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Selected Abstracts and Paper

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Abstracts

p. 2–12

The Impact of Carotid Angioplasty and
Stenting on the Cerebrovascular Reactivity

p. 13–17

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Clinical Features and Follow-Up Study on Cerebral Venous Sinus Thrombosis Patients with Nephrotic Syndrome*Zhou L, Cheng Z, Huang X, Wang Q, Xu A, Xu G, Liu X, Zhu W*

Department of Neurology, Jinling Hospital, Southern Medical University, Nanjing, China

Objective: To investigate the clinical features and prognosis of cerebral venous sinus thrombosis (CVST) in patients with nephrotic syndrome. **Methods:** The clinical data of 14 patients of nephrotic syndrome complicated with CVST were retrospectively analyzed. They had been hospitalized from January 2007 to January 2011 in department of Neurology and Nephrology in Jinling Hospital. The clinical features and follow-up were summarized. **Results:** The average age of the 14 cases was (31.4 ± 15.9) years old. The main clinical manifestations were headache, motor dysfunction, and epileptic seizures. All patients were performed neuroimaging examination, including CT and MRI scan. CT-positive rate was 29% (4/14), MRI/MRV-positive rate 93% (13/14). One patient who could not be diagnosed by MRI was performed DSA examination. Superior sagittal sinus was the most common site of cerebral venous sinus thrombosis, followed by the transverse sinus. Serum albumin of 12 patients was less than 25g/L, plasma fibrinogen of 8 patients was more than 4g/L. Each patient was given anticoagulant therapy (intravenous heparin followed by oral warfarin). At discharge, 14 patients improved symptom, 5 patients had headache. Within an average of 29 months follow-up, there was no death or recurrence, only 1 patient had sequel of headache. **Conclusions:** Neuroimaging examination should be performed in case of nephrotic syndrome patient have neurological symptom or sign, which can diagnose CVST timely. The early diagnosis and treatment may be useful to good outcome.

DWI Reversal in Acute Ischemic Stroke Patients with Intravenous Thrombolysis*Zhou Y, Shan P*

Department Neurology of People's Liberation Army No. 411 Hospital, Shanghai, China

Objective: It was a widely accepted hypothesis among clinicians that lesions with DWI hyperintensity represent irreversibly infarcted tissue (ischemic core) and DWI/PWI mismatch means the salvageable penumbra in the setting of acute stroke. But there was not any pathophysiological evidence in human body supporting this theory. Clinical observations and many published reports shown the frequency and extent of DWI reversal or ADC normalizations in stroke patients, especially in patients with intravenous thrombolysis.

sis. We wished to assess the evidence to support this phenomenon.

Methods: 37 consecutive patients with anterior circulation ischemic stroke treated with tissue plasminogen activator within 4.5 hours of stroke onset were studied. Multimodal MRI sequences include DWI, GRE, MRA were performed at baseline before rt-PA administration and 6–10 hr, 7–14 day after treatment. The relationship between the change of infarct extent in MR imaging and the score of NIHSS, mRS and the level of serum NSE before and after thrombolysis were investigated. **Results:** DWI abnormalities reversed in eleven cases (30%) at 7–14 days after thrombolysis and four of them showed the extent of initial DWI hyperintensity diminished or disappeared after 6hr. Good clinical outcome described by mRS, NIHSS and decrease of NSE were corresponded to the reversal of DWI lesion. **Conclusions:** Our findings contribute to the idea of hyperintense DWI lesions as heterogeneous regions comprising varying biochemical and metabolic environments, which may be variably amenable to salvage rather than as homogeneous regions of ischemic core tissue.

Convexity Subarachnoid Hemorrhage Herald an Isolated Cortical Vein Thrombosis*Martinez PM, Rodriguez G, Langendorf F*

Department of Neurology, University of Minnesota, Minneapolis, Minn., USA

Objectives: We present an interesting case of a cortical vein thrombosis presenting as a focal subarachnoid hemorrhage and sensory seizures. **Background:** Nontraumatic convexity subarachnoid hemorrhage (SAH) accounts for a small percentage of all SAH cases. Different etiologies have been reported; idiopathic, vasculitis, peripartum posterior reversible encephalopathy, vascular malformations, dural sinus and cortical vein thrombosis. Common presenting symptoms are headache and focal seizures without papilledema or increased intracranial pressure. Treatment with anticoagulation despite the presence of hemorrhage in cerebral venous thrombosis may be helpful. Neuroimaging is crucial in the diagnosis of cortical vein thrombosis. Increased signal of the affected vein on Computerized Tomography (CT) known as a “cord sign” has been described in the literature. Brain magnetic resonance (MR) imaging of the brain is the preferred diagnostic modality when the entity is suspected. Imaging shows increased signal intensity of the affected vein “a hyperintense vein sign”; additionally MR or CT venography can show the absence of flow in the affected vein. **Methods:** A 61-year-old male was admitted to our hospital with the chief complaint of brief episodes of left hand tightness and left upper lip numbness, accompanied by a continuous headache for a month that had worsened the day of admission. There was no history of trauma or migraine headaches. The patient was afebrile and a neurological examination was unremarkable. **Results:** CT of the head showed a high density lesion in the

right frontal convexity sulcus suggesting subarachnoid blood. MR imaging showed linear high intensity signal in that sulcus suggesting cortical vein thrombosis as well as subarachnoid blood. Conventional cerebral angiogram did not show other sources of SAH. A hypercoagulable states work up disclosed the presence of a Factor V Leiden heterozygous mutation. **Conclusions:** A presumptive diagnosis of cortical vein thrombosis with secondary SAH and focal sensory seizures was established and the patient was discharged on warfarin and levetiracetam. The patient has been asymptomatic ever since, and at nine months the patient was changed to aspirin and the antiepileptic medication was stopped.

Susceptibility-Weighted Imaging in Testing Microbleeds in Patients with Super-Acute Ischemic Stroke Treated by Intravenous Thrombolysis

Bai Q, Zhao Z, Sui H, Xie X, Zhao X, Lu L, Shen J, Chen J, Yang J

Pudong People's Hospital, Shanghai, China

Objective: Study of susceptibility-weighted imaging (SWI) in testing cerebral microbleeds (CMBs) in patients with brain stroke and intravenous thrombolysis and its clinical significance. **Methods:** MR fast imaging sequence and SWI were performed on 279 ischemic brain stroke patients who have been prescreened by CT plain scan within 12 h of disease onset. 162 (58.1%) patients were found as super acute ischemic brain stroke, that is, DWI hyper-intense, T₂WI and FLAIR no hyper-intense change and T₁WI no hypo-intense change. Among them, 113 (40.5%) super acute ischemic brain stroke patients were treated by rt-PA intravenous thrombolysis. Patients in thrombolysis and non-thrombolysis group were followed up by regular sequence and SWI. **Results:** Among the 113 patients treated by thrombolysis, 13 (11.50%) showed hemorrhagic transformation which was tested by CT plain scan and regular MRI sequence, while 4 (8.16%) out of 49 patients in the non-thrombolysis group showed hemorrhagic transformation; by SWI, 46 (40.70%) and 9 (18.37%) patients were found with new CMBs in the thrombolysis and non-thrombolysis group, respectively ($p < 0.01$); SWI showed that the 24h NIHSS in the group with microbleeds is better than the group without microbleeds ($p < 0.05$), and the 90d modified Rankin Scales (mRs) and life quality Barthel Index (BI) are also significantly better in the group with microbleeds group ($p < 0.01$). **Conclusion:** After MRI-guided thrombolysis treatment for super acute ischemic brain stroke patients, no significant increase of cerebral hemorrhagic transformation was observed; however, the incidence of CMBs was significantly increased. SWI showed that CMBs, a possible indication of vascular recanalization or reperfusion, were related with beneficial prognosis.

