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FEVER IN NEONATES IN NICU

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Introduction: Fever is the manifestation of the organism's defense reaction against various infectious or non infectious agents. Aim of this study is to present the final diagnosis in neonates admitted in our unit with main symptom during admission the fever.

Material and method: We studied retrospectively all neonates admitted during the last 2 years with cause of admission the fever. We referred in certain parameters such as: sex, age, level of fever, some laboratory indices(CRP, white blood count (WBC), urine, blood and cerebrospinal fluid (CSF) cultures), somministration or not of antibiotics and final diagnosis.

Results: During the 2 years period there were hospitalized 1018 neonates. 81 neonates, 48 boys and 33 girls had fever as the main admission symptom. Their age in admission was 2–29 days. All neonates were mature. Their temperature in admission was 37,2–39,9° C. Half of the neonates (40/81) had as final diagnosis a systemic infection (24 urine infection, 6 meningitis, 6 sepsis, 4 bronchiolitis) and the other half (41/81) had a viral infection. An abnormal WBC was found in 26/81 neonates (14 with systemic and 12 with viral infection). CRP was positive in 32/81 neonates (10 with systemic and 22 with viral infection). Blood cultures were positive in 16 neonates, urine cultures were positive in 24 neonates and CSF cultures were positive in 4 neonates. All of the 40 neonates with systemic reaction received antibiotic therapy. 25/41 neonates with viral infection did not receive any antibiotic therapy while 16/41 neonates received antibiotics because of the positive markers of infection. In 4 of these neonates the therapy was interrupted on the 3rd day after evaluating the clinical condition and the laboratory results of the neonates.

Conclusions: Half of the neonates with fever had a systemic infection and the other half a viral infection. 52/81 (65%) neonates received full antibiotic therapy, 25/81 neonates did not receive any therapy and in 4/81 (5%) neonates therapy was interrupted on the 3rd day. The laboratory tests in admission were indicative neither for viral or microbial infection nor for the use of antibiotics. Every neonate with fever must receive antibiotic therapy until the laboratory tests and the clinical condition are evaluated for continuing or not the therapy.

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IMPACT OF MULTIPLE BIRTHS ON LOW BIRTH WEIGHT RATE IN PORTO ALEGRE, BRAZIL

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Background: The increase on multiple births has been associated with a rise of low birth weight rates (LBW) in developed countries. In Brazil, despite the steady increase of LBW rate in some settings, there is no evaluation of the impact of multiple births on LBW rates.

Objective: To investigate the influence of multiple births on trends of low birth weight rates in the city of Porto Alegre, one of the most developed areas in the South of the country. Methods: This is a registry-based study of all live births from 1993 to 2002. The data were obtained from the SINASC (live birth information system). The Chi-Square test for trend was calculated to identify trends in LBW and multiple birth rates. The percent increase in LBW rate per year was estimated in a logistic regression model taking LBW as the dependent variable and year as the independent variable. The impact of multiple births on LBW trends was assessed by extending the former logistic regression model, including adjustment for multiple births.

Results: A total of 230,615 live-births were included. The LBW rate increased steadily from 9.2% to 10.3 ($p<0.01$) and the multiple birth rate rose from 1.7% to 2.3% ($p<0.001$). The LBW rate increased by 7.6 percentage points among multiple births ($p<0.05$) and by a 0.7 percentage point among singletons ($p>0.05$). The low birthweight rate increased 0.9% per year. When adjusted for multiple births the increase in the low birth weight rate was 0.7% per year, implying that multiple births accounted for 20.5% of the increase in the low birth weigth rate over the period.

Conclusion: LBW rate increased significantly. This rise was greatly influenced by a simultaneous increase in multiple births, linked to the widespread introduction of new reproduction technologies.

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DIFFERENCIAL DISTRIBUTION OF CELL DEATH IN HYPOXIC-ISCHEMIC BRAIN INJURY IN PRETERM LAMBS

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The brain damage produced during the hypoxic-ischemic event is one of the major causes of mortality and neurological morbidity in premature and term newborns. The aim of this work was to evaluate the distribution of cell death in the first hours after HI brain injury in fetal lambs. Fifteen near-term lambs at 80–90% of gestation were assigned to two hypoxic-ischemic groups with or without life support (3 h), and a healthy one. Hypoxia-ischemia was induced by partial cord occlusion of the umbilical cord (60min). Lambs were sacrificed and brain fixed by perfusion. Light and transmission electron microscopy, and the TUNEL method for apoptosis were performed. In both treated groups we have observed scattered neurons with necrotic changes and oligodendrocytes-like cells with apoptosis. Necrotic cells were located mainly in subcortical areas whereas apoptotic cells were placed in white and gray matter of cortical areas. Our results suggest that cell death by necrosis involves elements which participate in extrapiramidal pathway and that apoptotic cells were implicated in cortical pathway alteration. Thus, the hipoxic-ischemic injury would produce a disorder in the common final pathway and motor impairment in preterm lambs. This work has been supported by grants from Fondo de Investigación Sanitaria, Ministerio de Sanidad (FIS01/0110–2), and from the Universidad del País Vasco (1/UPV075.327-E-14885/2002 and 9/UPV00077.327–15330/2003 HILARIO).

