
Glomerular filtration rate (GFR) and effective renal plasma flow (ERPF) were determined in a paired study of 28 renal homograft recipients and their donors an average of three years after transplantation. Donor GFR averaged 75.5 ml/min and ERPF 348 ml/min. Function in 17 of the 28 donors was 70% of preoperative function in the same patients. An inverse correlation between age at the time of unilateral nephrectomy and renal function three years later was demonstrated. The ratio of postnephrectomy to prenephrectomy function in 17 donors was also inversely correlated with age, indicating impairment of compensatory response with increasing age. The donor studies constitute a standard against which renal homograft function can be assessed. Recipient GFR averaged 65.8 ml/min and ERPF 309 ml/min. These values were statistically only questionably less than the corresponding donor values. However, in 7 recipients GFR, and in 9 recipients ERPF, were less than 80% of their respective donor’s functions. No significant correlation between donor or recipient age and recipient function could be demonstrated, suggesting that other factors were more important in determining recipient function. The author feels that these studies represent an important standard for evaluation of further improvements in immunosuppressive management and the efficacy of donor-recipient matching techniques.

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Renal function was studied in 29 of 34 surviving renal allograft recipients beginning two years after transplantation. Mean clearances of inulin and PAH were, respectively, greater than and equal to half the donors’ initial predicted clearances. Minimal urine osmolality during water diuresis was greater, and maximum urine osmolality during hydropenia was less than normal, an effect, the authors feel which is attributable partly to enhanced solute load in a single transplanted kidney. Patients with compatible donor-recipient lymphocyte antigens demonstrated statistically better function than those with one or more incompatibilities, although there was a definite degree of overlap between the two groups. In contrast, little correlation could be demonstrated between the cumulative histopathology and renal clearances. Renal function in patients with compatible donors was statistically greater than half the donor’s initial predicted function. Serial increase in renal clearances was documented in one patient with a compatible donor. Serial decreases were demonstrated in two patients with incompatible donors. These findings suggest that hypertrophy of the denervated, transplanted kidney occurs when immune reaction is minimal.

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Summaries – Résumés

Alterations in human serum Bic-globulin (C’3) in renal transplantation
Fifteen recipients of renal transplants were studied serially to determine the effect of rejection on the complement system, as manifested by specific alterations in Bic-globulin (C’3) during rejection episodes. Bic-globulin levels rose at the time of rejection to an average of 58 ± 18% above the mean, declined below the mean six days after maximal intensity of rejection, and fell to a minimum of 41 ± 16% below the mean 22 ± 6 days after rejection began. An acute rise in Bic-globulin did not occur: (1) in a patient who had an acute exacerbation of glomerulonephritis in his isogeneic graft, (2) as a result of surgery per se, (3) during acute bacterial infections in some of the patients, or (4) in patients with no rejection episode. Although the return of Bic-globulin to its previous level after rejection-related depression was associated with clinical improvement, stability of the level was the most important criterion for sustained control of rejection, and thus, it may be a useful guide in planning therapy. Immunoglobin levels were not generally altered in these patients although some depression of IgG and IgA occurred in cases of prolonged and poorly controlled rejection. In patients with chronic renal disease, the IgM level was low initially and rose after successful transplantation. Although low titer latex reactions were found in seven of nine patients at variable intervals after transplantation, none of them had clinical manifestations of rheumatoid disease.
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Renal transplantation in polycystic renal disease. Decrease in size of the cystic kidneys and erythremia
A 37-year-old man is presented with familial polycystic renal disease who received a renal homograft from his mother three years before. The recipient enjoys good renal function. It is noted that the polycystic kidneys which were large and left in place at the time of transplantation have since markedly decreased in size. In addition, and in spite of the fact that the patient has maintained normal renal function without evidence of significant rejection episodes, he has developed an erythremia following transplantation (peak hematocrit reading of 64%). The polycythemia persists more than three years postoperatively. Erythropoietin assay of cystic fluid revealed no activity in a specimen containing old blood. The exact cause of the erythremia in this patient remains speculative.
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Humoral factors in canine renal allograft rejection
In an attempt to assess the importance of humoral factors in the absence of immunologically competent cells in the homograft system, and the part played by nonspecific cells, sensitized dogs were irradiated, and when their peripheral white blood cell counts fell below 500/mm3, they were regrafted with kidneys from the sensitizing source. Exposure to plasma components in the absence of incompatible cells was continued for several hours, and then the kidneys were returned to their original donors. Hence, any cells that participated in subsequent events would necessarily be autologous. Four specific
sensitizations were carried out in which the second kidneys passed through the sensitized dogs and back into the original dogs. These kidneys were in their respective irradiated hosts for 2, 5, 10, and 12 h respectively. Three out of the four kidneys reimplanted into their donors continued to function. Urinary secretion by all three reimplanted kidneys fell off rapidly after 2 h, and none had any significant output after 6 h. By contrast, passage of a nonspecific kidney through an irradiated host and back to the original dog resulted in no apparent diminution of output during this time period. In all three kidneys so treated, the urinary output was good for at least 24 h. No discernable histologic change in the kidney was noted after its presence in the irradiated dog for as long as 12 h. The observation that most of the kidneys examined did not appear histologically damaged by passage in a specifically sensitized irradiated dog raises the obvious possibility that damage mediated by humoral factors may not be visible within this period. Return of the kidneys to their original donors resulted in a rapid histological change. Within 2 h a heavy polymorphonuclear leukocyte infiltration was present, predominantly around the peritubular capillaries and adjacent interstitial spaces. Second biopsy specimens obtained 6-13 h after reimplantation showed further deterioration of kidney structure. The glomeruli, which had been relatively spared in the earlier specimens began to show some loss of normal architecture in the loops. Kidneys passed through their irradiated host not specifically sensitized to them and then reimplanted into their donors gave a different histological picture. The authors conclude that these experiments demonstrate that humoral factors can initiate an immunological process which results in a dog rejecting his own kidney.

