

Fisher & Paykel Poster Abstracts

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1: A 24 Hour Stability Study of Noradrenaline Infusions in the Simulated NICU Environment

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Biography:

Lisa qualified as an Advanced Neonatal Nurse Practitioner in 2014 and is currently practising at Glan Clwyd Hospital in North Wales. She completed her MSc in Advanced Clinical Practice in 2018 at Brighton and Sussex University Hospitals NHS Trust, which involved research of noradrenaline infusion stability.

Lisa has a special interest in simulation training, which she facilitates locally and at regional education days, as well as instructing on Neonatal Life Support Courses.

At present Lisa is co-editing the third edition of Boxwell's Neonatal Intensive Care Nursing, due to be published later this year.

Background: Neonatal hypotension is increasingly managed with noradrenaline infusions in UK neonatal units. There remains, however, a lack of evidence that such infusion solutions retain adequate drug concentrations over 24 hours when exposed to the environmental conditions of a NICU

Objective: To determine the appropriateness of running noradrenaline infusions for 24 hours in a NICU setting

Design: Prospective drug stability study

Setting and Methods: Noradrenaline infusions in different vehicles (glucose 5%, glucose 10%, sodium chloride 0.45% and sodium chloride 0.9%/glucose 5%) underwent simulated NICU conditions over 24 hours: incubators with/without humidification, ambient temperature and conditions associated with the delivery of therapeutic hypothermia. Samples of the noradrenaline solutions were obtained at the time of infusion commencement, after 30 minutes, 12 hours and 24 hours, and subsequently analysed with HPLC-ED. The impact of phototherapy on infusion stability was also investigated.

Results: A percentage loss of >7.5% was deemed significant. At room temperature and associated with therapeutic hypothermia, all infusion vehicles retained acceptable concentrations of noradrenaline. However, when exposed to an incubator, and particularly with humidity, significant changes were noted in all solutions. Noradrenaline concentrations were within limits at 24 hours in an incubator, ambient temperature and with therapeutic hypothermia only in sodium chloride 0.9%/glucose 5%; but not in a humidified incubator, where adequate concentration in this diluent was maintained only at 12 hours.

When associated with phototherapy, significant concentration degradation was noted in all infusion vehicles.

Conclusions: Definitive recommendations for practice cannot be derived from the results due to inherent wide margins of error, but results suggest that NA infusion solutions are not stable in a simulated NICU environment. The use of sodium chloride 0.9%/glucose 5% as a diluent may be an

adequate strategy to overcome stability issues when phototherapy is not required, but further research in this area is needed.

