

**566** A STUDY OF BONE MINERALIZATION IN PATIENTS (Pts) WITH CYSTIC FIBROSIS (CF) Douglas T. Gibbens, Denise Duffer, Chun-I Wang and Vicente Gilsanz. (Sponsored by Joseph A. Church). University of Southern California, Childrens Hospital of Los Angeles. Departments of Pediatrics and Radiology, Los Angeles, California.

Although the centralized, aggressive treatment of pulmonary disease has prolonged the life expectancy of pts with CF, most of these pts., especially the older ones, are chronically ill. Undermineralization of their skeletal system is not unexpected. Quantitative computed tomography (QCT) of the vertebrae is a new technique for assessing the trabecular bone mineral content (BMC) in the axial skeleton. The turnover rate of the trabecular bone is eight times greater than that of cortical bone, rendering QCT a highly sensitive method for measuring early metabolic changes.

We measured the BMC in 66 pts with CF, (27 M, 39 F), age 3-48 yrs., and compared the results with 120 age-matched controls. Forty-four (23 M, 21 F) of the 66 (66.7%) were below the mean for their age. Twelve (4 M, 8 F) of the 66 (18.2%) were 2 SD below the mean. When the pts with low BMC were matched to their nutritional status, using Wt for Ht, tricep skin fold, and arm muscle area as criteria of their degree of malnutrition, there was a high correlation with each parameter. The reduced BMC's were, however, not found to be related with serum Ca or albumin levels. The BMC's of 22 pts (4 M, 18 F) in the present group were above the mean for their age-matched controls. None were 2 SD above the mean. The predominance of females (81.8%) in this group was quite surprising in that males with CF were known to do better than the females.

**567** ELEMENTAL DIETS IN INTRACTABLE DIARRHEA: COMPARISON OF A WHOLE PROTEIN ELEMENTAL DIET WITH AN AMINO ACID FORMULA. Wallace A. Gleason, The University of Texas Medical School, Pediatrics, Houston, TX.

The ideal composition of an enteral formula for use in intractable diarrhea of infancy is unknown, but should address the abnormalities of digestive function attributable to malnutrition which occur in these infants. These include dietary protein hypersensitivity, disaccharidase deficiency, monosaccharide malabsorption, cholethic enteropathy and steatorrhea. In a group of 9 infants with intractable diarrhea, we compared the use of an aminoacid, 1% fat elemental diet (Group 1), with a peptide-containing, 10% fat elemental diet (Group 2). Dilute elemental diets were begun at 50 cc/kgm/day and advanced in volume and concentration. Data collected before and after attaining a caloric intake of 100 kcal/kgm/day were compared:

	Group 1	Group 2
Number of infants	5	4
Age (days + S.E.)	68.8 + 6	80.75 + 18
Weight (% of 50th %ile weight for age, + S.E.)	68.6 ± 4	64 ± 3.3
Duration of elemental diet feeding (days + S.E.)	13.0 ± .84	12.75 ± 1.4
Days to 100 kcal/kgm (days + S.E.)	5.4 + 0.9	5.25 + .48
Weight gain/day (gm/day + S.E.)	20.4 ± 6.2	25.6 ± 8
Weight gain/day after 100 kcal/kgm	11.0 ± 7.5	31 ± 13.8

The peptide containing 10% fat formula can be used successfully, avoiding the expense and osmolality of the amino acid formula.

**† 568** INCREASED TYPE V COLLAGEN IN THE STRICTURES OF CROHN'S DISEASE. Martin F. Graham, Robert F. Diegelmann, William J. Lindblad and Charles O. Elson (spon. by H. Maurer), Medical College of Virginia, Depts. of Peds., Surgery and Medicine, Richmond, VA

Histologic studies of strictured intestine in Crohn's disease have revealed an accumulation of collagen and a proliferation of smooth muscle cells. In order to determine if these changes were associated with changes in collagen types, collagen was isolated (acetic acid extraction, limited pepsinisation and salt precipitation) from control intestine, inflamed intestine, and strictured intestine resected from patients with Crohn's disease and collagen types separated by slab gel electrophoresis, and quantitated by densitometry. The major collagen type in control intestine was Type I followed by Types III and V. In strictured intestine the relative amount of Type V collagen was significantly increased.

Specimen	N	Collagen Type (% mean ± SEM)		
		V	III	I
Control	17	12±1	20±2	68±2
Inflamed	9	13±1.5	18±3	69±4
Strictured	14	*17±1	24±3	*58±2

Quantitation of hydroxyproline content of the specimens by acid hydrolysis and HPLC demonstrated a significant ( $p < 0.05$ ) increase in collagen per unit area of mucosa in strictured (2308±269 nM) vs. control (1706±122 nM) intestine. Intestinal strictures in Crohn's disease contain increased Type V collagen. These data, in conjunction with the histologic data, suggest a significant role for smooth muscle cells in intestinal fibrosis. Supported by NIH grant AM34151 and the NFIC.

