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COMPOSITION OF WEIGHT GAIN AND MACRONUTRIENT STORAGE IN VERY LOW BIRTH WEIGHT (VLBW) INFANTS FED OMM MOTHER'S MILK (OMM) OR MEDIUM-CHAIN-TRIGLYCERIDE (MCT) ENRICHED FORMULA. J. Van Aerde, P. Sauer, T. Heim, P.R. Swyer, J. Smith. Dept. Pediat. Med. Eng. Univ. Toronto & Res. Inst., Hosp. Sick Child., Toronto, Ont. M5G 1X8, Can.

In order to determine the effect of MCT diet on "quality growth" (i.e. protein vs. fat deposition) we investigated the effect of feeding an MCT-enriched formula (Group I; n=8) vs. OMM (Group II; n=9) on oxidation (oxid.) and accretion (accr.) of energy, macronutrients and growth in 17 healthy VLBW infants combining macronutrient balance, indirect calorimetry and anthropometry. 14 studies were performed in Group I and 13 in Group II. Clinical parameters and energy intake were comparable in both groups. Results are demonstrated in the table (*p<0.01; *p<0.05)

(M±SE)	Energy (Kcal/kg.d)		Protein (g/kg.d)		Fat (g/kg.d)	
	Group I	Group II	Group I	Group II	Group I	Group II
Intake	119.6±1.3	116.1±4.0	3.03±0.03	3.10±0.18	6.23±0.1*	5.23±0.3
Losses	5.5±0.5	12.6±2.6	0.28±0.02	0.36±0.06	0.36±0.1*	1.03±0.2
Oxid.	56.7±1.8	55.5±1.2	0.43±0.03*	0.67±0.07	1.69±0.3	1.73±0.3
Accr.	57.4±2.3	48.0±4.2	2.35±0.07	2.08±0.13	4.18±0.3*	2.46±0.6

Oxygen consumption (VO2), carbon dioxide production (VCO2), respiratory quotient (RQ) and weight gain did not differ in the two groups. The composition of weight gain indicated a higher percent of fat per gram weight gain in Group I (25.5%) than in Grp.II (14.7%). Protein accretion was similar. Conclusions: 1) Although weight gain was similar in the infants fed either OMM or MCT formula, the composition of weight gain in the MCT group favoured more fat, presumably due to the higher fat intake and lower losses. 2) Similar VO2, VCO2 and RQ indicate a similar proportion of carbohydrate and fat oxidation. 3) Since MCT diet did not promote fat oxidation, we assume that part of MCT is diverted into the chain elongation pathway in the liver of the preterm infant.

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ISCHEMIC INJURY TO NEWBORN RABBIT ILEUM: PROTECTIVE ROLE OF SUPEROXIDE DISMUTASE (SOD). Kiran Vohra, Inderjit Singh, Virginia Anderson, Warren Rosenfeld, Robert Lerner, Ramesh Jhaveri. SUNY/Health Science Center at Brooklyn & Interfaith Medical Center, Bklyn, N.Y., Departments of Pediatrics and Surgery.

Free oxygen radicals (superoxide anion, O₂⁻) cause tissue damage in reperfusion injury of the intestine. The protective effect of a specific scavenger of O₂⁻, SOD, on weanling rabbit ileum during ischemia and reperfusion was evaluated. Twenty-three anesthetized weanling rabbits underwent laparotomy. The ileum was divided into 4 loops, each 8-10cm in length. Ischemia was induced in 2 loops by clamping the artery to the loop for 5mins; unclamped loops served as controls. Eleven rabbits were pretreated with parenteral human SOD (5-10mg/kg, SC) at 0 and 16hrs. and surgery begun at 20hrs. Twelve received intraluminal SOD (10mg/kg) in 2 loops, and no SOD in 2 control loops. Animals were sacrificed 4 hrs. post surgery. Loops were fixed in formalin and examined histologically for the degree of mucosal necrosis by a pediatric pathologist who was blind to the conditions of the experiment. All rabbits given SC SOD had detectable serum levels of hSOD at 20 & 24 hrs. (.9-6.0mcg/ml). P value by Fisher Exact Test.

Muc. Necrosis	CONTROL		PARENTERAL SOD		INTRALUMINAL SOD	
	Ischemia	No Isch.	Ischemia	No Isch.	Ischemia	No Isch.
Positive	12	7	3	3	6	4
Negative	0	5	19	19	6	8

p (compared to ischemic controls) = .00003. = .007.
Reperfusion ileal loops are protected from mucosal necrosis by both parenteral and intraluminal SOD. This may be an important etiology and therapeutic modality in NEC.

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THE DAMAGED INTESTINAL MUCOSA: DIFFERENTIAL RESPONSE TO ORAL HYDRATION SOLUTIONS OF VARIABLE OSMOLALITY. R.A. Wagnir, M. Zdanowicz and F. Lifshitz. Cornell Univ. Med. Coll. and North Shore Univ. Hosp., Dept. of Peds., Manhasset, N.Y.

