71 A FOLLOW-UP STUDY OF CHILDREN WITH COW'S MILK INTOLERANCE. DEVELOPMENT OF MULTIPLE FOOD INTOLERANCE.

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The aim of this study is to investigate the outcome of cow's milk intolerance and the possible development of multiple food intolerance. 43 children with C.M.I. were followed for periods varying from 7 to 72 months (mean 34 months). The age at onset of symptoms varied from 1 to 6 months. 14 presented immediate reactions to cow's milk and 29 delayed reactions. They were evaluated clinically and using skin prick test and RAST to milk and 15 other food allergens. The diagnosis of acquired C.M. tolerance or the development of multiple food intolerance was based on tests of elimination and challenge of milk and other proteins. To evaluate the outcome of C.M.I. we used the method employed for actuarial analysis of survival data. This revealed that the probability percentage of recovery from C.M.I. is 28% at 1 year from diagnosis, 79% at 2 years, 84% at 3 years and 95% at 4 years. After the third year from the diagnosis all intolerant children presented multiple food intolerance.

72 ASSESSMENT OF THE UNSTIRRED WATER LAYER IN THE SMALL INTESTINE OF THE PRETERM INFANT

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Providing optimum nutrition to the preterm infant will necessitate studying the postnatal development of absorptive processes. The thickness of the unstirred water layer, lying between the lumen of the gut and the microvillous membrane, affects the calculated kinetics in in vivo transport studies. We have previously measured transmucosal potential differences (P.D.) in preterm infants and have now used this technique to estimate the thickness of the unstirred water layer. Six preterm infants were studied on 8 occasions at a postnatal age of 8 to 57d (mean 30d). Gestational age ranged from 29 - 36w (mean 31.5w) and birth weight was 970 - 2340g (mean 1520g). The distal duodenum was perfused with a solution containing 154 mM NaCl at 100ml/hr until a steady P.D. reading was obtained. A second solution containing 104mM NaCl and 100mM mannitol was then infused. Lowering the luminal NaCl created a diffusional pathway and change in P.D. The half time taken for development of this P.D. was measured and used to calculate the unstirred water layer by the method of Diamond (1).

Results: The unstirred water layer was 278 ± 31μm (mean ± S.E.M.) ranging from 181 to 435 μm.

Conclusion: The unstirred water layer can be estimated in the preterm infant by measuring diffusion potentials. The values obtained are less than estimated adult values - 632 ± 24μm (2).

(1) Diamond J.M., J.Physiol., 183:83-100 (1966)
(2) Read N.W. et al., Gut 18:865-876 (1977)

73 MINERAL METABOLISM IN PREMATURE INFANTS FED HUMAN MILK SUPPLEMENTED WITH PHOSPHORUS OR CALCIUM AND PHOSPHORUS

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It is still uncertain if supplementation of human milk with phosphorus(P) alone or with both calcium(Ca) and P better meets mineral requirements of premature infants. We therefore studied the effect of both types of supplementation on biochemical markers of mineral metabolism.

14 premature infants fed human milk(Ca 32mg/dl,P 15,4mg/dl) were matched to pairs considering birthweight(1430g,980-1700g;x̄,range) and gestational age(33weeks,31-35weeks).In each pair infants were randomly assigned to supplementation with either glucose-1-P(group P;+14mg/dl P) or Ca gluconate plus glucose-1-P(group CaP; +14mg/dl P +27mg/dl Ca).Vitamin D 1000I.U./d were given from age 1 week.

Ca and P in serum and in 24h urine,activity of serum alkaline phosphatase(AP),iPTH (midregional antibody) and 25OH vitaminD(competitive protein binding assay) were measured when the infants had reached a bodyweight of 1800±75g(day1) and 2150±75g (day 2).

Ca,P,AP,iPTH and 25OH vitaminD in serum as well as urinary Ca excretion were within normal range and not significantly different within and between groups on days 1 and 2.Urinary P excretion on day 2 was significantly($p<0,05$) lower in group CaP (4,4±3,5mg/kg/d) than in group P(19,7±14,1mg/kg/d) indicating either poorer P absorption or higher P retention in group CaP.

We conclude that supplementation of human milk with P prevents premature infants from mineral imbalance and impaired bone mineralisation as efficiently as supplementation with both Ca and P.

