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POSTNATAL GROWTH RESTRICTION IN VLBW INFANTS IN SPANISH NICUS. A MULTICENTRIC STUDY (SEN 1500 NETWORK).

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OBJECTIVE: To study postnatal growth restriction from birth to discharge, in VLBW infants <33 weeks admitted in all 55 NICUs of SEN 1500 Network. To study their differences related to perinatal morbidity and NICU type.

METHODS: 2317 infants were included in SEN 1500 Network during 2002–2003. Weight was evaluated at birth, at 28 days, at 36 postconceptional weeks (PCA) and at discharge. Height and head circumference progression was also evaluated. Local intrauterine growth charts were used to analyze growth and z score changes. Lineal regression analysis was used to compare changes in z score weight from birth to 28 days of life, to the 120 perinatal variables collected in the Network.

RESULTS: In this population, birth weight was 1111g (SD 238), gestational age 29 weeks (SD 2.1) and discharge age 66 days (SD 66). During the first 28 days of life weight gain was 10.7 g/day (SD 6.4). Mean Z score fall from -0.66 (SD 1.3) at birth to -2.54 at 28 days (SD 1.3) and to -3.12 (SD 1.7) at 36 weeks of PCA. At discharge, weight and height restriction (74–81% of infants <10p) was more important than head circumference restriction (32–42% of infants <10p). Using difference in weight Z scores between birth and 28th day as dependent variable, predictor variables selected by the model were: antenatal steroids, gestational age, place of birth, NICU type, CRIB score, PDA and late bacterial sepsis. These variables only explained the 14.1% of growth restriction.

CONCLUSION: VLBW infants <33 w of SEN 1500 Network have a severe extrauterine growth restriction compared to intrauterine growth patterns. This restriction is greater during the first 28 days of life. Perinatal and neonatal morbidity can explain only the 14% of this restriction. There are significant differences in growth restriction among NICUs.

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SUCCESSFUL USE OF PORCINE SURFACTANT IN A PEDIATRIC NEAR-DROWNING CASE.

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Backgrounds/Aims: The World Health Organization estimates the annual worldwide incidence of death by drowning to be about 400,000. Deaths from drowning are more common in young children, representing 27% of deaths at 1–4 years from unintentional injury in the US. Drowning victims develop hypoxaemia related to the acute lung injury as a result of surfactant disruption. The severe lung dysfunction leads to alveolar collapse, atelectasis and intrapulmonary shunting and often progresses to acute respiratory distress syndrome (ARDS). Surfactant replacement therapy has been shown to reduce mortality and complications in premature and neonates with severe respiratory distress syndrome (RDS). Administration of surfactant to adults with ARDS has received great attention and specific patients may benefit from surfactant treatment; however more studies are needed. This Case report describes our experience with a 18 months child affected by a severe ARDS from freshwater near-drowning and treated with a single dose of surfactant (Curosurf).

Methods: While she was unattended, a little 18 months girl fell in a big basin full of freshwater. Her face remained under water for 3–5 min. Her parents resuscitated her and started a basic CPR. They transported her to the nearest hospital where she was intubated and ventilated. Medical staff continued CPR and started acidosis correction, noradrenaline infusion (0.1 mcg/kg/min), antibiotics and corticosteroid therapy. Finally both pupils reacted to light. The patient had severe combined acidosis with pH 7.09, but normal electrolytes. On ICU admission, 270 min after the submersion, her GCS was 8, BP 100/60 mmHg, HR 120. A chest X-Ray showed bilateral infiltrates, subatelectasis and an increased cardiothoracic ratio. The rectal temperature was almost normal. The pulse oximetry revealed a saturation 100% with FIO2 = 1. After repeated suctioning and recruitment manoeuvres a 240 mg dose of Surfactant (Curosurf) in volume of 50 ml of normal saline was injected intratracheally during a fiberoptic bronchoscopy (mg/5ml). The ET tube was connected to the pressure controlled ventilation. The patient was also treated with antibiotics (ceftriaxone and amikacin), corticosteroids (desametasone), ranitidine, phenobarbital, fluids therapy and re-warming.

