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SERUM THYROID HORMONES IN PRETERM INFANTS AND RELATIONSHIPS TO INDICES OF SEVERITY OF INTERCURRENT ILLNESS

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Introduction: In adults a decrease in serum T3 and an increase in rT3 are the most common changes in thyroid hormone levels in response to a variety of acute and chronic illnesses. With more severe illnesses serum T4 levels also decrease and this is associated with a worse prognosis. Thyroid hormone levels in infants are crucially determined by the inter-relationship between gestational and postnatal age but it remains unclear whether changes in thyroid hormone status in response to illness are similar across the wide gestational age range of prematurity.

Aim: The purpose of this study was to relate severity of illness at 1, 7, 14 and 28 postnatal days in preterm infant groups 23–27 (n=73), 28–30 (n=160) and 31–34 (n=208) weeks gestation, to the corresponding sera levels of T4, FT4, TBG, TSH, T3, rT3 and T4S.

Methods: The British Association of Perinatal Medicine and Neonatal Nurses Association 1992 scoring categories (Arch Dis Child; 67: 868–9) were used as an index of illness severity: Level 1 (maximal intensive care) was compared with Level 2 (high dependency intensive care) combined with Level 3 (special care); infants were scored on 1, 7, 14 and 28 postnatal days.

Results: In Level 1 infants there were significant reductions in: T3 at 7 days (28–30 weeks), 14 and 28 days (23–27 and 28–30 weeks); T4 at 7, 14 and 28 days (23–27 weeks), at 14 and 28 days (28–30 weeks), and at day 7 (31–34 weeks); FT4 at 14 days (23–27 weeks). TSH was unchanged in all groups at all ages.

Conclusion: The clear message from our data is that T4 and T3 are substantially reduced in infants with severe illness, irrespective of gestational age, yet TSH remains unchanged.

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OCCURRENCE OF LACTOBACILLUS REUTERI, LACTOBACILLI AND BIFIDOBACTERIA IN HUMAN BREAST MILK

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Background: Human milk, considered ideal with respect to the optimal nutrition for the infants, not only contains nutritional substrates but also commensal bacteria such as Lactobacillus and Bifidobacterium species. It can be postulated that mothers in rural areas have higher incidence of these bacteria compared to mothers from urban environments.

Aim: To investigate the occurrence of lactobacilli, particularly L. reuteri and bifidobacteria in the milk of nursing mothers and to compare the frequencies in different countries and between different areas within those countries.

Methods: Breast milk samples were collected from 226 women living in urban or rural areas in Sweden, Israel, South Africa, Japan, Peru, Korea and Denmark. The numbers of total lactobacilli, L. reuteri and bifidobacteria were analysed using conventional bacterial cultivation methods.

Results: The isolation rates varied from 50% L. reuteri positive samples from rural areas in Japan and Sweden to negative samples from urban areas in Peru, Denmark and Israel. Overall, 12% of the mothers had detectable L. reuteri counts. 100 percent of mothers milk from rural samples from Japan and 79% from Korea was positive for bifidobacteria whilst mothers from these areas in Denmark, Peru and Sweden had low or non-detectable levels. Among the samples from the rural areas approximately 50% of the Israeli, Japanese and Korean samples had positive total lactobacilli levels. In comparison the urban samples from Israel, Peru and Denmark contain about 20% positive total lactobacilli counts.

Conclusion: Breast milk microbiota varies between different countries and parts of the world. Japanese breast milk shows the highest frequency of colonisation with L. reuteri and Japanese and Korean mothers have higher bifidobacteria and total lactobacilli counts in their breast milk compared to mothers from other countries. Breast milk from rural areas contains more lactic acid bacteria than milk from urban areas.

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SURFACE ELECTROGASTROGRAPHY IN GROWING PRETERM NEONATES

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Background: The ability to provide enteral nutrition to preterm infants is limited by immaturity of GI motor function. Manometry and electrogastrography(EGG) have been used to study gastric dysrhythmias and GI motor disorders in adults. EGG has been shown to be a reliable non-invasive alternative technique to gastric manometry in preterm infants. The information on pattern and maturation of EGG is limited in preterm infants.

Objective: To investigate the effect of gestational and postnatal age on the pattern of gastric myoelectrical activity in preterm infants without feeding intolerance and those with gastroesophageal reflux(GER).

Methods: EGG signals were recorded at 10Hz and bandpass filtered between 1.2 and 18 cycles/min(cpm), 30 minutes before and 2 hours after feeds. Signals were analyzed by FFT spectral analysis. The percentage of regular 2–4 cpm normal slow wave activity (NSW) and tachygastria(4–10cpm)was determined from a running power spectrum analysis generated at 10 minute intervals.

Results: 70 EGGs were obtained in 31 infants; BW 1550±758SD g, range 618 to 3494, GA 30.7±4.5 SD wks, range 25 to 40, study age 38±24SD days, range 2–112. Preterm infants at term PCA had lower pre feeds NSW than those born at term(30.1±5.9% vs 41.7±14.8%). After feeds NSW increased in both groups (37.9±3.8% vs 52.1±10.8%). GER babies had 35% lower NSW than controls before feeds. NSW increased 53% after feeds in GER babies vs 13% in controls. tachygastria activity was 1.4 vs 7.8% (p=0.03) pre feeds, and 6.1 vs 6.8% post feeds in GER group as compared to controls.

Conclusions: Preterm infants have less normal slow wave activity as compared to term infants which persisted up to term PCA. The response to feeds was less but similar to babies born at term. Maturation of Gastric myoelectrical activity of preterm infants with GER appears to lag behind that of infants without feeding intolerance.

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BACTERIAL COLONIZATION AND INFECTIONS OF THE NEWBORNS IN AN INTENSIVE CARE UNIT.

