1609 POST-NEONATAL HYPERTENSION SCREENING IN NICU GRADUATES WHO HAVE HAD INDWELLING UMBILICAL ARTERY (UA) CATHETERS. V. Kamtorn, A. Koons, H. Graber, A. Bautista, A. Soni, S. Sun (Spon. by R. Rapkin) UMD-NJ Med. Sch., Children's Hospital of NJ, Dept. of Neonatology, Newark, N.J.

Most reported neonatal hypertension has been renovascular in origin, with the majority caused by renal artery thrombosis as the result of indwelling UA catheters. The incidence of such catheter related hypertension during the neonatal period is reported to be about 3%. But the long term, post neonatal effect of UA catheterization on the kidney is not known. We have systematically followed the blood pressure (BP) of 112 NICU graduates who have had indwelling catheter during the past 3 years. BP was measured by Roche Doppler ultrasound BP monitor on each scheduled follow-up visit (1 month, 3 months, 6 months, 1 year, 1½ yers, 2 years and 3 years). Post neonatal hypertension were defined as a BP of over 113 mmHg at age 4 wks or older (95th percentile of Brompton study). Seventy-nine percent were preterm, 14% term and 7% post term infants. Infants with congenital heart diseases and increased intracranial pressure were excluded from the study. Duration of follow-up was between 1 to 3 years. Mean BP at 1 to 3 months of age was 75.4 mmHg, at 3 to 6 months was 78.0 mmHg, at 6 mos to 1 year was 81.1 mmHg , at 1-2 years was 88.1 mmHg and at 2 to 3 years was 83.6 mmHg. No one was found to be hypertensive during the study period. We conclude that if NICU graduates survive the neonatal period without hypertension, the chance of developing hypertension during the next 3 years is minimal.

†1610 MODEL OF ACUTE CYCLOSPORINE-INDUCED NEPHROTOXICITY (ACIN) IN THE GROWING RAT. Frederick Kaskel Seema Agarwala, Jacqueline Partin, Aija Birzgalis and Leon C. Moore (Spon. by Leonard I. Kleinman). SUNY at Stony Brook, Depts. of Pediat., Physio. and Biophys., Stony Brook, NY.

Immunosuppression with cyclosporine (CYC) results in an early, acute, reversible reduction in renal hemodynamics. In an attempt to establish a model for investigating the functional and morphologic effects of ACIN at the single nephron level, renal micropuncture (MP) and ultra-structural (EM) studies were performed in growing male rats (100-140 g). Pair-caged animals were treated with IM injections of CYC (10 or 25 mg/kg/d) or olive oil for 1 week. Daily weight gain was reduced in both treated groups (-32%, n=24, and -44%, n=6, p<.01). Inactin anesthesia (110-120 mg/kg IP) and the hydropenic (HYP) state were maintained throughout MP. Rats given 25 mg/kg CYC were hypothermic and hypotensive; few survived the surgical preparation for MP. Kidneys appeared grossly abnormal with no superficial tubular flow. Kidney glomerular filtration rate (GFR) was less in the 10 mg/kg CYC treated rats (0.39 ± .07 S.E. ml/min/100 g, n=4), than in a separate group of HYP controls of the same weight (0.56 ± .04 ml/min/100 g, n=5, p<.005). Proximal single nephron GFR was also lower (24.2 ± 1.8 nl/min, n=4) than the controls (34.0 ± 2.6 nl/min, n=9, p<.001). EM studies performed in a group of identically treated rats showed distal tubules with widely dilated lateral intercellular spaces. Proximal tubules had increased intracellular vacuoles. These results agree with observations in human ACIN and demonstrate that this is a useful animal model of ACIN.

1611 EARLY NEONATAL URINARY TRACT INFECTION (EUTI): A CONTROLLED STUDY OF MORPHOLOGY, BACTERIOLOGY AND NATURAL HISTORY. Abdul J. Khan, Teofilita Willinger, Luzminda Concepcion, Warren Rosenfeld, Ramesh Jhaveri, Eloisa Acosta and Hugh E. Evans. Interfaith Medical Center, SUNY/Downstate Medical Center, Brooklyn, New York.

UTI during early neonatal period (under 2 weeks) has rarely been studied. Previous studies included older infants (even up to 3 months) and often lacked complete investigation and long term follow-up. We evaluated all infants with EUTI who were treated and prospectively studied regarding host factors and long term follow-up (mean 2.6 yrs.). Recurrences were classified as frequent (FR) (≥ 2 episodes in any 3 months) or infrequent (IR) if <2. The control group consisted of all neonates with late onset UTI (LUTI) (between 2 weeks and 2 months). M:F ratio, frequency

UTI (N)	FEVER	ORGANISM %		ABN.	REFLUX	RECUR. RATE %			#RECUR/
	%	EC	Others	IVP %	%	Total	FR	IR	PT/YR.
Early(15)	20	33	67	50	36	33	20	13	0.34
Late (20)	45	80	20	26	40	53	21	32	1.4
P Value	>0.05	<0.01	<0.01	>0.05	-	>0.05	-	>0.05	-

of positive blood culture and abnormal urinalyses was similar. E.coli (EC) constituted only 33% cases of EUTI but 80% of LUTIs (P<0.01). Incidence of abnormal IVP was about double in EUTI (not statistically significant). Recur. rate was slightly lower in EUTI and number of recurrences less than ½ compared to LUTI.

In summary EUTIs are due to organisms other than EC, fever is an unusual sign (1/5 of cases), structural abnormalities are frequent (50%) but associated with fewer recurrences.