74 PROSTAGLANDINS AND ESSENTIAL FATTY ACID IN PRETERM AND TERM MILKS AT DIFFERENT STAGES OF LACTATION.

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It is thought that prostaglandins(PGs) in human milk may play a role in modulating the gastrointestinal physiology of breast-fed infants. In this study,we measured PGs levels by radioimmunoassay and essential fatty acid(EFA) by gaschromatography in aliquots of foremilk and hindmilk obtained at different stages of lactation (colostrum:1-3 days, transitional milk:6-9 days, mature milk: 1 month) from 6 preterm mothers(26-34 weeks: preterm milk) and 7 term mothers(39-41 weeks: term milk). Results (1) Human milk levels of PGE_2 and $PGF_{2\alpha}$ were approximately 1.5-2 times higher than plasm levels, but PGE_1 levels in human milk were similar to those of plasma. (2) No difference of PGs levels could be found between foremilk and hindmilk. (3) PGs levels in preterm milk were not different from those of term milk at each stages of lactation. (4) Preterm milk levels of linoleic acid were significantly lower than term milk levels ($p<0.05$) in colostrum, and significantly higher ($p<0.01$) in mature milk. (5) Arachidonic acid in preterm milk were similar to those of term milk, but the levels decreased with advancing of lactation in both types of milk. (6) PGs levels did not correlate with EFA levels both in preterm and term milks. Maintaining stable levels of PGs in human milk, irrespective of lactation, found in this study may suggest the important physiological roles of the gastrointestinal tract.

75 FUNCTIONAL LACTASE ACTIVITY IN PRETERM INFANTS

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We have previously shown normal levels of lactase activity in the jejunal fluid of preterm infants (1) and have now measured the change in transmucosal potential difference (P.D.) evoked when lactose is infused into the small intestine. The P.D. depends on the absorption of the products of lactose hydrolysis and is therefore a measure of lactase activity. The P.D. generated by 100mM lactose (P.D.L100) was compared to that evoked by 100mM glucose (P.D.G100) giving an index of functional lactase activity. 13 perfusions were performed on 6 infants, gestational age 29 - 36w (mean 31.5w) and birth weight 970 - 2340g (mean 1520g) with a postnatal age of 8 to 57d (mean 28d). The distal duodenum was perfused at 100ml/hr with solutions containing 100mM mannitol, 100mM glucose and 100mM lactose each made isosmolar with 104mM NaCl. The P.D.L100 and P.D.G100 were measured and the ratio P.D.L100 to P.D.G100 calculated.

Results: Mean P.D.L100 was 6.7 ± 0.8mV (mean ± S.E.M.) and P.D.G100 9.9 ± 0.7mV. The ratio of P.D.L100 to P.D.G100 was 0.65 ± 0.04.

Conclusions: Functional lactase activity in these preterm infants is comparable to older infants (2) and adults (3). This method of assessment of lactase activity can be used in the preterm infant to further elucidate postnatal development.

(1) Mayne A.J. et al., Paediatric Research, 18:1049 (1984)
(2) Igarashi Y. et al., Euro.J.Pediatr., 135:255-260 (1981)
(3) Read N.W. et al., Gut, 18:640-643 (1977)

76 HLA PHENOTYPE DISTRIBUTION IN LACTOSE ABSORBERS FROM SOUTHERN ITALY (CAMPANIA REGION).

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The frequence of HLA antigens for ABC loci in 22 adult lactose (L) absorbers from the Neapolitan area and surrounding was compared to a panel of general population (n=254)from the same area, with high prevalence of lactose malabsorbers (78-83%)(1).L.absorbers were defined by an excretion of less than 20 ppm of H_2 by analysis of breath test after standard oral lactose load. The HLA antigen analysis was performed on lymphocytes isolated from peripheral blood samples by the standard two stage microcitotoxicity test.The A1 and B8 antigen frequencies in L.absorbers are 50.5% and 40.9%,respectively,as compared to 15%(p corr=0.001) and to 11%(p corr=0.002) in the general population (2).The A1B8 haplotype frequency (0.057%)in the L.absorbers follows the same pattern of the single antigens, and is significantly greater than in general population (0.019%) ($p<0.001$).Comment: HLA phenotype distribution in the L.absorbers from the Neapolitan area appears to approach the distribution of the same antigens in high lactose persistence populations from northern Europe (i.e.,the Danes).Further investigation is required to clarify the nature of this relationship. 1)Lancet 1:335,1984. 2)Tissue Antigens 16:286,1980.