang, Jianjun Li, Xuewen Qin, Min Yao, Haibo Liu, Yongjian Wu, Jue Chen, Jinqing Yuan, Shijie You, Wei Li, Runlin Gao
Peking Union Medical College; Chinese Academy of Medical Sciences; Fuwai Hospital; National Center for Cardiovascular Diseases of China, Beijing, China

Background Though drug-eluting stent (DES) almost solved problem of restenosis, safety issues related to stent thrombosis are still the major concern of DES. We hypothesized that hybrid stent implantation may decrease the use of DES, probably improving the long-term safety but not affecting efficacy adversely when treating multilesion coronary artery disease in the DES era.

Methods From April 2004 to October 2006, 848 patients with multilesion disease underwent hybrid stent implantation. During the same period 5 647 patients with multilesion coronary heart disease were treated by exclusive DES implantation in Fu Wai Hospital. According to propensity score matching, we chose 823 pairs of patients with multilesion coronary artery disease for inclusion into our study. We obtained the 24-month clinical outcome including death, myocardial infarction (MI), thrombosis, target lesion revascularization (TLR), target vessel revascularization (TVR), and major adverse cardiac events (MACE, the composite of death, MI, and TVR). We used Cox's proportional-hazard models to assess relative risks of all the outcome measures after propensity match.

Result At 24 months, patients in the hybrid stent implantation group showed a significantly higher risk of TLR (8.39% vs 3.28%, HR 2.38, 95% CI: 1.50 – 3.70), TVR (11.07% vs 6.32%, HR 1.61, 95% CI: 1.15 – 2.27) and MACE (13.75% vs 8.75%, HR 1.37, 95% CI: 1.02 – 1.85). No significant difference was apparent in terms of mortality (1.22% vs 1.15 – 2.27) and MACE (13.75% vs 8.75%, HR 1.37, 95% CI: 1.02 – 1.85).

Conclusion In patients with multilesion coronary artery disease, the exclusive DES implantation was associated with significantly lower risks of TLR, TVR and MACE, and the hybrid stent implantation did not result in any significant improvements regarding safety issues. Prospective studies are needed to confirm our Result.

Clinical analysis of inpatients of systemic lupus erythematosus with coronary artery disease

Ying Guo, Youhong Jia
Key Laboratory of Clinical Trial Research in Cardiovascular Drugs, Ministry of Health, State Key Laboratory of Cardiovascular Diseases, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, P. R. China.

Objective In order to improve clinical practice and awareness, we analyze clinical characteristics of coronary artery disease (CAD) patients with systemic lupus erythematosus (SLE),

Methods Searching 2002 – 2013 year diagnosis of CAD patients
with SLE through Fuwai hospital electronic medical records management system. 25 CAD patients with SLE are found in all. The control groups are 50 cases matched randomly from FuWai Hospital diagnosis of CAD without connective tissue diseases. For each group, traditional coronary risk factors, blood biochemistry, chest X-ray, ultrasound, and Result of coronary angiography are analyzed retrospectively.

**Result** Compared to CAD patients without connective tissue diseases, CAD patients with SLE have earlier menopause [(47.80 ± 4.07) years vs (50.81 ± 2.98) years, P < 0.01], have more unstable angina possibilities [92% (23/25) than 50% (25/50)], get more III and IV grade heart failure rate [28% (7/25) than 4% (2/50), P < 0.01]. CAD patients with SLE have higher level of C-reactive protein [(12.46 ± 14.85) than (8.86 ± 6.21), P < 0.01], creatinine [(77.39 ± 20.34) than (67.06 ± 17.02), P < 0.05], urea nitrogen [(8.86 ± 7.17) than (6.21 ± 2.09), P < 0.05] in blood than the control group. Results of Chest X-rays in the case group show more costophrenic angle blunting [36% (9/25) than 6% (3/50), P < 0.01] and pulmonary congestion [28% (7/25) than 2% (1/50), P < 0.01]. Coronary angiography showed CAD patients with SLE the rate of two coronary blockage [24% (6/25) than 4% (2/50), P < 0.01] and three coronary artery disease [48% (12/25) than 26% (13/50), P < 0.05] is significantly higher than the control group.

**Conclusion** CAD patients with SLE have earlier menopause than CAD patients without connective tissue disease. Traditional coronary risk factors are similar in these two groups. The case group patients’ coronary pathological changes are extensive, with higher occlusion rate, easily combined with cardiac insufficiency. Tests and inspections like C-reactive protein, creatinine, urea nitrogen, chest X-rays, coronary angiography may be able to reflect CAD combined with SLE’s severity and prevent cardiac events of CAD patients with SLE.

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**Percutaneous balloon aortic valvuloplasty in the treatment of patients with severe aortic stenosis**

Hanjuan Pei, Yongjian Wu, Yuejin Yang

Department of Cardiology, Cardiovascular Institute and Fu Wai Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China

**Background** Patients who have aortic stenosis (AS) with severe heart failure or cardiac shock are considered unsuitable for surgical aortic valve replacement (AVR) or transcatheter aortic valve implantation (TAVI), and generally have a poor prognosis with conservative therapy. It has been shown that percutaneous balloon aortic valvuloplasty (PBAV) may transiently improve severe left ventricular dysfunction in patients with AS.

**Objective** To assess procedural and clinical outcomes in patients with severe AS undergoing PBAV, who are considered transiently unsuitable for either AVR or TAVI.

**Methods** Between March 2011 and January 2013, a total of 10 patients underwent PBAV. Pre- and post-procedure aortic valve gradients were measured by catheterization and echocardiography. Patients were assessed for symptomatic benefit and clinical outcomes.

**Result** Mean patient’s age was 70 ± 8 years (52 – 87), 6 were male, and the logistic EuroScore was 26.1 ± 6.7%. All patients were severe heart failure with New York Heart Association (NYHA) class ≥ III, and 5 were in cardiac shock requiring inotropic support. Mean left ventricular fraction (LVEF) was 29 ± 6%, and LVEF ≤ 30% was in 6 patients. PBAV was successfully performed in all cases. Mean transaortic valve gradient fell from 50 ± 18 mm Hg to 33 ± 14 mm Hg (P = 0.028). The most common complications were hypotension and minor bleeding at the femoral puncture site. No patients died during procedure, and 2 died in hospital: one died of pulmonary infection 3 days after procedure; 1 died of repeated ventricular tachycardia. Three died post-discharge: 1 died of cardiogenic shock at 6-month; 1 had a sudden death at home at 16-month; 1 died of multiple organ failure at 5-month. Five patients underwent secondary successful TAVI (n = 2) or AVR (n = 3).

**Conclusion** In high-risk patients with AS and temporary contraindications to AVR or TAVI, PBAV can be safely used as a bridge to intervention with good outcomes.