Intranasally Delivered Nerve Growth Factor Protects against β -Amyloid Deposition and Improves Neurological Function in Rats following Traumatic Brain Injury

Tian L, Guo R, Lv Q, Xu L, Xu G, Liu X

Department of Neurology, Jinling Hospital, Nanjing University School of Medicine, Nanjing, China

Objective: Amyloid- β (A β) peptide increased rapidly after traumatic brain injury (TBI) both in humans and animals, which was also developed in Alzheimer's disease (AD) patients. Here we aimed to ameliorate the A β deposition after TBI in rats. Nerve growth factor (NGF) is great potential to repair brain injury. But its clinical application is limited because of lacking feasible methods for delivering NGF into brain. This study investigated the effects of NGF, delivered intranasally, on the A β burden in the central nervous system (CNS) of rats with TBI. **Methods:** Adult male Sprague-Dawley rats were subjected to the modified Feeney's weight-drop model. The treatment group was treated with NGF administered by nasal route, and the control group was given phosphate-buffered saline (PBS). Beam walking and Morris water maze test were performed in the three groups. The concentration of A β_{40} , A β_{42} and amyloid protein precursor (APP) in the injured ipsilateral hippocampus and cortex was elevated by ELISA measurement. Immunohistochemistry was used to detect the APP and A β positive cells near the region of injury in the hippocampus and cortex in rats after TBI. Western blot was performed to advance test the level of APP at 7 and 14 days following TBI. **Results:** Compared to sham operated rats, TBI rats exhibited significantly increased APP and A β_{42} expression as well as decreased functional outcome after TBI. Intranasal administration of NGF significantly attenuated A β_{42} deposits, and improved functional outcome after TBI. **Conclusion:** Thus, intranasal delivery of NGF provides a potential strategy for reducing the risk of developing AD in the later life of TBI patients.

Melatonin Activates the Nrf2-ARE Pathway when it Protects against Early Brain Injury in a Subarachnoid Hemorrhage Model

Chen G, Ma C, Wang Z

Department of Neurosurgery, the First Affiliated Hospital of Soochow University, Suzhou, China

Objective: Melatonin has beneficial effects against early brain injury (EBI) by modulating cerebral oxidative stress after experimental subarachnoid hemorrhage (SAH); however, few investigations relate to the precise underlying molecular mechanisms. To date, the relation between melatonin and nuclear factor erythroid 2-related factor 2 and antioxidant responsive element (Nrf2-ARE) pathway has not been studied in SAH models. This study was undertaken to evaluate the influence of melatonin on Nrf2-ARE pathway in rats after SAH. **Methods:** Adult male SD rats were divided into four groups: (1) Control group (n=18); (2) SAH group (n=18); (3) SAH+vehicle group (n=18); and (4) SAH+melatonin group (n=18). The rat SAH model was induced by injection of 0.3 ml fresh arterial, non-heparin-

ized blood into the prechiasmatic cistern in 20 sec. In SAH+melatonin group, melatonin was administered i.p. at 150 mg/kg at 2 h and 24 h after the induction of SAH. Brain samples were extracted at 48 h after SAH. **Results:** Treatment with melatonin markedly increased expressions of Nrf2-ARE pathway related agents, such as Nrf2, heme oxygenase-1 (HO-1), NAD(P)H: quinone oxidoreductase 1 (NQO1), and glutathione S-transferase α -1 (GST- α 1). Administration of melatonin following SAH significantly ameliorated EBI, including brain edema, blood-brain barrier (BBB) impairment, cortical apoptosis, and neurological deficits. **Conclusion:** post-SAH melatonin administration may attenuate EBI in this SAH model, possibly through activating Nrf2-ARE pathway and modulating cerebral oxidative stress by inducing antioxidant and detoxifying enzymes.

The Experimental Research on the Promoters CPG Island Methylation of Androgen Receptor Gene in Cerebral Hemorrhage

He J, Sun H, Xu Y

Department of Neurology, the First Affiliated Hospital of Baotou Medical College, Baotou, China

Objective: This study is intended to study the relationship between the promoters CPG island (CCGG) methylation of androgen receptor gene and cerebral hemorrhage by discussing the mechanism and characteristics of the cerebral hemorrhage on molecular level. **Methods:** A case-control study of 54 patients with cerebral hemorrhage and matched 111 healthy individuals was carried out. Total testosterone was measured by chemiluminescence technique. The promoters CPG island methylation of androgen receptor gene was further analyzed by MSP. **Results:** We found no significant difference of total testosterone level in the cerebral hemorrhage group and the control group ($P>0.05$). The CPG island methylation of androgen receptor gene in the cerebral hemorrhage group 44.4% was lower than that in the control group 46.8% ($P<0.05$). The methylation had no obvious change between in the male cerebral hemorrhage group 43.7% and in the male control group 43.7% ($P>0.05$); The methylation had no obvious change between in the female cerebral hemorrhage group 45.5% and in the female control group 51.1% ($P>0.05$); The methylation had no obvious change between in the male cerebral hemorrhage group 43.7% and in the female cerebral hemorrhage 45.5% ($P>0.05$); there was no significant difference of methylation between in the male control group 43.7% and in the female control group 51.1% ($P>0.05$). **Conclusion:** The total testosterone level is not related to the incidence of cerebral hemorrhage. The methylation of androgen receptor gene CPG island is not related to the incidence of cerebral hemorrhage.

