● 1528 β_2 MICROGLOBULIN ($\beta_2\mu$) IN RENAL TRANSPLANT RECIPIENTS.

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The handling of $\beta_2\mu$ was studied in 19 renal transplant recipients, aged 2 to 18 yr, to find an improved method to identify rejection and separate it from other causes of renal failure. Serum $\beta_2\mu$ concentrations, measured daily, usually increased 24 to 48 h before serum creatinine (S_{cr}) increased in patients undergoing transplant rejection. In addition, being poorly dialyzable, serum $\beta_2\mu$ was superior to S_{cr} in demonstrating changes in GFR in transplant recipients requiring dialysis post transplant.

$\beta_2\mu$ is reabsorbed almost completely from tubular fluid in the normal proximal tubule making urinary excretion of $\beta_2\mu$ a good indicator of proximal tubule function. Fractional excretion (FE) of $\beta_2\mu$ was followed daily in transplant recipients. Most values were elevated, especially in the first 4 days after transplantation, a time when acute tubular necrosis (ATN) is expected. Values also rose in several patients 3 to 7 days after rejection had been established. This is consistent with the thesis that acute rejection may be complicated by ATN which may persist after rejection is reversed by steroid pulses. The study demonstrates that daily measurement of serum $\beta_2\mu$ is a valuable adjunct in the management of renal transplant recipients, also that measurement of FE of $\beta_2\mu$ has the potential of distinguishing rejection from ATN in transplant recipients, helping to determine the need for treatment with steroid pulses. Measurement of FE is superior to measurement of urinary concentration of $\beta_2\mu$ for this purpose.

1529 MINIMAL CHANGE NEPHROTIC SYNDROME (MCNS): AN AUTOIMMUNE DISEASE?

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The presence of low-level tissue directed antibodies (AAb's) and immune complexes (IC) were determined in 12 MCNS and 5 mesangial proliferative glomerulonephritis (MesPGN) patients with biopsy proven disease. The AAb's were detected by immunofluorescence (IF) against human cadaveric tissues and the IC detected by 3 different methods and isolated by polyethylene glycol precipitation/sedimentation. The isolated antibodies from the IC were also tested by IF for AAb activity against the same tissue antigen battery. The presence of such AAb activity was demonstrated in 8/12 MCNS and in all of the MesPGN sera. In the MCNS group 7/8 of the AAb positive sera also contained IC with corresponding AAb activity (2/7 directed against smooth muscle antigens and 5/7 directed against kidney tubular microsomes). The MesPGN group all reacted against kidney basement membrane antigens but no other tissue antigen. Of these 3/5 also demonstrated the presence of IC which contained AAb reactive with the same kidney antigen.

The presence of such AAb's and their formation of IC indicates that these antibodies may have a functional role in the initial immunological insult to the kidney.

● 1530 EVALUATION OF NEUROLOGIC DYSFUNCTION IN CHILDREN WITH CHRONIC RENAL FAILURE(CRF)BY NEUROMETRICS(NM).

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NM(computerized averaged electroencephalography)was used to quantitatively assess brain electrical activity in children with CRF. Computer-derived electrophysiologic data obtained via scalp electrodes were compared to previously derived,age-related norms by z-transformation. A Severity Index(SI)was calculated to represent the probability that electrical activity differed significantly from normal, as follows: SI=2,p=.01;SI=3,p=.001,etc.Forty six NM studies were performed on 26 CRF pts; 19 were receiving maintenance dialysis(DP)and 6, with GFRs of 6-31 ml/min/1.73 M^2, were not(NDP). One pt with GFR=76ml/min/1.73$M^2$was also evaluated with the NDP group. SI correlated with duration of CRF(GFR≤30 ml/min/1.73M^2) for DP(r=.68,p<.006), NDP(r=.77,p<.05), and the whole group(r=.61,p<.003). A significant correlation between SI and residual GFR was observed for NDP(r=.77,p<.05)but not for DP(r=.21, p>.42). SI increased from 4.09±1.94($\bar{X}$±S.D.)to 6.66±1.52(p<.03) in 6/7 DP re-examined after 8-32 months. SI differentiated DP with (7.74±2.68)from those without(5.51±1.71,p<.05)seizures, but in both groups was greater than the SI in NDP(2.87±1.87,p<.01 vs. seizure-free DP). No difference was noted between the SI obtained in pre-(6.99±2.71) vs post-(6.90±2.53)dialysis studies in 8 pts (p>.94). SI decreased markedly in 2 pts after renal transplantation(8.34-4.33;3.39-0.55). Serum aluminum levels in 6 NDP ranged from 13.6-335µg/l(normal-16.9±2.8µg/l), and did not correlate with SI(r=.72,p>.10). The data suggest that progressive deterioration of brain electrical activity occurs as CRF worsens. Observed disturbances were more severe in DP, even in the absence of clinically apparent neurologic dysfunction, and were not improved acutely by dialysis. NM may be useful in the quantitative assessment of neurologic disorders in children with CRF;observer bias is thus avoided.(Supported in part by RR-75)