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**Transradial vs transfemoral method of percutaneous coronary revascularization for chronic total occlusion disease: comparison of procedural and late-term outcomes**

Hanjuan Pei, Yongjian Wu, Yuejin Yang

Department of Cardiology, Cardiovascular Institute and Fu Wai Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China

**Background** Transradial coronary intervention is a safe and effective method of percutaneous revascularization. Furthermore, the indications for transradial percutaneous coronary intervention (PCI) are expanding. However, the efficacy and the safety between TR and TF approaches of PCI for chronic total occlusion (CTO) have not been compared.

**Objective** This study sought to compare outcomes between transradial (TR) and transfemoral (TF) percutaneous revascularization in patients with chronic total occlusion (CTO).

**Methods** Among 2 352 consecutive patients with CTO disease treated with percutaneous revascularization by either TR (n = 1 858) or TF (n = 494) vascular access, procedural outcomes, resource use, in-hospital bleeding, and late clinical events were compared according to vascular access method.

**Result** Clinical and angiographic characteristic were similar in both groups. Duration of hospital stay (7.7 ± 4.9 vs 9.4 ± 5.4, P < 0.001) and in-hospital occurrence of bleeding defined by Bleeding Academic Research Consortium (5.9% vs 1.9%, P < 0.001) were significantly lower with TR access. Using propensity score modeling (421 matched pairs), over a mean follow-up period of 15 months, rates of death (0.5% vs 1.0%, P = 0.413), nonfatal myocardial infarction (0.5% vs 0.5%, P = 1.000), stent thrombosis (0.5% vs 0.5%, P = 1.000), and any target vessel revascularization (4.0% vs 5.7%, P = 0.262) did not statistically differ among TR and TF groups, respectively.

**Conclusion** In contrast to TF vascular access, TR percutaneous coronary revascularization for CTO disease is feasible and associated with similar procedural success, abbreviated hospitalization, reduced bleeding, and comparable late-term clinical safety and efficacy.

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**Early alterations of red blood cell rheology in infective endocarditis patients with sepsis**

Xiaolu Sun, Jian Zhang

State Key Laboratory of Cardiovascular Disease, FuWai Hospital, National Center for Cardiovascular Disease, Chinese Academy of Medical Sciences and Peking Union Medical College

**Objective** Septic shock is one of the main causes of death of infective endocarditis (IE). Microcirculation plays a vital role in the
development of multiple organ failure in severe sepsis. The effects of red blood cell (RBC) rheology on these tissue and microcirculation variables in early severe sepsis are not well defined. The aim of the present study was to explore the red blood cell rheology in a intensive care unit population on admission.

**Methods** On the basis of the preliminary work, we investigated the erythrocyte deformability and aggregation, osmotic fragility and erythrocyte electrophoresis rate, among the three groups of IE patients with sepsis, non-septic critical ill patients and volunteers, in order to further clarify the pathogenesis of IE. Red blood cell rheology was assessed within the first 24 hrs after intensive care unit admission.

**Result** The whole blood viscosity as significantly altered in septic compared to non-septic patients and volunteers for the majority of shear stress rates studied. Red blood cell deformability and the aggregation index were significantly altered in septic compared to non-septic patients and volunteers. The erythrocyte electrophoresis rate was decreased significantly in septic compared to non-septic patients and volunteers. We also found that the osmotic fragility of RBCs at 145 mOsm/kg was greater increased in septic patients than the other groups, and non-sepsis critical ill patients was higher than the control group, but no statistical difference.

**Conclusion** Early alterations of red blood cell rheology are common in intensive care unit patients, especially in those with sepsis. These alterations could contribute to the microcirculatory alterations observed in critically ill patients.

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**Transcatheter closure of coronary artery fistulae: initial human experience with the amplatz duct occluder II**

Minjie Lu, Shihua Zhao, Shiliang Jiang, Zhongying Xu, Gejun Zhang, Tao Zhao

State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College

**Purpose** Transcatheter device closure is an alternative treatment for selective patients with coronary artery fistulae (CAF). Currently available technology is limited for closure of CAF with tortuous coronary artery to the drainage. The purpose of this study was to evaluate the technical feasibility, safety, and efficacy of the new device Amplatz duct occluder II (ADO II) for closure of coronary artery fistula (CAF).

**Methods** From April 1, 2011 to July 15, 2012, 5 patients (3 males, 2 females) aged from 3 years to 27 years (median age 5 years) underwent CAF closure with the ADO II. We evaluated early and short-term Result.

**Result** The devices (ADO II) were deployed via the femoral vein (3 cases), brachial artery (1 case) and radial artery (1 case). There were no complications during the procedures. Median fluoroscopy and procedural times were 20 and 39 min, respectively. Immediate trivial and mild residual shunt was present in one patient, respectively, but disappeared 24 hours after the procedure, and there was no recanalization at a median follow-up of 6 months.

**Conclusion** The new device ADO II was safely deployed with complete resolution of the CAF shunt with tortuous coronary artery to the drainage. The reduced sheath sizes and softer shape of this device allows for venous or arterial approach. The ADO II might be a preferable alternative for closure of small-tortuous CAFs.

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**Digoxin and mortality in patients with atrial fibrillation**

Han Zhang, Yanmin Yang, Jun Zhu, Xinghui Shao, Juan Wang, Li Tian, Bi Huang

Emergency and Intensive Care Center, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, China

**Background** Digoxin is frequently used for rate control in paroxysmal, persistent and permanent atrial fibrillation (AF). The relationship of digoxin and mortality was so different in recent studies, and it remains unclear how digoxin affected mortality. The objective of this study was to determine the relationship between digoxin and mortality in patients with AF.

**Methods** In this prospective observational multicentre registry study, all AF cases were confirmed by the electrocardiograms (ECGs) in the ED from November 2008 to October 2011 in China. Patients' demographics, medical history, type of AF, treatment, and outcome of emergency room visit were collected at baseline by the treating physicians using a standardized questionnaire. The main outcome measure was all-cause mortality at 1 year post-ED visit.

**Result** The association between digoxin and mortality was assessed in 2016 Chinese patients with AF enrolled in emergency department (ED) using multivariate Cox proportional hazards models. Of those, 722 received digoxin as initial therapy and 1 291 received no digoxin at baseline. Propensity scores for digoxin use were estimated for each of these 2016 patients and used to assemble a cohort of 359 pairs of patients receiving and not receiving digoxin, who were balanced on 49 baseline characteristics. Among pre-match patients, digoxin was associated with an increase in all-cause mortality (16.6% vs 12.6%, P = 0.014). However, this association became non-significant after multivariable adjustment (HR: 1.03; 95% CI: 0.66 – 1.61; P = 0.911) and adjustment for propensity scores (HR, 0.97; 95% CI: 0.63 – 1.50; P = 0.892). All-cause mortality occurred in 15.2% and 14.7% of matched patients receiving and not receiving digoxin, respectively (HR: 1.21; 95% CI: 0.68 – 2.13; P = 0.519).