Expression of PD-1 Peripheral Blood T Cells of Patients with Cerebral Infarction

Sun H, He J, Xu Y

Department of Neurology, the First Affiliated Hospital of Baotou Medical College, Baotou, China

Objective: This study is intended to investigate the expression of programmed death-1 (PD-1) on peripheral blood T cells between the cerebral infarction patients and the healthy controlled groups by discussing the mechanism and characteristics of the cerebral infarction from molecular level. **Methods:** A case-control study of 108 patients with cerebral infarction and matched 90 healthy individuals was carried out. The cerebral infarction group was divided into four groups by OSCP. To obtain the blood samples, The Peripheral blood T cells of cerebral infarction patients and controls were isolated by ficoll density gradient medium and nylon wool column. The expression of PD-1 was detected by direct immunofluorescence, flow cytometry and half-quantitative RT-PCR. **Results:** PD-1 expressed on peripheral blood T cells of cerebral infarction patients and controls by direct immunofluorescence. The expression level of PD-1 by flow cytometry in cerebral infarction group ($8.26\pm2.17\%$) was found to be lower than that of the normal control group ($16.25\pm2.96\%$) ($P<0.05$). The expression level of PD-1 did not show significant changes among four subtypes of cerebral infarction groups by OSCP ($P>0.05$); In every subtype of cerebral infarction group, The expression level of PD-1 was all significantly lower than that of the control group ($P<0.05$); The mRNA expression of PD-1 on peripheral blood T cells by half-quantitative RT-PCR in the ischemic cerebrovascular disease group (0.537 ± 0.065) was lower than that in the control group (0.931 ± 0.059) ($P<0.05$). The mRNA expression of PD-1 on peripheral blood T cells did not show significant changes among four subtypes of cerebral infarction groups by OSCP ($P>0.05$); In every subtype of cerebral infarction group, the mRNA expression of PD-1 on peripheral blood T cells was all significantly lower than that of the control group ($P<0.05$). **Conclusion:** The expression of PD-1 on peripheral blood T cells from patients with cerebral infarction was significantly down-regulated, which might play some role in the pathogenesis of cerebral infarction.

The Effect of Blood Pressure Reduced Amplitude on Prognosis in Acute Phase of Patients with Ischemic Stroke

Wu L, Guo X, Sun L, Gao W, Wang D, Wen J, Wang Y, Liu D, Sun H, Jia L

Department of Neurology, the First Affiliated Hospital of Baotou Medical College, Baotou, China

Objective: To investigate the effect of blood pressure reduced amplitude on prognosis in acute phase of ischemic stroke. To analyze the relationship between blood pressure reduced amplitude and prognosis in patients with different reasons of ischemic stroke. **Methods:** To include 216 cases who were hospitalized within 24 hours of ischemic stroke in the First and Second Affiliated Hospital of Baotou Medical College from February 2011 to January 2012.

Male 129 cases, female 87 cases, mean age 65.15 ± 11.41 years old. According to China Stroke guideline, it is valued to regulating blood pressure on the basis of patients' blood pressure. To measure the blood pressures every 6–8 hours within 7 days in the hospital. Reduced amplitude cohort formed naturally and cases were divided into 5 groups, <0 mmHg, 0–10 mmHg, 11–20 mmHg, 21–30 mmHg, >30 mmHg. Patients were registered about general condition, past medical history, blood pressure reduced amplitude, TOAST subtype, treatment, complications and prognosis. **Results:** 1. Reduced in blood pressure >30 mmHg group, blood pressure reduced amplitude is related with fatality rate of patients ($OR=8.667$). 2. Blood pressure reduced 21–30 mmHg group is 5.76 times the death/disability rate of 0–10 mmHg group in three months' follow-up; and, >30 mmHg group is 7.2 times 0–10 mmHg group. 3. The recurrence rate of stroke increased in blood pressure reduced >30 mmHg group ($OR=9.50$, 95%CI 1.96–13.64). 4. Blood pressure reduced >30 mmHg group in large artery sclerotheroma subtype is 4.36 times the death/disability rate of 0–10 mmHg group. The death/disability rate of blood pressure reduced 10–20 mmHg group is lower in cardioembolism subtype. **Conclusion:** Blood pressure reduced too much may be the independent risk factor of poor prognosis in patients with acute ischemic stroke, especially in large artery sclerotheroma subtype patients. Patients need to stabilize blood pressure within 24 hours after stroke, especially in older people.

Endovascular Recanalization of Atherosclerotic Subclavian Artery Stenosis

Li Y^{1,2}, Yin Q¹, Wang Y², Bao Y¹, Zhang Y¹, Sun W¹, Xu G¹, Liu X¹

¹Department of Neurology, Jinling Hospital, Nanjing University School of Medicine, Nanjing, China;

²Department of Neurology, Provincial Clinical Department of Fujian Medical University, Fuzhou, China

Objective: Subclavian artery stenosis (SAS) is a common lesion of the aortic arch branches. Endovascular revascularization is emerging as an alternative to surgical bypass for symptomatic SAS. In this study, we aimed to present a single-center experience of endovascular recanalization of SAS. **Methods:** Between 2004 and 2011, sixty patients (44 male and 16 females; median age 64 years, range 45–78 years) who were treated with endovascular stenting of atherosclerotic SAS were retrieved from the Nanjing Stroke Registry Program (NSRP). Baseline demographics, comorbidities, clinical presentation, data of procedure, and the followed-up outcomes were documented and analyzed. **Results:** Among the 60 enrolled patients, 51 (85.0%) were symptomatic, 9 (15%) were asymptomatic. Forty-two (70%) patients had other craniocervical artery stenoses. Thirty-one (51.7%) patients had a history of nondisabling ischemic stroke/TIA. A total of 60 SAS lesions (53 stenoses, 7 total occlusions) underwent recanalization. The overall technical success rate was 93.4% (98.1% for stenosis; 71.4% for occlusion). Four minor complications were observed (6.7%). During a period of 21 ± 19 months followed up, 6 (10%) restenoses and 8 (13.3%) clinical events were identified over. The primary patency rate was 94.1%, 81.7% and 81.7%, respectively at 12 months, 24 months, and final followed-up; and the rate of overall clinical event-free was 91.7%, 80.5% and 69.0%, respectively.

Conclusion: Endovascular revascularization is safe and feasible for atherosclerotic SAS with an acceptable immediate and mid-term outcome.

Effect of Hyperglycemia on Nerve Cell Apoptosis and Caspase-12 and Caspase-9 Expression in Cerebral Ischemia Reperfusion of Rats

Hu Y, Han J, Lin D, Wu J, Liang H, Li J, Yan J

Department of Neurology, the Fifth Affiliated (Zhuhai) Hospital, Zunyi Medical College, Zhuhai, China

Objective: Observe effect of caspases-12 and caspase-9 expression in hyperglycemia cerebral ischemia-reperfusion penumbra cortex area of the model rats to study the mechanism of hyperglycemia in cerebral ischemia-reperfusion injury. **Methods:** Male SD rats were randomly divided into hyperglycemia cerebral ischemia-reperfusion group, normal glucose cerebral ischemia-reperfusion group, sham operation group. Model of the middle cerebral artery occlusion (MCAO) was established according to the advanced Zea Longa's method. The number of apoptotic cells was counted with the TUNEL method and the expression of caspase-12 and caspase-9 was detected with immunohistochemistry method in ischemia 2h and time point of reperfusion 3h, 12h, 24h, last analysis image. **Results:** The apoptosis index of hyperglycemia cerebral ischemia-reperfusion group at all time points was higher than normal glucose cerebral ischemia-reperfusion group ($P<0.05$) and caspases-12 and caspase-9 expression of hyperglycemia cerebral ischemia-reperfusion group at all time points was higher than normal glucose cerebral ischemia-reperfusion group ($P<0.05$). **Conclusion:** Up-regulation of caspase-12 and caspase-9 expression may be one of the mechanisms of hyperglycemia-exaggerated cerebral ischemic reperfusion injury.

