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INFUSION RATE OF GLUCOSE IS THE MAJOR PREDICTOR OF HYPERGLYCEMIA IN VERY PREMATURE INFANTS RECEIVING TOTAL PARENTERAL NUTRITION

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Background: Hyperglycemia occurs frequently in very premature infants receiving total parenteral nutrition (TPN). Commonly, the glucose infusion rates in TPN exceed the patient's glucose needs. In adult intensive care patients, accompanying hyperglycemia was associated with increased mortality. Since premature infants also represent a high-risk population, preventing hyperglycemia while providing sufficient energy intake may likewise reduce the risk of an adverse outcome. **Objective:** To determine whether hyperglycemia in infants receiving standard TPN is primarily due to differences in their ability to suppress hepatic glucose production when presented with a high rate of exogenous glucose or to failure of the infant's disposal rate to match the intake. **Design/Methods:** 11 clinically stable infants (962±49 g; 26.7±0.4 wks) were studied on day 4±1 of life while receiving TPN as ordered by the attending physician. Glucose production rate (GPR) was measured during an 8 h period of stable blood glucose using isotope dilution of [6,6-²H₂]glucose. Multiple regression analysis was used to determine the effects of infusion rate of glucose, lipids and amino acids, residual GPR, gestational age and birth weight on blood glucose concentration.

Results: Range and median (within parenthesis) for each parameter: Blood glucose 5.3–12.6 (7.1) mM; Total glucose appearance rate (Ra) 8.9–13.1 (10.9) mg/kg min of which glucose infusion was 7.3–11.3 (9.5) mg/kg min and residual GPR 0.1–1.5 (1.4) mg/kg min; Infusion rate of lipids was 0.6–2.7 (2.1) mg/kg min and of amino acids 1.6–2.2 (2.0) mg/kg wks. Glucose Ra explained 58% of the variation in blood glucose concentration ($p<0.007$), of which the glucose infusion rate accounted for the major part, 49% ($p<0.02$) and GPR for only 9% ($p<0.05$); gestational age explained 9% while infusion rates of amino acids and lipids, and birth weight did not affect blood glucose concentration. GPR was suppressed by 80% (assuming a normal glucose turnover rate of 6 mg/kg min).

Conclusion: In premature infants receiving TPN, the infusion rate of glucose is the strongest predictor of hyperglycemia, while residual GPR and gestational age have marginal impact. A potential clinical implication of these results is that a reduction of the glucose infusion rate while maintaining adequate supply of lipids and amino acids will reduce the incidence of hyperglycemia without compromising energy and protein balance. Grants: NIHRO1-HD37957-05; GCRNIHHO1-RR-001888.

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SIDS PREVENTION IN POLAND – IS IT EFFICIENT? THE EVALUATION OF SIDS RISK FACTORS APPEARANCE IN WARSAW DISTRICT

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Background: Sudden Infant Death Syndrome (SIDS) is sudden, inexplicable death of an infant or young child, which causes are unknown. It is also one of the most common causes of infant deaths in the postneonatal period. The risk factors SIDS include prone sleep position, parental smoking, co-sleeping and overheating are currently well – known. A great world-wide campaign have been undertaken to improve parent's knowledge and to decrease the appearance of the risk factors and SIDS. The aim of our study was to determine if the information movement has been effective enough among the population of Warsaw district.

Methods: We compared the appearance of four controversial risk factors (prone sleep position, parental smoking, co-sleeping and overheating) in populations of parents in 1998/99 and 2002/03. A random selection of 202 parents of infants born between 06.1998 and 05.1999 and 207 parents of infants born between 06.2002 and 05.2003 in the Obstetric Department of the Central Teaching Hospital MSWiA in Warsaw were examined. Both groups of parents were twice interviewed with a questionnaire – just after their child birth and six months later (120 parents answered the second questionnaire in 1998/99 and 136 in 2002/03).

Results: The number of mothers who smoked during the pregnancy and the first six months of child life rose up from 9,7% in 1998 to 28,1 in 2002, the total number of infants exposed to one or more adults smoking in the home increased from 50,2% in 1998 to 65,2 in 2002. Placing the children on their backs to sleep was more common in the group of parents examined in 2002 (27,5% vs 8,5%), while less of them are eager to define children's sleeping position as "changeable" (15,75% vs 53,5% in 1998). In 1998 81% of infants regularly co-slept with their parents, and in 2002 – 75%. The temperature >200C was in 64% infant's room in 1998 vs. 50% in 2002.

