1117 AMELIORATION OF ACUTE RENAL FAILURE WITH ATP-$MgCl_2$ INFUSION. Norman J. Siegel, Marc B. Osias, and Irshad H. Chaudry. Depts. of Ped. & Surg., Yale School of Medicine, New Haven, Connecticut.

Since previous studies have shown a protective effect of the administration of ATP-$MgCl_2$ in shock, the present study was designed to determine the effect of the infusion of ATP-$MgCl_2$ after 30 minutes of bilateral renal artery occlusion. Twenty-four hours later, animals who received no infusion or only $MgCl_2$ had 1) reduced GFR (275±80 or 377±32 µl/min/100gmBW vs 1091±36 control values, $p < 0.01$), 2) marked diuresis (6.1±0.7 or 12.3±2.5 µl/min/100gmBW vs 3.1±0.2 control, $p < 0.01$), and 3) increased proportional flow to the outer cortex (1.83±.04 or 1.93±.06 vs 1.68±.04 control, $p < 0.01$) which suggested that these rats were in the early recovery phase of post-ischemic acute renal failure. The animals who received ATP-$MgCl_2$ had 1) improved GFR (784±60), 2) no diuresis (3.5±0.4), and 3) a normal pattern of cortical perfusion (1.70±.05) which suggested that these animals had an enhanced state of renal function compared to the no-infusion or $MgCl_2$-only groups of rats.

These findings suggest that the infusion of ATP-$MgCl_2$ after 30 minutes of renal artery occlusion either 1) ameliorated the effect of renal ischemia or 2) accelerated the recovery process following acute renal injury.

1118 URINE-UREA EXCHANGE PROCEDURE FOR URINARY BLADDER RESIDUAL VOLUME DETERMINATION. Gilbert Simon, M.D., Thomas Blumenfeld, M.D. (Spon. by Michael Katz, M.D.)

In some children, small residual bladder volumes may predispose to urinary tract infections but current methods for determining small residual urine volumes are relatively inaccurate and impractical. A urine-urea exchange procedure was developed to determine full-bladder volume prior to voiding. Subtracting the volume voided from the full-bladder volume gives the residual volume. This procedure consists of injecting suprapubically a small volume of concentrated urea solution, and measuring the increase in osmolality; the larger the urine volume prior to the injection, the smaller will be the increase in urine osmolality following the injection. A mathematical error analysis to determine the overall statistical standard deviation of the full-bladder volume, the voided volume and the residual volume showed the standard deviation of each to be 0.929cc, 0.401cc and 1.33cc, respectively. With trials, using an in vitro laboratory model, the mean error of the full-bladder volume was 1.1cc and the mean error of the residual volume 1.14cc. In vivo dog experiments confirmed that the procedure is safe and practical. Clinical trials have been started.

1119 EFFECT OF AMINO ACIDS AND GLUCOSE (TPN) ON RECOVERY FROM ACUTE RENAL ISCHEMIA. Elda H. Simpson, JoAnne Brasel, and Wm. C. Heird, Columbia Univ. Col. of Phys. & Surgs., Dept. of Peds. and Inst. of Human Nutr., N.Y.

TPN increases survival of adults with acute renal failure and may result in faster recovery of renal function (Abel et al., NEJM, 288:695, 1973). To study the latter possibility, a model of transient unilateral renal ischemia was used to measure reparative growth in the ischemic kidney (IK) and compensatory growth in the contralateral kidney (CK). 60 hours after ischemia, weight (wt), protein (Pr) and DNA were determined in both kidneys of 170-182 gm rats receiving either TPN (318 Cal/kd/d; n=6), or isocaloric amounts of glucose IV (n=6). Controls (n=13) were chow-fed unoperated rats.

		Contralateral Kidney		Ischemic Kidney	
	Control	TPN	Glucose	TPN	Glucose
Wt. (Gms)	0.85±0.1	0.94±0.07	0.79±0.06	1.35±0.05	1.13± 0.14
Pr. (Mg)	65.70±9.6	68.10±7.90	53.80±3.60	81.90±8.60	63.10±11.50
DNA (Mg)	2.93±0.4	2.75±0.25	2.60±0.33	2.55±0.27	3.24± 0.60

The data reveal that the mass of CK is maintained with TPN while a loss occurs with glucose alone. Reparative growth of IK of animals given TPN is also greater; both Pr content and Pr concentration are significantly greater with TPN ($p<.001$). Lack of significant differences in DNA suggests that the reparative growth is hypertrophic. These findings support the suggestion that TPN may result in faster recovery of renal function. If so, a regimen containing amino acids should be more beneficial in treating patients with acute renal failure than glucose alone.

1120 CARDIAC FUNCTION IN HEMODIALYSIS PATIENTS M. Sivakoff, S. Conley, A. Hernandez. Washington University School of Medicine, St. Louis, Mo.