Ginsenoside Rg1 Protect Oxidative Injured Neurons via Regulating on HSP90 and NF- κ B

Liu Q^{1,2}, Kou J¹, Guan T¹, Wang Y¹, Yu B¹

¹State Key Laboratory of Natural Medicines, Department of Complex Prescription of TCM, China Pharmaceutical University, Nanjing, China; ²Department of Neurology, Jinling Hospital, Nanjing University School of Medicine, Nanjing, China

Objective: Cell oxidative stress induced by pathological stimulations produces extra reactive oxygen species (ROS) to damage neurons to apoptosis and death. Neural oxidative stress is a widely accepted cause of the neurodegenerative diseases, such as Alzheimer's disease (AD) and Parkinson's disease (PD). Ginsenoside Rg1 (GRg1), being extracted from the traditional Chinese medicine ginseng, is a well known as a natural neuroprotectant. As for the formal studies both *in vivo* and *in vitro*, GRg1 showed a notable neuroprotective activity in AD and PD models. But the detail mechanisms during them

remain unclear. The present study is about the regulations of Rg1 on over-activated of HSP90 and NF- κ B in exogenous hydrogen peroxide injured neurons, which would contribute to the neuroprotective mechanism explanation. **Methods:** Primary cultured neurons from E16 rat brain were subjected to exogenous hydrogen peroxide induced oxidative stress injury. DCF-DA and Hoechst 33342&PI double staining assays were applied to detect the cell apoptosis with hydrogen peroxide and GRg1 treatments; Western blotting and ELISA methods were applied for the HSP90 and NF- κ B (IKK, I κ B and NF- κ B/p65) expression detections, as well as the nuclear translocations. **Results:** The treatment of 400 μ M exogenous hydrogen peroxide for 15 min obviously injured the primary cultured neurons to apoptosis, while the damage was apparently reduced by the pre-treatment of 0.1–100 μ M GRg1 for 24 h. The over-expressions of HSP90 and NF- κ B (IKK, I κ B and NF- κ B/p65) were partly blocked by the GRg1 pre-treatment, as well as the nuclear translocations. **Conclusion:** The exogenous hydrogen peroxide could induce the over-activation of HSP90 and NF- κ B and neural apoptosis. GRg1 protected neurons against this damage through its down-regulating effect on over-expressed HSP90 and NF- κ B, which give a supplement to the pharmacological mechanism explanation of GRg1 as a natural neuroprotectant.

AQP4 Expression Levels in the Rat Brain Tissue of Ischemic Stroke Based on Atherosclerosis

Duan H¹, Hao C², Fan Y¹, Hao J¹, Liu Y¹, Xia T¹, Huang F¹, Lu G¹, Chen Z³, Jing Z³

¹Neurosurgery Department, ²Geriatric Cardiology Department and ³Experimental Animal Center, the First Clinical College of Shanxi Medical University, Taiyuan, China

Objective: To investigate the establishment of global cerebral ischemic stroke rat model based on the atherosclerosis (AS), and the expression levels of aquaporin 4 in the rat brain. **Methods:** 60 Adult male Wistar rats were randomly divided into 2 groups, the normal group (n=30, C group) and AS group (n=30, A group), each group divided into sham group and brain ischemic 0.5,6,12,24 h subgroup. Pathological changes in morphology and optical microscopy determine the success of modeling. AQP4 protein and gene expression changes detected by immunohistochemistry and RT-PCR. Spss17.0 statistical software was used for statistical analysis. **Results:** The rat model was successfully produced. Pathological changes were observed under the light microscope, such as aortic endothelial continuity interrupted, lipid plaques, calcification, proliferation of medial smooth muscle, elastic fiber breakage and outer membrane thinning. Ischemic stroke model was also established. Such as dilated pupils, dark red bulbar conjunctiva, arched back and pilo-erection, were successfully observed. AQP4 gene and protein expression were significant in the brain tissue of ischemic 0.5h subgroup, 6h subgroup reached its peak, 12, 24 h sub-group continued to express highly. The difference of above changes between the 0.5h and sham subgroups, 6h and sham subgroup, 6h and 0.5h subgroup, was significant ($P<0.05$). Above changes in ischemia 12, 24 h subgroups, respectively, compared with the 6h subgroup were no statistically significant difference ($P>0.05$). No significant difference between the normal group

and AS group ($P>0.05$). **Conclusion:** High fat diet and the bilateral carotid artery occlusion can successfully established the brain ischemic rat model on the basis of atherosclerotic; The expression of AQP4 enhanced in the ischemic stroke models based on the atherosclerosis, and increased to the peak at 6h. At 12h and 24h, the expression of AQP4 also maintained at the high levels.

The Dynamic Expression of TWEAK, NF- κ B and MMP-9 in Focal Cerebral Ischemia following Ischemic Preconditioning in Rats

Han J, Wang Z, Tang W, Song Y, Zhu M, Yan C

Department of Neurology, Qianfoshan Hospital Affiliated to Shandong University, Jinan, China

Objective: TWEAK, NF- κ B and MMP-9 expressions and the effect of ischemic preconditioning on it after permanent middle cerebral artery occlusion (PMCAO) in rats were investigated. **Methods:** The healthy adult male SPF Sprague-Dawley rats were randomly divided into the experimental group, the control group, the sham group and the normal group to subject to MCAO10min served as IP. PMCAO models were made after IP 48 h. After the neurological scoring, the rats were sacrificed at different time points respectively at 6h, 12h, 24h, 48h, and 72 h after PMCAO. Brain water content was measured by Wet and dry weight method and the volume of cerebral infarction was calculated using TTC staining. TWEAK, NF- κ B and MMP-9 expression were detected by immunohistochemistry and reverse transcription polymerase chain reaction (RT-PCR). **Results:** 1. Neurological deficit symptoms in the experimental group were significantly reduced than in the control group ($P<0.05$); 2. There was significant difference of brain water content between the experimental group and control group ($P<0.05$); and significant difference existed between the experimental group and the sham group, similarly in the control group and sham group ($P<0.01$); 3. The infarction volume in the experimental group was significantly less than the control group, and the comparison between the experimental group and control group showed significant difference ($P<0.05$); 4. The protein expression and mRNA expression of TWEAK, NF- κ B and MMP-9 at each time point after infarction showed a significant positive correlation. **Conclusion:** The expression of TWEAK, NF- κ B and MMP-9 was significantly elevated in brain tissue after cerebral ischemia and there was a close correlation between each other. Ischemic preconditioning could improve the neurological deficits, lessen cerebral edema, reduce the infarct volume and inhibit the TWEAK, NF- κ B and MMP-9 expression after cerebral ischemia. Ischemic preconditioning produce ischemia tolerance having neuroprotective effects against focal cerebral ischemia. TWEAK, NF- κ B or MMP-9 were involved in this endogenous neuroprotective mechanism.