**Conclusion** There was no significant increase in all-cause mortality in AF patients with digoxin as baseline initial therapy.
A prospective, multicenter, randomized trial comparing paclitaxel-coated balloon with Paclitaxel-eluting stent for the treatment of drug-eluting stent restenosis: 9-month angiographic and 12-month clinical Result from PEPCAD China ISR

Bo Xu1, Runlin Gao1, Jianan Wang2, Yuejin Yang3, Shaoliang Chen1, Bin Liu1, Fang Chen1, Zhanquan Li1, Yaling Han1, Guosheng Fu1, Yelin Zhao1, Junbo Ge1
1. Fu Wai Hospital, National Centre for Cardiovascular Diseases of China, Beijing
2. 2nd Affiliated Hospital of Zhejiang University School of Medicine, Hangzhou
3. Affiliated Nanjing First Hospital of Nanjing Medical University, Nanjing
4. Jinlin University 2nd Hospital, Changchun
5. Affiliated Andzhen Hospital of Capital Medical University, Beijing
6. Liaoning Provincial People’s Hospital, Shenyang
7. Shenyang Northem Hospital, Shenyang
8. Affiliated SRRS Hospital of Zhejiang University School of Medicine, Hangzhou
9. Affiliated Zhongshan Hospital of Fudan University, Shanghai

Background Treatment of drug-eluting stent (DES) restenosis is still challenging with no established best strategy. The PEPCAD China ISR trial was to demonstrate the efficacy and safety of paclitaxel-coated balloon (PCB) Sequent Please (B Braun, Germany) compared to paclitaxel-eluting stent (PES) TAXUS Liberte (Boston Scientific, USA) in a Non-European patient population with DES restenosis.

Methods In this prospective, multicenter, randomized trial, we planned to enroll patients between 18 – 80 years old with at least one DES restenotic lesion stratified by Mehran classifications at 17 Chinese centers. Patients were 1:1 randomly assigned to either receive PCB or PES treatment. The primary endpoint was in-segment late lumen loss (LLL) at 9-month, and the major secondary endpoints include percentage of diameter stenosis (%DS), binary restenosis at 9-month, target lesion failure (TLF) defined as the composite of cardiac death, target vessel myocardial infarction, or ischemia-driven target lesion revascularization at 12-month, and definite/probable stent thrombosis (ST).

Result 215 patients were randomized to PCB group (n = 109) and PES group (n = 106). In terms of the patient, lesion or procedural characteristics there were no significant differences between both treatment groups. Angiographic follow-up data at 9-month was available for 172 (80%) patients. The 9-month in-segment LLL in the PCB was non-inferior as compared to the PES group (0.46 ± 0.51 mm vs 0.55 ± 0.61 mm, difference [95% CI]: -0.06 mm [-0.23, 0.10], P for non-inferiority = 0.0005). The 9-month in-segment %DS, binary restenosis, 12-month TLF, and definite/probable ST rates were no statistical differences between both treatment groups (29.0 ± 21.3 vs 30.8 ± 25.3, P = 0.59; 18.6% vs 23.8%, P = 0.38; 16.5% vs 16.0%, P = 0.92; 0.9% vs 1.0%, P = 1.00, respectively).

Conclusion PCB angioplasty was non-inferior to PES implantation in a Chinese population in need of revascularization after DES restenosis without the necessity of having additional metal layers for drug release. (ClinicalTrials.gov identifier: NCT01622075).

The clinical characteristics and outcomes of Chinese NSTE–ACS patients in different time periods

Ying Bai, Yan Liang, Huqiqiong Tan, Shubin Qiao, Jun Zhang, Yamin Yang, Yang Zhang, Jun Zhu
Emergency and Intensive Care Center, Coronary Artery Disease Center, Cardiovascular Institute and FuWai Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing 100037, China

Objective To compare the clinical characteristics, treatment Methods and outcomes in Chinese NSTE–ACS patients in different time periods.

Methods All Chinese NSTE–ACS patients from two large International clinical trials (OASIS registry and TIMACS) who accepted coronary artery angiography after first admission were recruited in our analysis. The current primary outcome was the combination of death, myocardial infarction, refractory ischemia, and stroke within 180 days. We compared the clinical characteristics, treatment Methods and outcomes between those two patient groups.

Result The total of 1,473 NSTE–ACS patients were recruited in our analysis, in which 749 from Organization to Assess Strategies for Ischemic Syndromes (OASIS REISTRY) that completed in 38 centers in China from April 1999 to December 2000, and the other 724 patients from The Timing of Intervention in Acute Coronary Syndromes (TIMACS) trial in 24 centers in China performed from April 2007 to June 2008. For baseline characteristics, comparing to TIMACS patients, OASIS group had older age (58.7 ± 10.2 y vs 64.2 ± 10.1 y), more males (74.4% vs 66.3%), higher blood pressure at admission (136/83 mm Hg vs 131/78 mm Hg), more myocardial infarction history (28.0% vs 12.0%), but less current smoking (30.0% vs 33.8%), less histories of previous PCI (6.4% vs 9.4%), stroke (5.1% vs 8.8%), hypertension (56.6% vs 62.8%) and diabetes (16.2% vs 23.3%). After admission, comparing to OASIS group, TIMACS patients had significant higher PCI proportion (74.9% vs 49.3%, P < 0.001). In addition, for secondary prevention, TIMACS patients had significant higher medication treatment proportion in hospital, at discharge and at 180 days' follow up than OASIS group (P < 0.05 for β-blocker, ACEI/ARB and lower lipid drugs) and also higher compliance rate. The combined primary outcome event rate at 180 days was much lower in TIMACS than OASIS patients (13.0% vs 48.5%, P < 0.001) in which the refractory angina reduction contributed most for it. By multivariable Logistic regression analysis for combined primary outcomes at 180 days, after adjusted for other factors, previous PCI (HR: 2.23; 95% CI: 1.17 – 4.24), medical history of diabetes (HR: 1.84; 95% CI: 1.22 – 2.79) or stroke (HR: 2.47; 95% CI: 1.19 – 5.13), calcium antagonists treatment during hospitalization (HR: 1.71; 95% CI: 1.25 – 2.33) were independent risk factors in OASIS group; while patient age (HR: 1.03; 95% CI: 1.01 – 1.06), previous MI (HR: 2.35; 95% CI: 1.21 – 4.58), IABP treatment during hospitalization (HR: 3.96; 95% CI: 1.52 – 10.31) were independent risk factors in TIMACS group.

Conclusion TIMACS population had higher rates on PCI treatment and secondary prevention medication administration but less integrated incidence of primary outcomes than OASIS group which reflected the big progress in Chinese medical care in the decades according to the updated guidelines.
Stroke as the first and recurrent manifestation of takayasu arteritis: a case report.

Lirui Yang, Huimin Zhang, Wenhong Song, Ting Guan, Yubao Zou, Xianliang Zhou, Lei Song, Haiying Wu, Xiongqing Jiang, Rutai Hui
1. 7th Ward, Hypertension Center, Fuwai Hospital Cardiovascular Institute, Chinese Academy of Medical Sciences, Peking Union Medical College, Beijing 100037, People's R China; 2. Department of Cardiology, the forth hospital of Hangshui City, Hebei, 063000, People's R China; 3. Sino-German Laboratory for Molecular Medicine, Key Laboratory for Clinical Cardiovascular Genetics, Ministry of Education, Fuwai Hospital Cardiovascular Institute, Chinese Academy of Medical Sciences, Peking Union Medical College, Beijing 100037, People's R China.

