241 ISCHEMIC ACUTE RENAL FAILURE: ENHANCED RECOVERY OF SUPERFICIAL NEPHRON FUNCTION BY ATP-MGCL$_2$. Gaudio, K.M., Siegel, N.J., Chaudry, I., Kashgarian, M. Yale University School of Medicine, New Haven, Connecticut.

The infusion of ATP-MgCl$_2$ will enhance the recovery from an ischemic renal insult. To define the role of intratubular obstruction and hemodynamic factors in the recovery process, rats were subjected to 45 minutes of bilateral renal artery occlusion and infused with either ATP-MgCl$_2$ (25 µmoles) or 0.9% saline (NS).

In ATP-MgCl$_2$ treated animals, whole kidney GFR (WKGFR) was significantly greater (550 ± 46 µl/min/100 gmBW) than NS infused animals (286 ± 32, P < 0.01) although both values were less than controls (1107.8 ± 51.4). Superficial single nephron GFR (SNGFR) attained control values (45.6 ± 2.2 µl/min) in ATP-MgCl$_2$ treated animals whereas SNGFR was 50% of control values in NS treated rats (22.6 ± 2.1, P < 0.01).

The return of SNGFR to normal values while WKGFR remained reduced was not related to intratubular obstruction since proximal tubular pressure was not significantly different in either group (11.8 ± 0.3 in NS and 10.8 ± 0.3 in ATP-MgCl$_2$, P = NS).

The relative changes in SNGFR and WKGFR could be related to hemodynamic factors. Although total renal blood flow was similar in both groups (5585 ± 282 µl/min/100 gmBW), the proportion of flow to the outer cortex was significantly increased in ATP-MgCl$_2$ treated animals (1.94 ± 0.06, P < 0.01) as compared to NS (1.51 ± 0.03). Thus, the enhancement of recovery of GFR in superficial nephrons appears to be related to cortical blood flow distribution rather than intratubular obstruction.

242 ISCHEMIC ACUTE RENAL FAILURE: DELAYED INFUSION OF ATP-MGCL$_2$. Siegel, N.J., Taylor, M., Gaudio, K.M., Chaudry, I., Kashgarian, M. Yale University School of Medicine, New Haven, Connecticut.

We have shown that the infusion of ATP-MgCl$_2$ will accelerate the recovery from either 45 minutes or 60 minutes of renal ischemia. Since, in previous studies, ATP-MgCl$_2$ was infused immediately after the ischemic injury, this study was designed to determine the efficacy of ATP-MgCl$_2$ when given several hours after the initial insult. Rats were subjected to either 45 or 60 minutes of bilateral renal artery occlusion and then eight or 24 hours later the animals were infused with normal saline (NS) or ATP-MgCl$_2$ (25 µmoles each). Inulin clearance (C_{in}) was determined 48 hours after the initial injury in all groups.

In animals with 45 minutes of ischemia: accelerated recovery of C_{in} occurred when ATP-MgCl$_2$ was given either eight hours (637 ± 40 µl/min/100 gmBW, P < 0.01) or 24 hours (661 ± 46, P < 0.01) after the ischemic insult. In contrast, C_{in} was only 429 ± 45 in NS treated animals as compared to controls (1107.8 ± 51.4).

In animals with 60 minutes of ischemia: the infusion of ATP-MgCl$_2$ eight hours after the injury failed to have an effect on C_{in} (475 ± 39) in comparison to NS treated animals (430 ± 69, P = NS).

The present investigation demonstrates that: 1) ATP-MgCl$_2$ will effectively accelerate recovery even when given eight or 24 hours after moderate (45 minutes) ischemic insult, but 2) when the renal injury was more severe (60 minutes of ischemia), this agent was not effective.

243 CHARACTERISTICS OF ACTIVE NA-K TRANSPORT IN ERYTHROCYTES IN CHILDREN WITH UREMIA

Sigström, L. Department of Pediatrics, University of Göteborg, East Hospital, S-416 85 Göteborg, Sweden.

Purpose of the study: To evaluate the active Na-K transport in the following aspects of uremia: degree of azotemia, effect of therapeutic measures, relation to growth and hypertension.

Methods: Erythrocyte Na-K-ATP-ase by measuring the capacity of hemoglobine free membranes to generate phosphate from ATP. Erythrocyte Na^+, K^+ and ATP were determined.

Material: 15 children in different stages of uremia aged 7 months to 16 years.

Results: All children had Na-K-ATP-ase activities within the range for corresponding ages. Crossectionally no correlation was seen between the levels of Na-K-ATP-ase and serum creatinine. Longitudinally a decrease of Na-K-ATP-ase and increase of erythrocyte Na-K ratio were seen. Dietary treatment did not change the levels of Na-K-ATP-ase, erythrocyte Na-K ratio and ATP. A single hemodialysis for 3-5 hours slightly increased Na-K-ATP-ase and erythrocyte Na-K ratio and repeated hemodialyses further increased the Na-K-ATP-ase. Renal transplantation markedly increased Na-K-ATP-ase and decreased erythrocyte Na-K ratio. A distinct feature of hypertensive uremics was a low erythrocyte Na-K ratio combined with a high Na-K-ATP-ase.

