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OBSTETRIC DETERMINANTS OF VASOPRESSIN (AVP) PLASMA LEVELS IN LOW BIRTH WEIGHT NEWBORN INFANTS.

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At birth plasma AVP concentrations in full-term newborns are higher than contemporaneous maternal levels and they vary in accordance with the type of delivery. We measured the variations of AVP plasma concentration at birth and at the third day of life in 10 low birth weight (LBW) vaginally delivered infants (BW 2126±430.92 g; GA 35.5±3.13 w.), and as control those of 14 full-term vaginally delivered infants (BW 3421±346.98 g; GA 40.07±0.196 w.) and of 10 healthy, full term newborns, born by caesarean section (BW 3454±354.62 g; GA 40.2±0.78 w.). AVP cord blood levels of LBW vaginally delivered infants result significantly higher (48.1±29.36 pg/ml; p<0.01) than those of full-term vaginally delivered ones (24.89±21.80 pg/ml; p<0.01). At birth AVP blood levels in both vaginally delivered groups are significantly higher than in caesarean section (Full-term 24.89±21.80; LBW 48.1±29.36 vs. 8.14±3.83 pg/ml; p<0.01 and p<0.001, respectively); they are also significantly higher if compared with AVP vaginal delivery blood levels in third day of life (p<0.001). On the contrary, there is no statistically significant difference between AVP blood levels of the vaginal delivery groups and AVP blood levels of the caesarean section group, at the third day of life (Full-term 7.09±8.45; LBW 6.3±2.90 vs. 5.15±1.73 pg/ml). In our study, the type of delivery appears an important determinant to attribute the significant increase of AVP blood levels in full-term and LBW newborns.

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PREVENTION OF HYPOXIA AND CATECHOLAMINE SURGE ASSOCIATED WITH INITIATION OF PARALYSIS BY PANCURONIUM IN PRETERM VENTILATED INFANTS. A. Greenough, J. Pool, H. Lagercrantz. Dept. of Child Health, King's College Hospital, London and Karolinska Institute, Stockholm, Sweden.

Although selective paralysis significantly reduces the incidence of pneumothoraces, initiation of paralysis with pancuronium has been associated with transient hypoxia and catecholamine surge, both of which could hazardously affect cerebral blood flow. This study investigated the effectiveness of increasing ventilator settings immediately prior to paralysis to try and prevent transient hypoxia and consequent rise in catecholamine levels resulting from hypoventilation (associated with the first dose of pancuronium). 18 infants GA 30 wks (range 26-34), <48 hrs old and ventilated for RDS were entered into the study. Peak inspiratory pressure (PIP) was increased from mean 23 cms H₂O (range 14-40) to 27 cms H₂O (range 20-43) immediately before paralysis. Comparison of arterial blood gases immediately before and 20 mins after paralysis did not detect a change in PH or PCO₂. In all infants arterial oxygenation rose post-paralysis but not significantly. Adrenaline was detected in 8 infants only with no consistent changes following pancuronium. The mean pre-paralysis noradrenaline level was 21.5 nmol/l (range 3.3-78.9). Levels were significantly reduced post-paralysis 10.2 nmol/l (range 1.7-29.9) p<0.05. These results suggest increasing PIP immediately prior to paralysis can effectively prevent the initial and transient disturbance of oxygenation and catecholamine surge previously associated with this otherwise beneficial treatment.

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FETAL BREATHING MOVEMENTS, NOT AMNIOTIC FLUID VOLUME, PRESERVE ANTENATAL LUNG GROWTH M. Blott, KH Nicolaidis, A. Greenough. Departments of Child Health and Obstetrics King's College Hospital, London SE5 8RX

Spontaneous rupture of membranes (SROM) in the second trimester of pregnancy is associated with an extremely poor prognosis in the infant, primarily due to pulmonary hypoplasia (PH) therefore parents are offered elective abortion. PH does not occur universally however, and some infants survive. In an attempt to predict in utero the development of PH, we examined by realtime ultrasonography the quality and quantity of fetal breathing movements (FBM) in 10 pregnancies complicated by oligohydramnios, due to SROM at a mean gestation of 22 wks (range 15-26 wks). The groups were similar in onset (Group A mean 22 wks, range 18-26, Group B mean 22 wks, range 15-26) and duration of oligohydramnios (Group A 5 wks range 1-10, Group B 6 weeks range 1-19). Although all the infants in Group A had respiratory difficulties attributable to prematurity, they did not have PH and they all survived. In contrast in Group B, 1 patient elected to have a termination of pregnancy and postmortem of the fetus showed PH. Of the 4 patients who continued with their pregnancies, 1 had an IUD and 3 neonatal deaths, in 3 of these postmortems were performed and PH was present. These preliminary results suggest that the presence of FBM, when oligohydramnios complicates the second trimester of pregnancy, may be a useful predictor of continuing lung growth and development.