Takayasu arteritis is a chronic, idiopathic disease characterized by granulomatous vasculitis of medium and large arteries. In addition to constitutional symptoms, it causes various clinical morbidities, such as arm claudication, decreased arterial pulses, carotidynia and hypertension. Neurological involvement is reported in only a minority of patients and occurrence of stroke as the first and recurrent manifestation of disease has been rarely reported. The rarity of the disease and especially such a presentation can cause considerable delay in the diagnosis and treatment. We reported clinical, laboratory and imaging findings of an 18-year-old boy with TA, who was initially presented by a stroke and suffered another two strokes within 10 months. CTA showed a serious coarctation of the descending aorta about 3.0 mm in width, occlusion of initial segment of right subclavian artery and left external carotid artery, and nearly occlusion of initial segment of right external carotid artery. BP right arm 143/85 mm Hg, right leg 116/79 mm Hg, left arm 210/110 mm Hg, and left leg 112/35 mm Hg. ABI right 0.55, and left 0.53. The angiography showed occlusion of right subclavian artery, and 90 percent stenosis of the middle part of the descending aorta. Patient was planted a stent in the descending aorta. He improved remarkably after two weeks of follow up.

An 18-year-old boy was admitted to our hospital with a 10-month history of coarctation of aorta. 10 month before admission, the patient suffered a sudden onset of impaired mobility of the left side body under no obvious predisposing causes, dysphagia and cough. The skull CT examination revealed cerebral infarction. It was detected that his left arm blood pressure (BP) was 180/90 mm Hg, but his BP in legs was not checkable. The cardiovascular CT angiography (CTA) presented that there is coarctation of the thoracic aorta (diameter 4.62 mm), calcification of the wall and collateral circulation. Six months ago, he was referred to the department of Cardial Surgery, Fuwai Hospital. The ultrasonic cardiogram at Fuwai Hospital suggested patent ductus arteriosus (3 mm) and a distal segment narrow (10 mm) of the descending aorta. CTA showed a serious coarctation of the descending aorta about 3.0 mm in width, occlusion of initial segment of right subclavian artery and left external carotid artery, and nearly occlusion of initial segment of right external carotid artery. BP right arm 143/85 mm Hg, right leg 116/79 mm Hg, left arm 210/110 mm Hg, and left leg 112/35 mm Hg. ABI right 0.55, and left 0.53. The angiography showed occlusion of right subclavian artery, and 90 percent stenosis of the middle part of the descending aorta. Patient was referred to the department of Peripheral Vascular, Fuwai Hospital in order to perform interventional treatment. Patient had history of cerebral infarction approximately three years ago with no sequelae. Patient had left-sided impairment of mobility and speech difficulties. The Bruit was audible over the right carotid artery and the back area. The right radial pulse and both femoral pulses were weak. The left arm BP was 180/110 mm Hg, while the right arm BP was 140/120 mm Hg. At Fuwai Hospital, the patients were administered Nifedipine Sustained Release Tablets (ii) 10 mg q8h and Metoprolol Tartrate Tablets 25 mg q8h to control BP. Prednisone was given 20 mg qd. Pantoprazole 40 mg qd was substituted for Omeprazole to protect the stomach. Calcitriol Soft Capsules 0.25ug qd and calcium carbonate tablet 0.5 g tid were given to prevent osteoporosis.

Patient was performed percutaneous peripheral vascular imaging via femoral artery, showing occlusion of right subclavian artery, 90 percent stenosis of the middle part of the descending aorta. A Wallstent 22 mm*45 mm was planted in the descending aorta. The treatment was successful. After the intervention, the patient still had high BP for his age (140/80 mm Hg) and the antihypertensive drugs should not be discontinued. Besides, he should receive dual antiplatelet therapy with aspirin 100 mg qd and clopidogrel 50 mg qd to prevent thrombotic events. After two weeks follow up, the patient recovered remarkably.

Clinical profile and management of hospitalized patients with chronic heart failure in Xinjiang

Hua Jiang, Xianhui Zhou, Baopeng Tang, Liman Ai, Jinxin Li, Yu Zhang, Guojun Xu, Yanyi Zhang, Lin Sun, Yaodong Li, Jianghua Zhang
Department of Cardiology, First Affiliated Hospital, Xinjiang Medical University, Urumqi 830011, PR China

Objective Chronic heart failure (CHF) is a common cause for admission to hospital in the Chinese population. It remains one of the major cardiovascular diseases with an increasing hospitalization burden and an ongoing drain on health care expenditures. The purpose of this study was to determine the epidemiological factors, the current status of treatment and prognosis in patients with a clinical diagnosis of CHF in Xinjiang.

Methods This was a prospective, multi-centre, hospital-based study conducted in 15 hospitals distributed throughout the major parts of Xinjiang from January 2010 and October 2012. CHF was diagnosed by clinical and echocardiography criteria according to the modified Framingham criteria. Follow-up information was obtained through outpatient examination or telephone contact.

Result A total of 5 357 patients of all ages were enrolled, 34.7% female and 65.3% male. Mean age was 64.60 ± 12.77 years. The number of patients with CHF dramatically increased with advancing age, 68.7% was aged > 60 years. The main risk factors or possible causes of CHF were coronary heart disease, hypertension, and idiopathic dilated cardiomyopathy, which accounted for 50.8%, 31.8% and 7.2% respectively. Rheumatic heart disease and pulmonary heart disease causing heart failure were scarce. In these patients, systolic function was reduced (left ventricular ejection fraction < 45%) in 2066 (38.6%) and normal (left ventricular ejection fraction ≥ 45%) in 3291 (61.4%). At discharge, conventional drugs, including diuretics and digitals, were prescribed in 45.5% and 26.8%. 72.8% of patients were on blockers of...
the rennin-angiotensin-system (including angiotensin-converting enzyme inhibitors or angiotensin-receptor-blockers) and 66.8% on beta-blockers. Spironolactone was prescribed in 46.6%. Among the participating hospitals, the prescription rates of neuroendocrine antagonists was much less in primary hospitals than teaching hospitals and district hospitals (P < 0.001). One-year mortality rate of patients discharged alive in primary hospitals, district hospitals and teaching hospitals was 16%, 14% and 11% respectively (P < 0.001).

**Conclusion** The present study reports the clinical profile and management of patients with CHF as it presents in Xinjiang. Standard treatment for CHF seems to be less than optimum, particularly in primary hospitals. Early identification, treatment and prevention of the CHF include lifestyle changes and management for controlling the components of the CHF, are major challenges in the general population in Xinjiang.

