

We assessed cannulation success, time to cannulate, and correct treatment identification for each participant.

Results 14 experienced (9 Fellows, 5 Consultants) and 9 junior (Registrars) medical staff attempted 46 cannulations. Experienced participants successfully cannulated 100% of treated and control sections with no significant difference in mean (SD) time to cannulate (98 (75)s and 97(51)s respectively, $p = 0.97$). Junior participants cannulated 89% and 67% of treated and control sections respectively ($p = 0.69$), and mean (SD) time to cannulate was 132 (78)s and 106 (53)s respectively ($p = 0.42$). GTN treated arteries were correctly identified by 43% of experienced and 22% of junior participants ($p = 0.47$).

Conclusions This study suggests that topical application of GTN does not increase successful cannulation of umbilical arteries by experienced staff. More participants or prolonged GTN application time may be needed to confirm these findings in junior staff.

PS-199 IMPROVED IRRADIANCE OF PHOTOTHERAPY DEVICES IN DUTCH NEONATAL INTENSIVE CARE UNITS

SJ Van 't Klooster, KE Lorenz, CV Hulzebos, PH Dijk. *Pediatrics, Beatrix Children's Hospital/ University Medical Center Groningen, Groningen, Netherlands*

10.1136/archdischild-2014-307384.495

Background/aims Phototherapy (PT) is an effective treatment for hyperbilirubinemia, provided a minimum irradiance level is applied. Previously, we reported on low irradiance levels of PT devices in Dutch Neonatal Intensive Care Units (NICUs). These data were shared with all NICUs. We hypothesised that this knowledge would positively affect current applied irradiance levels. Therefore we determined irradiance levels of PT devices again in 2013.

Methods Irradiance levels of overhead and underneath PT devices in all 10 NICUs were measured with a Dale 40 radiometer (FlukeBiomedical, Everett, Washington, USA), in routinely applied PT practice patterns, using an infant silhouette model. The infant's distance from the overhead device was measured.

Results Irradiance levels of 35 PT device-incubator combinations were measured (Table); 10 types of PT devices were in use in the 10 NICUs (8 overhead and 2 underneath). Overall irradiance levels increased ($p = 0.01$); irradiance levels of overhead and underneath PT devices also increased with 50% (NS) and 200% ($p = 0.03$), respectively. The mean (range) distance between overhead PT device and infant decreased with 7 cm to 38 (30–62) cm ($p < 0.01$). Minimal recommended irradiance levels of 10 $\mu\text{W}/\text{m}^2/\text{nm}$ were obtained for 70% of PT devices versus ~50% in 2008 ($p = 0.02$).

Conclusions Applied irradiance levels of PT devices in Dutch NICUs have markedly improved in 2013. Current data suggest that awareness among healthcare workers regarding requirements for effective PT results in improved use of PT devices, including smaller distances between PT device and infant.

Abstract PS-199 Table Median Irradiance levels of PT devices in Dutch NICUs

Median irradiance level ($\mu\text{W}/\text{cm}^2/\text{nm}$)	2013	2008 ¹	p-value
All PT devices	14.9 [0.7-41]	9.1 [0.8-32.6]	0.01
Overhead PT devices	14.6 [5.8-41]	9.7 [4.3-32.6]	0.11
Underneath PT devices	20.7 [0.7-27.3]	6.8 [0.8-15.6]	0.03

Moreover, the availability of better performing (Light Emitting Diode) PT devices might have contributed.

PS-200 HOSPITAL-LEVEL VARIATION IN READMISSION RATES OF NEONATAL INTENSIVE CARE (NICU) PATIENTS: A POTENTIAL QUALITY MEASURE

S Lorch, M Macheras. *Pediatrics, The Children's Hospital of Philadelphia, Philadelphia, USA*

10.1136/archdischild-2014-307384.496

Background Variation in readmission rates may assess the quality of a provider through the quality of inpatient care or transitions from inpatient to outpatient providers. The aim of this project was to validate readmission rates as a measure of NICU quality.

