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### COMPARISON OF CLINICAL OUTCOMES OF TWO SUBPOPULATIONS OF VLBW NEWBORNS: VON VS. NEOCARE

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**Introduction:** Vermont Oxford Network (VON) is well recognized North American neonatal database, which exists since 1991. The first Polish neonatal database (NeoCare) has been created in 2001 in the two western regions: Wielkopolska and Lubuskie. Aim: To compare neonatal outcomes of newborns with birth weight below 1500g from NeoCare with those from VON.

**Method:** NeoCare Basic Information Sheet (NeoCare BIS) was used to collect data on all neonates born in Wielkopolska and Lubuskie in 2001. Audited data were gathered from 53 hospitals linked into the level III perinatal care system in the region. Non-parametric statistics were used to compare interventions or outcomes between the two databases. In order to compare similar populations, only newborns with birth weight below 1500g were chosen from NeoCare.

**Material and Results:** There were born 39064 neonates in 2001 and reported in NeoCare. Out of them 465 were below 1500g (1.19%). There was significant statistical difference noted in the percentage of infants born in the tertiary unit, in the percentage of use of Hi Frequency Ventilation and in the mortality rate in favor of VON (table).

**Conclusions:** These data support the goal of decreasing the number of deliveries of VLBW infants in level I and II hospitals by 'in utero' transfer to the single level III facility within the region, when possible. Higher mortality rates in the NeoCare cohort is probably associated with a greater risk of congenital malformations in the Polish population at birth perhaps because of the limitation on pregnancy termination within this population compared to the VON sites in North America.

| Birth weight | | 501–1500 g | |
|---|---|---|---|
| | No.30032 VON % | No.465 NeoCare % | p |
| Born at level III | 84 | 67,5 | 0,0000 |
| IMV | 72 | 66,9 | 0,0173 |
| HiFi Vent | 24 | 1,1 | 0,0000 |
| Home | 72 | 50,5 | 0,00000 |
| Transfered to hospital | 14 | 22,4 | 0,00000 |
| Death | 14 | 23,4 | 0,00000 |

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### DETECTION OF BASAL GANGLIA INJURY BY EARLY USE OF AMPLITUDE INTEGRATED EEG IN NEONATAL ASPHYXIA

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**Background:** The value of amplitude integrated EEG (aEEG) for early diagnosis of perinatal brain injury in fullterm asphyxia has been extensively studied. However, most studies have focused on the global aspect of the tracing: continuous normal voltage, discontinuous intermittent low voltage, burst suppression, very low voltage or inactive flat tracing. These scoring systems are based on qualitative assessments. We were interested in the measurement of some quantitative more objective discrete parameters reflecting amplitude and frequency variations.

**Aims:** To evaluate changes of discrete electrophysiological parameters, obtained through the analysis of the aEEG in fullterm asphyxiated infants. Methods: Between May 2004 and April 2005, 12 term infants with perinatal asphyxia were included. Asphyxia was defined by an Apgar score <6 at 5 minutes, or metabolic acidosis with cord pH<7 or base excess <-10. EEG electrodes were placed bilaterally at the C3, C4, P3, and P4 placement according to the modified international 10–20 system (Hydrospot® neonatal electrodes, Physiometrix Inc, North Billerica, MA) and applied with minimal skin preparation within 6–10h of birth. The aEEGs were recorded continuously during 24–72 hours on the REBRM3 (research BRM, Brainz Instruments Ltd, Auckland, NZ). The EEG amplitude, intensity and spectral edge measurements were averaged and stored to disk at 1-minute intervals. The averaged signals were analysed off-line using customized software (Chart analyser, Brainz Instruments). The distribution of the median parameters, analysed separately for each hemispheric recording, were compared in the infants with or without brain injury evidenced by advanced MRI. Functional outcome was measured at 43 wks by a specialized assessment scale of infant behavior (APIB).

**Results:** 6 infants were excluded due to technical problems in the recordings. Among the 6 remaining patients, 2 exhibited basal ganglia lesions on MRI and 4 had a normal brain MRI. The minimal value of aEEG (aEEG min) and the spectral edge frequency in the bursts (SEFb) were analysed during the first hour of the recording, then 12 hours and 18 hours after the beginning of the recording .The results were compared between the group of patients with brain lesions and the group of patients without lesions. There was a statistically significant difference in the measurement of aEEG min (1.52mV1 +/-0.7 vs 7.4mV1 +/-3 p= 0.004), and SEFb (5.03 Hz+/-2.5 vs 12.2 Hz +/-7 p=0.001) during the first hour of the recording comparing infants with MRI evidence of basalganglia lesions to infants with no lesions . The measurements at 12 hours and 18 hours did not differ significantly. Behavioral assessment (APIB) showed significantly less mature scores in the attention-interaction capacity and in the autonomic reactivity in the group of patients with lesions (p<0.05).

**Conclusions:** These preliminary results obtained on a small group of infants suggest that monitoring with aEEG and measurement of aEEG min and SEFb in the first 6–10 hrs of life after perinatal asphyxia may enable to detect brain injury to the basalganglia in term newborns. Whether these results are specific to basal ganglia lesions needs to be studied more extensively. Nevertheless these findings stress the importance of early electrophysiological monitoring after asphyxia, in order to offer better guidance to the primary caregivers.

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### GASTROINTESTINAL OUTCOMES IN A RANDOMISED CONTROLLED TRIAL OF PRE-EMPTIVE MORPHINE ANALGESIA IN PRETERM INFANTS

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**Objectives:** To study the gastrointestinal (GI) side-effects of morphine and the epidemiology of feeding and GI morbidity in preterm infants.

**Background:** Morphine slows gut motility, a key to the advancement of enteral feeds in preterm infants. Morphine may thus increase the risk of meconium inspissation and necrotising enterocolitis, and of complications related to parenteral feeding.