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The impacts of baseline alkaline phosphatase and other traditional biomarkers on the extent of coronary artery disease and early outcome in patients with angina–like chest pain

Lifeng Hong, Yanjun Jia, Liu Jun, Yuelin Guo, Songhui Luo, Chenggang Zhu, Xiaolin Li, Sun Jing, Dong Qian, Ping Qing, Ruixia Xu, Naqiong Wu, Geng Liu, Lixin Jiang, Jianjun Li

1 Division of Dyslipidemia, State Key Laboratory of Cardiovascular Disease, Fu Wai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences, Peking Union Medical College, Beijing 100037, China; 2Division of Cardiology, Guangxi Hospital affiliated Medical College of Wuhan University & the Fifth Hospital of Wuhan, Wuhan 430050, China

**Objective** We compare the predictive value of alkaline phosphatase (ALP) C-reactive protein (CRP), neutrophil count, fibrinogen, hemoglobin A1C (HbA1c) and survival in patients with stable angina pectoris (SAP).

**Methods** Patients with SAP, 1433, scheduled for coronary angiography were prospectively followed up and were classified into tertiles according to values of serum ALP. The relationship between the five markers and clinical outcomes were evaluated.

**Result** ALP was correlated with hs-CRP, neutrophil count, fibrinogen and HbA1c. Area under the ROC curve (AUC = 0.57, 95% CI 0.53 – 0.63, P = 0.001) and multivariate logistic regression models were consistently suggested that ALP, Fibrinogen and HbA1c were independent predictors of severity of coronary artery disease (CAD) for patients with SAP (ALP: OR = 1.01, 95% CI 1.00 – 1.02, P = 0.010; Fibrinogen: OR = 1.49, 95% CI 1.15 – 1.93, P = 0.002; HbA1c: OR = 1.53, 95% CI 1.23 – 1.89, P = 0.000). During an average 12-month follow-up, 133 out of 1433 patients underwent pre-specified outcomes. In Cox regression models, HbA1c and neutrophil count, but not ALP, CRP and fibrinogen, were identified as the independent predictors of adverse prognosis (HR = 1.53, 95% CI 1.23 – 1.89, P = 0.000; HR = 1.49, 95% CI 1.15 – 1.93, P = 0.002, respectively).

**Conclusion** High levels of ALP were correlated with CRP, neutrophil count, fibrinogen and HbA1c and it was an independent predictor for extent of CAD but not for the early outcome of patients with SAP.
Effect of desmopressin on platelet aggregation and blood loss in patients undergoing valvular heart surgery
Hongwen Ji, Lei Jin
Department of Anesthesiology, State Key Laboratory of Cardiovascular Disease, Fuwai Hospital

Objective To explore the effects of desmopressin on platelet aggregation and blood loss in patients undergoing cardiac surgery with cardiopulmonary bypass and to evaluate the function of desmopressin in hemostasis.

Methods For a randomized, double-blind, placebo-controlled trial, a total of 102 patients undergoing valvular heart surgery were divided into a desmopressin group (n = 52) and a control group (n = 50). A dose of desmopressin (0.3 μg/kg) was administered intravenously 1 hour before the end of the cardiopulmonary bypass in the desmopressin group. At the same time, normal saline was given to the control group. Platelet aggregation was measured. Postoperative blood loss, blood transfusions and urine volumes were documented.

Result There was no significant difference in platelet aggregation between the two groups. The blood loss in the first 6 hours was reduced in the desmopressin group (202 ± 119 ml vs 258 ± 143 ml, P = 0.023). Postoperative blood loss, blood transfusions and urine volumes were not different between the groups.

Conclusion A single dose of desmopressin can reduce postoperative blood loss within the first 6 hours in patients undergoing valvular heart surgery.

The association study between hypertension combined metabolic syndrome with coronary disease
Youyou Zhang, Xiaomei Shen
First Hospital of Shanxi Medical University, Shanxi 03001, China

Objective To study the relationship of EH combined MS and its metabolic components with the CHD.

Methods EH whether with MS can be divided into EH group and EH combined MS group, determine their BMI, FBG, TG, HDL-C, LDL-C.

Result (1) Compared with EH group, EH with MS group of BMI, FBG, TG level increased significantly (P < 0.05); HDL-C, LDL-C levels decreased significantly (P < 0.05); (2) EH with the MS group coronary disease events is increased, but no statistical difference (P > 0.05). (3) Logistic regression analysis showed that MS is independent risk factor for CHD. (4) Pearson analysis shows the elements of MS, TG and HDL were positively correlated.

Conclusion (1) MS is independent risk for CHD, and dangerous degree is higher than its single components. (2) EH with the MS has a certain effect on CHD. (3) MS in lipid metabolism may have its protection regulation mechanism between components.
Objective: The objective of this study was to investigate the effects of slow breathing rate on heart rate variability (HRV) and blood pressure variability (BPV) in healthy subjects.

Methods: 53 healthy volunteers underwent three periods of controlled breathing at 8, 12, and 16 breaths/min. ECG (RR), respiratory and blood pressure signal were continuously and simultaneously recorded. In our study, the influence of the respiration on RRI (RR interval) and BP were observed. Simultaneously, we studied the effects of slow breathing rate on RRI, amplitude of blood pressure oscillation, high-frequency (HF) power, low-frequency (LF) power and LF/HF ratio of HRV and BPV. Then we also corrected the effects of slow breathing rate on respiratory peak shifts.

Result: RRI and BP cyclical change coincided with the respiratory cycle; As breathing rate reduced, amplitude of RRI and blood pressure oscillation increased, heart rate slowed (P < 0.05), respiratory peak shifted towards left (P < 0.05). Compared to 16 breaths/min, conventional spectral analysis showed increased LF and HF (P < 0.05) power, decreased LF/HF ratio (P < 0.05) of HRV, increased LF, HF power (P < 0.05) and LF/HF ratio of BPV at a rate of 12 breaths/min; It also showed increased LF power (P < 0.05) and LF/HF ratio (P < 0.05), decreased HF power (P < 0.05) of HRV and BPV at a rate of 8 breaths/min. As the respiratory frequency decreased gradually, correct spectral analysis showed increased HF power, decreased LF power and LF/HF ratio (Compared with 16 breaths/min, statistically significant respiratory rate effects were found in HF power, LF/HF ratio of HRV and BPV in 8, 12 breaths/min and LF power of HRV in 8 breaths/min, P < 0.05).

Conclusion: Reductions of respiration rate shifted the respiratory peak into the junction of HF and LF or even below LF range. In accordance with this shift, the effects of slow breathing rate on respiratory peak shifts should be corrected when we performed HRV and BPV spectral analysis; correct spectral analysis demonstrated that slow respiration can cause increase in HF power and decrease in LF power and LF/HF ratio. These demonstrated that slow breathing was indeed capable of increasing vagal activities and shifting sympatho-vagal balance towards vagal activities.
remains controversial. The aim of this study was to assess the effect of bisoprolol fumarate, a highly selective beta-1 adrenoceptor antagonist, on plasma glycosylated hemoglobin (HbA1c) levels in patients of type 2 diabetes mellitus (T2DM) associated with hypertension and/or coronary heart disease.