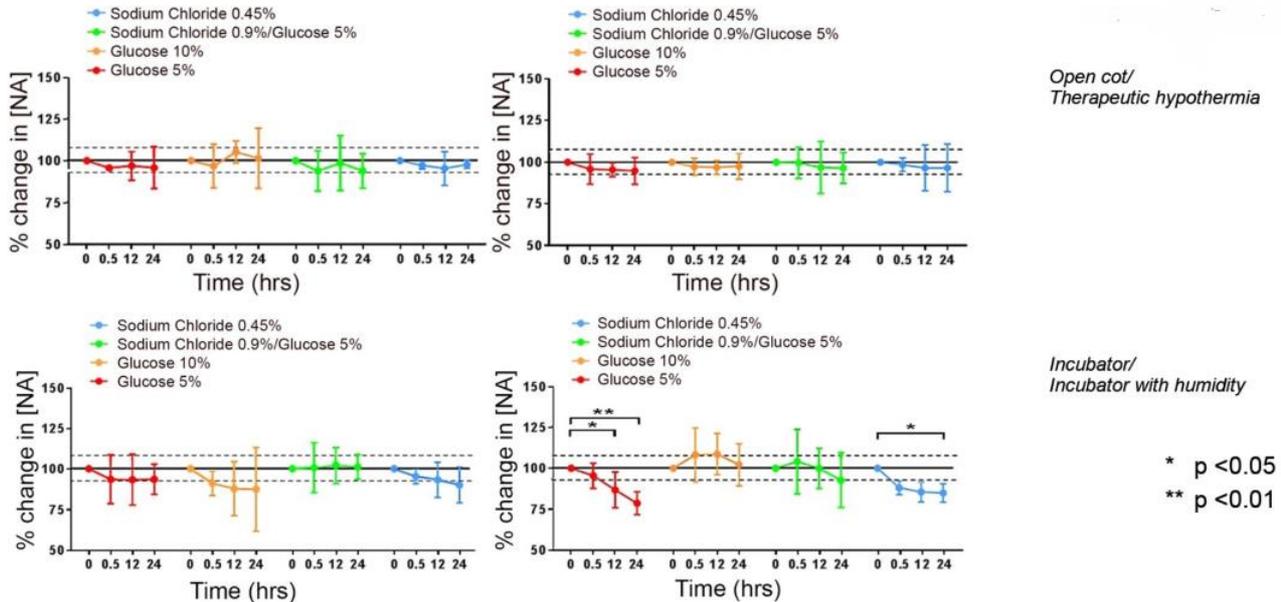
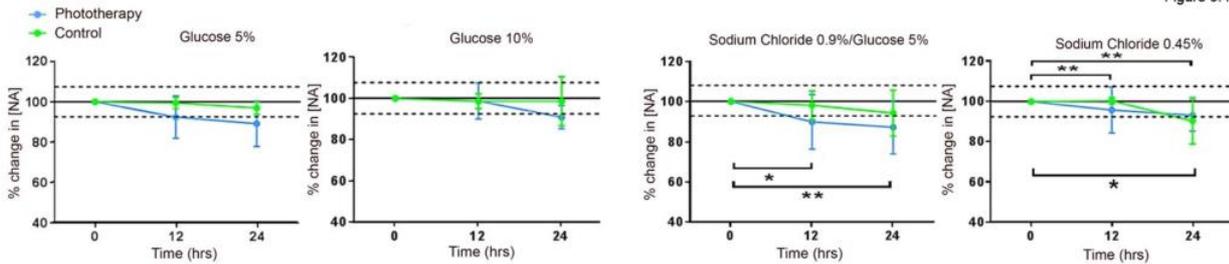


Figure 3. Phototherapy



2: BAPM Framework on Central Venous Catheters in Neonates – is it pragmatic?

Dr Pinki Surana¹, Dr Ruth Pitt¹, Dr Vikki Fradd¹

¹Birmingham Heartlands Hospital, Birmingham, West Midlands

Biography:

Pinki is a Neonatal Consultant and Clinical Lead for the tertiary neonatal unit at Birmingham Heartlands Hospital. She is actively involved in clinical governance activities.

Background: British Association of Perinatal Medicine (BAPM) published framework on use of central venous catheter in neonates in 2018.

Aims: We aimed to assess the compliance with this framework in our tertiary neonatal unit focussing on umbilical venous catheters (UVCs).

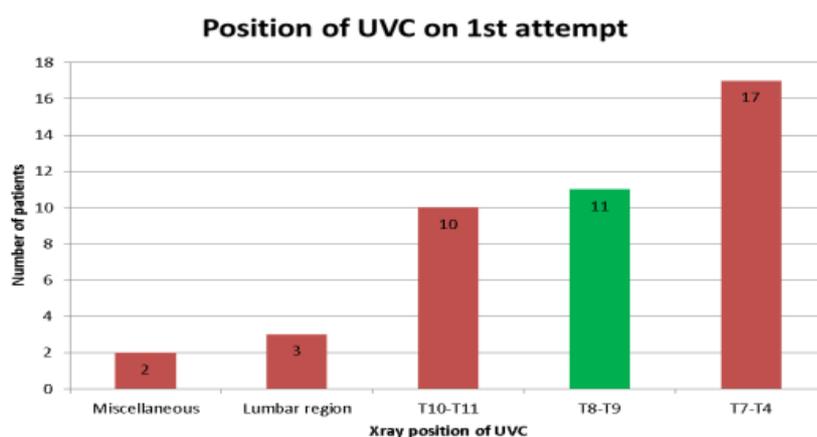
Methods: Information was collected and analysed using Neonatal Badgernet database and PACS radiology on all UVC placements from Sep 2017- Mar2018. Optimal position of the tip of the UVC was defined as at T8-T9 (assuming this lies outside the cardiac silhouette), as per BAPM framework. The unit guideline for calculating UVC length is to use the Shukla method.