Conclusion: The most striking effect upon parameters indicating active Na-K transport was seen after renal transplantation. The increased extracellular volume seen in hypertensive uremics could be explained by increased active Na-K transport.

244 HAEMOGLOBIN-OXYGEN($Hb-O_2$) DISSOCIATION IN CHILDREN WITH CHRONIC RENAL FAILURE(CRF)

Müller-Wiefel,D.E., Schärer,K.

University Children's Hospital,Heidelberg, F.R.G.

Anemia can be compensated by a decreased $Hb-O_2$ affinity shifting the $Hb-O_2$ dissociation curve to the right. We studied this mechanism in 3 groups of CRF children of similar age and serum phosphate levels: On conservative treatment(CT:n=21,S_{CR} 4,7 mg/dl,Hb 10.2 g/dl,pH 7.35) on regular haemodialysis(HD:n=10,Hb 7.6 g/dl, pH 7.38) and with a functioning transplant(TP:n=7, S_{CR} 1.0 mg/dl,Hb 14 g/dl, pH 7.40). $Hb-O_2$ dissociation curves were measured directly(Hem-O-Scan) in capillary blood and the O_2 pressure leading to half-saturation of Hb at pH 7.40(p50c) was calculated. In spite of different Hb levels p50c was similar in CT(25.1 mmHg), HD(25.9) and TP(26.6). p50c correlated inversely with BUN(r=0.54) but less with S_{CR}. The inverse correlation between p50c and Hb was dependent on BUN levels. At a given Hb the p50c was highest in TP(30.8 mmHg) and lowest in CT with BUN levels > 70 mg/dl(21.3 mmHg). The influence of BUN on the correlation between Hb and p50c indicates a negative effect of uremia on O_2 release. The uremia-induced shift of the $Hb-O_2$ dissociation curve to the left might be explained by an inhibition of the erythrocyte 2,3-diphosphoglycerate synthesis.

245 ALTERATIONS IN ILEAL TRANSPORT OF ZINC IN EXPERIMENTAL CHRONIC UREMIA. Exeni,R., Wapnir R.A., and McVicar, M., Dept. of Peds, North Shore University Hosp. Cornell University Medical College, New York, N.Y.,U.S.A. and Hosp. Mun.del Nino, San Justo, B.A. Argentina

Uremia is known to be associated with hypozincemia and low levels of zinc in most tissues. We evaluated absorption of zinc in experimental chronic uremia. Male Wistar rats weighing 125-150g were made uremic (U) by a 2 stage nephrectomy which removed approximately 90% of the renal tissue. Two control groups, pair fed (PC) and ad libitum fed (AC) were sham operated. Three weeks after the second surgical procedure, the mean (± SEM) BUN for the uremic group was 61.0 ± 1.8 mg/dl while that of PC was 16.5 ± 1.3 mg/dl and AC was 19.3 ± 0.5 mg/dl. At that time an in vivo ileal perfusion was performed with a buffer containing 0.015 mM Zn adjusted to pH 7.5 and using phenol red as an indicator of water movement. There were no significant differences in absorption among the 3 groups, indicating that at levels of Zn equivalent to normal plasma level there was no change in ileal zinc transport associated with uremia. However, when higher concentrations of Zn were perfused, U rats absorbed more Zn than controls:

Zn concentration	Ileal Absorption Rates p moles/min x cm Uremic	Pair fed Controls	Ad lib fed Controls	P
.077 mM	247.7 ± 8.7	167.3 ± 8.1	187.8 ± 11.5	<.001
.15mM	404.8 ± 10.6	242.9 ± 9.5	241.1 ± 8.2	<.001

These findings are consistent with altered transport in the uremic ileum which allows increased absorption of Zn at higher concentrations and indicate that malabsorption is not a cause of Zn deficiency in uremia.

246 A DIALYSIS-ENCEPHALOPATHY(DE)-LIKE SYNDROME IN CHILDHOOD: AN INTERNATIONAL SURVEY. Polinsky, M.S., Prebis, J.W., Elzouki, A.Y., Baluarte, H.J., Rosenblum, H.W., Gruskin, A.B. St.Christopher's Hospital for Children, Phila.,Pa.

Recent epidemiologic data suggest that DE may affect as many as 5.3% of adults receiving maintenance dialysis. To determine the magnitude and geographic distribution of this problem in childhood a questionnaire survey of 96 pediatric end-stage renal disease (ESRD)centers was conducted. 14/61 responding centers (23.0%) caring for 728 ESRD patients responded affirmatively to the questionnaire. 24 patients(3.3%) were reported to have developed unexplained encephalopathy: the geographic distribution of cases was worldwide. 73.9% of patients had congenital renal disease. Personality changes, dementia and regression of developmental milestones were noted in patients from all 14 centers. Seizures were noted in patients from 9/14 centers and an abnormal EEG in those from 10/13. Speech disturbances were seen in cases from 11/14 centers. 13/13 reported patients were receiving aluminum-containing compounds prior to or at the time of appearance of symptoms. Secondary hyperparathyroidism affected patients from 12/13 centers. Children from 9/13 centers had been dialyzed prior to appearance of neurologic symptoms. Symptoms occurred in 9 children who had not been dialyzed. A syndrome of unexplained progressive neurologic deterioration occurs in children with ESRD and appears to be clinically indistinguishable from that of adult DE. The implications of the above findings are discussed.