Results: The first blood gas 3 hours after surfactant administration showed PaO2/FiO2 ratio of blood gas analysis 0h (144)–3h (407), 6h (431), 12h (471), 18h (474) and chest X-Rays were checked at 6–12–18 hours and revealed a rapid improvement of oxygenation and respiratory distress. Electroencephalography and neurological evaluation were normal. An Echocardiography revealed normal ventricular function and minor ventricular septal decreased contractility.

Conclusions: The key pathophysiological feature in drowning is hypoxia. In our experience surfactant replacement had dramatically improved oxygenation. Prompt resuscitation is crucial for optimal survival: that means good neurological outcome.

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BRAIN DIFFERENTIAL GENE EXPRESSION IN NEONATAL RATS: AGE- AND GENDER-RELATED DIFFERENCES

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BACKGROUND: Neonatal rats are used as animal models for neurological and developmental studies but possible age- or gender-related changes in their genomic profile are not known.

OBJECTIVES: We tested the hypothesis that brain genomic profile could be different during the first days of life, depending on both gender and age.

DESIGN/METHODS: Differential gene expression was tested in 3 groups of male and 3 groups of female pups (n=9 for each) randomly taken from 6 litters at birth and 3 and 10 days of age, respectively. At each age/gender category, pups were euthanized (pentobarbital) and whole brain was rapidly removed for microarray processing, using a 10K oligonucleotide rat array. Measurements from 9 samples in each group were taken at all 6 design points, leading to total of 27 slides. The slides were configured with extensive dye swaps to estimate dye bias and allow for precise (direct) estimation of simple period effects for gender and age. After slide-based normalization, gene-by-gene linear mixed models with random slide effects were fit using SAS Microarray solutions software package (Cary, USA). Bonferroni correction was used to control type-I error at an alpha level of 0.05.

RESULTS: Statistically no significant differential gene expression occurred within the first 3 days after birth. At ten days of age, 45 genes were significantly up-regulated relative to birth and 21 genes were up-regulated relative to 3 days of age. No genes exhibited significant differential expression across genders up to 10 days.

CONCLUSIONS: Whole brain genomic profile in neonatal rats is significantly modified at 10 days of age, whereas it may not be affected by gender at this early developmental period. The possibility that the genomic expression in specific neuroanatomical structures, as compared with whole brain, could be either age- or gender-related at an earlier developmental period, cannot be yet excluded.

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MATERNAL PLASMA UROCORTIN I LEVELS IN PREECLAMPSIA AND FETAL GROWTH RESTRICTION PREDICT NEONATAL INTRAVENTRICULAR HAEMORRHAGE

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Urocortin I levels were measured in maternal plasma collected from women with gestational hypertension (GH; n=70), preeclampsia (PE; n=19), PE with superimposed fetal growth restriction (PE+FGR; n=15), and controls (n=70), and also in umbilical cord plasma collected at delivery from a subset of patients (Controls: n=11; GH: n=10; PE: n=11; PE+FGR: n=9). The correlation of maternal plasma urocortin measurement with the occurrence of perinatal intraventricular hemorrhage (IVH) was also evaluated. In all cases ultrasound scanning, Doppler velocimetry patterns of the uterine artery resistance index (UtA RI) and the umbilical cord artery vessels, and samples were collected before birth. Maternal levels were significantly higher in GH (P<0.05), PE (P<0.001) and PE+FGR (P<0.001) than in controls. PE+FGR had the highest urocortin levels, significantly (P<0.001) higher than PE and GH. In umbilical cord levels were significantly (P<0.0001) higher in GH, PE and PE+FGR than in controls; and significantly (P<0.001) higher in PE+FGR than in GH and PE. Concentrations were significantly (P<0.0001) higher than, and correlated to maternal levels. Eleven out of 140 patients developed IVH, giving an overall prevalence of the disease in our population of 7.14% (pretest probability). By using the cut-offs indicated by the ROC curve analysis, when mean UtA RI was used the probability of developing IVH (positive predictive value) was 28.6% (CI.95%: 0.6–56.6%), and 0% if it was not altered, respectively. By using urocortin, the probability of IVH was 66.7%, and 0% if levels were unaltered. In conclusion, urocortin I levels are increased in maternal and fetal circulation in presence of hypertensive disorders of pregnancy, and their changes are correlated with neonatal IVH.