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Blood level, excretion and dosage of N-pyrrolidino-methyl-tetracyclin (PMT) in renal disease/Blutspiegel, Ausscheidung und Dosierung von N-pyrrolidino-methyl-tetracyclin (PMT, Reverin) bei Nierenkranken


In renal disease the dosage of antibiotic agents, which are normally excreted in part or entirely by the kidney, should be reduced according to the degree of functional impairment. This can be done only, however, if the excretory mechanism and the distribution volume of the drug are exactly known.

N-pyrrolidino-methyl-tetracycline (PMT) is filtered by the glomerulus. The PMT-clearance averages 68.5% of the GFR. The distribution volume is 113% of the body weight. After an intravenous injection there is an exponential decrease in the blood concentration. In normal subjects, the half-life of PMT averages 8.4 h, the coefficient of elimination k 0.082, the renal fraction of the total elimination 0.78. In renal disease, the coefficient of elimination is reduced in relation to the GFR, according to the equation k = 0.0184 + 0.000455 GFR. In anuria k averages 0.0184, corresponding to a half-life of 38 h. These values may be used to define extrarenal elimination.

The adequate dosage of PMT in renal disease can be calculated from these data. As a rough approximation and for practical purposes the degree of renal impairment can be estimated from the blood levels of creatinine.

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Summaries – Resumes

Hemodialysis in the home: A new approach to the treatment of chronic uremia
Twenty-three patients with severe chronic renal failure were trained to treat themselves in their own home with hemodialysis, which they accomplished on a 3-times per week basis while sleeping unattended and protected by appropriate monitors. All but two patients are alive, and all are fully rehabilitated; the majority without any complications of uremia other than anemia. Various parts of this program are discussed which include: (1) Medical aspects of home dialysis. The medical problems encountered in these patients are no different from those seen in center-treated patients and usually are less frequent because of more intense dialysis. Cannula survival has averaged 6 months for venous and 9 months for arterial cannulas. (2) Biochemical data. Predialysis blood urea nitrogen and creatinine values are generally lower with 8-10 h of 3 times weekly dialysis than with 12-16 h of twice weekly dialysis. (3) Psychological aspects. Most patients and their spouses or families have adjusted well to the effort and emotional stress imposed upon them by home dialysis. (4) Problems during dialysis. Over 2500 dialyses have been performed in the home, and on only four occasions has it been necessary for a physician to make a house call during dialysis. (5) Technical aspects. Service calls have been necessary approximately every two months for all three dialysate systems utilized. (6) Economic aspects. Initial costs equal $10000-$14500 and annual costs average $3550. The authors feel that home dialysis interferes much less with the home life of the patient than does center dialysis, gives them more independence, and, because they know how to treat themselves, it gives them a much healthier and more responsible attitude toward their chronic illness. Since physicians have been willing to care for these patients as they do other patients with chronic illnesses, it appears that chronic hemodialysis can be integrated into the general practice of medicine, making maintenance dialysis available to more and more patients.

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Increased intracranial pressure from unsustained levels of plasma mannitol during hemodialysis
A 33-year old woman in barbiturate coma, who was given large doses of intravenous hypertonic mannitol before hemodialysis, deteriorated suddenly during the fourth hour of hemodialysis. Clinical and necropsy evidence indicated increased intracranial pressure. In order to determine whether the rapid removal of mannitol by dialysis might create a blood-brain osmotic gradient favoring the development of intracranial edema, dogs were infused with mannitol and underwent hemodialysis as the mannitol was stopped. This was associated with an increase in cerebrospinal fluid pressure (CSFP) which did not occur if the plasma mannitol concentrations were sustained by continuous infusion or with the addition of mannitol to the dialysate. A similar concentration of glucose did not prevent the CSFP rise. Increased CSFP was associated with a cerebrospinal fluid osmolality increase greater than that of the plasma and was felt to be caused by increased concentrations of CSF sodium chloride and a rapid reduction of plasma mannitol during dialysis. The authors conclude that until further data are available, mannitol infusion should be sustained throughout dialysis once mannitol has been administered.