Damage of the small intestinal mucosa (SMI) could result in different permeability to water and electrolytes, and, hence, produce an abnormal response to oral hydration solutions (OHS) of diverse sodium:glucose ratios and osmolality. This hypothesis was tested in an animal model of mucosal damage induced by exposure of the jejunum to 5 mM deoxycholate (Dch). Anesthetized rats were treated [+], or not [-], with Dch in buffered saline for 1 hr and perfused through the jejunum with OHS containing bicarbonate, potassium and Na:glucose ratios (mM/l:mM) 30:55, 60:30, 60:111 and 90:111; and 146, 190, 258 and 324 mOsm/kg, respectively. In [-] rats, Na was retained in solutions with >60 mM/l Na, but in the [+] group the balance was negative at all Na levels. The rate of water absorption in both groups of rats inversely correlated with OHS osmolality. Net water transport ranged from a mean of 3.68±0.21 to 1.36±0.25 µl/min x cm in [-] rats, and from 1.68±0.17 to 0.10±0.19 in [+] rats. By extrapolation, these data revealed that, at zero osmolality, the [+] rats would lose about half their water absorption capacity. Water influx and efflux data in [-] rats correlated inversely and directly with osmolality, respectively, but in [+] rats efflux rates were consistently higher than in [-] and independent of OHS osmolality. Therefore, if mucosal damage is suspected, the advantage of lower osmolality in terms of net water absorption is lost and high Na concentration is insufficient to avoid Na loss.

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HOME-MADE DRINKS (HMD) INADEQUACY IN INFANTILE DIARRHEA (ID). Zvi Weizman, Mauricio Binsztok, (spon. by R.Gorodischer) Faculty of Health Sciences, Ben-Gurion University, Soroka Medical Center, Div. of Pediatrics, Beer-Sheva, Israel.

Although commercial ORS (CORS) are available HMD are still in wide use. We analyzed HMD for Na, K and osmolality to determine adequacy in ID and to correlate socioeconomic (SE) parameters.

Results: 61 infants were enrolled (1-12ms.).

	CORS (WHO) (n=2)	water-based (WB) (tea-67%) (n=37)	soft drinks (SD) (cola-32%) (n=22)
Na (meq/l)	90	4.6±2.3 (2.1-8.4)	5.8±1.8 (3.9-9.9)
K (meq/l)	20	0.4±0.1 (0-3.1)	0.8±0.6 (0-1.9)
osmolality (mos/kgH2O)	333	201±113 (14-405)	590±156 (428-862)

mean±S.D. (range)
(1) Most HMD were WB & SD and significantly differ from CORS. (2) This was noted in various SE levels.

We conclude that since inadequate HMD are so widely used in ID, pediatricians should increase public awareness.

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ENVIRONMENTAL STRESS FACTORS (ESF) AND CHRONIC NON-SPECIFIC DIARRHEA (CNSD). Zvi Weizman, Mauricio Binsztok (spon. by R. Gorodischer) Faculty of Health Sciences, Ben-Gurion University, Soroka Medical Center, Div. of Pediatrics, Beer-Sheva, Israel.

Children with CNSD are often unnecessarily subjected to intensive workup, without adequate psychosocial evaluation. We evaluated 24 consecutive CNSD cases, aged 7-37 ms. assessing the role of ESF. CNSD was defined as diarrhea (>3 loose stools/day) >3 wks. with normal growth and a negative basic workup. Parents' interviews based on standard questionnaire, assessed ESF, e.g. marital discord, day-care adaptation, etc. Following ESF determination, children were monitored throughout trial period with factor elimination, and when possible, throughout re-exposure to original ESF. Dietary intake, stool pattern and growth were monitored. In 5/8 ESF-positive cases diarrhea stopped after factor elimination, with no dietary changes. Factors included marital discord (2), day-care adaptation (2), and maternal separation (1). In 4/5 cases, circumstances allowed us to determine the reappearance of diarrhea on re-exposure to the original ESF.

We conclude that since ESF may play a significant role in CNSD, this aspect should be carefully evaluated in this syndrome.

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QUANTITATIVE LIVER FUNCTION BEFORE ORTHOTOPIC LIVER TRANSPLANTATION (OLT). Peter F. Whittington. Dept. of Pediatrics, Univ of Chicago Pritzker School of Medicine, Wyler Children's Hospital, Chicago, IL.

The timing of OLT is important because, on the one hand, a long and only modestly impaired survival with chronic liver disease should not be preempted by death due to an unsuccessful OLT nor should a possibly successful OLT be hindered by waiting until the candidate is critically ill. Standard "LFT's" are of little value in quantitating declining liver reserve. Sixteen infants and children awaiting OLT were studied 1-4 times during their course of illness using a set of "quantitative liver function tests" (QLFT's) comprising indocyanine green clearance (ICGC), galactose elimination (GEC) and C-aminopyrene breath test (ABT) to determine if they improve assessment of hepatic reserve. ICGC was deranged in all patients (t1/2=3.8-40 min, control=1.9-3.0), reflected cholestasis and/or portosystemic shunting and did not change with time. ABT was normal to severely deranged (11-2.4% 2hr excretion, control=8.5-12) and reflected hepatic reserve, but was difficult to perform and the results erratic. GEC was normal (t1/2=7.5-11.5 min, control=8-11.5) early in the course and fell linearly in each patient with progression to end-stage (22-28 min). Long GECs predicted inability to effect improved nutrition, important in OLT. We conclude that GEC improves assessment liver reserve before OLT.