

WATER LOSS FROM THE SKIN OF NEWBORN INFANTS DURING PHOTOTHERAPY. Sveinn Kjartansson, Karen Hammarlund and Gunnar Sedin. Uppsala University, Department of Pediatrics, Uppsala, Sweden.

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Transepidermal water loss was studied in 10 fullterm and 10 preterm infants (GA 29-33 w) before and during phototherapy.

The method to measure evaporation from the skin is non-invasive and based on determination of the water vapor pressure gradient close to the skin surface. The sensors are not influenced by the radiative energy from the phototherapy equipment.

The study was made with the infant naked in an incubator with a controlled environment as to temperature, ambient humidity and air velocity.

In term infants the mean evaporation rate (ER; g/m²h) from an interscapular skin area was 3.1 both before and after 30 min. of phototherapy. In the preterm infants ER was 10.2 before and 10.5 after 90 min. of phototherapy (n=10) and in another comparison 10.4 before and 10.4 after 120 min. of phototherapy (n=6).

This study does not confirm that water loss from the skin increases because of phototherapy, as has been suggested in previously published papers.

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NO INFLUENCE OF MATERNAL VITAMIN K SUPPLEMENTATION ON VITAMIN K CONCENTRATION IN BREASTMILK

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Haemorrhagic disease in breastfed infants caused by vitamin K deficiency can be prevented by oral or parenteral vitamin K administration. Low vitamin K intake with breastmilk may be responsible for the late onset vitamin K deficiency. Therefore we measured vitamin K intake of 28 healthy term breastfed infants at 6, 28 and 90 days of age in a longitudinal randomized study. 16 mothers received a daily oral vitamin K₁ supplement (100µg, Milusan®). Milk intake was evaluated by 24 hour testweighing and vitamin K₁ concentration in milk was measured employing the HPLC-technique. Vitamin K₁ intake was similar in the two groups and no influence of age was detected. (Tab., intake in µg/d).

	Vitamin K supplement		controls	
	age	N	median	range
6 days	16	0.685	0.079-1.382	12 0.660 0.146-1.169
28 days	14	0.824	0.203-2.396	12 1.037 0.201-2.188
90 days	15	0.606	0.266-6.414	9 0.989 0.413-3.498

However, vitamin K₁ intake of all infants was substantially below the RDI value of 10µg/day. (Am.J.Clin.Nutr;1987;45:687-92). Therefore low vitamin K intake with breastmilk might be responsible for late onset vitamin K deficiency in some infants.

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GLUCOSE OXIDATION AND SUBSTRATE UTILIZATION IN VLBW INFANTS FED A FORMULA CONTAINING 5 OR 40 PERCENT OF FAT AS MEDIUM CHAIN TRIGLYCERIDES (MCT).

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The fat composition of special formula milk for VLBW infants may include up to 50% MCT. During feeding with two formulas (Nutricia, Holland) containing per 100 ml: 80 kcal, 8.0 g carbohydrate, 2.2 g protein and 4.4 g fat with 40% MCT (A) or 5% MCT (B), glucose oxidation was measured by primed constant oral infusion of U-13C glucose as 13CO₂ recovery in breath and substrate utilization by indirect calorimetry. At week 4, 15 infants (birthw.1236±228 g, gest.age 32.0±2.2 wks) received 150 ml/kg/day of formula A and 10 infants (birthw.1304±165 g, gest.age.32.6±1.9wks) received B. Net fat oxid. was calculated as non-protein met.rate - net gluc.oxid. Results in g/kg/d or kcal/kg/d ±S.D.:
Gluc.oxid. Carbohydr.util. Fat.util. Fat oxid. Met.rate
A 5.9±1.6 10.3±1.7 1.6±0.9 3.6±0.7 58.6±3.8
B 8.3±0.7 10.7±1.9 1.8±0.9 2.6±0.4 62.9±4.8
p<0.001 NS NS p<0.001 NS

Conclusions: 1. No differences were found in met.rate and substrate util of infants fed formula A or B. 2. However, increasing the % MCT causes a significant decrease in net glucose oxid as measured with stable isotopes. 3. Combining these methods we also conclude that net fat oxidation is higher in the high MCT group.