Author’s address: Dr. R. E. Randall, Jr., Department of Medicine, Medical College of Virginia, Richmond, Va. (USA).
A patient is presented in this report in whom severe hyperglycemia was associated with coma and convulsions during the course of prolonged peritoneal dialysis with hypertonic glucose solutions. In addition, glucose absorption was studied on 18 occasions in 13 peritoneal dialyses in uremic patients. Three two-liter exchanges of 1.5%, 4.25%, or 7% glucose were arbitrarily chosen for study during the course of dialysis. An average of 32.4 g of glucose was absorbed from the 1.5% glucose solution, 131.6 g from the 4.25% solution, and 201.5 g from the 7% dialysate. These figures represent glucose absorption from three exchanges over a period of approximately 3 h. Hyperglycemia was a common finding after three successive exchanges with the 7% glucose solutions, but it occurred only occasionally when 4.25% dialysate was used. Symptoms of thirst, nausea, and vomiting and Cheyne-Stokes respiration were associated with a blood sugar of 655 mg/100 ml in one patient and thirst and vomiting were noted in two additional individuals with elevated blood glucose levels. It is pointed out that because serum sodium is maintained at a constant level during dialysis, hyperglycemia produced by peritoneal dialysis is especially likely to cause hyperosmolality, and late rises in serum sodium, dehydration, and consequent disturbances of central nervous system function.

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Effects of anabolic steroids in chronic renal failure. I. Short term effects

Eleven patients with mild or moderate stable chronic azotemia (serum urea nitrogen = 32-85 mg%) who had been observed previously for many months were studied under conditions of strict metabolic balance for periods of 31-63 days each. When nitrogen excretion, blood urea nitrogen, and renal function were deemed constant, they were given an anabolic agent, either norethandrolone, 80 mg/day or oxandrolone 30 mg/day. The treatment lasted from 9-33 days. After stopping steroid therapy, there was a 12-27 day posttreatment study period. All patients showed improvement in biochemical uremia as demonstrated by a mean 27% fall in urea nitrogen. In addition, they all gained weight. Nitrogen excretion studies demonstrated that this drop in serum urea nitrogen could be explained on the basis of diminished protein breakdown. It is suggested by the authors that anabolic steroids may be an adjunctive mode of therapy in the treatment of chronic azotemic patients, particularly in the presence of malnutrition or during acute decompensations of renal function which are potentially reversible.

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initial insulin secretion, continued elevation of plasma insulin levels later, and decreased sensitivity of the tissues to insulin action. The persistent elevation of plasma insulin after intravenous glucose was the result of both a prolonged insulin half-life and continued stimulation of insulin secretion. Insulin resistance in the uremic patients was manifested by elevated fasting plasma insulin in the presence of normal fasting blood glucose levels, high insulin/glucose ratios after intravenous glucose, and decreased blood glucose responsiveness to intravenous insulin. Elevated plasma growth hormone levels were present in some, but not all of the uremic patients, and no correlation could be made between increased growth hormone level and impaired glucose tolerance in individual patients. It was also found that urea, per se, exerted no effect on insulin-stimulated glucose oxidation by adipose tissue in vitro.

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Metabolic behaviour of the kidney during ischemia. Conclusions concerning conservation of the kidney

\[\text{Stoffwechselverhalten der Niere während der Ischämie. Folgerungen für die Organkonservierung} \]


The kidney obtains its energy supplies mainly by splitting the tri-phosphate of adenine nucleotide. These metabolites were determined in rabbit kidneys after storage at 24°C. During the first 5 min the ATP dropped by 70%, and the ADP by 25%, whereas the AMP increased by 130%. Anaerobic glycolysis was of much slower onset. During the hour that followed, the ATP and ADP content decreased only slowly, whereas the AMP remained constant and the anaerobic glycolysis increased. After 2 h the latter also decreased. The AMP content appears to be the limiting factor for the revivability of the kidney.