Results: Of the 646 infants admitted during this period, 43 UVCs were inserted. Of these, 14 were extreme preterm infants (<28 weeks) and 14 were term infants. The optimal position was obtained in 11 neonates (25%) on first attempt. The catheter tip was above T8 in 17 neonates (39%) and below T9 in 15 (39%) [Fig 1]. The tip was outside the liver and cardiac silhouette in 15 (35%) of the neonates. The UVC required manipulation in 31 neonates (72%), of which 13 (42%) achieved an optimal position. In the remaining 19 suboptimal UVCs, 15 were used despite being in a suboptimal position, with parenteral nutrition infused through 8 of them. The majority of the suboptimal UVCs were below T10, with 4 in the lumbar region. 24 (55%) neonates required more than one x-ray to determine UVC position, with 7 patients (16%) requiring 3 or more. No cases of infection, extravasation or cardiac tamponade were recorded during the audit period.

Conclusion: This audit from a busy tertiary neonatal unit revealed that only one in four UVC placements achieved optimal positioning on first attempt and one in three UVCs were used despite being in suboptimal position due to clinical need. Despite multiple manipulations and x-rays, optimal positioning as defined by BAPM was achieved in only 55% of UVCs inserted.

This raises the question as to whether the described optimal positioning is practicable and clinically feasible given the restricted target area for the UVC tip and the limitations of the method of insertion in our fragile population.

Figure 1: X Ray Position of UVC on first attempt, optimal position based on BAPM recommendations is highlighted in green



3: CAN WE REDUCE NEONATAL ADMISSIONS DUE TO JAUNDICE?

DR SONAL DATIR¹, DR GOPA SARKAR

¹Stoke Mandeville Hospital, Aylesbury, United Kingdom

Biography:

I am a Paediatric Registrar, working at Stoke Mandeville Hospital. I have a special interest in neonatology and passionate about my work. I have completed my postgraduate training in Paediatrics (M. D. Paediatrics) in India. Thereafter, I came to the UK to broaden my experience in neonatology. I completed my MTI neonatal fellowship from John Radcliffe Hospital, Oxford, and also worked in Neonatal unit at Luton and Dunstable Hospital. I have enjoyed working in these tertiary Neonatal units which were amazing units to work, with amazing people; The experience in these units has not only strengthened my neonatal skills but also provided me with excellent opportunities to involve in various audits and quality improvement projects and to be able to make a change. I would like to continue my efforts further to contribute to the development in neonatal care.

Background:

Neonatal hyperbilirubinemia is a common cause for neonatal admission in term and preterm infants. These infants are primarily managed on postnatal wards; however, they require admission to neonatal unit due to jaundice above the exchange level, rapidly increasing bilirubin levels, pathological jaundice or sepsis.

Failure to initiate and establish adequate breastfeeding can play an important role in development of severe jaundice.¹ Face-to-face professional support has been shown to increase breastfeeding success.²

Aim:

The aim of this project was to evaluate the management of infants admitted to neonatal unit with jaundice including the feeding practices; and identify areas of improvement to reduce admissions.

Methods:

This was a retrospective observational project including infants born at ≥ 35 weeks admitted to neonatal unit at District Hospital with a diagnosis of jaundice from January 1, 2017 to December 2018. Data was collected using proforma, medical records and blood results on computer system.

Results:

A total of 519 infants ≥ 35 weeks were admitted to the neonatal unit of which 12%(60) infants were admitted due to jaundice. Of these, 42%(25) were late preterm (≥ 35 - 36+6/40 weeks) and 58%(35) were term infants. The mean birth weight was 2892.5 grams and 20%(12) were low birth weight. The risk factors for jaundice were identified as male infant (66%), first born (49%), gestation (37 weeks), prematurity, and breast fed babies. 35%(21) infants were admitted from home (average 3.9 days) and 65%(39) from postnatal wards. 27%(16) infants had jaundice <24 hours. 6 infants had > 10% weight loss on admission. DAT was positive in 23%(14) infants of which 8 infants presented <24 hours. Sepsis was suspected in 72% (43) infants; inflammatory markers were raised in 8 and blood culture was positive in none.