**569** INCREASED 25-OHVITAMIN D<sub>3</sub>, DECREASED 25-OHVITAMIN D<sub>2</sub> AND NORMAL 1,25(OH)<sub>2</sub>VITAMIN D CONCENTRATIONS IN BREAST-FED INFANTS WITHOUT SUPPLEMENTAL VITAMIN D<sub>3</sub>. Frank Greer, Sharon Marshall, Xiao-rong Chen, University of Wisconsin, Dept Pediatrics, Madison WI

We hypothesized that exclusively breast-fed, white full-term infants do not require vitamin D supplements. We studied in a randomized, double blind fashion, 20 term, white infants fed exclusively human milk for 6 mos. 10 received 400 IU/day D<sub>2</sub> (VitD) and 10 received placebo (NoVitD). Serum concentrations of 25-OHVitD<sub>2</sub>, 25-OHVitD<sub>3</sub>, and 1,25(OH)<sub>2</sub>VitD as well as bone mineral content (BMC) of the radius were measured at birth, 6 wks, 12 wks, and 26 wks of age. Sunshine exposure (minimal erythemic doses [MED] of ultraviolet B light [UVB]) was monitored with polysulphone dosimeters. 25OHD<sub>2</sub> (±SD) was higher ( $p < .01$ ) in VitD vs. NoVitD (32.9+8.9 vs 2.3+1.7 ng/ml at 12 wks and 24.7+11.2 vs 2.3+1.5 at 26 wks). However, 25-OHD<sub>3</sub> (synthesized in skin by UVB) was lower ( $p < .05$ ) in VitD vs NoVitD (8.75+8.8 vs 19.9+11.2 ng/ml at 12 wks and 13.7+12.1 vs 25.7+10.5 at 26 wks), though mean weekly sunshine exposure did not differ in the groups (0.3+0.4 vs 0.2+0.3 MED's/wk). 1,25(OH)<sub>2</sub>VitD was similar in the groups at 12 wks (42.4±10.4 vs 41.5±12.3 pg/ml) and 26 wks (38.7+8.2 vs 37.2+8.7). BMC did not differ in the groups at 12 wks (VitD=80+12 mg/cm, NoVitD = 87+15 mg/cm) or 26 wks (Vit D=89+17 mg/cm, NoVitD=101+18 mg/cm). We conclude that white term, breast fed infants in Wisconsin do not need supplemental VitD as assessed by serum 1,25(OH)<sub>2</sub>Vit D and BMC, despite low sunshine exposure. This maybe due to NoVitD having higher serum 25OHD<sub>3</sub> and thus a higher rate of synthesis and/or utilization of VitD<sub>3</sub> from the skin compared to VitD infants.

**† 570** LATE HYPERTRIGLYCERIDEMIA IN VERY-LOW-BIRTH-WEIGHT INFANTS FED EXCLUSIVELY HUMAN MILK. Frank R. Greer Ann McCormick, Moti Kashyap, Charles Glueck, Univ Wisconsin, Dept of Pediatrics, Madison, WI and Univ of Cincinnati, Dept of Medicine, Cincinnati, Ohio

In a study to evaluate mothers' own milk for pre mature infants, we followed nonfasting serum triglyceride and cholesterol in 13 infants (gest age=29-1 [S.D.] wks, birth wt 1205-209 g) exclusively fed own mother's milk for > 18 wks. Triglycerides during hospitalization were 166-121, 153-67, and 154-96 mg/dl at 31, 33, and 35 wks post conceptional age respectively. Mean cholesterol in the nursery was 138-31 mg/dl, and mean fat intake was 5.3-1.6 g/kg/day which did not correlate with triglyceride or cholesterol. After discharge (mean stay 60-18 days) triglyceride rose to 371-324 mg/dl by 47+6 wks post conceptional age ( $p < 0.01$  compared to 35 wks) and cholesterol decreased to 116+37 mg/dl. Serum triglycerides measured in 25 exclusively breast-fed full term infants at 47 weeks post-conceptional age were 185.4-81.3 mg/dl, significantly lower ( $p < .02$ ) than the preterm infants at this time. At 47 wks post conceptional age, 3 of the preterm infants had severe hypertriglyceridemia--730, 810, & 1100 mg/dl. Lipid profiles showed Type I hyperlipidemia (hyperchylomicronemia), with normal levels of apoprotein CII. In 2 infants studied, post heparin extrahepatic lipoprotein lipase was absent, while hepatic lipase was in the high normal range. One year follow-up revealed normal triglycerides w/o hyperchylomicronemia. In conclusion, we report severe hypertriglyceridemia may occur post hospitalization in preterm infants fed mother's milk. This may represent a transient deficiency of extrahepatic lipoprotein lipase.

**† 571** IS VITAMIN D NEEDED IN BLACK BREAST-FED INFANTS TO PREVENT RICKETS? Fenella Greig and Mary Bastawros, (Spon. by Ramesh Jhaveri), Dept. of Pediatrics, Interfaith Med. Ctr. & Brookdale Hospital Med. Ctr., SUNY/Health Science Center in Brooklyn, New York.

Recommendations for giving supplemental Vitamin D to various sub-groups of breast-fed (BF) infants remain unclear. In a study of mostly fair-skinned BF infants adequate serum 25-OH-Vit.D was reported with brief outdoor exposure (Specker et al: J.Pediatr. 107,372,1985). In black BF infants nutritional rickets has been mostly attributed to restrictive dietary and social habits. The need for supplemental Vit.D was examined in a northern urban group of black BF infants. All were full-term, & without malabsorption, hepatic or renal disease. (1) In a preliminary study 10 infants, 5-37mos., were diagnosed clinically as having nutritional rickets, and confirmed biochemically and radiologically. In 7/10 infants, families had no restrictions in diet or use of medical care; 5/7 tested before treatment had serum 25-OH-Vit.D  $\bar{x}$  = 6.4ng/ml, range 2.0-13.4 (Adult nl:10-60). All had a history of being BF without Vitamin D supplements. (2) Prospectively we studied asymptomatic black BF infants who were not receiving Vit.D or formula supplements. In 9 infants, 2-10mos., three (5,6,10mos) had rickets by X-ray findings. Serum 25-OH-Vit.D was <10ng/ml in 7/9 ( $\bar{x}$  = 7.6; range 1.2-13.0)

We conclude that nutritional rickets, both clinical and sub-clinical, occurs in black BF infants without restrictive dietary or social habits if not supplemented with Vitamin D. The need for clear guidelines for Vitamin D supplementation in such a sub-group of breast-fed infants is suggested.