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THE USEFULNESS OF QUANTITATIVE ULTRASOUND (QUS) MEASUREMENTS IN THE EVALUATION OF SKELETAL STATUS IN NEWBORNS AND IN CHILDREN

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This study aimed to evaluate both the feasibility and usefulness of QUS in newborns and children and the factors influencing QUS parameters. In 50 consecutive healthy full-term newborns (23 males and 27 females; gestational age: 39,2±2,0 weeks) QUS parameters were assessed within three days of birth at distal diaphysis of humerus using Bone Profiler (IGEA, Italy), after an appropriate modification of calliper and software, and after 4 years of life by the standard technique used in the children and adults. In all subjects we evaluated: AD-SoS (m/s), the characterizing graphic trace parameters (SDy, FWA and BTT), SoS (m/s), that is the speed of sound calculated on the first peak and hBTT, that is the interval time between the first peak of the ultrasound and when this reaches the speed of 1570 m/s, that is the velocity of ultrasound in the soft tissue. This latter parameter allows to measure bone tissue independently of soft tissue. QUS were also performed at phalanges on all mothers, who also self-reported a questionnaire on their obstetric history, smoking and dietary habits and family history of osteoporosis. At birth all QUS parameters were slightly higher in male than in female newborns but the difference was not significant. BTT and hBTT of newborns showed a significant relationship with weight at birth and with the cranial circumference. In newborns none of the QUS parameters was significantly influenced by maternal QUS or by maternal smoking and calcium intake. By using a model of multiple regression analysis the cranial circumference was the only parameter entered into the model, explaining about 15% of hBTT value. At the fourth year of life BTT and ADSoS showed a significant increase with respect to basal values. BTT was positively correlated with the weight ($r=0.53$; $p<0.01$). BTT values at birth, expressed as percentile, showed a significant concordance with BTT in percentile at the fourth year of life. In addition, a multiple regression analysis showed that both BTT at birth and weight at the fourth year of life were predictive of BTT after 4 years of life (R^2: 0.11; $p<0.05$ and 0.30, $p<0.01$ respectively). The present study demonstrates that the assessment of BTT at birth seems to be partially predictive of skeletal status after 4 years of life. In addition, BTT appears to be the best parameter for both evaluation of skeletal status at birth and monitoring of bone growth in the first years of life.

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INTRAVENTRICULAR HAEMORRHAGE IN VERY LOW BIRTH WEIGHT INFANTS: GENOTYPE - ENVIRONMENT INTERACTIONS

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Objective: In a newborn mouse model of brain damage induced by infusion of lipopolysaccharide and subthreshold hypoxic ischemic insult, animals bearing a loss of function mutation of the TLR4-gene were protected against the severe axonal and neuronal loss observed in wild-type animals (PNAS 100:8514–9). We speculate that intrauterine infection and polymorphisms of the innate immune system, like the CD14–159T-, the TLR4–896G and the NOD2–3020insC-polymorphism, might influence the occurence of brain lesions in preterm infants.

Methods: Genotyping of 1262 VLBW-infants (841 enrolled during previous trials, 421 enrolled between September 2003 and November 2004 in our current trial) by PCR and restriction enzyme digestion.

Results: Genotyping was successful in 1243 infants. The CD14–159C/T-polymorphism was associated with the development of IVH. Number of infants (% infants with IVH) according to genotype and intrauterine infection as the cause of preterm birth: CC no infection: 252 (11.9); CC infection: 70 (14.3); CT no infection: 510 (14.9); CT infection 152 (21.7); TT no infection: 190 (21.1); TT infection 69 (29.0). We compared infants with CC-genotype and CT genotype without infection to infants with TT-genotype and CT-genotype with intrauterine infection as the cause of preterm birth in our previous trials and found a significant difference ($p=0.003$ Fisher's exact test). We were able to confirm these data in our current trial ($p=0.03$, total $p=0.0002$, Fisher's exact test). In a multivariate logistic regression analysis including gestational age, the reason of preterm delivery and the CD14-genotype as independent and IVH as dependent variables, only the CD14 genotype (OR 1.39, 95%CI 1.1–1.7, $p=0.004$) and gestational age (OR 1.31, 95%CI 1.2–1.4, $p<0.001$) were significant predictors of IVH.

Conclusion: The CD14–159T-allele is associated with an increased rate of IVH in preterm infants.

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THE INFLUENCE OF NCPAP ON THE PROGNOSIS OF VLBW NEWBORNS WITH BPD.

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Background Treatment of bronchopulmonary dysplasia (BPD) includes oxygen, diuretics, xanthines, salbutamol and cortisone. These newborns usually present with respiratory problems and often require readmission to hospital during their first two years.

Aim We asked if nCPAP treatment affects the prognosis of VLBW newborns with BPD.

Methods 45 VLBW infants with BPD (O2>28 days, + chest x-ray) were included in the study. 27 of these, [group A: mean BW (SD) 977 (163) gr. mean GA (SD) 27.5 (1.4) weeks], were treated with nCPAP for 18 (median, range 9–34) days after the 10th day of life. They were also administered diuretics and oxygen when needed. The control (group B) consisted of 18 newborns [mean BW (SD) 1023 (218) gr. mean GA (SD) 28 (2.1) weeks], their conservative treatment, besides O2 and diuretics, included theophylline IV or PO, salbutamol and cortisone IV or in nebulizer. These infants were either not in nCPAP after the 10th day of life, or were administered nCPAP<5 days. 25 newborns from group A (A1) and 15 from group B (B1) were followed for 2 years for lower respiratory tract infections.

Results Group A were in full enteral feeding 12 (mean) days earlier than the comparison group ($P=0.023$), needed O2 3.5 fewer days (NS) and remained in hospital 8 days fewer (NS). At 12 months, 15 /25 infants of group A1 were free of respiratory problems (60%) compared to only 3 /15 infants of group B1 (20%), ($P<0.05$). At 24 months, 17 of group A1 were free of respiratory problems (68%), compared to only 4 of group B1 (26.6%), ($P<0.05$).

Conclusions The use of nCPAP treatment in VLBW infants with BPD seems to positively influence their early and late prognosis. Nasal CPAP stabilizes the alveolus and thoracic cage and this may be the reason for a better prognosis.