**Methods** A prospective, multicenter open-label clinical trial was conducted in T2DM patients, aged 18 – 80 years, associated with hypertension and/or coronary heart disease. Bisoprolol was given at doses of 2.5 – 10 mg/d for 20 weeks, and a periodic follow-up was conducted. The primary endpoint was the change in plasma HbA1c level, and the secondary endpoints included changes in fasting blood glucose (FBG) level, serum lipid level, blood pressure and heart rate. Any adverse reactions caused by bisoprolol treatment were recorded.

**Result** 392 subjects were enrolled in this study. After 20 weeks of bisoprolol treatment, the HbA1c level, FBG level and serum lipid level were not significantly different from corresponding values at baseline, while blood pressure and heart rate were significantly reduced after bisoprolol therapy. No severe adverse events were observed. There were no significant differences in plasma HbA1c levels following treatment with low-, medium- or high-doses of bisoprolol.

**Conclusion** In patients of T2DM associated with hypertension and/or coronary heart disease, treatment with bisoprolol fumarate for 20 weeks reduced blood pressure and heart rate, with no adverse effects on HbA1c.

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**Lercanidipine can improve renal function in patients with atherosclerotic renal artery stenosis undergoing renal artery intervention**

Meng Peng, Xiongqing Jiang*, Ting Guan, Yubao Zou, Wenjun Ma, Hui Dong, Tuo Liang, Jin Bian, Haiying Wu

**Hypertension center, Cardiovascular Institute and Fuwai Hospital, Chinese academy of Medical Sciences and Peking Union Medical College**

**Purpose** To investigate the nephroprotective effect of lercanidipine in patients undergoing renal artery intervention.

**Methods** A prospective, single-center cohort study was conducted and the patients with atherosclerotic renal artery stenosis aged 30-75 year were consecutively enrolled between September, 2011 and October, 2012. Lercanidipine was regularly taken after the intervention. All patients were invited to present themselves at our institute at 3 and 6 months after the intervention. Serum creatinine, clinical blood pressure, 24-hour ambulatory blood pressure, pulse wave velocity, 24-hour urine protein were measured. Adverse events were recorded.

**Result** In term of renal function, estimated glomerular filtration rate (75.02 ± 27.11 ml/min/1.73 m² vs 71.28 ± 21.35 ml/min/1.73 m², P = 0.266) or 24-hour urinary protein [0.055 (0.01-0.225) g vs 0.03 (0.01-0.28) g, P = 0.742] at 3 months after the intervention was not statistically different compared with the baseline. At 6 months after the intervention estimated glomerular filtration rate significantly increased (78.03 ± 23.12 ml/min/1.73 m² vs 71.28 ± 21.35 ml/min/1.73 m², p = 0.021), 24 hour urine protein decreased significantly [0.02 g (IQR, 0.01 – 0.1) vs 0.03 g (IQR, 0.01 – 0.28), P = 0.042]. Blood pressure was controlled better at 3 months and 6 months after intervention. At 3 and 6 months after intervention the number of antihypertensive drugs, clinical systolic blood pressure, diastolic blood pressure, 24-hour average systolic blood pressure, 24-hour average diastolic blood pressure significantly decreased. Pulse wave velocity decreased significantly at 3 and 6 months after intervention. At the end of follow-up, death, dialysis, myocardial infarction or stroke occurred in none of the patients. Mild lower extremity edema occurred in only one patient. No other side effects occurred.

**Conclusion** The study showed that lercanidipine can improve renal function in patients undergoing renal artery intervention. It was safe and effective in control of hypertension.

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**Early routine post–fibrinolysis angioplasty benefits more patients with acute ST–elevation myocardial infarction**

Xianzhi He

1. Department of Cardiology, Longgang District Central Hospital of Shenzhen, Guangdong, China.
2. Department of Cardiology Long–Gang District People’s Hospital of Shenzhen Guandong 518116 Shenzhen, China.

**Objective** Evaluate whether early routine post-fibrinolysis angioplasty represents a reasonable reperfusion option for victims of ST-elevation myocardial infarction (STEMI), So that we can calmly deal with these patients and patients can have better prognosis.

**Methods** A total of 936 STEMI patients were randomized to full Urokinase followed by stenting within 3-12 hours (early routine post-fibrinolysis angioplasty; 472 patients), or primary stenting within 12 hours (Primary angioplasty; 464 patients). The primary endpoints were the reperfusion time within 3 hours and the incidence of no-reflow or slow-reflow. The secondary endpoints were the acute incidence of bleeding, the extent of myocardial damage, determined by the 6-month left ventricular function and the 3 year composite incidence of death, reinfarction, stroke, or revascularization.

**Result** Early routine post-fibrinolysis angioplasty significantly increased the percentage of reperfusion treatment within 3 hours (P < 0.01). The primary angioplasty group resulted in higher frequency of no-reflow or slow-reflow (P < 0.01). Both groups were similar regarding major bleeding (P > 0.05). The 6-month left ventricular function of early routine post-fibrinolysis angioplasty group was better than primary angioplasty group. Both groups were similar regarding reinfarction, stroke or revascularization (P > 0.05), but the incidence of 3-year cumulative death is higher in the primary angioplasty group (P < 0.01)

**Conclusion** Early routine post-fibrinolysis angioplasty can significantly improve effective time window within effective reperfusion treatment percentage, Result in better myocardial perfusion, lower no-reflow and preserving left ventricular function and the prognosis of patients with STEMI than primary angioplasty.

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**Effects of ventricular conduction block patterns and pulmonary hypertension on mortality in hospitalized patients with dilated cardiomyopathy**

Xiaoping Li, Wei Hua, Guodong Niu, Feng Gan, Jing Wang, Ligang Ding, Shu Zhang

Cardiac Arrhythmia Center, State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, 100037, P.R. China.

**Objective** Ventricular conduction block (VCB) identified on a 12-lead electrocardiogram is associated with poor outcomes in patients with known cardiac diseases. The prognostic implications of VCB
patters in dilated cardiomyopathy (DCM) patients, however, need to be evaluated. The purpose of this study was to determine all-cause mortality in DCM with VCB.

**Methods** and Result An observational cohort study was undertaken of patients from 2003 to 2011, 1119 patients were enrolled with median follow-up of 3.5 years. Standard demographics, echocardiography and routine blood tests were obtained shortly after admission. Outcome was assessed with all-cause mortality. All patients were then divided into LBBB, RBBB, intraventricular conduction delays (IVCD) and narrow QRS groups. Of those, 19.8% (n = 221) had LBBB, 7.3% (n = 82) had RBBB, 6.0% (n = 67) had IVCD, 66.9% (n = 749) had narrow QRS. All-cause mortality rates were highest in patients with IVCD (47.8%, n = 32), intermediate in those with RBBB (32.9%, n = 27) and LBBB (27.1%, n = 60), and lowest in those with narrow QRS (19.9%, n = 149), a significant difference in all-cause mortality risk among the VCB groups and narrow QRS group (log-rank \( \chi^2 = 51.564, P < 0.001 \)). In addition, significant mortality differences were also demonstrated between the DCM patients with VCBs and pulmonary hypertension (PH) compared with those without PH (37.9% vs 20.9%, log-rank \( \chi^2 = 27.087, P < 0.001 \)). Presence of RBBB, IVCD, PH, left atrium diameter and NYHA functional class were the independent predictors of all-cause mortality in DCM patients.