1531 CONTINUOUS AMBULATORY PERITONEAL DIALYSIS (CAPD) IN CHILDREN.

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We have evaluated CAPD in 9 children, 9-15 years of age for periods of 1.5-14 months(mean 6.9 months). All but one had previously been treated with hemodialysis(HD)or intermittent peritoneal dialysis. Training was accomplished in 1-16 days. A mean volume of 41 ml/kg was exchanged 4 times a day, 7 days a week. The mean peritoneal urea clearance was 3.5 ml/min and steady-State BUN and creatinine levels were 68 and 9.3 mg/dl, respectively. Other biochemical levels were:

Na	K	Cl	CO_2	Ca	P	Cholesterol	Triglyceride
138	4.6	99	25	9.4	5.0	254	268

The mean hematocrit level was 21% and the transfusion requirement was 0.13 units per month. There was a striking improvement in anemia in children transferring from HD to CAPD. Ultrafiltration and maintenance of dry weight was easily achieved and the mean blood pressure was 110/74. Dialysate protein loss was 0.17 g/kg/day, dietary protein intake 2.1 g/kg/day, and serum albumin 3.6 g/dl. Glucose absorption from dialysate was 2.5 g/kg/day. Calorie intake from diet plus dialysis was 58 kcal/kg/day. The mean growth rate of 3 children was 2.7 cm/year. Peritonitis was a major problem with one episode every 4.3 months. Three children discontinued CAPD because of infection. Despite peritonitis and catheter complications children were enthusiastic about CAPD and preferred it to HD. CAPD has subjective and objective benefits in children and is an important new form of therapy.

1532 RENIN PROFILING IN CHILDHOOD HYPERTENSION(HBP).

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Renin profiling(comparison of plasma renin activity(PRA)to urinary sodium excretion)is usually not a routine segment of the diagnostic evaluation of(HBP)children and adolescents. PRA and urinary sodium excretion were performed in a nonstimulated manner in 28 normal children,12 males and 16 females,11-19 years old and in 68 HBP pediatric patients; 43 had essential HBP and 25 an underlying renal etiology. The mean PRA±1SD in the control population was 4.5±2.1 ng/ml/hr. Sodium excretion ranged from 62-356 mEq/1.73m^2/24hr. No correlation existed between sodium excretion and PRA. The PRA of the essential HBP was 5.4±3.3 while that of the renal HBP was 15.8±7.7. The mean PRA of the renal HBP was significantly higher than that of the normals(p<0.001) and the essential HBP(p<0.001). 21/25(84%)of renal HBP had high renin HBP when hyperreninemia was defined as a PRA >2S.D. above the control mean, while 7/43(16%) of the essential HBP had high renin HBP. This study demonstrates that renin profiling is of diagnostic value in childhood HBP. The presence of a high PRA HBP indicates the liklihood of a renal etiology,but as in adult studies about 15% of pediatric patients with essential HBP also have high PRA. Renin profiling in an unstimulated state as performed here cannot accurately identify children with low and/or suppressed PRA. Stimulated renin measurements may identify renal HBP with normal PRA as well as differentiate high PRA essential HBP from renal HBP. Supported by RR75 and HL23511-01.

1533 URINARY N-ACETYL GLUCOSAMINIDASE (NAG) AS AN INDICATOR OF GENTAMICIN (G) NEPHROTOXICITY IN PREMATURE INFANTS.

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Urinary concentrations of NAG reflect nephrotoxicity and are generally expressed per mg creatinine (Cr). We studied the time course of G-induced renal effects in 22 neonates of 32-36 wks gestational age. Gp A (n=13) received G; Gp B (n=9) otherwise comparable but not requiring G served as controls. Timed urine collections started on day of first G treatment (Gp A) or on admission (Gp B). NAG, β_2-microglobulin (β_2-M) and Cr were assayed.

NAG excretion (units/min)(m±SEM)	Day 1	Day 3	Day 4-7
Gp A (while receiving G)	84.2±15.3	109±17.6	91.2±18.1
Gp B (*p<0.01)	27.4±6.1*	36.2±8.9*	35.0±8.7*

NAG increased within 11-25 h of starting G and decreased to control 2-3 days after cessation of G. The pattern with β_2-M was similar. The rapid decline of NAG following cessation of G suggests that de novo exposure to the drug is more important in inducing enzymuria than is persistence of G in renal tubular cells. Urinary Cr was not different between Gps (p>0.2), but rose with postnatal age (PNA):0.015±0.002 mg/min (PNA 1 day); 0.017±0.002 (PNA 3 days); 0.028±0.004 (PNA 4-7 days). Serial values of NAG/mg Cr were also greater in Gp A (p<0.01). Although age-related increase in U Cr was not a problem with serial evaluations as described here, in analysis of subtle differences in comparative drug studies, timed output of NAG may be a more reliable indicator of nephrotoxicity when studies are not controlled for age.