**Methods:** A post-hoc analysis was done of babies in the NEOPAIN trial, a double-blind. randomised controlled trial of pre-emptive morphine (M) or placebo (Pl) in ventilated preterm infants. A loading dose (100$\mu$g/kg of morphine) was followed by an infusion for up to 14 days at a gestation-dependent dose (10–30$\mu$g/kg/hr). Open-label morphine bolus (A) could be given if clinically indicated.

**Subjects:** There were 449 babies in each group. The gestations in weeks (median, range) were: 27, 23–32 for both groups. Birthweights in grams (median, range) were: M 984, 452-2030; Pl 985, 420-2440. The number of babies receiving A (no., %): M 201, 45; Pl 242, 55.

**Results:** Group M was later at starting feeds [S] (median, quartiles): M 5, 3–8; Pl 4, 2–7; P=0.02, and attaining full feeds [F]: M 20, 13–29; Pl 17, 12–26; P=0.003. There was a weak correlation between total dose of morphine (TDM) and these outcomes: for S rsq.=0.12, P<0.001; for F rsq.=0.07, P<0.001. There was no relationship between morphine and GI complications (necrotising enterocolitis or intestinal obstruction): M 9/449, Pl 8/449; Chi sq. P=0.81. On multivariate analysis, S was independently associated with centre (P=0.03), the use of an umbilical venous catheter (P<0.001) and TDM (P<0.001), and F with birthweight (P=0.005), hypotension (P=0.04), Neonatal Medical Index (a morbidity score, P=0.001), and TDM (P=0.001).

**Conclusions:** Morphine delays the attainment of full enteral feeds, but does not increase GI complications. Ages of starting and full feeds are associated with morphine dose, but are influenced by several other factors.

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### DELIVERY ROOM INTUBATION, MECHANICAL VENTILATION AND BRONCHOPULMONARY DYSPLASIA AMONG TERTIARY-LEVEL NEONATAL UNITS IN NORTHERN ITALY

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**Background:** Bronchopulmonary dysplasia (BPD) remains a significant complication of prematurity, and wide variations of BPD rates in different neonatal units have been reported. These differences have been ascribed to different practices, especially in mechanical ventilation.Since mechanical ventilation is often started in the delivery room (DR), we wanted to investigate if different approaches to DR intubation affected the development of BPD.

**Methods:** We examined a cohort of 1338 newborns, with birthweight < 1500g (mean 1086 g) and gestational age < 32 weeks (mean 28.7 weeks), admitted to 12 tertiary-level neonatal units in Lombardy (Northern Italy) participating in a local network in 1999–2002 and surviving to 36 weeks; 226 (16,1%) developed BPD defined as oxygen need at 36 weeks.

**Results:** BPD rates significantly differed between hospitals (from 8.5% to 27.7%), as well as rates of intubation in the DR (from 28.8% to 73.6%), and rates of mechanical ventilation (from 32.2% to 84%). Centers with high intubation rates had higher ventilation (R2 = 0.7, linear regression analysis) and higher BPD (R2 = 0.35) rates. In univariate analysis, intubation in the DR was associated with increased risk of BPD (odds ratio 5.9), while surfactant administration did not affect BPD.Differences in individual infants characteristics (GA, BW, antenatal steroids, CRIB score) did not explain the differences in intubation rates across centers. Differences between centers were highly significant (P<0.001, logistic regression)

**Conclusions:** These results support the hypothesis that differences in initial management of VLBWI between hospitals partly explain differences in BPD, and that these differences are not explained by case-mix, but probably by different policies of treatment. Moreover, this enlights the problem of a wide variation in practices, that deserves further investigation. In these situations, potentially better practices, including a more selective approach to the endotracheal intubation in the DR, could achieve better clinical results.

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### DELAYED CORD CLAMPING IN VERY LOW BIRTHWEIGHT INFANTS REDUCES THE INCIDENCE OF INTRAVENTRICULAR HEMORRHAGE AND LATE ONSET SEPSIS

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**Background:** The current prevailing obstetrical practice at birth in the USA is that the umbilical cord of the very low birth weight (VLBW) infant is immediately clamped. The aim of this study was to compare the effects of immediate (ICC) and delayed (DCC) cord clamping on infants born between 24 and 31.6 weeks on two primary outcome variables: bronchopulmonary dysplasia (BPD) and suspected necrotizing enterocolitis (NEC). Secondary outcome variables were blood pressure, hematocrit, late onset sepsis (LOS), and intraventricular hemorrhage (IVH). The hypothesis was that DCC would result in less BPD and suspected NEC.

**Methods:** This was an unmasked randomized controlled trial in which women in labor with infants between 24 and 31 weeks were randomized to ICC (cord clamped at 5 to 10 seconds) or DCC (30 to 45 seconds) groups. DCC infants were held 20–30 cm. below the introitus as possible. The exact time of cord clamping was measured. All neonatal care was at the discretion of the attending physicians.

**Results:** Intention-to-treat analyses revealed no differences in maternal variables, birth weights, gestational age, Apgar scores, initial temperature, and peak serum bilirubin levels. There were no signficant differences in the incidence of BPD (25% vs 22%, p = .78) or suspected NEC (55% vs. 39%, p = .16). Significant differences in IVH (13 vs. 5, p = .03, OR 2.6, 955 CI, 1,6.5) and LOS (8 vs. 1, p = .01) were found between the ICC and DCC groups. In the ICC group, 12 had a grade I-2 IVH compared to 5 in the DCC group. One ICC infant had a grade 4 IVH.

**Conclusions:** Delayed cord clamping appears to protect very low birth weight infants from IVH and sepsis. DCC is an easy to implement intervention.