Only 20%(12) received lactation support on postnatal ward prior to admission whereas 43%(26) did not receive any support. 36 infants were exclusively breastfed, 13 were formula fed and 11 were mixed-fed. After admission, formula feeds were added to 32 infants while 4 infants continued to exclusively breastfed. 10 infants required intravenous fluids.

The causes of jaundice included prematurity (25), ABO incompatibility (11), Rh incompatibility (3), poor feeding or exaggerated jaundice (25).

33 infants had bilirubin above exchange line, and required a mean of 24 hours (range 6- 144 hours) of phototherapy. None of them required immunoglobulins or exchange transfusion.



The mean length of stay was 3 days (range 1-14 days) and there was a remarkable decrease in breastfeeding as only 7(11.6%) infants were breastfed on discharge, while the rest were formula fed or mixed-fed.

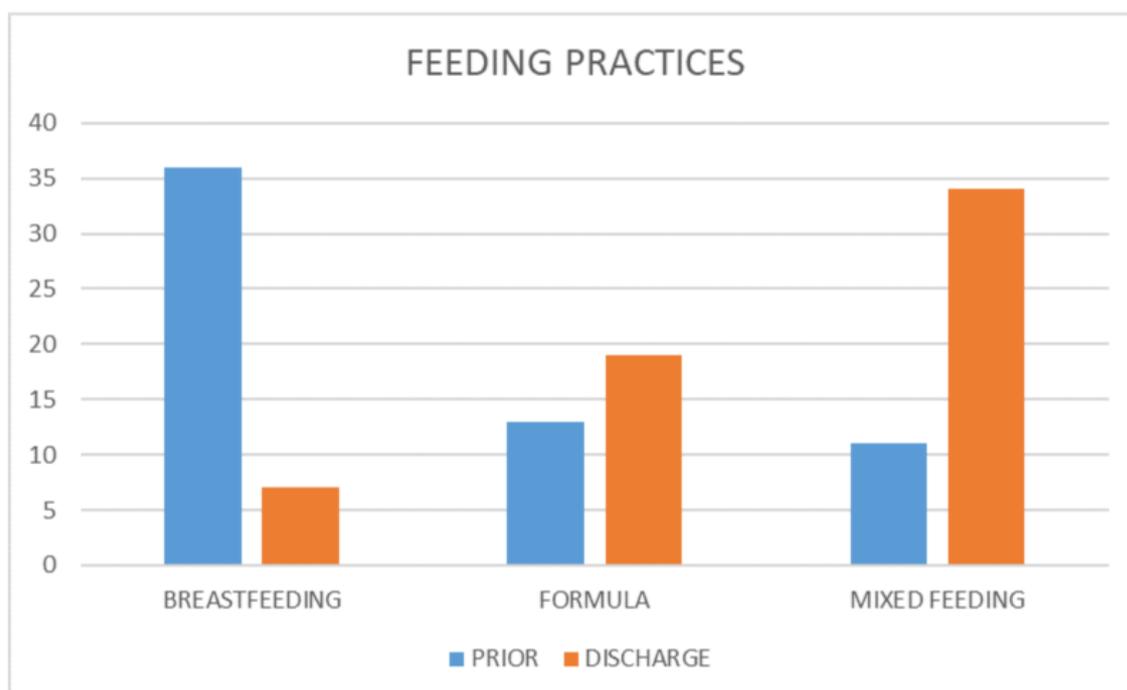
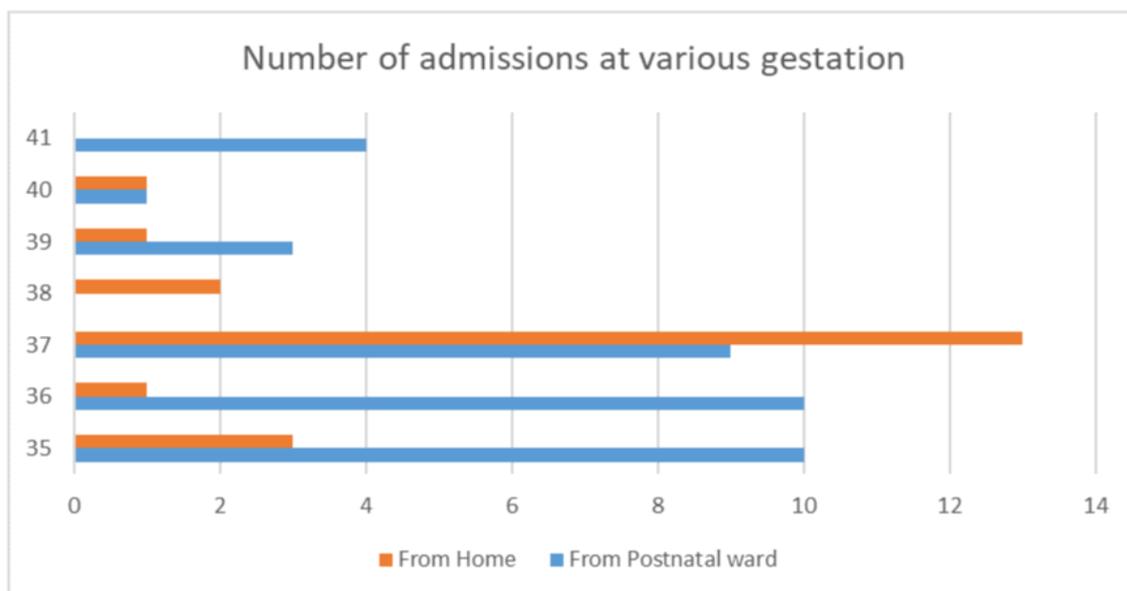
Conclusion:

There is a scope to decrease admissions due to jaundice by optimising feeding support and management of jaundice on postnatal wards/ community in the presence of risk factors.

Appropriate management of jaundice in late preterm infants in transitional care setting is important thereby reducing separation of mother and baby.

Opportunities to support lactation on postnatal ward and neonatal unit are often missed. Effective measures should be taken to promote lactation support at all levels.

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4: Changing Profile of Culture Positive Sepsis in a Tertiary Neonatal Unit

Dr Katrina Harrison¹, Dr Julie Fletcher¹, Dr Vennila Ponnusamy¹

¹St Peter's Hospital, Ashford and St Peter's NHS Foundation Trust, Chertsey, United Kingdom

Biography:

I am a Consultant Neonatologist in St Peter's hospital and unit lead for transitional care. My special interests are neonatal nutrition and neurodevelopment. In addition to clinical interests, I am also interested in postgraduate teaching through simulation; improving service through a number of quality improvement projects and promoting research. I lead and deliver regular in-house multidisciplinary simulations. In addition to supporting research activities in our unit, I am also doing a part time PhD in Biomarkers of Brain Injury in Newborn in Queen Mary University of London.

Background

Culture positive sepsis is a major cause of significant mortality and morbidity in neonates. While early onset sepsis (EOS) is associated with perinatal infections, late onset sepsis (LOS) is often associated with the presence of central lines. With increasing move towards non-invasive ventilation, early feeding pathway and use of peripheral parenteral nutrition, we have seen a reduction in the use of central lines. We therefore analysed the pattern of culture positive sepsis in our unit to understand the new profile.

Method

All neonates born in 2018 with a diagnosis of positive blood culture were included. Data was gathered on baseline characteristics, risk factors for EOS (0-72 hrs of age), and LOS (beyond 72 hrs). This included corrected gestational age, comorbidities when sepsis diagnosed, C-Reactive Protein (CRP) trends and presence of central lines or peripheral venous line (PVL) at the time of sepsis. Additionally, we reviewed this data against the positive blood culture growth and sensitivities.

Results

Of the total admissions in our unit, 2.8% (21/748) had culture positive sepsis. Of these 86% were inborn babies. There were 25 episodes of culture positive sepsis in 21 babies, with 2 outlier babies accounting for 6 episodes.

In total, 57% (12/21) were extreme preterm (23+0 to 27+6 weeks); 19% (4/21) were very preterm (28 to 31+6 weeks); 10% (2/21) were moderate preterm (32 to 36+6 weeks) and 14% (3/21) were term Infants. While majority (81%) were low birth weight (<2500 grams), 57% (12/21) babies were extreme low birth weight (<1000 grams).

