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Post-natal development of Protein C K-sensitive in Full-term newborns.

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The purpose of this study was to determine the concentration of Protein C K-sensitive in the blood of full-term healthy newborns and to evaluate its pathophysiologic role in neonatal age.

The levels of Protein C evaluated by electroimmunoassay in 77 full-term infants of weight appropriate for gestational age and breast feeding,from 1 to 360 days old were low in the first 5 days of life(from 38.9 ± 15.4% in the 1st day to 27.2 ± 16.9% in the 5th day) and lower than the critical thrombotic level.

The antigenic activity increased progressively from the 2nd week of life and the adult values were reached after the 6th month (84.3 ± 15.5%).

The reduction of Protein C levels impairs the ability of the newborn to control consumptive disorders, thus exposing the infants to the risk of thrombotic conditions in neonatal age particularly if trigger events (prematurity,sepsis,hypoxia,etc) occur.

58 Evaluation of aminoglycoside-induced nephrotoxicity in the newborn

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Renal toxicity of aminoglycosides seems to be less frequent in newborn infants compared to adults.In 14 infants kinetic parameters of gentamicin were determined using an open three compartment body model. According to the lower glomerular filtration rate the ß-elimination phase is longer in the newborn infant compared to adults,while the γ-elimination phase is quite similar to adult values. The calculated drug accumulation in the deep compartment (kidney) under steady state conditions is lower in newborns compared to infants.The Q-tissue:Q-body ratio is 0.38 in the newborn and 0.53 in older infants.The excretion of urinary enzymes of tubular origin, that is the brush border associated AAP (alanine-aminopeptidase),GGT (γ-glutamyl-transpeptidase) and the lysosomal NAG (N-acetyl-ß-D-glucosaminidase),ß-glucuronidase were determined in 74 healthy children and 14 gentamicin treated ones. If related to the body surface the excretion of these enzymes is lower in healthy newborn infants compared to older ones. But during aminoglycoside-therapy the increase of AAP is less pronounced in newborn infants especially in prematures if compared to adult values. After therapy the AAP excretion decreases to normal The calculated rate of this decrease takes place in a similar fashion like the release of drug from the kidney (γ-elimination phase).There may be a lower renal accumulation of aminoglycosides in newborn infants,which can be explained by the morphometric and functional characteristics of the newborn kidney.

59 Surfactant apolipoprotein from adult and fetal lung is related to cytoplasmic actin

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The concentration of the major apolipoprotein of pulmonary surfactant (M.Wt. = 36,000 - 45,000) has been reported to increase in amniotic fluid after 29 weeks gestation. We wished to evaluate the role of this protein in the development of surfactant secretion by fetal lung. Apolipoprotein was identified in bronchioalveolar lavage of adult lung and then purified from adult human lung homogenate. The purified protein was a polymer of sub-unit M.Wt 42,000 and was virtually the only protein from adult lung cytosol that bound to an emulsion of dipalmitoylphosphatidylcholine. Surprisingly, the concentration of this protein in immature fetal lung (14 - 17 weeks gestation) was similar to that of adult lung. It was detected not only in the surfactant fraction of term amniotic fluid but also in the particulate fraction of immature amniotic fluid. A comparison of their sub-unit M.Wts., isoelectric points and limited proteolysis patterns suggested that surfactant apolipoprotein is related to cytoplasmic actin. The physiological role of surfactant apolipoprotein is probably involved in the intra-cellular migration and exocytosis of lamellar bodies. Its presence early in gestation could then be due to actin not specifically related to surfactant.

60 Comparison of glycine and carnitine effect in neonatal isovaleric acidemia

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A 7 days old breastfed newborn was admitted because of progressive neurological detoriation. Hyperammonemia isovaleric acidemia (4,5 µmol/ml plasma) and large amounts of urinary isovalerylglycine were found. Isovaleric acid (IVA) and urine metabolites were closely monitored by mass fragmentography from admission until discharge. Laboratory data and clinical signs normalized within 6 days under a normo-caloric protein free diet and intermittent use of argininhydrochloride. The baby did well under the subsequent low leucine (155 mg/kg/d) diet (total protein 2.3 g/kg/d),IVA was about 30 nmol/ml plasma. A single leucine load (25 mg/kg) revealed an 5 fold increase of plasma-IVA within 3 hours. A mild hyperammonemia without ketoacidosis occured, clinically mild lethargy and odor developed. Simultaneous oral glycine (250 mg/kg) reduced this biochemical and clinical response. Simultaneous oral carnitine (250 mg/kg) showed a similar protective effect on leucine load.

Early diagnosis and therapy would appear to improve significantly the prognosis in neonatal isovaleric acidemia. Therapeutic trials may mimic internal compensatory mechanisms e.g. eliminating toxic IVA by conjugating to glycine or carnitine.

61 RECORD AND ANALYSIS OF HOME BLOOD GLUCOSE DATA BY MEMORY REFLECTANCE METER IN DIABETIC CHILDREN

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Home blood glucose monitoring has rapidly generated a large volume of data, which is difficult to record and analyse for both patient and physician. In an attempt to overcome these problems a standard Glucometer reflectance meter (Ames) has been modified to include a non-volatile memory and an internal clock. This allows storage of 448 blood glucose results over a period of up to 99 days. The data from the memory reflectance meter are transferred to and stored in an IBM-XT computer, where the monitoring period is converted to real time, and the blood glucose data is analysed. Seven children (age range 11.5-17.0yr) monitored their diabetes (period range 25-55 days) using the memory reflectance meter, and expressed keen satisfaction with this system. Computer analysis of this data has included a summary report, display of all glucose values 24 hour glucose profiles, mean glucose and M-value.

The memory reflectance meter is simple to use and with a desk-top computer allows storage, analysis and display of diabetic control. Furthermore, this data will be available for long-term storage and analysis in relation to the development of micro-vascular disease.

62 An ultrasonographic study of the organisation of sucking and swallowing in newborn infants.

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The organisation of sucking and swallowing in newborn infants was investigated using ultrasound. Twelve term neonates, 6 breast-fed and 6 bottle-fed, were examined at 2-5 days postnatal age. The ultrasound probe was held under the baby's chin to record sucking and swallowing movements. Breathing was recorded with an apnoea alarm device, and displayed on the scanner monitor via the ECG input. Videotape records were made of all feeds. To analyse the records breathing movements were traced from the screen onto paper, and sucking and swallowing events over the same period superimposed onto the trace.

The analysis showed that sucks either occurred on their own or together with a swallow; whereas swallows were never observed without a suck. In babies 2-3 days of age a swallow was often associated with a pause in breathing, while in babies 4-5 days of age swallows took place at the end of an inspiratory or expiratory phase so that the breathing rhythm looked undisturbed. 2-3 day-old breast-fed babies frequently sucked more than once before swallowing: this was not seen in bottle-fed babies. During sucking on the breast tongue movements conformed to a caudally directed, peristaltic wave, while on the bottle teat they were more piston-like in the vertical plane. There were also differences between breast and bottle-fed babies in the resting position of the tongue.

These preliminary observations suggest that ultrasound provides an investigatory probe suitable for studies of normal and disturbed feeding physiology.