General Guidance and Training to the Caregivers of Stroke Improves Long-Term Functional Outcome of Stroke Patients

Chi X, Yu Y, Chang B

Department of Neurology, Wendeng Center Hospital of Weihai, the Affiliated Hospital of Weifang Medical College, Weihai, China

Objective: The aim of this study was to investigate whether the general guidance and training of rehabilitation therapy to the caregivers of stroke patients during hospitalization can improve long-term functional outcome of stroke patients. **Methods:** The experimental group included 38 cases of stroke patients, whose caregivers were given general guidance and training of rehabilitation therapy after admission. The caregivers provided rehabilitation therapy for their patients for 3–4 weeks during the rehabilitation period. The control group included 46 patients; they received rehabilitation therapy by therapists for 3–4 weeks during the rehabilitation period after admission. Dynamic follow-up guidance was given for all patients and their caregivers after discharge. The limb motor function and daily living activities (ADL) of two groups were assessed and compared through the Fugl-Meyer Assessment of Motor Recovery (FM) and the Modified Barthel Index (MBI) before rehabilitation therapy, at discharge and 3 months after discharge. **Results:** There were no differences between experimental group and control group in FM and MBI before rehabilitation ($p>0.05$, $p>0.05$, respectively) and at discharge ($p>0.05$, $p>0.05$, respectively). However, the experimental group showed greater gains than the control group in FM and MBI 3 months after discharge ($p<0.05$, $p<0.05$, respectively). **Conclusions:** General guidance and training to the caregivers of stroke patients during hospitalization can improve long-term functional outcome and ADL of stroke patients. In addition, applying this strategy can largely reduce the family's economic burden and improve the social satisfaction. Then it might be a feasible and economical method for the management of stroke rehabilitation.

The Association between c.14576G>A Polymorphism of RNF213 Gene and the Genetic Susceptibility of Adult Moyamoya Disease in Chinese Han Population

Wang X, Huang X, Zhang M, Zhang Z, Liu W, Ni G, Sun W, Liu X, Xu G

Department of Neurology, Jinling Hospital, Nanjing University School of Medicine, Nanjing, China

Objective: To explore the association between c.14576G>A (p.Arg 4859 Lys) and c.15209C>T (p.Ala 5070 Val) polymorphisms of RNF213 gene and the genetic susceptibility of adult Moyamoya disease (MMD) in Chinese Han population. **Methods:** Sixty-four adult MMD patients and 96 healthy controls were recruited from Chinese Han population as subjects. Polymorphisms of c.14576G>A and c.15209C>T in RNF213 gene were genotyped by improved multiple ligase detection reaction (iMLDR). Each genotype frequency and allele gene frequency was compared between the two groups.

Linkage disequilibrium and haplotype were statistically analyzed. **Results:** The distribution frequency of G/A+A/A genotype and a allele of c.14576G>A in MMD group were significantly higher than that in control group. The prevalence of A-C haplotype in MMD group was significantly higher than that in control group. **Conclusion:** Polymorphisms of c.14576G>A in RNF213 may be a genetic marker for adult MMD in Chinese Han population, and the population carrying A-C haplotype is more susceptible to MMD.

Stroke Rehabilitation – What Is New and What Works and What Does Not? What Are the Evidences Telling Us?

Xu J

Staff Specialist Rehabilitation Medicine, Liverpool Hospital, Braeside Rehabilitation Hospital, Disability Specialist Unit, Concord Hospital, Sydney, NSW, Australia

Objective: To identify and summarise the current evidence in stroke rehabilitation management from published research and clinical studies of last decade and to facilitate the incorporation of clinical evidence into clinical practice and decision making. **Methods:** An electronic online literature search of published clinical studies in stroke rehabilitation, predominantly focus on literatures published in English, via Medline, Embase and CINAHL were conducted. Selected studies include randomised control trial, control trial and observational studies, review, meta-analysis and research performed on animal studies. **Results:** Study provides a critical review and summary of evidence on advancement in rehabilitation of stroke sufferers. Apart from well established treatment in some subset of acute phase of ischemic stroke, there are solid evidences that reduced stroke mortality, level of disability and functional impairment could be achieved with well-coordinated multi-disciplinary care in a dedicated stroke service. Despite extensive research and efforts, new treatment especially based on cellular biotechnology in stroke rehabilitation remains promising but still in need of further vigorous research. It highlights challenge facing health care professional working with stroke survivors and their families. **Conclusion:** Stroke is a leading cause of long terms disabilities and due to project trend of worldwide aging population. It is anticipating that it's economic and social costs would likely to increase. To provide cost effective and quality stroke rehabilitation we need sound scientific evidence. There are good evidences to support multi-disciplinary stroke care which are cost effective, less dependent on expensive technology and could have high potential utility value in middle-income countries.

Association between Serum Bilirubin, Gamma-Glutamyltransferase, C-Reactive Protein, Non-High Density Lipoprotein Cholesterol and Silent Brain Infarcts

Yu Y¹, Zhang C², Chi X¹, Sun C³

¹Department of Neurology, Wendeng Center Hospital of Weihai, the Affiliated Hospital of Weifang Medical College and Teaching Hospital of Dalian Medical University, Weihai, China; ²Department of Neurology, the Affiliated Hospital of Qingdao University Medical College, Qingdao, Shandong Province, China; ³Institute of Brain Disorders and the Provincial Key Lab for Brain Disorders of Liaoning Province, Dalian Medical University, Dalian, China

Objective: The aim of this study was to assess the relationship among serum bilirubin (Bil), Non-high density lipoprotein cholesterol (Non-HDL-C), urea, uric acid, lipoprotein (a), C-reactive protein (CRP), gamma-glutamyltransferase (GGT), cardiovascular risk factors and silent brain infarct (SBI) in patients without any neurological disorder, as well as whether the factors of interest were associated with SBI was investigated. **Methods:** One hundred and sixty subjects with a mean age of 56.2 ± 10.8 years (28–88 years), without any history of stroke, transient ischemic attack and other neurological abnormality were enrolled in this cross-sectional study. The subjects underwent brain magnetic resonance imaging (MRI) and blood chemistry determinations. The χ^2 -test was used for categorized variables. Student's t-test was used to compare differences in means of laboratory results between the groups with and without SBI. Multiple logistic regression analysis was used to determine the independent predictors of SBI. **Results:** The group comprised 64 men and 96 women. SBI were found in 52 patients (32.5%). The low-density lipoprotein (LDL) and CRP were significantly higher in the infarct group ($P=0.020$, $P=0.040$), serum total and indirect bilirubin (TBil and IBil) levels were significantly lower in the infarct group respectively ($P=0.025$, $P=0.030$) while there is no difference in the serum direct bilirubin (DBil) between these two groups. GGT concentrations were significantly higher in the men-infarct group ($P=0.045$) and Non-HDL-C levels were significantly higher in the women-infarct group than the women non-infarct group ($P=0.007$). **Conclusion:** CRP, GGT, IBil and Non-HDL-C levels may be associated with SBI. We expected that these biomarkers could predict the occurrence of SBI.

Comparable Study for Intra-Arterial Thrombolysis and Mechanical Thrombectomy Intracranial Recanalization of Acute Ischemic Stroke Treated

Jiang C, Li Y, Wang B, Zhang T, Yang J, Li X, Pan X

Department of Neurology, Baotou Central Hospital, Baotou, China

Objective: To access differences in effectiveness and relative risks among the patients with acute ischemic stroke treated with the intra-arterial thrombolysis and revascularization by mechani-

cal thrombectomy, and analyze the factors related to the outcome.

