

85

SYMPATHO-ADRENAL RESPONSE TO HYPOGLYCEMIA IN INFANCY. A Lischka, A Pollak, H Hörtznagl, B Stanek, E Ogris. Dept. of Pediatrics and Inst. of biochem. Pharmacology, University of Vienna, Austria.

The response of the sympatho-adrenal system to hypoglycemia (H) of different etiology was studied in 7 infants ages 10 to 189 days. Five infants had hyperinsulinemia (HI) secondary to nesidioblastosis or microadenoma of the pancreas, one had neonatal sepsis due to staphylococcal infection and one congenital hGH- and ACTH-deficiency.

In babies with HI plasma noradrenaline (NA) increased from 0.29 ± 0.06 to 0.68 ± 0.14 ng/ml ($p < 0.01$), whereas adrenaline (A) increased only in three, but did not alter in two babies. Increases in heart rate and blood pressure paralleled these changes. In H due to sepsis NA increased from 0.39 to 1.64 ng/ml and A from 0.05 to 0.86 ng/ml, associated with marked hemodynamic changes. In contrast in hGH- and ACTH-deficiency the low basal plasma levels of NA (0.12 ng/ml) and A (0.01 ng/ml) remained unchanged in response to H and heart rate as well as blood pressure were unaffected.

The present data indicate, that the sympatho-adrenal system is activated in response to hypoglycemic stimuli except for congenital hGH- and ACTH-deficiency. However, the precise role of NA as counterregulatory hormone in neonatal H remains unclear. For the first time the preponderant role of NA to H in infancy is described, which is in contrast to the A response observed in adults and children beyond two years (Gerich et al, Am J Physiol 236, 1979).

86

EFFECTS OF FETAL AND NEONATAL HYPERINSULINISM ON GLUCOSE HOMEOSTASIS. A Lischka, A Pollak, E Ogris, R Gherardini. Dept. of Pediatrics, Dept. of Surgery and Dept. of Nuclear Medicine. Univ of Vienna, Austria.

Infants with persistent hyperinsulinism (HI) provide an excellent opportunity for studying the effect of insulin induced hypoglycemia (H) on glucoregulatory hormones and substrates. A total of 4 patients, 3 boys and 1 girl, ages 12-39 days, were studied. Three were found to have nesidioblastosis, one had a microadenoma of the pancreas.

Impaired fine tuning of glucose control became evident during the "fasting test" (the following values are mean basal values \pm SEM vs mean hypoglycemic values \pm SEM): insulin (57.3 ± 17.9 vs 27.5 ± 10.6 μ U/ml), C-peptide (4.9 ± 1.1 vs 3.5 ± 0.8 ng/ml), FFA (0.30 ± 0.01 vs 0.32 ± 0.02 mval/l), β -hydroxybutyrate (≈ 0.03 vs ≈ 0.03 mmol/l), acetoacetat (< 5 vs < 5 pmol/l), lactate (5.3 ± 0.7 vs 5.4 ± 1.1 mg/dl). These data suggest "inappropriate" high insulin and C-peptide levels, which inhibit lipolysis and gluconeogenesis.

An increase of plasma cortisol (6.5 ± 7.1 vs 18.6 ± 6.5 ng/ml), adrenaline (0.02 ± 0.005 vs 0.25 ± 0.24 ng/ml), noradrenaline (0.28 ± 0.06 vs 0.68 ± 0.14 ng/ml) was noted, whereas no or only minute increase was found for glucagon (134.3 ± 89.6 vs 161.3 ± 101.4 ng/ml) and hGH (5.7 ± 1.8 vs 7.1 ± 1.7 ng/ml). Although some stimulation of neonatal glucoregulatory hormones was evident, this was not strong enough for counteracting endogenous HI.

87

CARNITINE AND NEONATAL LIPID METABOLISM DURING TPN. F.F. Rubaltelli and A. Orzali. Department of Pediatrics, Univ. of Padova, Italy.

The fact that full-term as well as premature newborn infants have a plasma lipoprotein lipase (LPL) concentration similar to that found in adults supports the concept that LPL is not the rate-limiting factor for clearance of fat from the circulation in infants (Ped. Res. 18, 642, 1984). The aim of our study was to verify whether carnitine administration along with lipid infusion was able to decrease the triglyceride serum concentration during TPN. For this reason, we have performed a 10% Intralipid tolerance test, 1 gm/Kg body weight spanning 4 hours, with and without L-carnitine administration (100 mg/Kg body weight during 6 hours) in 8 AGA preterm (mean gestational age 36.28 ± 0.5 weeks, mean body weight $2,310 \pm 308$ gm), 13 AGA full-term neonates in their first 48 hrs. of life, and in a group of 11 newborns on prolonged TPN. We have determined the blood plasma levels of triglycerides, glycerol, FFA, ketone bodies, total, free, short-chain, and long-chain carnitine. We have demonstrated that carnitine was acylated in the neonatal tissues. In fact, large amounts of plasma short-chain and long-chain acyl-carnitine were found. However, only in newborns less than 48 hrs. old, who were not receiving glucose along with the lipid infusion, the carnitine administration results in a significant increase in plasma level of ketone bodies. This indicates that glucose administered during TPN reduces the fatty acid oxidation. On the other hand, triglyceride plasma concentration was not significantly different in the newborns receiving carnitine in comparison with control infants. In conclusion, carnitine administration does not seem to improve fat clearance during TPN in the neonatal period.