**Conclusion** VCB, in particular IVCD, predicts mortality in DCM, and that RBBB and IVCD but not LBBB are independent predictors of mortality.

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**Hypertension: meta–analysis of randomized controlled trials**

Ken Chen1,2, Xun Kou1,2, Yu Han1,2, Lin Zhou1,2, Chunyu Zeng1,2

1. Department of Cardiology, Daping Hospital, the Third Military Medical University
2. Chongqing Institute of Cardiology, Chongqing, P. R. China

**Background** Aliskiren is a novel renin-angiotensin aldosterone system (RAAS) inhibitor, the combination therapy of aliskiren and amlodipine for blood pressure control have been reported recently. The primary objective of this analysis is to review recently reported randomized controlled trials (RCTs) to compare antihypertensive effects and adverse events between mono (amlodipine or aliskiren alone) and combination therapy of both medicines.

**Methods** Databases for the search included PubMed, embase and the Cochrane Central Register of Controlled Trials. Revman v5.0 statistical program was used to analyze the data. Weighted mean differences (WMD) with a 95% confidence interval (CI) were used for the calculation of continuous data, and relative risk (RR) with a 95% CI was used for dichotomous data.

**Result** We analyzed the data from 7 RCTs for a total of 6074 participants in this meta-analysis. We found that the aliskiren/amlodipine combination therapy had a stronger effect in lowering blood pressure as compared with the monotherapy using aliskiren (SBP: WMD = -10.42, 95% CI -13.03 - -7.82, P < 0.00001; DBP: WMD = -6.60, 95% CI -7.22 - -5.97, P < 0.00001) or amlodipine (SBP: WMD = -4.85, 95% CI -6.88 - -2.81, P < 0.00001; DBP: WMD = -2.91, 95% CI -3.85 - -1.97, P < 0.00001). No differences were found in terms of adverse events between combination therapy and monotherapy, except for the rates of peripheral edema and hypokalaemia which were significantly lower in the combination therapy than in the amlodipine monotherapy (RR = 0.78, 0.66 – 0.92, P = 0.004; RR = 0.51, 0.27 – 0.97, P = 0.04). Similar antihypertensive effects were found in both obese (body mass index \( \geq 30 \text{ kg/m}^2 \)) hypertensive and non-obese hypertensive patients. Moreover, there was no difference with the blood pressure lowering or adverse effects with regards to the combination therapy in both subgroups.

**Conclusion** We found that aliskiren/amlodipine combination therapy provided a more effective blood pressure reduction than monotherapy with either drug without significant increase in the occurrence of adverse events.

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**Sudden death of a 15-year-old boy: what's the etiology?**

Haizhou Zhuang1, Hong Zhao1, Luhua Shen1, Meili Duan1
1. Department of Critical Care medicine, Beijing Friendship Hospital, Capital Medical University
2. Department of Pathology, Fu Wai Hospital, CAMS & PUMC

**History** A male patient, 15 years old, complained of “fatigue for 1 day, and respiratory and cardiac arrest for 5 hours”. Before admission, the patient was on the 5th day of military training. On the day of admission, after running, the patient suffered a sudden death and received CPR. A physical examination after CPR at admission showed the following: RR 22 times/min; P 113 bpm; blood pressure 92/59 mm Hg. At the bottom of both lung lobes, a slight amount of moist rales was heard. No wheezing or pleural friction rub was heard. The border of cardiac dullness was normal, and heart rate was 113 bpm, with a regular rhythm. No pathological murmurs, extra heart sounds, or pericardial friction rub was heard in each heart valve auscultation area. Laboratory test Result were as follows. A routine blood test showed: WBC, 20.9×10\(^9\)/L; GR, 85.7%; Hb, 172 g/L; and PLT, 261×10\(^9\)/L. Blood biochemistry was as follows: Cr, 199 μmol/L; BUN, 5.6 mmol/L; Alb, 55.5 g/L; AST, 295 U/L; ALT, 1129 U/L; LDH, 2062 U/L; CK > 300 ng/ml; and Tnl > 50 ng/ml.

**Impression** Sudden cardiac death and severe myocarditis? Arrhythmia, atrial fibrillation, ventricular tachycardia, ventricular fibrillation, cardiopulmonary resuscitation postoperative state, acute enteritis, severe sepsis, septic shock, acute respiratory distress syndrome, acute liver injury, acute kidney injury. The patient was conscious when transferred into the ICU, with mild agitation. After admission, the next day, however, the patient suffered another SD and showed ventricular arrhythmia. After 1.5 h CPR, however, the patient's heart rate still could not be maintained. After approximately 3 hours of chest compression, clinical death was declared at 12:43 pm. At autopsy, we found atrioventricular node artery stenosis, obvious thickening of the arterial intima, and fatty infiltration around the atrioventricular node. We diagnosed the patient with congenital hypoplasia.

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**Relationship of CTGF, HGF and atrial fibrosis in patients with atrial fibrillation during rheumatic heart disease**

Xin Yi, Yanli Zhou, Lele Ma, Mingjiang Li
Department of Cardiology, Renmin Hospital of Wuhan University

**Objective** To investigate the possible molecular mechanisms of atrial fibrosis, the alteration of connective tissue growth factor (CTGF), hepatocyte growth factor (HGF) and the level of phosphorylation of MAPKs signaling pathway molecules in patients with atrial fibrillation during rheumatic heart disease was detected.
the protein expression of HGF is markedly reduced in AF (P < 0.001).

and collagen volume fraction are significant increased in AF group, but
the level of phosphorylation of MAPKs signaling pathway molecules
level of phosphorylation of MAPKs signaling pathway molecules was
and HGF were measured by immunohistochemistry technique, and the
observe the degree of atrial fibrosis, and the protein expression of CTGF
heart disease during undergoing surgery. Masson staining was used to
patient's atria fibrosis, and then participate in the incidence and maintain
of atrial fibrillation.

Impact of hemodynamics on in--stent restenosis after coronary bifurcation stenting
Xiujian Liu 1, 2, Changyan Lin 1, 2, Yuyang Liu 1, Guanghui Wu 1, 2, Chuangye Xu 1, 2
1. Beijing Anzhen Hospital, Capital Medical University, Beijing 100029, China
2. Beijing Institute of Hear Lung & Blood Vessel Diseases, Beijing 100029, China

Objective Stenting in coronary bifurcation has always been an important issue in cardiology, considering the higher procedural difficulties and the post-interventional risks like in-stent restenosis (ISR). The mechanism and causes of ISR are still not fully understood, however, a series of studies demonstrate that hemodynamic factors provoked by stent implantation affect the risk of restenosis. In the past decade, most of the numerical models carried out lack patient-specificity, simulating stenting interventions in idealized arterial geometries. Hence, the aim of this work is to implement a patient-specific virtual model, overcoming the limitations of the current state-of-the-art in numerical stenting procedures simulations.

