97 SERIAL EVALUATION OF CARDIAC FUNCTION IN CHILDREN UNDERGOING DIALYSIS Donner, R.M. Meyer, R.A. Kaplan, S. Children's Hosp. Medical Center, Cincinnati, Ohio USA

Serial echocardiographic (echo) evaluation of cardiac performance in children undergoing chronic dialysis is currently not feasible due to significant dialysis induced changes of heart rate (HR), preload and afterload which alter selected echo indices in the absence of true dysfunction. To eliminate this problem the effect of the independent variables heart rate (HR), preload index (PI) (represented by left ventricular end diastolic dimension (LVED)/a matched control LVED) and afterload (represented by a simultaneously recorded aortic diastolic pressure (DP)) upon pre-ejection period (PEP), ejection time (ET), PEP/ET, shortening fraction (SF), mean circumferential fiber shortening (Vcf), isovolumic contraction time (ICT), maximum posterior wall velocity (PWV) and cardiac output (CO) was evaluated on 92 echograms obtained from four children undergoing chronic dialysis. Multiple linear regression analysis of the data was performed for each patient and for the entire group in order to express each echo index as a function of HR, DP, and PI. Few significant regressions were obtained for the group as a whole but were obtained ($r>0.77, P<0.05$) in all individuals for ET, CO, and SVR; in three for Vcf and PEP/ET; in one for ICT and SF but in none for PEP. For each echo index except CO, the independent variables differed among children. We conclude that these regressions should significantly improve the ability to interpret selected echo indices in some patients with frequent alterations of HR, preload, and afterload.

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DIALYSIS ENCEPHALOPATHY IN A NON-DIALYSED UREMIC BOY TREATED WITH ALUMINIUM ORALLY.

Brain aluminium concentration has been found significantly higher in patients dying with dialysis encephalopathy than in uremic patients without this syndrome. Encephalopathy combined with high aluminium level in brain has previously been reported only in hemodialysed patients. We report a case of high brain aluminium concentration in a uremic boy showing symptoms of severe encephalopathy. He was never dialysed but only treated with aluminium hydroxide orally. Baluarte reported corresponding symptoms in non-dialysed uremic children, but brain aluminium concentration were not reported. His patients as well as our had very high levels of parathormone which may play a role in the resorption and distribution of aluminium. Aluminium preparations should be avoided in children with renal failure.

99 ANTHROPOMETRIC MEASUREMENTS IN CHILDREN ON REGULAR DIALYSIS TREATMENT (RDT)*
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Height, weight and bone maturation in children with chronic renal failure(CRF)have been widely investigated, but other anthropometric measurements in these patients are almost entirely lacking. Cross-sectional measurements of body height and weight, bone age, percent cortical area of the 2nd metacarpal bone, mid-arm circumference and skinfold thicknesses were done in 85 children treated by RDT in 8 pediatric centres in Europe. Biochemical examination included serum albumin, prealbumin, and transferrin as indices of body protein mass(BPM). Nutritional intake(NI) was calculated from dietary records. BPM and NI did not correlate with height, but correlated with weight($p<0.05$), There was no correlation of NI with skinfold thicknesses, muscle area and fat area at the mid-arm. Fat mass was more reduced than muscle mass. The data confirms that, although a satisfactory nutritional status is required for allowing children with CRF to grow, further factors are involved in the pathogenesis of growth retardation on RDT.

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100 Seventien months experience with pediatric hemodialysis on acrylonitrile filter with closed circuit.

Ten children aged from 2 years 6 months to twelve years were dialysed 12 months on RP_6 (acrylonitrile membrane) with a closed circuit.
During each dialysis session weight, ultrafiltration, blood pressure, urea clearance, creatinine clearance, plasma levels of phosphorus and uric acid were closely monitored.
Cardiovascular function, phosphocalcic balance, hematocrit, hemoglobin levels, WBC, platelets, hepatic function and nutritionel status were checked every month.
Our results show it is possible:

1. to reduce significantly the duration of dialysis session (from 6 to 9 hours per week).
2. to increase considerably ultrafiltration in cases of severe hypertension.
3. to ameliorate growth rate in 50 % of the children.

No medical complication was observed and clinical status of children is very satisfactory:outside dialysis sessions children lead a normal life and follow normally the cursus at school.

101 ACID-BASE CHANGES AND ACETATE METABOLISM DURING ROUTINE AND HIGH EFFICIENCY HEMODIALYSIS IN CHILDREN.
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To evaluate the acid-base status and plasma acetate levels of children undergoing hemodialysis, we studied 8 children during 11 hemodialysis sessions. During dialysis, the blood bicarbonate fell (20.5±0.7 to 19.6±0.8 mEq/L), the pCO_2 fell (33.4±0.8 to 27.5±1.4 mm Hg), and the pH rose (7.42±0.01 to 7.48±0.02). During the hour after dialysis the bicarbonate rose to normal, 23.4±9.7 mEq/L, the pCO_2 rose to 32.8±0.8 mm Hg, and the pH remained unchanged. The half-life of plasma acetate, measured after dialysis, was 8.7±0.9 minutes. During 5 "high efficiency" dialysis sessions (urea clearance>3.0 ml/min/kg) blood bicarbonate fell 3.2 mEq/L, pCO_2 fell 8.7 mm Hg, and plasma acetate rose to 7.51 mM/L, whereas during 6 "routine efficiency" dialysis sessions (urea clearance 1.5 - 3.0 ml/min/kg) bicarbonate rose 1.0 mEq/L, pCO_2 fell 3.7 mm Hg, and acetate rose to 3.52 mM/L. At one hour after the end of dialysis blood bicarbonate, pCO_2, and plasma acetate concentrations were similar in the two groups. Clinical problems occurred more frequently in the high efficiency group during dialysis but the difference was not significant. The data indicate that 1) dialysis with acetate buffer effectively corrects pre-dialysis metabolic acidosis, 2) although children have a high rate of acetate metabolism, during high efficiency dialysis this rate is exceeded by the influx of acetate, and acid-base abnormalities occur. These abnormalities are transient but may cause clinical problems.

102 LONG TERM HAEMODIALYSIS IN LOW-WEIGHT CHILDREN
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Since 1969 to 1.2.1980, we accepted 10 children weighing 6 to 10 kg (aged 1 1/2 to 3 years), for an haemodialysis program. Renal hypoplasia with urinary tract abnormalities was the most common cause (6/10). Initial blood access was an arteriovenous shunt inserted on brachial vessels in the 2 firstcases (1969-1970) then an arteriovenous (A/V) fistula in all other patients afterwards : direct A/V fistula on brachial artery (6 cases) or radial artery (one 9-kg-boy), and teflon graft on brachial artery (one 8-kg-child). During the course of treatment, 9 children had 12 fistulas (mean survival of these fistulas 11 months, range 1 to 32 months). A single needle system was routinely used in only one case. Different multilayers dialysers (0,24 to 0,54 m2) were used for a total of 6 to 16 hours a week, in 2 or 3 sessions, according to weight, and dialysers' performances. Dialyses were generally well tolerated in children over 7 kg but needed permanent monitoring of weight in 6 kg children. Complications, except thrombosis of blood access (2/2 shunts, 5/12 fistulas) were uncommon. No cardiac failure was observed. One child died from anaphylactic shock; 2 were successfully transplanted after 18 and 30 months of haemodialysis, and 8 are still haemodialyzed for respectively : 2, 10, 10, 16, 19, 32 months and 10 1/2 years. Children's psychological acceptance was good and their mental development seemed normal. Height gain during dialysis treatment was variable but always present. Long term haemodialysis is thus possible even in very small children.