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EFFECT OF GRADUAL LIBERALIZATION OF DIET ON COGNITIVE FUNCTIONS AND BEHAVIOR IN PKU

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The question of if, when and how dietary therapy can be stopped in PKU patients is still controversial. A gradual increase in natural protein was introduced with the aim to stop dietary liberalization when the serum Phe exceeded 20 mg/100 ml. Twenty three patients aged 10 - 14 years with classical PKU (serum Phe > 20 mg/100 ml) were studied with WISC, neuropsychological tests and standard questionnaires to parents and teachers before and 3 (2) years after liberalization of diet. About one fifth of the patients could normalize the diet completely, one fifth tolerated only a small increase in natural protein while the rest fell in between these two extremes. The compliance was good in all but two. There were no significant changes in IQ, neuropsychological tests or in behavior problems during the observation period. The data suggest that a gradual increase in natural protein may disclose patients at risk, and that serum Phe levels below 20 mg/100 do not harm cognitive functions or cause behavioral problems in PKU teenagers.

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PLASMA AND MEMBRANE COMPOSITION OF PRETERM INFANTS ON DIFFERENT CHOLESTEROL INTAKES. B. Kolitzko, I. Kupke, G. Harzer, E. Schmidt. Depts. Pediatr. & Pediatr. Clin. Chem., Univ. Düsseldorf & Milupa AG

During early life, considerable amounts of cholesterol (CH) are required for the synthesis of membranes and steroid hormones. Common formulae contain less cholesterol than human milk. We studied the effects of different dietary CH concentrations in 33 premature infants (birthweight 1694±173 g, gest. age 34.0±1.8 weeks, M±SD). Infants were fed either human milk (HM, n=15; CH 0.3-0.5 mmol/l), a commercial formula (F, n=10; CH 0.1 mmol/l) or a formula with an increased CH content (CHF, n=8; CH 0.5 mmol/l). Plasma and erythrocyte membrane CH and plasma apolipoproteins (APO) A1 and B were determined on days 4 and 21 of life. Results: Plasma CH (Table) and CH esters were low on day 4. They increased by day 21 in HM and F and tended to increase in CHF. In all feeding groups, APO A1 was low on day 4 and increased by day 21 (Table), but APO B, plasma non-esterified CH and erythrocyte membrane CH were unchanged. CH levels were higher in HM than in F and CHF, but changes with time were similar in all feeding groups.

PLASMA CHOLESTEROL (mmol/L) AND APOLIPOPROTEIN A1 (g/L)

	HM day 4	F day 4	CHF day 4	HM day 21	F day 21	CHF day 21
CH	2.6±0.1	2.9±0.1*	2.0±0.1	2.4±0.1*	2.0±0.3	2.3±0.3
APO A1	1.6±0.1	2.2±0.1*	1.5±0.1	2.3±0.1*	1.4±0.2	2.1±0.2*

(M±SE, P<0.05* and <0.0001†, paired two-tailed t-test)

Conclusions: Plasma CH, CH esters and APO A1 are low postnatally and increase during the first weeks of life with the introduction of milk feeding. Variations of dietary CH concentration, within the range studied, seem not to alter plasma and erythrocyte CH levels in premature infants. Our results do not exclude possible long-term effects of early diet on CH metabolism later in life.

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LIPID LEVELS IN VERY LOW BIRTHWEIGHT PRE-TERM INFANTS: BIWEEKLY FOLLOW-UP DURING THE FIRST EIGHT WEEKS OF LIFE

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Free fatty acid (FFA), triglyceride (TG), cholesterol (C), VLDL+LDL-C, HDL-C and its subfractions were determined in 18 very low birthweight pre-term infants (birthweight: 1064±179 g, gestational age: 28.7±1.6 weeks, mean±SD) on postnatal Days 1, 14, 28, 42 and 56. TG and C were measured enzymatically, FFA by colorimetric, whereas HDL-C and its subfractions by microprecipitation methods (data are in mmol/l). TG levels increased significantly from Day 1 to 14 and from 14 to 28 (0.61±0.26 vs 1.14±0.28 vs 1.70±0.89, p<0.02), thereafter remained unchanged. C levels increased up to Day 28 (Day 1: 2.29±0.83, Day 14: 3.05±0.71, Day 28: 3.34±1.58, Day 1 vs Day 14 p<0.01), thereafter decreased to the level of Day 1 (Day 56: 2.63±0.87). In absolute values more marked alterations were seen in the VLDL+LDL-C fraction (Day 1: 1.51±0.70, Day 28: 2.32±1.34, Day 56: 1.76±0.74), whereas within HDL-C it was HDL₂-C which changed significantly. The alterations observed were similar to those seen in term infants; the time course of the events, however, proved to be different.