Methods: We reviewed retrospectively all medical and neuroradiologic data from 75 patients presenting with a clinical diagnosis of acute stroke underwent catheter-based angiography documenting focal occlusion of an intracranial artery and performed with endovascular management. We assigned patients to intra-arterial thrombolysis group ($n=35$) and mechanical thrombectomy group ($n=40$). **Results:** NIHSS scores in retinal thrombolysis were lower than those in prior thrombolysis in two groups, $P<0.05$. NIHSS scores in intra-arterial thrombolysis group were reduced at the time of two weeks treatment, which in mechanical thrombectomy group was reduced at the time of three days treatment, $P<0.05$. Prior to thrombolysis, prompt, 24 hours and 3 days postprocedural NIHSS scores in two groups were evaluated, respectively, $P>0.05$. TIMI $\geq$ II and the postprocedural severity of stenosis $\leq 30\%$ that intracranial recanalization of acute ischemic stroke treated in mechanical thrombectomy group were higher than which in intra-arterial thrombolysis group, $P<0.05$. Symptomatic intracranial hemorrhage after 24 hours of treatment and deaths after 3 months of treatment in two groups were evaluated, respectively, $P<0.05$. There was no reclusion in mechanical thrombectomy group. The reclusion in intra-arterial thrombolysis group was higher than those in mechanical thrombectomy group, $P<0.05$. The NIHSS scores which was 0 or reduce ≥ 4 in 24 hours of treatment were no difference in two groups, $P<0.05$. 3 months MRS which was 0 or 1 was higher in mechanical thrombectomy group than which in intra-arterial thrombolysis group, $P<0.05$. **Conclusions:** No differences in improve of nerve function and in the outcome for the near term between the patients of acute ischemic stroke treated with intra-arterial thrombolysis and mechanical thrombectomy. The patients with acute ischemic stroke treated with mechanical thrombectomy have earlier improvement of nerve function-higher efficacy and security-better outcome at a specified future date than those with intra-arterial thrombolysis.

The Effects of Pericarpium Trichosanthis Injection on Hemorheology in Patients with Cerebral Infarction

Zhou G¹, Nie S¹, Dai L¹, Wang X¹, Chen H², Fan W³

¹Department of Neurology, ²Department of Neurosurgery, ³Drug and Equipment Section, No.425 Hospital of PLA, Sanya, China

Objective: To explore the effects of pericarpium trichosanthis injection on hemorheology in patients with cerebral infarction. **Methods:** Participants included 650 patients with cerebral infarction from Sanya Stroke Registry Program and divided randomly into treatment group ($n=320$) and control group ($n=330$). Obtained from the patients, some parameters were compared between groups as follows: hemorheology, the level of fibrinogen, the status of neurologic impairment and electrocardiogram. **Results:** Before treatment, there were no significant differences in hemorheology, the level of fibrinogen, the status of neurologic impairment and electrocardiogram between each group ($p>0.05$). After treatment, the parameters of hemorheology was markedly improved in patients of treatment group compared with control group ($p<0.05$). Compared with control group, there was also an improvement in status of neurologic

impairment and electrocardiogram in treatment group ($p < 0.05$). **Conclusion:** Pericarpium trichosanthis injection can reduce blood viscosity safely and effectively, which strengthens improvement of neurological function and stroke prognosis.

Cerebral Microbleeds Associated with White Matter Lesions Independently of Hypertension in Patients with Ischemic Stroke and Related Risk Factors

Gao Z, Zhao X, Wang W, Wang Z, Wu W

Department of Geriatric Neurology, Nanlou Division, Chinese PLA General Hospital, Beijing, China

Objective: Cerebral microbleeds (CMBs) are common in patients with cerebrovascular disease and the elderly. White matter lesions (WML) and lacunar infarcts often coexist and share similar risk factors with CMBs. However, it remains unclear whether the association of CMBs with WML and lacunar infarcts is independent of hypertension and related risk factors. **Methods:** Forty-five hospitalized patients with acute ischemic stroke and 150 subjects with cerebrovascular risk factors were recruited. The number of CMBs and lacunar infarcts were recorded. The severity of WML was separately assessed as peri-ventricular hyperintensity (PVH) and deep white matter hyperintensity (DWMH) by modified Fazekas rating scale. The association between the number of CMBs and the severity of WML and lacunar infarcts was examined using a Pearson correlation analysis. **Results:** The prevalence of CMBs was high in patients with DWMH (46.5%), PVH (44.1%) and lacunar infarcts (48.2%). CMBs were correlated with DWMH ($r = 0.321$, $P < 0.001$), PVH (0.255, $P < 0.001$) and lacunar infarcts (0.286, $P < 0.001$). The correlation of CMBs with DWMH or PVH was independent of hypertension. **Conclusions:** Our observations suggest that CMBs are an important manifestation of cerebral small vessel disease.

Gene Modification with Adiponectin Improves Function of Endothelial Progenitor Cells and Attenuates Endothelial Injury

Huang Z^{1,2,3}, Liu D^{1,2}, Zhu J^{1,2}, Wu L^{1,2}, Wang Q^{1,2}, Sun W^{1,2}, Liu Q^{1,2}, Fan X^{1,2}, Chen M^{1,2}, Xu G^{1,2}, Liu X^{1,2}

¹Department of Neurology, Jinling Hospital, Southern Medical University, Nanjing, China; ²Department of Neurology, Jinling Hospital, Nanjing University School of Medicine, Nanjing, China; ³Department of Neurology, First Hospital of Putian City, Putian, China

Objective: To study the effects of adiponectin expression on EPCs function and their homing capacity the adiponectin-mediated therapeutic benefit after endothelial cells injury. **Methods:** Rabbit peripheral blood-derived EPCs were transfected with adiponectin expression vector (Adiponectin-EGFP) or empty control vector (Ctrl-EGFP). 48 hours after transfection, the Adiponectin-GFP fused

protein was viewed directly with fluorescence microscope, and the expression of adiponectin was detected by using RT-PCR (real time-PCR) and ELISA. The migration of EPCs toward SDF-1 α was evaluated in a transwell migration assay, and the adhesion to fibronectin was determined using a static adhesion assay. Besides, the EPCs proliferation was studied by MTT. We investigated the effects of adiponectin, secreted by endothelial progenitor cells, on TNF- α -stimulated vascular endothelial cells focusing on inflammatory signal transduction. Vascular endothelial cells obtained from carotid artery of male rabbits were treated with TNF- α in the absence or presence of Adiponectin. RT-PCR and Western blotting were performed to analyze the cellular signal and Cell adhesion molecules. **Results:** Adiponectin expression of Adiponectin-EGFP transfected EPCs was statistically significant in comparison with nontransduced EPCs ($P < 0.05$). Adiponectin-EPCs showed an increased migration toward SDF-1 α ($P < 0.05$); Adiponectin expression also increased the adhesion and proliferation capacity of EPCs ($P < 0.05$). In vitro, rabbit EPCs expressing adiponectin inhibited the activation of NF- κ B/p65 and had lower expression of cell adhesion molecule, such as interstitial cellular adhesion molecule-1, E-selectin, interstitial cellular adhesion molecule-1. **Conclusions:** The present study demonstrated for the first time that the adiponectin gene modified EPCs protected endothelial cells against TNF- α -mediated inflammation. Adiponectin improved EPCs-mediated therapeutic benefit after endothelial injury.