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NEONATAL RESUSCITATION OF EXTREMELY LOW BIRTH WEIGHT INFANTS: A SURVEY OF PRACTICE IN ITALY

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Background/aims: There is a lack of information regarding the delivery room management of the extremely low birth weight infants (ELBWI). We aimed to survey the practice and the approach to the neonatal resuscitation of the ELBWIs in Italian tertiary centres.

Methods: A structured 73-item questionnaire was sent to the heads of the 86 Italian neonatal intensive care units (NICU) provided with on-site delivery.

Results: Information was obtained for 74 (86%) centres, in which 1294 (median 15; range 1–63) ELBWIs were born in year 2002. One hundred oxygen concentration for resuscitation of ELBWIs was used in 41 (55.4%) centres; in the remaining 33 (44.6%), varying oxygen concentrations (median 40%; range 21–70) were provided. The positive pressure ventilation was manually administered at 61 (82.4%) centres; at the remaining 13 (17.6%), PPV was administered by using a ventilator. Positive end expiratory pressure was routinely used at 26 (35.1%) centres and delivered tidal volumes were measured at 5 (6.7%). Forty four centres (59.5%) did not administer routinely surfactant in the delivery setting. During the year 2002, 791 (73.7%) out of 1072 ELBWIs born at the 68 responder centres were intubated at birth. In the same period, 230 (21.6%) and 93 (8.7%) out of 1061 ELBWIs born at the 66 responder centres received chest compressions and medications, respectively.

Conclusions: The practice and the approach to the neonatal resuscitation of the ELBWIs vary consistently, reflecting a paucity of evidence and consequent uncertainty among clinicians. Further prospective studies in this field are needed.

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EFFECT OF SURFACTANT ADMINISTRATION ON OXYGENATION AND OUTCOME OF NEONATES WITH CHRONIC LUNG DISEASE

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Background. There is evidence indicating that secondary surfactant insufficiency is involved in the pathogenesis of chronic lung disease (CLD).

Aim. To investigate the effect of surfactant administration on oxygenation and outcome of neonates with CLD.

Patients and Methods. 32 premature neonates with CLD were studied. Inclusion criteria were BW less than 1500gr, age 8–30 days, need for mechanical ventilation with FIO2 of at least 0.4 and radiological findings compatible with CLD. Neonates were randomly assigned into two treatment groups, the CLD-surfactant group (n=15) treated with surfactant and the CLD-control group (n=17). 2 doses of 100mg/kg of natural bovine surfactant (Survanta®) were administered every 24 hours. The primary end point was improvement in oxygenation during the first 96 hours after entry and the secondary end points were improvement in survival and reduction of duration of ventilatory support, oxygen supplementation and hospitalization. Oxygenation index (OI), A-aDO2 and a/APO2 were calculated.

Results. The two study groups had comparable BW and GA. Surfactant administration was followed by a transient non significant deterioration of oxygenation and an increase in ventilatory support, which was reduced to the pre-treatment levels in the following 3–6 hours. No significant difference in OI, A-aDO2 and a/APO2 was observed between the two treatment groups during the first 96 hours after entry. As regard to the secondary end points, no significant difference in the survival rate, duration of hospitalization and oxygen supplementation was observed, whereas the duration of mechanical ventilation was significantly less in the surfactant treated group.

Conclusions. Results of this prospective randomized controlled study indicate that exogenous surfactant administration to premature neonates with CLD at the dose regime used in this study has no significant effect on oxygenation and outcome. Different dose schedules of surfactant should be tested before any certain conclusion could be drawn.