The table 1 describes the baseline characteristics according to EOS and LOS groups. In EOS, 89% (8/9) were inborn babies. Of these, 50% had known risk factors for sepsis with elevated maternal CRP and/or positive maternal culture in blood or vaginal swab. Only 1 had placenta sent for histology which showed confirmed evidence of chorioamnionitis. This baby's blood culture grew *Moraxella* species. Only 1 baby had umbilical arterial and venous lines in EOS group.

In LOS group, 75% had PVLs and 44% had central lines, of which only 1 was percutaneous central venous catheter. Half of this group (50%) were ventilated at the time of sepsis episode with other comorbidities. Staph species (56%) remain the most common pathogen. Graph 1 shows the trend of CRP around the time of sepsis. Although only 7 babies had central lines in-situ, our central line

associated blood stream infection (CLABSI) rate was 7.41 per 1000 line days in comparison to national average of 5.85 in <32 weeks gestation.

Conclusion

Identification of maternal risk factors and prudent use of placental histology and culture could aid in appropriate management of EOS. Majority of LOS is related to non-central lines. This could be due to insertion of PVL's or heel pricks in vulnerable preterm babies. Despite reduction in usage of central lines, the rate of CLASBI is higher than national average. Although CLABSI definition helps to benchmark units, it doesn't provide an in-depth profile of a unit's infection rates, unless detailed analysis is undertaken.

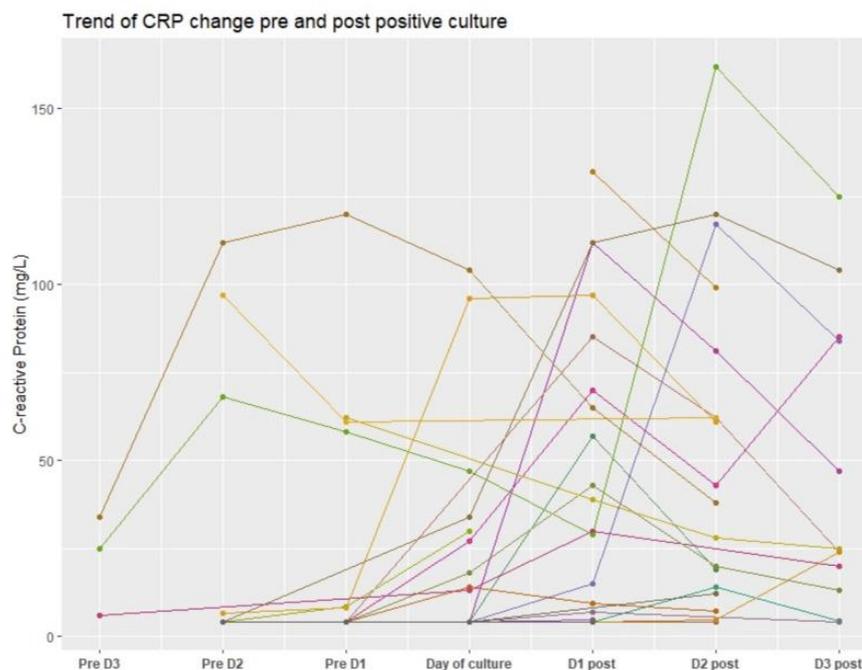


Table 1: Characteristics of Early versus Late Onset Sepsis in our cohort

	Early Onset Sepsis	Late Onset Sepsis
Incidence (%)	36% (9/25)	64% (16/25)
Gestational Age	35+6 (23+4 - 40+2)	25+2 (24+1 - 32+2)
Birth Weight, grams	2414 (433 - 3430)	717 (648 - 18620)
Ventilated before onset of sepsis (%)	22% (2/9)	50% (8/16)
NBM or on partial feeds, (%)	78% (7/9)	81% (13/16)
Presence of known risk factor (%)	Maternal positive culture - 11% Chorioamnionitis - 11% Maternal high CRP - 44%	Presence of central line - 44% Presence of PVL - 75%
Culture results, (numbers)	Group B Streptococci - 2 Escherichia Coli - 2 Moraxella species - 1 Staphylococcus Haemolyticus - 4	Group B Streptococci - 2 Escherichia Coli - 3 Candida species - 1 Staph Haemolyticus or Capitis or Warneri - 10

All values are median (range) unless specified otherwise

5: Development of a Discharge Criteria for Neonatal Transitional Care at South Tees NHS Foundation Trust

Mrs Sian Oldham¹, Mrs Alison Stewart, Dr Vrinda Nair

¹South Tees NHS Foundation Trust, Middlesbrough, United Kingdom

Biography:

Siân Oldham DIP HE (Childrens Nursing); ENB 998; BSc (hons) Neonatal Care; PG Cert (Advanced Neonatal Nursing Practice); MSc Advanced Clinical Practice.