1612 FRACTIONAL EXCRETION OF SODIUM IN LOW BIRTH WEIGHT INFANTS William A. Kostun, Jill A. Largent, Albert Bartoletti, Allan W. Geis, Samuel M. Willinger, Noel Carrasco (Spon. by Ernest B. Hook) Albany Medical College, Department of Pediatrics, Albany, New York.

The small premature infant is at risk of developing renal impairment. The fractional excretion of sodium (FeNa) has proven useful to define renal tubular integrity. The FeNa is inversely proportional to gestational age, but little information is available about the FeNa in birth weight <1500 grams. We studied 36 unselected consecutive newborns of this size longitudinally over the first 21 days of life. For our group, mean birthweight was 1173 +/- 206 gm., gestational age was 29.4 +/- 2.4 weeks, and apgars were 4.8 +/- 2.7 at one minute and 6.9 +/- 2.1 at 5 minutes. A total of 125 determinations of FeNa were made.

DAY OF LIFE	1	2	3	7	10	14	21
NUMBER	11	27	29	21	16	11	10
FeNa (mean)	9.6	6.4	5.7	6.7	5.5	3.0	2.2
S.D.	14.7	6.8	4.1	5.1	5.2	2.7	2.1
serum Cr. (mean)	1.2	1.3	1.2	1.1	1.2	0.9	0.9
S.D.	0.3	0.4	0.3	0.2	0.3	0.1	0.3

Thus, the FeNa decreases over the first 21 days of life with mean less than 3 by 21 days. The creatinine also decreases over this time interval. Infants with abnormal urinalysis have higher FeNa's than those with normal urinalysis. We conclude that these values will be helpful in interpreting FeNa's and degree of tubular damage in premature infants.

●1613 NMR MEASUREMENTS OF INTRACELLULAR Na^+ CONCENTRATION IN PROXIMAL TUBULE SUSPENSION OF RAT KIDNEY. Adarsh M. Kumar, Raj K. Gupta, and Adrian Spitzer, Albert Einstein College of Medicine, Depts. of Pediatrics and Physiology and Biophysics, Bronx, New York.

Transport of Na^+ and consequently of many other substances by the proximal tubules is dependent on the intracellular concentration of sodium (Na_i). It is therefore important that a method be developed that permits to measure Na_i without disturbing the function and integrity of the cells. Slices of superficial cortex from saline perfused rat kidneys were digested by emerging them in a solution of 0.15% collagenase for 1 hour at room temperature. The slices were then washed and sheared by passing them through PE-190 and PE-50 tubing. The resulting suspension was filtered through a 150 µm sieve and centrifuged at 50 g for 1 min. The pellet obtained was washed several times with chilled Ringer's, 6% BSA-Ringer's and suspended in 6% BSA Ringer's solution. Microscopic examination showed the suspensions to contain ≈95% proximal tubules which were 98-99% viable when tested with trypan blue. Succinate stimulated (5mM) oxygen consumption was 1.83 µl/min per mg protein. The measurement of Na_i were done by NMR spectrometry (Varian XL-200, 53 mHz) following incubation of proximal tubules in the aqueous shift reagent dysprossium tripolyphosphate $Dy(PPPi)_2$ for 30 min. NMR observable Na_i (n=6) was 34.06 ± 1.75 mM at room temperature (≈25°C) and 16.3 ±0.58 mM at 37°C ($p < .001$). Addition at 37°C of 0.1 mM oubain, an inhibitor of Na^+-K^+-ATPase, raised the concentration to 30.92 ± 2.93 mM ($p < .001$), whereas nystatin, a channel former, increased Na_i concentration to 81.0 ± 2.39 mM ($p < .0005$). Thus, NMR, a non-invasive method, provides reliable measurements of Na_i in proximal tubule cells under a variety of experimental conditions.

1614 UTILITY OF TWO URINARY ENZYMES, N-ACETYL-BETA-D-GLUCOSAMINDASE (NAG) AND GAMMA-GLUTAMYL TRANSPEPTIDASE (GGT), AS INDICATORS OF RENAL ALLOGRAFT REJECTION. Dan Kurtycz, Ann Behrman, Russell W. Chesney and Thomas Tenhave. Depts. of Pathology, Pediatrics and Statistics, University of Michigan, Ann Arbor and University of Wisconsin, Madison, WI.

Urinary enzymes have been used in the diagnosis of renal transplant rejection. NAG, a lysosomal enzyme, and GGT, a brush border enzyme, were serially measured in 110 renal transplant patients. Sixty six patients had evidence of rejection, independent of enzymuria. Enzyme values were correlated with parameters used to determine rejection, including: serum creatinine, urine creatinine and urine output. Patients were stratified by rejection status and disease type. Maximum, minimum and mean values were analyzed. Receiver Operator Characteristic (ROC) curves were constructed to assess the sensitivity vs false positive rate of NAG and GGT in detecting rejection, with clinical rejection as the standard. Mean NAG values were different between rejectors and non-rejectors ($p < 0.01$). Peak prerejection values for NAG in rejectors were not statistically different from overall peak values obtained from non-rejectors. However mean, pre-rejection NAG values were different from mean overall values for non-rejectors ($p < 0.01$). Similar studies of GGT values failed to discriminate between the rejection and non-rejection groups. ROC curves revealed a marginal ability of NAG to detect rejection, while GGT had no ability. The relationship between the appearence of these enzymes in the urine and rejection is not simple enough to have clinical utility.