Angioplasty Therapy for Acute Vertebral-Basilar Arteries Occlusion

Li W, Xue D, Yu Y, Wang S, Xu F, Ba J, Jiao D

Department of Neurosurgery, Affiliated Hospital of Armed Police Logistics College, Tianjin, China

Objective: To evaluate the effect of vertebral-basilar arterial recanalization by angioplasty for acute vertebral-basilar arterial occlusions. **Methods:** Retrospective analysis of 17 patients with acute vertebral-basilar arterial occlusion was treatment by angioplasty, from January 2009 to April 2011. All patients' responsibility occlusion arterial was recanalization with angioplasty. **Results:** Partial recanalization was achieved from 15 cases (88.2%). Rate of residual stenosis after recanalization ranged from 20.0% to 30.0%, average rate of residual stenosis was 25.1%. 14 cases were treated with stenting after vertebral-basilar arterial recanalization, stent implantation rate of 93.3%. 12 patients' condition was apparent improved and 3 patients were died within 30 days after operation. During the clinical follow-up for a period of 6–10 months, DSA follow-up showed no restenosis in 4 patients. **Conclusion:** Treatment of acute intra-arterial occlusion by angioplasty is effective to some patients with acute vertebral-basilar arterial occlusion, however, the safety and indications of operation need to sum up through more cases.

Effect of Chronic Intermittent Hypoxia on the Structural Change and Synaptophysin Expression in the Hippocampus of Parkinson's Disease Model Mice

Liu H, Xu J, Song Y, Zhang Z, Li J

Department of Neurology, Urumqi General Hospital, Lanzhou Command, PLA, Urumqi, China

Objective: To investigate the effect of chronic intermittent hypoxia on the structural change and synaptophysin expression in the hippocampus of Parkinson's disease model mice. **Methods:** Forty-four six-week-old male C57BL/6 mice were randomly divided into Paraquat (PQ) group, chronic intermittent hypoxia (CIH) group, PQ + CIH group and control group. Hypoxia-reoxygen device simulates the process of CIH. Meanwhile, intraperitoneal injection of PQ induced the model of mice of Parkinson's disease. Synaptophysin (SYN) expression in the hippocampus were observed by immunohistochemistry and the grey number of SYN in the hippocampus of mice; HE staining and Nissl staining studied the amount and morphology in hippocampus of mice. **Results:** The appearance of Nerve cell of hippocampus by HE staining and Nissl staining: Neurons in the hippocampus of control group showed even of density and distribution, distinct of nucleus texture and Nissl's body. Most neurons architecture disaggregation, Nissl's body decrease and even vanish in the other groups, especially appeared in PQ+CIH group. Compared with control group, the grey number of SYN in hippocampus were increased in the other groups ($P<0.05$), especially significant in PQ+CIH group ($P<0.01$). No significant difference was found within the PQ group and CIH group ($P>0.05$). **Conclusion:** CIH increased the impairment of the neuron and synapse in hippocampus of Parkinson's disease model mice.

Clinical Research of Citalopram Combined with Wuling Capsule on the Treatment of Post-Stroke Depression

Ran S, Yan K, Lin T

The Second Affiliated Hospital of Guangdong Pharmaceutical University, Guangzhou Xinhai-Hospital, Guangzhou, China

Objective: To observe clinical curative effect of citalopram combined with Wuling capsule (WLC) on the treatment of Post-stroke depression (PSD). **Methods:** 102 Post-stroke depression patients were randomly assigned to three groups, 34 cases in each group, which was treated with routine medicine. But to the WLC group and the Citalopram group, additional WLC and Citalopram was given respectively, while for the combined group, both of the two drugs were given. Before and after treatment of 4 weeks and 8 weeks, the cognitive function of the patients were estimated by HAMD scale and nerve function were estimated by MMSE scale, SSS scale and Barthel index (BI). **Results:** After treatment of 8 weeks, The grades of HAMD scale was Significant improvement in WLC treatment group ($P<0.05$), which was very significant improvement in citalopram group and combined treatment group ($P<0.01$), and HAMD

scale in the combine-treated group was well below than that of two other groups respectively ($P<0.05$). For all three groups after treatment 8 weeks, SSS score and BI score very significantly decreased ($P<0.01$), while MMSE score significantly increased ($P<0.05$), and have no significant difference between the three groups. **Conclusion:** Citalopram is effective in treating patients with PSD, more efficacy when combine-treated with WLC.

Research in Risk Factors of Intracranial Atherosclerotic Stenosis

Jiang J, Wang F

Department of Neurology of Lianyungang Second People's Hospital, Lianyungang, China

Objective: To investigate classical risk factors of intracranial atherosclerotic stenosis and its relationship with genetics polymorphisms of rs1800787 and rs1800790 which are located in promoter area in FGB gene. **Methods:** The research was a case-control study. Patients in Department of Neurology of NO.2 People's Hospital of Lianyungang were enrolled consistently from December, 2010 to February, 2012. Patients enrolled were grouped into 4 groups, symptomatic intracranial atherosclerotic stenosis group (SIAS), ischemic stroke caused by small vessel disease group (SVD), asymptomatic intracranial atherosclerotic stenosis group (aSIAS) and health control (HC). Basic characteristics, history and laboratory data including level of plasma fibrinogen were recorded. We used Taqman real-time polymerase chain reaction (PCR) for genotyping. **Results:** 1. A total of 164 patients were enrolled, 81 for SIAS group, 43 for SVD group, 15 for aSIAS group and 25 for HC. 2. As for classical stroke risk factors, level of CRP was in relation to IAS independently ($P=0.012$), while other risk factors were not significantly correlated to IAS ($P>0.05$). 3. There were no significant differences between groups in distribution of genotypes and alleles of rs1800787 and rs1800790. And significant relations were not found between IAS and alleles of rs1800787 and rs1800790. **Conclusion:** Elevated level of CRP was independently related to IAS. We did not find significant correlations between rs1800787, rs1800790 genetics polymorphisms and IAS.