Conclusion: In some areas the campaign has achieved a success (prone sleep position was reduced). Co-sleeping and overheating are similar in both studied groups. Smoking remains a significant health issue with an impact on SIDS, and in 5 years period its appearance increased. Our data suggest that parents have got an unsatisfied knowledge about some risk factors of SIDS. Great efforts are needed to promote to reduce the risk factors among parents and pediatricians. Especially we should endorse non-smoking behavior.

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FOREGOING OF TREATMENT OF CRITICALLY ILL NEWBORN INFANTS

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Background: Improvements in diagnostics and treatment have made it possible to save more premature and critically ill infants as well as infants born with severe congenital anomalies. However, some of these children often develop complications with a poor prognosis both for survival and for later quality of life. An active decision to withdraw treatment is a common practice in such cases. Little is known about the impact of this problem in neonatal care in Norway.

Methods: The records of 178 infants died in the NICU during the period 1990–1999 were reviewed and analyzed in the following groups: death in spite of full treatment, death because of active withdrawal of treatment, and death after palliative treatment. It was also evaluated to what extent the parents were involved in the decision process, and how the process was documented in patient records.

Results: A total of 4.647 infants were admitted to the NICU during the study period. On average 3.8% of these infants died, the death rate was significantly higher in the early study period. Death after withdrawal of treatment was identified in 65% of the infants who died. Death in spite of full treatment was seen in 19%, and 17% of the infants died after palliation, almost half of them with pharmacological support. Withdrawal of treatment was seen significantly more often in the early study period (74%). Death after withdrawal of treatment was seen in 74% of the deaths of critically ill immature and premature infants (74%), and in 45 of infants with severe malformations. In 9 term infants who died after severe birth asphyxia, treatment was withdrawn in 7 infants (78%). The process of withdrawing treatment was usually started by decisions made by the medical staff. The parents were usually involved in the decision process, and an agreement on treatment strategy was usually obtained. In three cases the parents demanded treatment to be continued, which was respected. All infants later died. The documentation of the decision process in the medical records was only regarded as satisfactory in 50% of the deaths, and in 13% of the records the documentation was considered totally inadequate. The official guidelines regarding the demand for record documentation of a decision of not to resuscitate a patient was only met in a few cases.

Conclusion: Also in Norway the majority of deaths in critically ill newborns seems to be the result of withdrawal of treatment. On this background, the ethical, legal and practical implications probably need to be reviewed.

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NEONATAL OUTCOME OF NEWBORNS BORN IN UNIVERSITY HOSPITAL IN POZNAN (1999–2002) AFTER ASSISTED REPRODUCTIVE TECHNOLOGY

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Background: Assisted reproduction is one of the major achievements of present medicine giving infertile couples the chance of having a baby. In spite of many ethical doubts at the time the method of assisted reproduction was introduced, it seems that it gained public acceptance as an effective, therapeutic method and the number of conceived children increases systematically and reaches hundred of thousands world-wide now. **Purpose:** of this study was to analyze the outcome of the neonates born after assisted reproductive technology (ART).

Methods: In 34 women delivering after ART, we analysed age, civil status, educational level and maturity of the neonate, birth weight, Apgar score, duration of hospitalisation, mortality and congenital malformations.

Results: Mean mother's age at delivery was 34±5 and 41% of them were > 35 years old. 38% of women had university education. There were 25 singleton pregnancies (73.5%), 7 twin pregnancies (20.6%), and 2 triple pregnancies (5.9%). Caesarean section was performed in 70.5% of pregnancies. Term neonates were delivered in 96% of singleton pregnancies and 44% of twin pregnancies. Totally, preterm delivery occurred in 41%. There were 45 neonates, 22 boys (49%) and 23 girls (51%) with mean gestational age 36±2 weeks and birth weight 3361±524grams. Median Apgar score at 1st minute was 9 and at 5th minute 10 points. The prevalence of LBW neonates was 36% and 11% of VLBW neonates. 3 (6.7%) extremely immature neonates from multiple pregnancies died. 5 neonates had respiratory distress syndrome (11%), 3 had broncho-pulmonary dysplasia (6.7%), 3 had intraventricular haemorrhage grade III (6.7%), 1 had posthemorrhagic hydrocephalus (2.2%) and 1 had retinopathy of prematurity (2.2%). 1 neonate (2%) with anencephaly died. Neonates were discharged home at mean 11.0±18.8 days. Those from singleton pregnancy stayed in hospital approximately for 5.6±6.3 days and from multiple pregnancy for 19.5±27.4 days.

