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ELECTIVE NASAL CPAP VS MODERN CONVENTIONAL VENTILATION IN PRETERM NEWBORN BABIES

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Background: In 2001, after reopening of the hospital maternity, it was possible to start elective nasal CPAP (EnCPAP) in preterm babies needing ventilatory support. At that time, modern conventional ventilation (MCV) - patient triggered ventilation with guarantee volume - SIPPV+GV and PSV+GV - was also started. Objective: To compare data between babies with EnCPAP and those with MCV. Kind of study: observational. Population: All preterm newborn babies born at our maternity from April 2001 thought December 2004, admitted at the NICU, without congenital abnormalities, were enrolled. Babies electively selected and exclusively ventilated with nCPAP were enrolled in the EnCPAP group; the remaining, including those selected for EnCPAP but in whom this kind of support failed, were enrolled in the MCV group.

Results: During the period of the study there were 285 illegible newborn babies; 161 needed respiratory support: 86 (53,4%) MCV and 75 (46,6%) EnCPAP. During the study period the use of EnCPAP increased from 37% to 58%. Babies under EnCPAP had higher gestational age (GA) (median 32 vs. 30w, p=0.000) and birth weight (median 1660 vs. 1298g, p = 0.000). Severity scores (CRIB, NTISS and SNAP) were significantly lower in babies under EnCPAP; also they had significant higher rate of prenatal steroids (96.3% vs. 82.9% p=0.03), lower incidence of HMD (24% vs. 68,6% p=0.000), BPD (0% vs. 8.1% p=0.03), PVL (2.7% vs 11,6% p=0.065) and pneumothorax (1,3% vs. 2.3% p= 0.9). Conclusion: Despite new and more physiologic modes of CV this continues to be an invasive treatment. Nasal CPAP is a valid alternative that should be offered to those healthy preterm newborn babies with full prenatal care.

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CONTROL OF HOSPITAL-ACQUIRED INFECTION AT A NICU

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Background: Hospital-acquired infection (HI) is one of the most important problems at a NICU. Continuous surveillance and prompt intervention to correct practices are the best way to decrease rates. Objective: To report monitoring and results of HI at a NICU. Patients and Methods: All newborns admitted are enrolled during all staying; a form is filled in describing kind of infection, microorganisms and resistance. Audits are done every 6 months or punctually if any anomaly is found. Results: From 2000 to 2004 infectious episods/1000 days of hospitalisation and /100 admitted babies decreased respectively from 19.3 to 7.7 and from 28.4 to 13.8; pneumonia/1000days of ventilation has varied from 1.7 in 2000 and 3.8 in 2001 but during 2004 increased to 9.1; septicaemia/1000 catheter days decreased from 18.5 in 1995 to 6.8 in 2000 and has varied between 0.9 and 3.8 from 2001 to 2004. Staphylococcus coagulase negative infection in VLBW babies decreased from 12.2% in 2002 to 4.3% in 2004.

Conclusion: The policy of prospective reporting of nosocomial infection has shown to be very useful allowing decreasing almost all items evaluated.

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EFFECTS OF INHALED ILOPROST AND NITRIC OXIDE ON CARDIAC FUNCTION AND TISSUE OXYGENATION IN PRETERM SHEEP WITH RESPIRATORY DISTRESS SYNDROME.

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Background: Respiratory distress syndrome (RDS) may be associated with pulmonary hypertension. We hypothesized that inhaled iloprost, a prostacyclin analog, decreases pulmonary vascular resistance and improves cardiac function and tissue oxygenation in preterm sheep with RDS.

Objective: Evaluate dose-related effects of inhaled iloprost on cardiac index, systemic and cerebral tissue oxygenation in preterm sheep with surfactant-treated RDS.

Design/Methods: Nineteen surfactant-treated preterm sheep (125 gestational days) on mechanical ventilation were randomized to increasing doses of inhaled iloprost (0.2 to 4 mikrog/kg/30 min, n=9 ILO) or inhaled saline (n=10,SAL). Five sheep in each group received inhaled nitric oxide (iNO) after iloprost. Cardiac index (CI) was measured by transthoracic echo-doppler cardiography and cerebral tissue oxygenation index (TOI) by near infra-red spectroscopy (NIRS). Right ventricular pressure was measured with a balloon catheter (4-F). Pre- and postductal arterial blood pressure and blood gases were measured

Results: In the saline- treated group, cardiac index decreased from mean (SD) 5.0 (0.6) to 3.5 (1.2) p=0.004, and cerebral TOI from 53 (9) to 37 (14) %, p=0.027. Sheep receiving 0.2–4 mikrog/kg/30 min, maintained their cardiac index, from 4.5 (1.1) to 3.5 (1.2) and cerebral TOI from 42 (15) to 42 (11). Inhaled NO (40 ppm for 15 min) caused an immediate increase in mean CI (3.6 to 4.6, p=0.001) and mean right coronary blood flow (15.3 ml/min to 28.6 ml/min, p<0.001). Oxygenation improved in all iNO-treated, mean arterial saturation 74% to 95% (p=0.017) and mean cerebral TOI 38 to 48 (p= 0.04).