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Reduction of clotting in scribner shunts by long-term anticoagulation


Oral anticoagulation with warfarin was given to a selected group of patients being treated by intermittent hemodialysis. The group was composed of patients whose shunts were known to be at risk because of previous clotting episodes. Total experience represented by this study was 195 patient-months. For 135 of these months anticoagulation was not given, and during this time 52 clotting episodes occurred. This represented a frequency of 4.6 clotting episodes per patient-year, or one every 2.6 patient-months. In the remaining 60 patient-months, anticoagulants were administered and seven clotting episodes occurred, a frequency of 1.4 clotting episodes per patient-year, or one every 8.6 patient-months. Two spontaneous hematomas occurred in the treated group, and on both occasions the prothrombin time was 2.0 times the control. The authors warn that the success found with the use of anticoagulants should not be allowed to detract from emphasis on accurate cannula placement and good cannula care, and on avoidance of hypotensive episodes.

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The influence of alkalinization on the hyperkalemia and hypermagnesemia in uremic rats

Hyperkalemia and hypermagnesemia often coexist in uremia and these changes have been ascribed to decreased urinary excretion as well as to accession of cellular K and Mg into the extracellular compartment in response to metabolic acidosis. To assess the effect of alkalinization on the hyperkalemic and hypermagnesemic response in uremic rats the following nephrectomized groups were studied: I = control, II = 7.5% NaCl, III = 5% glucose/⅛ O, IV = 7.5% NaHCO₃. Three injections were administered intraperitoneally, 1 cm³ q 8 h. In addition, 2 intact groups were included: V = intact control, VI = sham-operated. All animals, fasted and thirsted, were sacrificed 24 hours after inception of the study. As a consequence of alkalinization (Group IV) serum K increased but was significantly lower than in the other nephrectomized groups (I–III). In contrast, no amelioration of the hypermagnesemia was effected with alkalinization. Statistically significant increases in muscle K content were noted in the nephrectomized groups (I–IV), whereas, no increase was observed for muscle Mg content following nephrectomy. It is concluded that under the conditions of this study the principal intracellular cations K and Mg respond divergently to correction of uremic acidosis with NaHCO₃.

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Serum-creatinine levels in 2258 employed persons of different sex and age/Serum-Kreatininwerte bei 2258 arbeitstätigen Personen verschiedenen Alters und Geschlechts


Venous serum creatinine results (determination with autoanalyzer according to the method of Zender and Falbriard) of 1107 men and 1151 women 15 to 69 years old were analyzed for sex and age differences. All 2258 persons in this random and homogeneous population group were employed in the Swiss watch industry and volunteered for the examination. The arithmetic mean and standard deviation are 1.19 ± 0.33 mg% for men and 0.96 ± 0.28 mg% for women with a significant sex difference. There are no significant age differences in persons of 400 Varia

20-70 years of age, whereas for males aged 15 to 19 years the 10% deciles are significantly lower than for the other male age groups. Women of 15 to 19 years however behave as the 20 to 70 years old. Serum creatinine values found in the literature are tabulated according to the methods of determination; age and sex of the examined persons are given and compared with the own results.

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Low molecular weight proteinuria in chronic renal disease


In a previous study (1) urine proteins lower in molecular weight than albumin (LMW proteins) had been investigated by column and thin layer gel filtration, with electrophoretic and immunochemical analysis of the fractions. The excretion of LMW protein was increased in some forms of renal disease; the pattern was similar from case to case but differed from the LMW protein pattern of normal urine.

In the present study, polyvalent antisera were prepared to LMW urine proteins from a patient with renal tubular disease. Absorption experiments suggested that all the component proteins identified were present in normal urine and in serum. Two antisera were made specific, one to an
α protein of mean molecular radius 23 Å, and one to a 17 Å post γ protein; the urinary excretion rates and renal clearances of the two proteins could then be measured. The excretion rates were normally very low. In chronic renal disease they tended to increase with diminishing glomerular filtration but not with heavy proteinuria. The highest excretion rates were in the adult Fanconi syndrome, in which the clearances were consistent with normal glomerular permeability, negligible tubular reabsorption and the proteins’ molecular size. Reference I.Harrison, J.F. and Northam, B.E.: Low molecular weight urine protein investigated by gel filtration. Clin. chim. Acta 14: 679-688 (1966). Author’s address: Dr. J.F. Harrison, Renal Research Laboratory, Queen Elizabeth Hospital, Birmingham 15 (England). Varia Société Canadienne Française de Néphrologie La Société Canadienne Française de Néphrologie a été créée à Montréal le 19 octobre 1967. Distincte de la Société Canadienne de Néphrologie, elle est née à la suite des problèmes communs et des liens culturels qui unissent les Néphrologues d’expression française du Québec. Elle a déjà tenu deux réunions scientifiques. Le président de la Société est le Docteur Guy Lemieux, Hôtel-Dieu de Montréal; le secrétaire est Serge Carrière, Hôpital Maisonneuve de Montréal; les conseillers sont Yves Piette, Hôpital Notre-Dame et Raymond Barcelo, Hôpital Maisonneuve.