Conclusion: In our material, majority of women giving a birth after ART were older than 35 and were well educated. High rate of preterm deliveries due to multiple pregnancies seems to be the main reason of high incidence of neonatal mortality and morbidity. We agree that there is a need for very precise regulations concerning the number of replaced embryos after ART as well as regarding the process of embryo freezing. In our opinion avoiding multiple pregnancies would definitely improve the overall neonatal outcome after assisted reproductive technology.

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UREAPLASMA UREALYTICUM INFECTIONS IN PREMATURE INFANTS - EXPERIENCE FROM POZNAN, POLAND

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Background: Ureaplasma urealyticum (Uu) infections may cause sterility, infertility, preterm labor and stillbirths. Infants' infection with Uu is associated with a higher incidence of pneumonia and high risk for broncho-pulmonary dysplasia. The aim of the study was to determine whether the vaginal Uu colonization has an impact on fever, increase of the C-reactive protein level, and leucocytosis of the pregnant women. We also study histopathologic findings of the placenta and the occurrence of Uu colonization in newborns from the mothers with positive Uu cervical swab.

Methods: The study group consisted of 39 Uu positive women who delivered infants <30 weeks of gestation in the University Hospital at Poznań. They were compared to 65 women with negative Uu culture. Tracheal aspirate was taken from neonates at the first 2 hours and at 7th day of life. Culture and identification of Uu were performed with the Mycoplasma IST test. Afterwards, the placenta was examined histologically.

Results: Of Uu positive women, 22% manifested the symptoms of the infection (fever, increase of the C-reactive protein level, and leucocytosis). There was no difference in the occurrence of premature rupture of membranes and the frequency of vaginal delivery between the Uu positive and negative group of the women. The Uu was more frequently isolated from tracheal aspirate of neonates born to colonized women when compared to Uu negatives women (44% vs. 5%) ($p<0.05$). The infants of Uu positive mothers had lower mean birth weight (1103 ± 211 g vs. 1400 ± 239 g) ($p<0.01$) and higher mortality rate (17.6% vs. 4.5%) ($p<0.05$) when compared with the mothers without Uu colonization. The occurrence of late Uu infection was 9.5%. In the group of infants with confirmed congenital infection the inflammatory process of placenta was stated in 83.3% while in the group of healthy newborns the infection of placenta occurred in 13.3% ($p<0.005$).

Conclusion: Our findings support the hypothesis that maternal Uu colonization may proceed asymptomatic, without fever, increase of C-reactive protein or leucocytosis. Neonatal infection due to Ureaplasma urealyticum is often connected with the inflammatory processes in placenta presented in the pathological examination. In our study, preterm neonates <30 weeks of gestation were at high risk of the infection when born to mothers positive for Uu. The isolation of Uu from tracheal aspirate was associated with an adverse outcome of the neonates.

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C-REACTIVE PROTEIN IN THE NEONATAL URINE AT BIRTH

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Background: Previous studies reported that C-reactive protein (CRP), an acute phase protein, is present in amniotic fluid (AF) and fetal urine. Elevated AF-CRP levels have been associated with adverse pregnancy outcome such as preterm delivery and neonatal infection. Although it is known that adult kidneys normally do not excrete CRP, it has not been investigated whether there is CRP urine excretion immediately after birth. Therefore, we have conducted a study to explore if early neonatal urine contains CRP.

Methods: Consecutive newborns admitted to the neonatal intensive care unit were included in the study. Urine samples were obtained in the first week of life using sterile cotton flock. After centrifugation of the flock, CRP was collected in sterile tubes and sent immediately to the laboratory. Urinary CRP was measured with a commercially available ELISA kit. The sensitivity of the assay was 0.39 ng/mL (inter-assay coefficient of variation: 6.5%). The urinary CRP values were normalized for the urinary creatinin content of every single probe. Spearman correlation was used for statistical purposes.

Results: Urinary CRP was measured in 83 infants. Mean gestational age at delivery and birth weight was 33±4.3 weeks and 1907±945 grams, respectively. A total of 66 (78.6%) neonates were delivered preterm (<37 weeks gestation). Neonatal urine was collected at a median (range) day of life of 2 days (1–7). CRP was found in all samples. The median (range) concentration was 8.07 ng/ml (0.08–929) ng/mL. A significant correlation was found between urinary CRP concentration and both gestational age at delivery ($r=-0.60$, $p<0.0001$) and the days of life ($r=-0.51$, $p<0.0001$).

Conclusion: CRP is detectable in the neonatal urine at delivery and decreases during the early neonatal period. This could be explained by the progressive maturation of the neonatal kidneys. It remains to be explored whether urinary CRP measurements in neonates at high risk for an adverse outcome has a prognostic value.