

19 MILLA, P.J., AGGETT, P.J.A., WOLFF, O.H. and HARRIES, J.T. Hospital for Sick Children, Gt.Ormond Street and Institute of Child Health, London. **STUDIES IN PRIMARY HYPOMAGNASEMIA: EVIDENCE FOR A DEFECT IN CARRIER-MEDIATED TRANSPORT OF MAGNESIUM.**

In comparison with other divalent cations, the intestinal absorption of magnesium (Mg^{++}) has not been widely studied. Primary hypomagnasaemia is a rare disorder which is inherited in an autosomal recessive fashion, and which is associated with defective absorption of Mg^{++} . The precise site and nature of the transport defect has not been defined. We have investigated such a patient by means of metabolic balances as well as by a steady-state perfusion technique. Metabolic balance studies showed net malabsorption of Mg^{++} during infancy. At the age of 4 years perfusion of the proximal jejunum with Mg^{++} (1 and 2 mM) showed secretion of Mg^{++} , compared to mean control values of 0.019 and 0.025 $\mu\text{mol}/\text{min}/\text{cm}$ respectively; at 10 mM absorption occurred at a rate of 0.13 compared to a mean control value of 0.15. The kinetics of Mg^{++} transport were studied in a small group of control children, and the results suggest a saturable mechanism at low concentrations (K_m 3.7 mM; V_{max} 0.078 $\mu\text{mol}/\text{min}/\text{cm}$), with a superimposed diffusional component at high concentrations. These results suggest that Mg^{++} is transported by a carrier-mediated mechanism at low concentrations, and that this is defective in primary hypomagnasaemia.

20 MERYON, Sylvia D, BROWN, G.A., and WHARTON, B.A. Infant Development Unit, Q.E.M.C., Birmingham. **INTER-RELATIONSHIPS BETWEEN CALCIUM, FAT, AND FATTY ACID ABSORPTION IN THE NEWBORN.**

Negative calcium balance is commonly seen in newborn babies, some studies have related this to the formation in the gut of soaps with palmitic and stearic acids, others have discounted it. Calcium and fat balances were performed on 17 babies for 2-7 day periods during the first 2 weeks of life. No relationship between fat, fatty acid, and calcium absorption was found when the balance results were analysed conventionally, i.e. taking the balance period as a whole. The results were then analysed (unconventionally) for each day - this may be acceptable in babies having 4 or more stools per day. On the days when there was low fat excretion (<7mmol triglyceride per day) calcium absorption was proportional (significance of $r, < 0.05$) to the absorption of total fat and of the individual saturated fatty acids (not only C16 and C18), but not of the unsaturated ones. On high fat excretion days (>15mmol triglyceride), calcium absorption was proportional to the absorption of C18 only. We cannot explain these relationships between calcium and fat absorption solely by the intraluminal formation of palmitic and stearic soaps. Nor is it likely they are an artefact of the daily analysis method used. There seems to be a more intimate relationship between the absorption of calcium and all the saturated fatty acids; this breaks down when fat excretion is high, possibly as soaps are formed.

21 MOYA*, M and DOMENECH*, E. (Intr. by T. Peltonen) Pediatric Dept. Hosp. General y Clínico. La Laguna Tenerife. Spain. **RETENTION OF CALCIUM SUPPLEMENTATION ESTIMATED BY MEANS OF FULL BALANCES IN THE LOW BIRTH WEIGHT INFANT.**

Net absorption of Ca, Mg and P was measured in three low birth-weight babies with no major problems, during periods of 3 days in the 3rd week of life. Their formula was supplemented with 800 mg of calcium-magnesium lactate. Five control babies were on the same formula, the mineral content (mean \pm SD) of which was: Ca 76.26 \pm 5.44 mg/dl, Mg 10.23 \pm 2.06 mg/dl and P 53.40 \pm 6.94. In this control group the absorption (intake-faeces) was: Ca 89.98 \pm 18.73 mg/kg/day; Mg 14.19 \pm 2.08 mg/kg/day and P 88.59 \pm 13.96 mg/kg/day. Serum calcium, magnesium, phosphate, lipids, cholesterol and triglycerides were normal on all occasions. In supplemented group the absorption in each baby was: Ca 202.17; 232.29 and 216.63 mg/kg/day; Mg 20.59; 19.77 and 17.99 mg/kg/day and P 80.05; 100.40 and 83.19 mg/kg/day. Calcemia increases in two cases (11mg/dl) on the 4th day, but no hypo or hypermagnesaemia appeared. As previous experiences has suggested the supplementation considerably increases the absorption of divalent cations.

