

DECREASE IN SWEAT SODIUM CHLORIDE CONCENTRATIONS ON LIMITED DIETS. Douglas H. Sandberg, Paul M. Tocci, Robert M. McKey. Univ. of Miami Sch. of Med., Dept. of Ped., Miami, Fla.

Serial analyses of sweat NaCl concentrations by iontophoresis in children with cystic fibrosis (CF) commonly show unexplained fluctuations. Some children with previously normal values subsequently develop elevated levels. Some allergic children have values in the high normal range during acute respiratory or gastrointestinal infections and these levels decrease upon recovery. We have measured serially sweat NaCl levels in 22 children with chronic intestinal problems and/or chronic pulmonary disease who had had sweat Cl⁻ concentrations greater than 60 mEq/L. Tests were done before and after periods of 2-13 days on an elemental diet, Vivonex, 1800-2400 cal/day with 2-3 gm NaCl/day, and after varying periods on diets excluding foods to which children are commonly sensitive. Daily NaCl intake was kept in a similar range on all diets. Seven of 22 had a striking decrease in sweat Cl⁻ to normal (range 13-60 mEq/L) on one or more diets. (The one patient with a low value of 60 mEq/L had levels on other diets over 100 mEq/L.) Three of these had initial values of 80, 84 and 85 mEq/L. In 4 patients normal concentrations persisted weeks to months while on a limited diet. Four of the 7 were shown by complement (C3) alteration following food challenges to be sensitive to foods. These results support the concept that all children with elevated sweat Cl⁻ levels do not have CF and suggest that sweat NaCl concentrations may be a function of diet composition even when salt intake is kept constant.

EFFECT OF AN ORAL ELEMENTAL DIET ON NITROGEN BALANCE AND PLASMA AMINO ACIDS, Joseph O. Sherman*, Carole-Ann Hamly* and Avedis K. Khachadurian*, (Intr. by H.L. Nadler), Clinical Research Center, Children's Memorial Hospital, Northwestern University Medical School, Chicago.

Five infants between 7 and 16 weeks of age with severe intractable diarrhea were fed an oral elemental diet (Vivonex^R) consisting of crystalline amino acids, glucose, electrolytes and vitamins for 4 weeks by continuous NG drip. Each infant received a "low" nitrogen diet (LND) supplying 2.25gm of protein/Kg/day for 2 weeks and a "high" nitrogen diet (HND) supplying 4.58gm of protein/Kg/day for 2 weeks. Each diet supplied 110cal/Kg/day. The weight gain on the LND averaged 17.0 ± 14.7 gm/day and on the HND 28.6±13.5gm/day. Concomitantly, the nitrogen balance on the LND averaged +163±75mgm/Kg/day and on the HND +332±82mgm/Kg/day. The plasma levels of 22 amino acids were measured before beginning the diet, during the feeding of each diet and after the cessation of treatment. Pretreatment levels were normal except for decreased proline (-58%) and threonine (-36%). On the LND there was no appreciable change in the amino acid levels. On the HND the plasma levels of 6 amino acids increased more than 2 times the upper limits of normal (ULN): methionine (6.5xULN), glycine (2.6x ULN), tryosin (2.4xULN), phenylalanine (2.2xULN), threonine (2.2xULN) and ornithine (2.1xULN). The oral elemental diet proved effective in controlling severe intractable diarrhea and resulted in weight gain and positive nitrogen balance proportional to the amount of protein supplied.

SUGAR-AMINO ACID COMPLEXES IN PARENTERAL ALIMENTATION Lewis D. Stegink, J.A. Shepherd, L.K. Fry, and L.J. Filer, Jr. Univ. of Iowa College of Medicine, Department of Pediatrics, Iowa City, Iowa 52242.

Protein hydrolysate based parenteral alimentation solutions contain approximately equal quantities of peptides and amino acids. Peptide utilization in young infants alimented with such solutions varies according to the batch of hydrolysate used. With some batches infants fail to tolerate infusion of full strength solution (2.5% Amigen-25% glucose) exhibiting dehydration, with excretion of a hyperosmolar urine containing reducing substances other than glucose. Chromatograms of urinary amino acids from these infants show a number of ninhydrin positive peaks not found in urine of other infants parenterally alimented. Compounds isolated from urine were shown to be specific sugar-amino acid complexes formed during heat sterilization of the 5% Amigen-5% glucose used as the base solution in our hospital. Cold sterilization of 5% Amigen-5% glucose solutions eliminated these compounds. The quantity of such compounds varied from batch to batch, increased with storage time, and was roughly proportional to the quantity of yellow-orange color. During parenteral alimentation, they appear to be completely excreted in urine, leading to the osmotic effect noted.