88

EARLY NEONATAL JAUNDICE AND LIPID COMPOSITION OF THE DIET S. Masiero, B. Granati, G. Laragajolli, F.F. Rubaltelli. Dept. of Paed., Univ. of Padova, Padova, Italy.

It is known that the pattern of feeding and the nature of the milk might influence the hepatic function or enterohepatic circulation of bilirubin in certain infants, resulting in abnormal elevations of serum bilirubin concentration, which occasionally persist for long periods of time. It has been demonstrated that fatty acids, especially linoleate (18:2) and linolenate (18:3), inhibit the conjugation of bilirubin. The aim of our study was to evaluate the role of diet fatty acid composition in neonatal jaundice, comparing the serum bilirubin concentration and the incidence of light treatment in breast-fed infants and in formula-fed infants. No significant differences were found in bilirubin serum level in the 1st, 3rd and 5th day of life between mother's milk fed infants and bottle-fed infants. However, 20% in the breast-fed infants group (mother's milk and 5% dextrose solution in the first 48 hours of life) had to be treated with phototherapy compared with 14.2% of the newborns receiving an adapted formula (NAN, Nestlé with 3.3 gr of LCT, of these 0.45 gr is linoleate, in 100 ml of reconstituted formula), and 19.3% of the newborns receiving a semielemental formula (Pregestimil, with 1.1 gr of MCT and 1.6 gr of LCT, of these 0.9 gr is linoleate, in 100 ml of reconstituted formula). Supplementation of breast feeding with an adapted formula or with a semielemental formula resulted in an incidence of phototherapy of 14.8 and 16.6% respectively. In conclusion, it seems that early jaundice is not influenced by the lipid composition of the diet but may be associated with a lack of intake of breast milk.

89

INVESTIGATION OF THE BONE AGE IN OBESE CHILDREN.

N. Moundjiev and N. Stanimirova, The Institute of Medicine, Plevan, Dept. Paediatrics, Plevan, Bulgaria.

The obese children have not only greater weight but also accelerated physical, sexual and bone maturation. The bone age in 425 children from 7 to 15 years of age and suffering from obesity- II and III degree by A. Knjsev and T. Tashev that had at least 5 years duration was studied. The data from R₀ examination of the centers of ossification of the hand in these children were compared with the standards of Gruelich and Pyle. A manifested acceleration of the bone maturation in comparison with the calendar age ranging from 2 to 6 years was established in 38,6 % of the boys and in 52,2 % in the girls. SDS of the bone age for the girls under investigation was + 1,26 at 7 years and it increased to + 2,88 at 15 years of age demonstrating an accelerated bone maturation. SDS of the bone age in the boys was not so pointed and ranged from + 0,56 to + 1,75. The bone maturation correlated well with the accelerated growth, the degree and the duration of the obesity. So the bone age is one of the most manifest indicators illustrating the acceleration in obese children.

90

PROGNOSTIC VALUE OF THE CARDIORESPIROGRAPHIC PATTERNS IN EARLY LIFE.

D Neubauer, M Erjavec. Neonatal Special Care Unit; University Children's Hospital, Ljubljana, Yugoslavia

Using Hewlett-Packard's cardiorespirograph 80200 A, cardiorespirographic (CRG) patterns of 380 preterm and term infants were studied during neonatal period. Selected cases of two-year period (1983-1984) presented various paroxysmal states in early life (e.g. apnoea, seizures, jerks, multiple sighs, bradycardia, jitteriness). We compared early CRG patterns with the final diagnosis at discharge of these infants or with their post-mortem findings and we found out that the CRG patterns in early life could in many cases be of important prognostic value. The group of the infants with patterns of apnoea and simultaneous bradycardia (the so called appropriate diving reflex) which are typical for idiopathic apnoea of prematurity have a good prognosis when properly treated with xanthine derivatives. The CRG patterns of silent tracing, comb-like bradycardia, cluster breathing or Cheyne-Stokes' respiration indicate usually poor prognosis while the further diagnostic procedures in our cases have shown mainly gross abnormalities of the central nervous system. In the third group we observed CRG patterns of excessive periodic breathing, multiple sighs and bradycardia without apnoea, which are highly suggestive for primary cause of metabolic derangement and on the present possibilities of successful longterm treatment.