22 D.RIGAL, L.SANN, G.GALY, J.BOURGEOIS. Service de Neonatologie, Hôpital Debrousse and Centre de Médecine Nucléaire, Lyon, France. **Evolution of serum zinc (Zn) and copper (Cu) concentrations in low birth weight (bw) infants.**

The postnatal evolution of serum Cu and Zn concentration measured by atomic absorption photometry was studied in 58 preterm infants, appropriate (A) for their gestational age (G.A.) (G.A. : 27-34 weeks; bw = 850-1500 g) and 17 light-for-date (L.F.D.) infants (G.A. 31-38 w; bw 1000-1400 g). At 7 days of age, there was no correlation between serum (Cu) and (Zn) and G.A. in AGA infants. These concentrations were not different in LFD infants with the same G.A. or with the same birth weight. In the AGA infants, serum (Zn) decreased from (mean \pm SD) 149 \pm 41 $\mu\text{g}/\text{dl}$ to 91 \pm 24 at the mean age of 67 days ($p < 0.01$) and serum Cu increased from 55 \pm 33 to 86 \pm 32 ($p < 0.05$). A positive correlation was found between daily Zn intake ($\mu\text{g}/\text{kg}$) and serum (Zn) ($p < 0.001$), but no correlation was found for Cu. In 10 LFD infants (bw 1000-1500 g) (mean feeding = Cu 58 \pm 22 $\mu\text{g}/\text{kg}/\text{day}$; Zn 490 \pm 290 $\mu\text{g}/\text{kg}/\text{day}$) serum (Zn) at 45-60 days of age was 69 \pm 7 $\mu\text{g}/\text{dl}$ vs 104 \pm 28 $\mu\text{g}/\text{dl}$ in 8 AGA with the same bw fed with Cu = 70 \pm 15; Zn 633 \pm 153 $\mu\text{g}/\text{kg}/\text{day}$ ($p < 0.01$). No difference was observed for serum Cu concentrations.

These data suggest that

- 1) Neonatal serum Cu and Zn concentrations are not modified by dysmaturity
- 2) Serum Zn concentration can be influenced by the daily intake of Zn.

23 E. MALLET, A. HENCOQ, C. H. de MENIBUS (Intr. by J.L. CHAUSSAIN), Hôp. Ch. Nicolle, ROUEN, FRANCE.

DOES ELEVATED PHOSPHORUS LEVEL OF SO CALLED "INFANT FORMULA" MILK HAVE A DETECTABLE EFFECT ON PARATHYROID FUNCTION ?

The aim of this study was to determine the effect on parathyroid function of the phosphorus content of various milks used for infant feeding. Six healthy infants (aged 42-61 days) were studied. They were exclusively milk-fed, with vitamin D supplement (1600 IU/day). Various milks were studied. The study was performed serially, with each milk given for one week: "infant formula" (APTAMYL^R), classical dried (MILUMEL^R), "infant formula", human (frozen pool, Ca : 29 mg/100 ml, P : 11 mg/100 ml, "infant formula". At the end of each week, the following determinations were made : serum calcium, phosphorus, and immunoreactive parathormone (iPTH) as determined by N terminal-specific antiserum; in the urine, calcium, phosphorus and cyclic adenosine monophosphate (cAMP), as expressed as $\mu\text{Mole}/\text{g}$ creatinine. With infant formula milk, only serum levels of phosphorus were lower ($p < 0.01$) than those with classical dried milk; however, urine phosphorus level exceeded ($p < 0.001$) that with human milk. No parathyroid hypersecretion, as assessed by iPTH level and urinary excretion of cAMP, was found, and no significant difference in its level was seen with either infant formula or human milk. However, that these apparently good results for infant formula milk depend on present techniques, particularly methods for determining PTH. They remain to be confirmed in larger series.

24 POSTNATAL DEVELOPMENT OF RENIN-ANGIOTENSIN-ALDOSTERONE SYSTEM /RAAS/ IN RELATION TO ELECTROLYTE BALANCE IN PREMATURE INFANTS. E.Sulyok, F.Varga, M.Németh, I.Tényi, I.F.Csaba Dept.Obstet.Gynecol.University of Pécs,Pécs,Hungary

Simultaneous measurement of plasma renin activity /PRA/ plasma aldosterone concentration /PA/ and urinary aldosterone excretion /UAE/ of 7 healthy premature infants with mean birth weight of 1580g /range:1160-1850g/ and mean gestational age of 31 weeks /range:30-32 weeks/ was made using RIA methods along with determination of Na and K balance weekly up to 6-th week of life.

Due to the increased urinary Na loss negative Na balance developed in the first two weeks followed by positive balance thereafter. PRA, PA and UAE increased tremendously from the initially high values of 18.2 \pm 1.1 ng/ml/hr, 1.7 \pm 0.5 ng/ml and 3.2 \pm 0.9 $\mu\text{g}/\text{day}$ /mean and SEM/ to their maximum of 78.6 \pm 18.1 ng/ml/hr / $p < 0.01$ /, 6.8 \pm 2.7 ng/ml / $p < 0.05$ / and 25.1 \pm 8.1 $\mu\text{g}/\text{day}$ / $p < 0.01$ / in the third week, respectively. Later on, gradual declines occurred, however, PRA, PA and UAE remained highly elevated even at the 6-th week with values of 45.5 \pm 15 ng/ml/hr, 1.6 \pm 0.5 ng/ml and 15.1 \pm 4.6 $\mu\text{g}/\text{day}$, respectively.

It is suggested that late hyponatraemia of premature infants is due to tubular unresponsiveness to aldosterone and not to inadequate response of RAAS to stimulation.