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VEP and Hypoglycemia in Premature Infants. O. Pryds, G. Greisen & B. Friis-Hansen. Dept. of Neonatology, Rigshospitalet, Copenhagen.

Cerebral lesions in premature infants are usually found in the periventricular area, closely related to the optic tracts. Therefore, we have developed a simple set-up which allows repetitive measurements of visual evoked potentials (VEP) during the first hours of life leaving the infants undisturbed in the incubator. Stimulation by single flashes during periods of quiet spontaneous EEG activity results in distinct VEPs. In 20 "healthy" newborns (27-34 gw) the latency decreased over a few hours coinciding with the increase in core temperature and with the recovery from slight respiratory- and/or metabolic acidosis. No changes in VEPs were observed in 4 infants with arterial hypotension (m-BP down to 20 mmHg) nor in 5 infants with hypocarbia (pCO₂ down to 1.3 kPa). However, in 4 hypoxic infants (a-pO₂ down to 2.5 kPa) the latency increased and the amplitude decreased markedly. Finally, in 9 premature infants with asymptomatic hypoglycemia (0.0-1.3; median 0.7 mmol/l) no effects on VEPs were detectable. Conclusion: Repetitive investigations of VEPs immediately after birth appear to be a reliable method of monitoring the cerebral function. Only hypoxia was observed to induce marked changes in VEP and thereby in cerebral metabolism. Asymptomatic hypoglycemia, however, even when severe, did surprisingly not affect VEP.

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HUMAN TROPHOBLAST - SENSITIVITY TO GLUCOSE AND OXYGEN DEPRIVATION Vetteranta, K. & Raivio K.O., Children's Hospital, Univ. of Helsinki, SF-00290, Finland

Trophoblast uses large amounts of glucose and oxygen to meet the energy requirements of its synthetic and transport functions. We studied the effects of glucose and oxygen shortage on energy metabolism in a highly enriched population of trophoblastic cells from normal placentae, obtained with collagenase digestion and density gradient centrifugation. Intracellular adenylate (ATP, ADP, AMP) pool was labeled with ¹⁴C-adenine. Metabolic integrity was monitored with the adenylate energy charge (EC). Glucose-free medium or 100% N₂-atmosphere had no effect on EC. Inhibition of glycolysis with 2-deoxy-D-glucose (DG) caused a rapid reduction in adenylates to less than a fourth and EC to about 65% in both first and third trimester cultures. Inhibition of oxidative phosphorylation with rotenone (R) caused a slower reduction in EC (p<0.01) and in adenylates than DG in first trimester. The effect of R on EC was also less (p<0.01) in first than third trimester. R in the presence of glucose had no effect. Concl.: 1) the trophoblast is able to maintain its energy supply by glycolysis or respiration alone, 2) inhibition of ATP-production causes a profound deterioration in energy status, 3) exogenous glucose is required for glycolytic ATP-production, 4) susceptibility to hypoxia increases as a function of gestational age.

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Phenobarbital (PB) restores cerebral blood flow (CBF) autoregulation after seizures (S) in the newborn Piglet. P. MONIN, J.M. HASCOET, F. FEILLET, P. VERT. INSERM U272 UNIVERSITE NANCY1, BP3137 54013 NANCY FRANCE

CBF autoregulation is impaired after experimental S in the neonatal period; to analyse the effect of PB on this phenomenon, CBF is measured (microsphere) in the postictal period in 3 groups of newborn piglets (2 to 5 days old) following chemically induced S (bicuculline 1mg/Kg). 2 groups were treated with 20 mg/Kg of PB given either 3 minutes (grI; n=6) or 15 minutes (grII; n=6) after the onset of S; 6 animals (grIII) not treated served as controls. In the 3 groups, CBF was evaluated after a complete disappearance of S assessed clinically and on EEG. After a baseline postictal determination of CBF, 2 measurements were performed at different values of mean arterial blood pressure within the normal range for autoregulation obtained with a graded hemorrhage. Baseline postictal CBF was significantly lower in PB treated animals (grI: 59±11 ml/min/100g, grII: 56±17 ml/min/100g, mean±SD) than in control group (85±24 ml/min/100g) p < 0.01. During graded hypotension, CBF was pressure passive in the control group (r = 0.55, p < 0.04) but not in PB treated animals (groups I and II). This suggests that treatment of S with PB reduce CBF and restore CBF autoregulation providing a protection against hemorrhagic and/or ischemic brain insult.