Methods Using birth certificates linked to maternal and infant hospital discharge records, a cohort was constructed of 23–34 week gestation infants who survived to hospital discharge at a California hospital discharging over 50 such infants per year between 1995–2009 (N = 296,509 at 141 hospitals). Unadjusted variations in hospital readmission rates within 7, 14, 30, 90, and 365 days after discharge were compared to rates adjusted for hospital casemix, including patient gestational age, insurance status, race/ethnicity, and maternal education, and BPD, IVH, NEC, and ROP as measures of chronic health conditions.

Results Unadjusted readmission rates varied significantly between hospitals and across geographic regions, ranging from 2.2–28.4% 7–14 days after discharge to 2.7–34.4% 365 days after discharge. Some of this variation was explained by hospital casemix. However, after risk adjustment, there remained a 7.9–11.5 fold difference in readmission rates between hospitals with the lowest and highest rates across the five time frames that did not change when complications of preterm birth were included in the risk-adjustment model.

Conclusions There is substantial variation in readmission rates of premature infants that is only partially explained by gestational age and social factors. Readmission rates may provide a measure of the quality of NICU care and the integration of services within a geographic area.

PS-201 ASSOCIATION BETWEEN BLOOD TRANSFUSION AND DEVELOPMENT OF RETINOPATHY OF PREMATUREITY - SYSTEMATIC REVIEW OF LITERATURE AND META-ANALYSIS

¹J Banerjee, ²F Asamoah, ²JK Morris, ³N Aladangady. ¹Neonatology, Homerton University Hospital, London, UK; ²Department of Medical Statistics, Wolfson Institute for Preventive Medicine Barts and the London School of Medicine and Dentistry QMUL, London, UK; ³Department of Neonatology, Homerton University Hospital, London, UK

10.1136/archdischild-2014-307384.497

Background and aims Retinopathy of Prematurity (ROP) is an important cause of visual impairment and blindness in children.¹

Aim Conduct a systematic review and meta-analysis to determine the association between blood transfusion and the development of ROP in preterm infants ≤ 32 weeks gestational age or birthweight < 1500 grams.

Methods

Data Sources: MEDLINE, EMBASE, Cochrane Register, CINAHL, LILACS, Web of Knowledge, clinicaltrial.gov and Open SIGLE.

Study Selection Criteria: Cohort and case-control studies from 2000 onwards: Four reviewers independently assessed eligibility.

Data Extraction and analysis: The outcome measure was 'all stages of ROP'. Quality assessment of studies was done using Newcastle-Ottawa scale. A random effects meta-analysis model was used and heterogeneity was assessed using I^2 statistic.

Results Nine studies met the final selection criteria. Total sample size was 2106 preterm infants with median gestational age 30 weeks and birth weight 1228 grams. Blood transfusion was associated with the development of ROP; unadjusted odds ratio (OR) = 3.05 (95% CI 2.16 to 4.32) with a significant heterogeneity ($I^2 = 54.8\%$ $p = 0.02$). The unadjusted pooled OR in three of these studies was 2.59 (95% CI 1.35 to 4.98) and the adjusted pooled OR was 1.18 (95% CI 0.96 to 1.33), $I^2 = 8.8\%$.

Conclusion Blood transfusion was associated with the development of ROP in preterm infants. However once other factors such as gestational age and birth weight were adjusted for, the association between blood transfusion and ROP development was considerably weaker.

REFERENCE

1 Gilbert *et al.* *Eye* (Lond) 2007;21:1338–43

PS-201a HYPERBILIRUBINEMIA AND PHOTOTHERAPY IN NEWBORNS AFFECT CARDIOVASCULAR AUTONOMIC CONTROL

¹M Javorka, ²Z Uhríkova, ²M Zibolen, ¹L Chladekova, ¹K Javorka. ¹Department of Physiology, Comenius University Jessenius Faculty of Medicine, Martin, Slovakia; ²Clinic of Neonatology, Comenius University Jessenius Faculty of Medicine and University Hospital, Martin, Slovakia

10.1136/archdischild-2014-307384.498

Background Neonatal jaundice and its phototherapeutic treatment can lead to side effects involving activation of autonomic control mechanisms.

