

39 weeks under standard spinal anaesthetic and an intravenous bolus of 5 units of syntocinon after delivery of the fetus. Arterial lines were needed for calibration and pulse contour analysis used to obtain continuous data from the LidCO Plus system.

Results: Baseline was defined as the mean value during the last 20 s before the injection of syntocinon. Mean baseline values were: cardiac output (CO) 6.6 l/min, systemic vascular resistance 1155 dynes \times s/cm⁵/m², heart rate (HR) 91 bpm and mean arterial pressure (MAP) 94 mm Hg. At 10 s post-injection profound changes were noted: CO +20%, systemic vascular resistance (SVR) -44%, HR +6% and MAP -20%. Maximal effect was seen at 30 s (CO +28%, SVR -83%, HR +10%, MAP -34%) with values returning to baseline within 130 s.

Conclusions: Small doses of intravenous oxytocin produce profound and rapid changes in maternal haemodynamics at Caesarean section.

1. **Weis FR**, Markello R, Mo B, et al. Cardiovascular effects of oxytocin. *Obstet Gynecol* 1975;46:211-14.
2. **Why Mothers Die 1997-99**. The fifth report of the Confidential Enquiries into Maternal Deaths in the UK. London, UK: RCOG Press, 2001:134-49.

8.4 HYPEREMESIS IN PREGNANCY STUDY: A RANDOMISED CONTROLLED TRIAL OF MIDWIFE-LED "OUTPATIENT" CARE

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Background: Nausea and vomiting (NVP) in pregnancy is a frequent debilitating condition resulting in increased healthcare use and reduced quality of life (QoL). The aim of this pilot randomised controlled trial was to investigate the effect of a complex intervention, rapid rehydration combined with ongoing midwifery support, as compared with routine inpatient care.

Methods: 53 women attending the Maternity Assessment Unit with severe NVP were randomly allocated to intervention (rapid intravenous hydration (3 litres over 6 h), intravenous cyclizine, discharge home with advice leaflet, oral cyclizine and ongoing support involving two telephone calls from a specialist midwife; n = 27) or control (admission and routine care; n = 26) groups. Physical symptoms were measured using the pregnancy unique quantification of emesis and vomiting score (PUQE) on admission and for 7 days. QoL was measured on days 1 and 7 via SF36.v2 score and satisfaction with care on day 7.

Results: Groups were comparable at baseline in terms of demographics, blood and urine results, severity of symptoms and reported QoL. Protocol adherence was greater in the intervention group (93% versus 69%, p = 0.04). There were no differences between the groups on day 7 in terms of mean PUQE score, QoL and satisfaction with care. Re-admission rates were similar, whereas total admission time with NVP was higher in the control group (94 h versus 27 h, p = 0.001). Obstetric outcomes were comparable in the two groups.

Conclusions: This study suggests that a policy of rapid rehydration plus ongoing midwifery support is an effective alternative management option for treating women with severe NVP. A larger randomised controlled trial with economic analysis appears justified.

Session 8B BAPM/NNS: Resuscitation, Early Care and Prematurity

8.5 EPICUR 2: INTERVENTIONS TO STABILISE EXTREMELY PRETERM BABIES AT BIRTH

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Background: Survival of liveborn babies at 23 weeks' gestation in England is low at approximately 13% (EPICUR2, unpublished data);

Abstract 8.5

Gestation (completed weeks)	23	24	25	26	p Value
Total livebirths	318	411	492	541	
Interventions and outcomes by gestation (%)					
Active intervention withheld	17	4	1	1	<0.0001
CPR and/or adrenaline*	11	15	11	6	0.002
Successful intubation by 5 minutes*	62	66	64	61	NS
Heart rate >100 at 5 minutes†	83	83	90	92	0.0013
Died following active support*	24	10	4	1	<0.0001

CPR, cardiopulmonary resuscitation.

*% of all actively supported; †% of those intubated by 5 minutes.

this may reflect reluctance to stabilise and provide intensive care for these babies.

Objective: To record interventions at birth and to study differences between management at different gestations.

Methods: Details of signs of life and interventions at birth were recorded for all births 23 + 0 to 26 + 6 weeks in English hospitals in 2006.