Methods Four patients with LAD/D1 bifurcation lesions were divided into ISR (n = 2) and non-ISR (n = 2) groups. The pre-interventional geometry of a patient-specific atherosclerotic coronary bifurcation was generated from computed tomography angiography (CTA) images. Then stents were virtually implanted in the geometry model according to the follow-up CTA at 1 year. Numerical models were established to calculate the distribution of the hemodynamic factors and then to analyze the impact of hemodynamics on ISR after stenting compared with the follow-up CTA.

Result The wall shear stress (WSS) in all the segments of all patients was less than 0.7 Pa, and the WSS of the stented segment coronaries was less than the rest of the arteries. Comparing the calculated Result with the follow-up CTA, we found that the WSS of the restenosis group was lower than the nonrestenosis group.

Conclusion The presented work proves the feasibility of implementing a patient-specific virtual model replicating actual clinical cases. The model was investigated in terms of stresses and subsequently validated through a comparison with the actual post-intervention lumen. Such computational studies could be used prior to stenting implantation, comparing different clinical options and facilitating the intervention strategy planning. Also, the distribution of hemodynamic factors such as WSS can be evaluated as predictors of ISR.

Effects of chronic kidney disease on platelet response to antiplatelet therapy in acute myocardial infarction patients
Jie Deng, Yaling Han, Xiaozeng Wang, Zhao Xin
Department of Cardiology, Institute of Cardiovascular Research of People’s Liberation Army, Shenyang Northern Hospital, Shenyang, Liaoning 110840, China

Objective To elucidate effect of dual antiplatelet therapy on platelet response in acute myocardial infarction patients with chronic kidney disease.

Methods From Sep. 2011 to Jun. 2012, a total of 195 acute myocardial infarction patients undergoing drug eluting stent implantation were enrolled, among them, 133 cases with normal renal function, and 62 cases with chronic kidney disease (CKD). We examined platelet reactivity after clopidogrel 300 mg and aspirin 300 mg treatment for 24 h. High on treatment platelet reactivity (HPR) was defined as > 55% for light transmission aggregometry.

Result The CKD patients had higher diabetes mellitus (24.8% vs 43.5%, P = 0.01), anemia (5.6% vs 16.1%, P = 0.03) and high on treatment platelet reactivity (28.6% vs 45.2%, P = 0.03) than those with normal kidney function patients. Logistic regression analyses showed that CKD and diabetes mellitus were independent predictors of HPR. Prevalence of HPR was higher in CKD patients compared with normal kidney function patients (65.1% ± 10.2 vs 45.3% ± 7.8, P < 0.01). In subgroup analysis testing was done before and after antiplatelet treatment. At baseline there were no differences in platelet aggregation, however, absolute decrease in reactivity after antiplatelet treatment was significantly less in CKD patients compared to patients with normal kidney function (63.2% ± 8.6 vs 43.2% ± 5.2, P < 0.01).

Conclusion CKD is an important contributor to apparent HPR.

Study on the molecular genetic correlation between atrial fibrillation and sodium channel gene SCN5A in Chinese population
Zhenyan Xu, Kui Hong
Department of Cardiovascular Medicine, the Second Affiliated Hospital to Nanchang University, Nanchang, China

Objective Atrial fibrillation is the most common arrhythmia with high mortality and disability. It can lead to ventricular rhythm disorders, impaired heart function and atrial mural thrombosis. Atrial fibrillation has been considered as the result of various mechanisms and factors, and recent studies have shown that gene variations of ion channels, gap junction proteins, and nuclear pore proteins are closely associated with it. Sodium channel gene SCN5A is one of its virulence genes, but there is no such research between them in Chinese population yet. Our aim is to explore the molecular genetic relevance between SCN5A and atrial fibrillation in Chinese population.

Method We collected the clinical datum and blood samples of patients with atrial fibrillation in our hospital. All selected patients did routine examinations and echocardiography. Besides, we also collected patients with other cardiovascular diseases (hypertension, coronary heart disease, rheumatic heart disease and dilated cardiomyopathy) but without atrial fibrillation as control group. Do logistic regression analysis to find whether these factors (LAD and LVEF) may relate with the onset of atrial fibrillation. We extracted their DNA samples, and screening
Correlation of electrophysiological characteristics with genotype in arrhythmogenic right ventricular cardiomyopathy

Jingru Bao, Zijian Wang, Yifu Wang, Xiaofan Fan, Kai Sun, Dingsheng He, Frank I. Marcus, Shu Zhang, Rutai Hui, Lei Song, Yan Yao
1. State Key Laboratory of Cardiovascular Diseases, National Center for Cardiovascular Disease, Fuwai Hospital, Peking Union Medical College - Chinese Academy of Medical Sciences, Beijing, China
2. University of Arizona, Tucson, AZ, USA

Objective Although mutations of several genes are associated with arrhythmogenic right ventricular cardiomyopathy (ARVC), the exact correlation between genotype and electrophysiological (EP) features remain unclear.

Methods Ninety Chinese ARVC patients who underwent intracardiac EP study were recruited and 9 known genes of ARVC including PKP2, DSC2, DSG2, DSP, JUP, TGFb3, TMEM43, DES and LMNA were screened.

Result A total of 53 mutations were identified in 57 patients (63%), among which 19 (33%) carried multiple mutations. Mutation carriers had more frequent clinical ventricular tachycardia (VT) (89% vs 55%; P < 0.001) and negative T waves in V1 to V3 (61% vs 33%; P = 0.016). So did patients with plakophilin-2 (PKP2) mutations than all others. Syncpe occurred more often in multi-mutation carriers (58% vs 21%; P = 0.003). VT was significantly more often induced in mutation carriers (86% vs 58%, P = 0.003), especially PKP2 mutation carriers (80% vs 48%; P = 0.002). Furthermore, induced VT with a rate ≥ 200 bpm was also more often documented in mutations carriers (88% vs 54%; P = 0.013), as well as PKP2 mutations carriers (91% vs 67%; P = 0.041). Compared with non-carriers, the basal free-wall (90% vs 68%; P = 0.028) and inferior wall (90% vs 12%; P = 0.026) of right ventricle were more often the low voltage area in mutation carriers.

Conclusion Pathogenic gene mutations were found in nearly 2/3 of ARVC patients. Mutation carriers, especially PKP2, had a higher proportion of a history of VT and more inducible fast VT. They were also more frequently found to have substrates at basal free-wall and inferior wall of right ventricle than non-carriers, supporting that they are more susceptible to VT.
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