I trained as a paediatric nurse at Great Ormond Street Hospital and spent the early part of my career working in paediatric surgery, before specialising in neonatal care. I now work in as an ANNP at the James Cook University Hospital, Middlesbrough. In addition to my clinical role I am named ANNP lead for Transitional Care. I instruct NLS, and coordinate our in-house weekly nurse teaching programme. I am a member of the Executive Committee for the Neonatal Nurses Association.

Background:

Neonatal Transitional Care at South Tees NHSFT is a midwifery delivered model of care within the postnatal ward setting, supported by the Neonatal Medical Team. The local provision of Transitional Care was restructured in 2016 with the introduction of a Classification Chart. Whilst babies requiring Transitional Care were clearly defined by the Classification Chart, it was recognised there was no formal criteria to identify babies who were ready for discharge home. Readiness for discharge varied according to individual practitioners. Average length of stay on Transitional Care was 4-5 days, with 2-5 re-admissions per month.

A Discharge Criteria was developed to identify when babies requiring Transitional Care are ready to be discharged:

1. Maintaining temperature without additional heat source >12 hours;
2. Independent parent led care;
3. Successful feeding (good output/ appropriate length of feed/ taking full volumes);
4. Weight loss <10% of birth weight

Method:

An initial retrospective audit was conducted to assess when Transitional Care babies would have been ready for discharge had the Discharge Criteria been applied.

Results:

On applying the Discharge Criteria, 87% of babies admitted to Transitional Care were identified as successfully feeding by 48 hours; 96% of babies by 72 hours. 81% of these babies were independently cared for by parents by 48 hours; 95% of babies by 72 hours. Prior to the introduction of the Discharge Criteria, average length of stay was 4-5 days.

Action:

Following the retrospective audit, the Transitional Care Classification Chart was revised to include the Discharge Criteria. A predicted length of stay for each care category was also introduced. The revised chart also reflects the BAPM recommendations for classification of Transitional Care (BAPM, 2017) that can be accommodated within our current staffing provision and available resources. The re-admission rate was subsequently re-audited using the revised Care Categories. This indicated an overall reduction in re-admission of babies who had required Transitional Care.