Results: 1762 livebirths were recorded; 318 (18%) at 23 weeks. Although statistically fewer than at other gestations, nonetheless 83% of 23-week gestation infants were offered active support. Of these, similar proportions across gestations were intubated by 5 minutes and more extremely immature babies were given cardiopulmonary resuscitation and/or adrenaline. Good response, assessed by heart rate at 5 minutes was associated with increasing gestational age; there was an inverse relationship between gestational age and the proportion of deaths (see table).

Conclusions: These data refute the suggestion of systematic reluctance actively to resuscitate babies at 23 weeks' gestation.

8.6 SEX-SPECIFIC DIFFERENCES IN CIRCULATING CARBON MONOXIDE AND THE INCREASED INCIDENCE OF HYPOTENSION IN MALE PRETERM INFANTS

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Aim: Carbon monoxide (CO)-mediated cGMP release may result in abnormal vascular resistance and hypotension. With male sex a strong predictor of cardiovascular instability we hypothesised sex-specific differences in circulating CO contribute to the increased incidence of hypotension in preterm boys.

Methods: Infants 24-28 (n = 44) and 29-34 (n = 43) weeks' gestation were studied. Haemoglobin-bound CO (% COHb) was measured by spectrophotometry in umbilical arterial blood and at 24, 72, and 120 h postnatally. Blood pressure was measured invasively and microvascular blood flow determined by laser Doppler flowmetry.

Results: Umbilical COHb was higher in the most preterm infants (p = 0.043) and in boys (p = 0.049). Similar gestational (p = 0.011) and sex effects (p = 0.025) were observed over the first 5 days of life. COHb fell over time (p < 0.001). A negative correlation was observed between COHb and mean arterial pressure at 24 (r = -0.393, p < 0.001), 72 (r = -0.436, p < 0.001) and 120 h of age (r = -0.314, p = 0.009). A positive correlation was observed with microvascular blood flow at 24 (r = 0.495, p < 0.001) and 120 h of age (r = 0.548, p < 0.001). Controlling for gestation and sex, COHb was greater in infants who died in the first week of life at 72 h (p = 0.035).

Conclusions: The relationship between CO, blood pressure and microvascular blood flow are novel findings, not confined solely to sick preterm infants. CO was greatest immediately after birth. Both

inducible heme-oxygenase and non-heme oxygenase-dependent pathways related to oxidative stress may initially play a more central role in carbon monoxide production, with boys more susceptible to oxidative injury and its sequelae.

8.7 PREDICTING NEONATAL MORTALITY: A COMPARISON OF THE CRIB-II SCORE WITH AND WITHOUT TEMPERATURE AT ADMISSION

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Introduction: In 2003 the Clinical Risk Index for Babies was updated as CRIB-II. However, CRIB-II includes admission temperature, which complicates the use of this score as it can be influenced by early neonatal care. This work investigates the ability of CRIB-II with and without admission temperature (CRIB-II_(-T)) to predict in-hospital mortality among very preterm infants.

Methods: All infants born ≤ 32 weeks' gestation and admitted for neonatal care were identified from the Neonatal Survey 2005–2006. Infants with lethal congenital malformations were excluded. Predictive probabilities for mortality were calculated for each infant using the published algorithm for CRIB-II and then recalibrated for CRIB-II and CRIB-II_(-T) using the study data. The predictive abilities of the scores, investigated overall and by groups defined by gestational age and admission temperature, were summarised by c -statistics, Cox's regression and Brier scores.

Results: 3268 infants were included: 317 (9.7%) died before discharge. Using the published algorithm both versions of the score showed excellent discrimination ($c = 0.92$) but under-predicted the total number of deaths (CRIB-II, 255.2: CRIB-II_(-T), 216.6). After recalibration CRIB-II and CRIB-II_(-T) displayed excellent predictive characteristics both overall and for the groups defined by gestation. Whereas CRIB-II_(-T) also displayed excellent predictive characteristics for the groups defined by temperature, CRIB-II showed a statistically significant lack of calibration (Cox's regression 36.1°C to 37.5°C , $p = 0.021$; $\geq 36.0^{\circ}\text{C}$ or $> 37.5^{\circ}\text{C}$, $p = 0.011$).