Conclusions: Inhaled prostacyclin stabilized cardiac function and tissue oxygenation in a sheep model of preterm RDS. Treatment with inhaled NO significantly improved cardiac index and tissue oxygenation at varying degrees of pulmonary hypertension. This suggests that preterm RDS is associated with increased pulmonary vascular resistance.

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EFFECT OF DELAYED WHOLE-BODY COOLING TO 33°C OR 35°C AFTER TRANSIENT CEREBRAL HYPOXIA-ISCHAEMIA IN THE NEWBORN PIGLET

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Background: Although delayed cooling after transient perinatal cerebral hypoxia-ischaemia (HI) shows great therapeutic potential in clinical and experimental studies, fundamental questions remain about the optimal cooling temperature and mode of cooling. Aims: To investigate: (i) the effect of delayed cooling at 33°C or 35°C on the evolution of secondary energy failure (SEF) (ii) the relationship between cerebral energy metabolism during SEF and neuronal death.

Methods: Piglets were randomised to: (i) HI-normothermic rectal temperature (T) (n=12), (ii) HI-T35°C (n=7), and (iii) HI-T33°C (n=10). Groups (ii) and (iii) were cooled to the target rectal temperature between 2–26 hours following HI. Serial global phosphorous magnetic resonance spectroscopy was used to assess SEF over 48 hrs. At 48 hrs the brain was perfusion fixed and dead neurons assessed in the cortex and deep grey matter. The effect of cooling on SEF (indexed by the nucleotide triphosphate/exchangeable phosphate pool ratio (NTP/EPP)) was assessed using a linear model, which incorporated a random effect for each subject and fixed effects for groups.

Results: The cooled groups had significantly higher NTP/EPP than the normothermia group; HI-normothermic mean (95% CI) NTP/EPP was 0.131 (0.118, 0.144); HI-T35°C 0.149 (0.136, 0.162); HI-T33°C 0.149 (0.136, 0.162) (p= 0.032 for HI-T35°C; p=0.044 for HI-T33°C, both vs normothermia). There was no difference in NTP/EPP between HI-T35°C and HI-T33°C (p=0.996). Minimal NTP/EPP 36–48 hours after HI was linearly correlated with neuronal death in cortical and deep grey matter (p<0.05).

Conclusions: Compared to normothermia, delayed whole body cooling (33°C and 35°C) ameliorated global SEF. No advantage in global cerebral energy metabolism was detected with cooling to 33°C compared to 35°C, however further work is required to assess whether there is regional variation in the optimal brain temperature for neuroprotection. Minimal NTP/EPP during SEF correlated with neuronal death.

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NASAL CONTINUOUS POSITIVE AIRWAY PRESSURE FACILITATES EARLY NEONATAL BACK TRANSFER

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Introduction: Neonatal networks and dedicated intensive care retrieval systems are evolving in the United Kingdom. Early back transfer to step-down level 2 units (as defined by the British Association of Perinatal Medicine [BAPM]) could facilitate more efficient use of tertiary level intensive care cots. Use of nasal continuous airway pressure (nCPAP) during neonatal transportation may allow earlier back transfer of nCPAP dependent babies who would otherwise have to remain at a tertiary centre. **Aim:** To examine the feasibility of nCPAP for transfer of nCPAP dependent babies to referral units. **Methods:** In a prospective study between July 2003 and October 2004, we used nCPAP as a means of respiratory support for nCPAP dependent infants during neonatal back-transfer to base/home hospitals.After two weeks, a telephone enquiry was made to each accepting unit to ascertain if any clinical deterioration had followed transfer. We compared the study group with an historical cohort of nCPAP dependent infants who had to wait until they were no longer fully nCPAP dependent before undergoing transfer.

Results: Forty one infants in the study group were compared with 58 historical controls. Median (IQR) gestational age was 26 (25–28) weeks and 27 (25–29) weeks respectively, p=0.6. Infants transferred on nCPAP were significantly smaller and younger; at time of transfer, median (IQR) weight was 920g (739–1073g) vs 1128 g (832-1650g), p value< 0.001 and post menstrual age was 29 (28–31) weeks vs 32 (30–35) weeks, p< 0.001.The group transferred on nCPAP spent significantly less time in our neonatal unit: 8 (3–12) days vs 15 (6–33) days, p<0.01. There were no reports of clinical deterioration that could be attributed to the timing or mode of transfer.

Conclusion: Transfer of selected small infants using nCPAP appears to be practical and safe and could increase intensive care cot availability.