The cardiac function of 8 chronic hemodialysis patients ages 5-18 years (mean 13.5) was evaluated by echocardiography. Studies were done just prior to and immediately after a 4 hour hemodialysis. As has been found in adults, pericardial effusion was an unusual finding; only one patient had a minimal effusion pre-dialysis. 5/8 patients had decreased mean velocity of circumferential fiber shortening (Vcf) and stroke volume index (SVI) pre-dialysis. After dialysis 3 of these 5 patients' cardiac function returned to normal - according to echocardiographic standards established in our laboratory. 2/8 patients had dilated hearts with normal Vcf but increased SVI and end diastolic volume index pre-dialysis which returned to normal post dialysis. One patient had normal function pre and post dialysis. Change in cardiac function was unrelated to hematocrit, change in weight or change in blood pressure. All the patients had symmetrical left ventricular hypertrophy (LVH) by echocardiography (septum .89 cm, posterior left ventricular wall 1.02 cm), but none had LVH by electrocardiography.

Echocardiography demonstrated variable cardiac function pre-dialysis with improvement of 5/8 patients post dialysis, and has potential for use in the evaluation of the adequacy of dialysis.

1121 RENAL URIC ACID CLEARANCE AND EXCRETION DURING CHILDHOOD. Bruder Stapleton, Khatab M. Hassanein, Michael A. Linshaw, (Spon. by C.T. Cho), Univ. of Kansas Medical Center, Depts. of Pediatrics and Biometry, Kansas City, Ks.

Quantitation of uric acid (UA) excretion and clearance (C_{UA}) are essential when evaluating patients with abnormal serum UA or UA crystalluria. Normal values for 24 hour urinary UA excretion and C_{UA} during childhood, however, have not been reported. We measured total UA excretion, C_{UA} and serum UA in 52 healthy children ages 2-14 years in whom creatinine clearance (C_{Cr}) was normal and urine Na > 20 mEq/l. We found a linear increase in total UA excretion and serum UA and a linear decrease in $C_{UA}/1.73\ m^2$ and UA excretion mg per kg body weight with increasing age. Denoting any of these variables as y and age in years as x and correlation coefficient between x and y as r, we found:

y	r	p	Regression equation
Total UA	.686	<.001	y=113 + 22.1 x
UA mg/kg/24 h	-.528	<.01	y=15.4 - .5 x
$C_{UA}/1.73\ m^2$	-.376	<.05	y=15.1 - .56 x
Serum UA	.46	<.05	y=3.04 + .126 x

95% confidence belts were established for each variable. Although total UA excretion increases with age, mean UA excretion per kg is greater in younger children and falls to upper adult norms (10 mg/kg) by age 10. Mean $C_{UA}/1.73\ m^2$ is higher than adult norms (8-12 ml/min/1.73 m^2) until age 7. Although filtered urate increases (serum UA increases, $C_{Cr}/1.73\ m^2$ is constant), $C_{UA}/1.73\ m^2$ decreases with age. We conclude that tubular changes, either decreasing secretion or increasing reabsorption of UA, occur during childhood.

1122 MEMBRANOPROLIFERATIVE GLOMERULONEPHRITIS: A LONG-TERM FOLLOW-UP. John P. Stewart, Joseph P. Goodman, and Carolyn F. Piel, Univ. of California School of Medicine, Department of Pediatrics, San Francisco.

Nineteen patients (12 female, 7 male) with membranoproliferative glomerulonephritis were followed from 6 months to 15 years. Twelve patients were followed longer than 5 years and 7 longer than 10. Sixteen patients had onset of disease before age 12 yrs. There was no relationship between age of onset of disease and type of clinical presentation (6 nephrotic, 5 nephritic, 8 nephrotic-nephritic). Initially all patients received daily prednisone therapy (2.2 mg/kg) followed by alternate day therapy for periods from 6 months to 4 years. Fourteen patients also concurrently received cytotoxic therapy for 6-18 months. In those patients with nephrotic syndrome, therapy controlled edema, proteinuria diminished but persisted. Serial biopsies in those patients on therapy revealed less cellularity, less basement membrane splitting, and less electron dense deposits in the unsclerosed glomeruli. The 2 patients with dense deposit disease showed progression of deposits. The number of completely sclerosed glomeruli increased with duration of disease regardless of therapy. All patients who were either still on therapy or had been treated more than 3 yrs. had a serum concentration creatinine (SCr) which was normal at both five (n=3) and ten (n=2) yrs. of disease activity. In those patients treated < 3 yrs. or off therapy more than 6 yrs., values of SCr were > 4.1 mg/dl in 56% (n=9) and 80% (n=5) respectively. Serum compliment levels were not helpful in following disease activity. Younger age onset of disease (<8) was associated with a poorer prognosis at both 5 and 10 yr. follow-up.