Conclusions: After recalibration CRIB-II without temperature showed excellent predictive qualities and should be used when benchmarking neonatal care to avoid the risk of results being influenced by early neonatal care.

8.8 THE BLISS CLUSTER RANDOMISED CONTROLLED TRIAL OF THE EFFECT OF "ACTIVE DISSEMINATION OF INFORMATION" ON STANDARDS OF CARE FOR PREMATURE BABIES IN ENGLAND (BEADI)

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Background: Traditional dissemination of information has limited impact on change in practice. Clarification of which dissemination strategies work best in neonatal units is needed. The trial aim was to assess the effectiveness of an innovative active strategy for dissemination of neonatal recommendations.

Methods: Cluster randomised controlled trial, all English neonatal units, randomised by hospital ($n = 182$), stratified by networks and unit level of care. Multifaceted intervention: audit/feedback, interactive educational meetings, organisational changes. Outcomes: hospital policies (hypothermia prevention, resuscitation team at birth) and practices in preterm babies (resuscitation team and surfactant in labour ward, admission temperature). Data: EPICure2 study (baseline), CEMACH survey (post-intervention). Statistical analysis (intention to treat): post-intervention differences between active and control group accounting for clustering effect (practice outcomes).

Results: There were no differences between active/control units in level of care, number of admissions or babies < 1.5 kg per year and between preterm babies in active/control groups in relevant baseline demographics characteristics. There were no significant post-intervention differences between active/control units in hospital policies. There were post-intervention differences in practice for preterm babies: eg, mean admission temperature higher in the active group, mean difference 0.29°C (95% CI 0.22 to 0.55), more use of polyethylene occlusive wrapping 79% versus 62% ($p = 0.05$), more surfactant given in labour ward 78% versus 60% ($p = 0.04$) and a trend to more ideal birth resuscitation teams composition 68% versus 57% ($p = 0.09$).

Conclusions: An innovative "active" strategy for dissemination of neonatal recommendations is more likely to lead to practice changes in preterm babies than current knowledge transfer mechanisms in England.

Session 8C NNA: Feeding Difficulties

8.9 NASAL INJURIES IN PRETERM INFANTS ASSOCIATED WITH CONTINUOUS POSITIVE-AIRWAYS PRESSURE

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Background: Nasal trauma is a recognised complication of nasal continuous positive-airways pressure (CPAP) therapy, but its prevalence and severity has not been compared in controlled trials.

Methods: Preterm infants < 30 weeks gestation and/or < 1500 g at birth, randomly assigned to infant flow driver CPAP (IFD) or bubble CPAP (BCPAP) were followed to assess the incidence and severity of nasal injury. Nasal injury data on all babies were recorded prospectively on a nasal injury scoring chart devised for this study. The severity of nasal injury was graded as mild (1–4), moderate (5–8) or severe (≥ 9). Data were analyzed using t-tests and χ^2 tests.

Results: Records were obtained on 85 infants (IFD 46, BCPAP 39). There was no difference in the gestational age (27.7 weeks in IFD versus 27.6 weeks in BCPAP) and birthweight (1046 g in IFD versus 1024 g in BCPAP) between the two study groups. Half of the study infants sustained moderate (31.8%) to severe (24.7%) nasal injuries. This was similar in the two groups (54.3% on IFD versus 59.0% on BCPAP; $p = 0.668$). The time of worst nasal injury was similar (IFD 4.2 ± 3.9 days versus BCPAP 4.5 ± 5.1 days, $p = 0.813$).

Conclusions: Nasal injury was equally common in babies receiving CPAP with either IFD or BCPAP devices and requires further intervention to reduce its frequency and severity.

Session 9

Session 9A BMFMS: Labour and Delivery

9.1 MYOMETRIAL CONTRACTILITY STUDIES IN DIABETIC PREGNANT WOMEN

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Several studies worldwide have shown a higher Caesarean section rate in diabetic compared with non-diabetic women. Local audit conducted at our hospital revealed an emergency Caesarean section rate of 37.4% compared with 13.2% for non-diabetic women. We