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Objective: The aim of this study was to review the current epidemiology of bacterial infection and colonization in our neonatal intensive care unit patients.

Methods: Data were obtained retrospectively from the charts of 530 neonates during a 1-year period. Selected clinical and biochemical parameters were evaluated. Antimicrobial susceptibility was determined in all isolates.

Results: Sixty-six infants were found to be colonized (n=42) or infected (n=24) with one hundred twenty four bacteria. 24 neonates had 32 culture-proven infections. The primary diagnoses in the premature neonates were bacteremia 16, urinary tract infections 6, while in term infants were sepsis 2, meningitis 2, urinary tract infections 5 and skin abscess 1. Twenty-one percent of infected neonates had early-onset infections. The most frequently encountered bacterial pathogens in early-onset sepsis were E. coli and Klebsiella pneumoniae while in late-onset sepsis the organisms were CoNS, E. coli and Klebsiella pneumoniae. All staphylococci epidermidis isolates were susceptible to vancomycin and teicoplanin. E. coli was susceptible to amikacin (100%), imipenem (100%), piperacillin/tazobactam (100%), ciprofloxacin (100%), and netilmicin (90%), while Klebsiella spp. was susceptible to imipenem (100%), ciprofloxacin (100%), piperacillin/tazobactam (90%), amikacin (82%), and netilmicin (67%).

Conclusion: Periodic evaluation of bacterial antibiotic susceptibility is needed in order to select the appropriate therapy according to the antibiotic sensitivity pattern of the predominant pathogens in NICUs.

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PROTON MR SPECTROSCOPY (1H-MRS) AND AMPLITUDE INTEGRATED EEG IN PREDICTING OUTCOME IN NEWBORNS AFFECTED BY HYPOXIC-ISCHEMIC ENCEPHALOPATHY (HIE)

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Introduction. Prediction of outcome in HIE could be very useful in counselling parents and selecting patients for possible therapeutic intervention. To compare the predictive performance of various diagnostic tools for identifying infants at risk of developing neurological sequelae we are performing a prospective follow-up study in newborns with HIE.

Patients and methods. Newborns fulfilling the following criteria are eligible: 1)GA >=38 wks, 2) heart rate abnormalities during labour and/or meconium stained amniotic fluid and/or need for birth resuscitation, 3) 5 min AS <=5 or umbilical artery pH <=7.1 and BE >12 mmol/L. Clinical data were recorded; amplitude integrated EEG (aEEG), EEG, cranial US, 1H-MRS were performed in the neonatal period. Evaluation of general movements, physiatric examination, visual evoked potentials and ABR are scheduled at 3 months of age; psychomotor development (Griffith test) and Dubowitz examination are performed at 3, 6, 12, 24 months of age.

Results. In one year 24 newborns were recruited. In 13 of them follow-up at 6 months is available; 8 newborns are under 6 months, 3 were lost at follow-up. N-acethyl aspartate/Creatine (NAA/Cr) at basal ganglia level in the first 24 hrs of life decreased in newborns with motor impairment (MI) compared to newborns without MI (0.77 vs 0.82, p> 0.05); moreover NAA/Cr showed a good correlation with developmental quotient (DQ) (r=0.88, p>0.05). At 1 week of age NAA/Cr was 0.3 in newborns with MI vs 0.86 in newborns without MI (p<0.01); there was a correlation between NAA/Cr and DQ (r=0.86 p=0.015). Grade HIE, aEEG and US anomalies were also associated with MI (p<0.05); in particular aEEG had a 100% sensitivity and specificity in early identifying newborns with MI.

Discussion: These preliminary data show that Sarnat grading, aEEG and 1H-MRS performed together in the first 24 hours of life can predict outcome in HIE.

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IS HYPOXIA INDUCED ERYTHROPOIETIN (EPO) RELEASE A MEDIATOR OF PRECONDITIONING IN THE NERVOUS SYSTEM?

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Background: Erythropoietin has been implicated in the mechanisms of ischemic tolerance or preconditioning. It has been shown, experimentally, that the EPO/EPO receptor system might serve as an endogenous system to protect brain cells from damage caused by intermittent episodes of hypoxia. In addition, it is known, that after perinatal asphyxia, EPO levels are increased. Our hypothesis was that increased EPO levels at birth, as a result of a perinatal hypoxia insult, might activate endogenous protective mechanisms and potentially lessen the impact of subsequent, more severe insults.

Objective: The aim of this study was to assess if there was any association between EPO levels at birth and early neurological outcome. Moreover, to see if exogenous EPO administration has an additional effect on this issue compared to controls.

Methods: This study is a part of a controlled randomized study of EPO administration in premature neonates, early after birth, for the anemia (AOP). In 75 neonates, EPO levels have been measured in the first day of life. Cranial ultrasonograms and neurological examinations were recorded through the whole hospitalization period.

Results: The neonates according to EPO values were divided in 2 groups: EPO levels>50mU/ml (n=12, 135,7±75,78) and EPO levels<50mU/ml(n=63, 10,74±9,32). Cranial ultrasound lesions, (stage III IVH, and parenchymal involvement), detected early in life, were significantly fewer (p=0,04) in neonates with high EPO values compared to neonates with low EPO values. Although all neonates in the former group had a perinatal history of PROM either chorioamnionitis or IUGR, the difference was not significant compared to the perinatal history of the neonates with low EPO levels. Of the 75 neonates 47 were EPO treated and 28 controls. There was not any difference in early neurological outcome between them.

Conclusion: It seems that high EPO levels at birth, probably, as a result of a perinatal insult may have an association with early neurological outcome. rHuEPO treatment in doses for (AOP) has not any effect in early neurological outcome. Imitation of brain endogenous mechanisms may be the key to future successful approaches to neuroprotection.