Exome Sequencing, XYLB Mutations and Ischemic Stroke Risk in Chinese Han Population

Zhang Y, Geng Y, Cheng J

Key Laboratory of Molecular Biology of Guangdong Province, Center for Disease Control and Prevention, Shenzhen, China

Objective: Genome-wide association studies (GWAS) of ischemic stroke (IS) have been performed in some cohorts of Caucasian or Black persons and Japanese, resulting in somewhat inconsistent results. We sought to explore the suspicious susceptibility locus for IS by exome sequencing in Chinese Han population. **Methods:** We

used exome sequencing study including 100 IS patients and 100 age- and sex-matched controls to screen the suspicious susceptibility locus for ischemic stroke, and verified them in up to 5708 participants from three hospital-based case-controlled studies. Genotypes of tagging single nucleotide polymorphisms (SNPs) were determined by TaqMan SNP allelic discrimination. **Results:** In our initial scan, we found the SNP rs17118 in XYLB gene ($P=1.99 \times 10^{-8}$) showing genome-wide statistical association with IS in Chinese Han population. In replication studies, significantly increased odds ratio was observed in individuals with rs17118 A allele of Chinese Han population (OR=1.12, 95% CI=1.03–1.22). Compared with the CC genotype of rs17118, individuals with a allele had higher risk of IS (OR=1.15 for CA and 1.32 for CC; $P=0.0095$ and 0.0004 respectively). After adjustment with the conventional risk factors, the risk relationships remained unchanged. **Conclusion:** We identified the SNP rs17118 in XYLB gene that strongly associated with an increased risk of IS for Chinese Han population.

Analysis of the Risk Factors and Etiology in Patients with Recurrent Cerebral Infarction

Zhao H^{1,2}, Liu W¹, Wang Xi¹, Fan X¹, Zhu W¹, Liu X¹, Xu G¹

¹Department of Neurology, Nanjing University School of Medicine, Jinling Hospital, Nanjing, China; ²East Hospital, Tongji University, Shanghai, China

Objective: To investigate the causes and mechanisms of the recurrent cerebral infarction. **Methods:** 110 patients with recurrent cerebral infarction from Nanjing Stroke Registry Program were studied, 317 patients with first-ever cerebral infarction were enrolled as the control group. The clinical data were reviewed and recorded. All patients were classified into 5 major ischemic stroke subtypes according to the TOAST criteria. The occurrence and distribution of cerebral arterial stenosis or occlusion were analyzed by digital subtraction angiography (DSA), CTA or MRA. **Results:** Hypertension was the most common concomitant disease in both RCI and FCI group (68.2%, and 60.9% respectively). The incidence of hyperlipidemia and TIA in RCI group were higher than that in FCI groups ($P<0.05$). Large vessel disease was the most common type of both RCI and FCI group (46.4% vs. 54.9%), but there was no significant difference between two groups ($P=0.123$). The rate of stroke of undetermined etiology was higher in RCI group (RCI vs. FCI, 10% vs. 3.1%, $P=0.004$). The patients with negative vessels finding decreased in the RCI group (RCI vs. FCI, 9.8% vs. 20.4%, $P=0.015$). There was no significant difference in the distribution of cerebral artery stenosis between two groups ($P=0.062$). **Conclusion:** Hypertension was the most common concomitant disease in both RCI and FCI group. The incidence of hyperlipidemia and TIA in RCI group was higher than that in FCI group. The pattern of TOAST subtypes differed between the RCI and FCI group. Undetermined stroke was more common in the RCI group. The patients without obvious vessel lesion decreased in the RCI group.

Association of Blood Pressure Variability and Early Enlargement of Hematoma in Acute Intracerebral Hemorrhage Patients Treated with Early Intensive Blood Pressure Lowering Treatment

Zou M, Yan T

Department of Neurology, Tianjin Medical University General Hospital, Heping District, Tianjin, China

Background: Early intensive blood pressure lowering treatment was reported to be able to attenuate hematoma growth over 72 hours in acute intracerebral hemorrhage. The aim of the study was to find out the association of blood pressure variability with the growth of hematoma in acute intracerebral hemorrhage patients treated with early intensive blood pressure lowering treatment. **Methods:** 55 consecutive patients treated with early intensive blood pressure lowering treatment between 2006 and 2010 were studied. Blood pressure was measured every 15 minutes during the first 1 hour, then every 30 minutes during the first 6 hours, and thereafter at 1 hour intervals up to 24 hours. Blood pressure was described as mean, maximum, minimum, standard deviation and successive variation of both systolic and diastolic pressure. Baseline and 24 hours follow-up CT scans were performed and the hematoma volumes were calculated according to digital images. **Results:** In our study, early enlargement of hematoma was present in 12 patients (21.8%). Systolic and diastolic BP profiles, including mean, maximum and minimum did not differ between hematoma enlargement group and non-hematoma enlargement group. Patients with hematoma enlargement had higher systolic successive variation ($p<0.01$) and systolic standard deviation ($p<0.01$) than non-hematoma enlargement group. In univariate logistic regression analysis, high systolic blood pressure variability was associated with early enlargement of hematoma (OR=1.253, 95% CI: 1.011-1.863, $p=0.015$). **Conclusion:** High systolic blood pressure variability is associated with the early enlargement of hematoma in acute intracerebral hemorrhage patients treated with early intensive blood pressure lowering treatment.

Brief Screening Tests Administered during Acute Stroke Admission in Patients with Mild Stroke Can Predict Significant Vascular Cognitive Impairment (VCI) at 1 Year

Dong Y^{1,4}, Venketasubramanian N², Slavin MJ¹,
Sharma VK², Chan BP-L², Collinson SL³, Sachdev P¹,
Chen C³

¹School of Psychiatry, the University of New South Wales, Sydney, Australia; ²Medicine, National University Health System, Singapore, Singapore; ³Department of Psychology, National University of Singapore, Singapore; ⁴Pharmacology, National University Health System, Singapore, Singapore

Objective: A recent study has reported that brief screening tests (Montreal Cognitive Assessment (MoCA) or Mini-Mental State Examination (MMSE)) administered during acute admission in patients with mild stroke are predictive of significant VCI 3–6 months after stroke. Early detection of these patients is important as such patients are at increased risk of incident dementia. However, the prognostic value of MoCA and MMSE after acute stroke for significant VCI at 1 year has not been determined. We aim to examine the predictive ability of the MoCA and the MMSE at acute stroke admission (baseline) for significant VCI at 1 year. **Methods:** Patients with ischemic stroke and transient ischemic attack were assessed with both MoCA and MMSE within 14 days. They then received a formal neuropsychological evaluation at 1 year which was utilised to classify cognitive outcomes as either 'no to mild cognitive impairment (≤ 2 cognitive domains impaired)' or 'moderate to severe cognitive impairment (> 2 cognitive domains impaired, i.e., significant VCI)'. **Results:** 230 out of 322 (71.4%) patients completed neuropsychological assessments 1 year after stroke. Of these, 179 (81%) had no (n=118) to mild (n=68) cognitive impairment and 34 (19%) had moderate (n=40) to severe (n=4) cognitive impairment. Baseline MoCA and MMSE were equivalent and adequate in detecting patients with significant VCI at 1 year with almost identical areas under the curve (raw scores: 0.89 vs 0.89; age and education adjusted scores: 0.91 vs 0.90). Receiver Operating Characteristic curve analysis established optimal cutoff scores of baseline MoCA (≤ 20) (Sensitivity: 0.93; Specificity: 0.70; correctly classified 76%), baseline MMSE (≤ 25) (Sensitivity: 0.98; Specificity: 0.63, correctly classified 69%) in detecting significant VCI at 1 year. **Conclusions:** Either MoCA or MMSE administered at acute stroke admission can predict significant VCI at 1 year, should be considered for routine clinical service or research.