THE EFFECT OF EARLY ADEQUATE CALORIE INTAKE IN LOW BIRTH WEIGHT INFANTS. Kunnikar, Tanprasert, Yeai Roan, David E. Fisher and John B. Paton, Dept. of Ped., Michael Reese Medical Center, Chicago. (Intr. by Samuel S. Spector)

Adequate calorie intake, 120 cal/kg/day, was maintained from age 48 hours in two groups of low birth weight infants, 1001-1250g. and 1251-1500g., by continuous duodenal or proximal jejunal infusion (NJ) of commercial infant formula. The neonatal course of these infants was compared with a control group (C) fed conventionally by intermittent gavage feedings. The NJ groups were comparable to controls in birth weight, discharge weight and mortality; however, maximum weight loss was reduced by about 50% in the NJ groups with a comparable reduction in the time to regain birth weight. Hospital stay was reduced in the lower but not in the higher infant weight group. No significant complications of the feeding tube or the accelerated feeding program were encountered.

	1001-1250g		1251-1500g	
	C(9)	NJ(7)	C(13)	NJ(28)
Birth weight (g)	1146±73	1126±78	1385±65	1405±56
Maximum weight loss (g)	109±78	41±28	116±56	56±43
Birth weight regained (days)	15±7	8±4	13±5	7±4
Duration of stay (days)	56±12	46±5	34±6	33±9

Early malnutrition may have a detrimental effect on developmental potential; this technique permits greater control over the duration and severity of catabolism in the early neonatal period.

NUTRITIONAL EVALUATION OF HEAD START CHILDREN WITH SHORT STATURE. P.A. Walravens, K.M. Hambidge, A.M. Glasgow, P. Cullen, and H.P. Chase. University of Colorado Medical Center, Department of Pediatrics, Denver.

Twenty-nine children in the Head Start program were referred for evaluation of short stature after preliminary screening by nutrition aides, three months after starting school. This group comprised 18 Hispanics, 3 Negroes and 8 Anglos (15 males and 14 females) with a mean age of 4.4 years (range 3.2-6.4 years). The height was <3P in 26/29 children and weight <3P in 19/29. Physical abnormalities included multiple cavities (4/29), hepatomegaly (4/29), cardiac murmurs (4/29), stigmata of rickets (4/29), and skin or mucosal changes compatible with Vitamin A deficiency in 5/29. Normal laboratory parameters included: hematocrits (39.8% ± 2.65), urinalyses, serum Ca, Alk. Phos., BUN, total protein and serum albumin. Vitamin A levels were <30µg in 18 patients and <20µg in 9 of these. Vitamin C levels were <.5mg% in 2. The mean hair zinc concentration was 105 + 4ppm, lower than control children of similar age (p <0.01). Low hair zinc levels (<70ppm) were present in 8 and low plasma zinc levels (<70µg/100ml) in 4 children.

The present study demonstrates inadequate vitamin and trace mineral nutrition or metabolism in 50% of this Head Start group of children with short stature, emphasizing the need for medical and nutritional attention in this high risk group.

COMPARISON OF IN VIVO INTESTINAL ABSORPTION OF OLIGOSACCHARIDE (O, DE 20) AND SUCROSE (S), IN RATS. M. Kabir Younoszai, M.D. Univ. of Iowa Col. of Med., Univ. of Iowa Hosp. and Clin., Dept. of Peds., Iowa City.

The proximal jejunum of anesthetized rats 150-180 g was flushed with 50 ml of 0.85% NaCl solution and cannulated proximally at 1 cm aborad to the ligament of Trietz and 25-30 cm distally. The cannulated segments were perfused at the rate of 0.3 ml/min for 90 minutes with a solution containing either 10 mg/ml of O (11 rats) or S (10 rats). Enough NaCl was added to the perfusion solutions to attain 294-300 mOsmoles/liter. Phenol red 50 µg/ml was included as non-absorbed indicator for volume change. Glucose (G) was measured (glucose oxidase) in the perfusion and collected solutions both before and after acid hydrolysis. The amount of G disappearing from the lumen was considered as absorbed. The amount of G absorbed plus amount of G in the perfused solution (before acid hydrolysis) gave an estimate of the amount of G released from hydrolysis of O or S. The data (Mean±S.E.) presented below pertain to the last 30 minutes of perfusion. From similar amount (mg) of O (83±4) and S (86±4) perfused the amount of G released (mg/g segment) from O (32.0±6.5) was about 3.2 times that released from S (10.0±2.4). However, the rate of absorption of G (mg/g segment) during the same time was only 1.7 times higher from O (14.2±1.2) than from S (9.2±1.6). The finding of relatively large amounts of G after perfusion in the non-acid hydrolyzed solutions of O suggested the presence of glucoamylase activity in the intestinal lumen.