Aim To investigate the autonomic nervous system changes in icteric neonates using heart rate variability (HRV) and to assess the effect of phototherapy on HRV as an indicator of autonomic nervous control of cardiovascular system.

Methods HRV recordings of 20 icteric full-term neonates before, during and after the phototherapy and of 20 healthy controls were analysed. Besides traditional time and frequency domain measures, HRV complexity parameters including normalised complexity index (NCI), normalised unpredictability index (NUPI), pattern classification (0V%, 1V%, 2LV%, 2UV%) and multiscale irreversibility indices (P%, G%, E) were evaluated. All measures were derived from data segments of 1000 RR intervals.

Results The analysis revealed higher values of 1V% and 2LV%, lower P% and reduced percentage of irreversible HRV recordings in the group of neonates with hyperbilirubinemia. While mean heart rate was increased during and after the phototherapy, HRV magnitude was not changed. Nonlinear analysis showed a decrease of complexity, unpredictability and pattern classification measures 2LV% and 2UV%. In contrast, 0V%, P% and the percentage of irreversible recordings were increased during and after the phototherapy.

Conclusion The results suggest a shifted autonomic balance in icteric neonates compared to the controls and its further

alterations during phototherapy. As the nonlinear HRV parameters are independent of the linear methods, they can provide new information about the cardiac regulatory mechanisms and their changes in neonates.

Supported by grants VEGA N. 1/0223/12, 1/0059/13 and APVV-0235–12.

PS-201b THE OUTCOME OF TREATMENT LIMITATION DISCUSSIONS IN NEWBORNS WITH BRAIN INJURY

¹D Wilkinson, ²M Brecht. ¹Oxford Uehiro Centre for Practical Ethics, University of Oxford, Oxford, UK; ²Neonatal Department, Women's and Children's Hospital, Adelaide, Australia

10.1136/archdischild-2014-307384.499

Background Most deaths in severely brain-injured newborns in neonatal intensive care units (NICU) follow discussions and explicit decisions to limit life-sustaining treatment. There is little published information on such discussions.

Objective To describe the prevalence, nature and outcome of treatment limitation discussions (TLD) in critically ill newborns with severe brain injury.

Design A retrospective statewide cohort study.

Setting Two tertiary NICUs in South Australia.

Patients Ventilated newborns with severe hypoxic ischaemic encephalopathy and peri-/intraventricular haemorrhage (P/IVH) admitted over a 6-year period from 2001–6.

Main outcome measures Short-term outcome (until hospital discharge) including presence and content of TLDs, early childhood mortality, school-age functional outcome.

Results We identified 145 infants with severe brain injury; 78/145 (54%) infants had documented TLDs. Fifty-six infants (39%) died prior to discharge, all following treatment limitation. The majority of deaths (41/56; 73%) occurred in physiologically stable infants. Twenty-two of 78 (28%) infants with at least one documented TLD survived to discharge, most in the setting of explicit or inferred decisions to continue treatment. The majority of long-term survivors after TLD (8/15, 53%) were severely impaired at follow-up. Two thirds of surviving infants with TLD in the setting of unilateral P/IVH had mild or no disability.

Conclusions and relevance Some critically ill newborn infants with brain injury survive following TLDs between their parents and physicians. Outcome in this group of infants provides valuable information about the integrity of prognostication in NICU, and should be incorporated into counselling.

Neonatal Lung Injury

PS-202 INFLUENCE OF MODERATE PERMISSIVE HYPERCAPNIA ON PULMONAL INFLAMMATION IN EXTREMELY LOW BIRTHWEIGHT INFANTS (ELBWI)

¹S Gentner, ²U Uhlig, ³HD Hummler, ⁴UH Thome. ¹Department of Cardiac Thoracic and Vascular Surgery, University Hospital Ulm, Ulm, Germany; ²Department of Pharmacology and Toxicology, RWTH Aachen University, Aachen, Germany; ³Department of Pediatrics, Children's Hospital University of Ulm, Ulm, Germany; ⁴Department of Neonatology, University of Leipzig, Leipzig, Germany

10.1136/archdischild-2014-307384.500