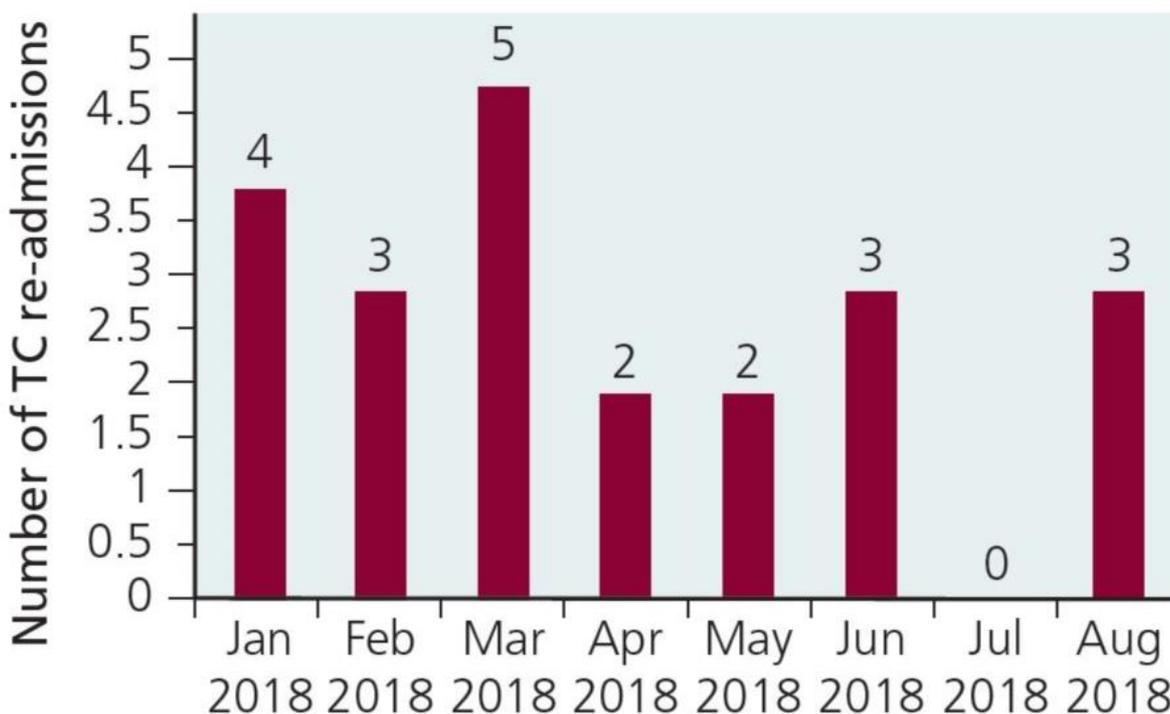
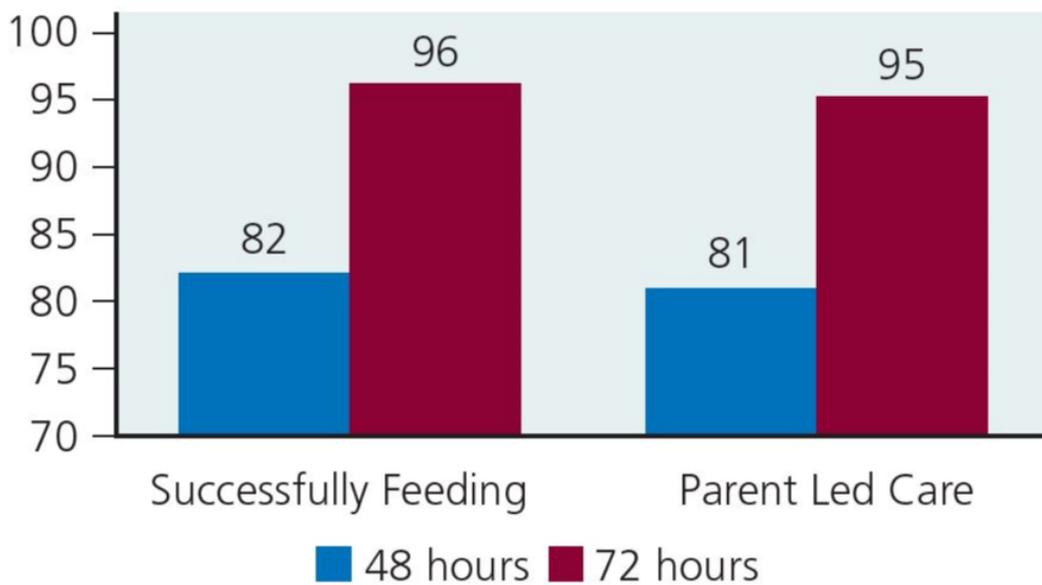


Conclusion:

Introduction of the Discharge Criteria will reduce the length of stay for babies on Transitional Care and identifies a predicted length of stay to parents at the point of admission. Re-admission rates for Transitional Care babies have reduced. This improves family centred care by discharging babies home when they are ready for discharge and reduces variation in assessing readiness for home. Reducing length of stay also improves efficiency of utilisation of resources such as cot space, equipment and staffing.

An audit of length of stay for Transitional Care babies subsequent to the introduction of the revised Care Categories is in progress.

Audit Findings:



6: Early Extubation Success in Extremely Preterm Infants – A tertiary neonatal unit experience

Dr Amelia Shaw, Dr Aishin Lok

¹Leeds General Infirmary, Leeds Teaching Hospitals NHS Trust, United Kingdom

Biography:

I am a ST8 neonatal grid trainee working in West Yorkshire with a MSc in child health. My interests include fetal medicine, neurodevelopment and risk governance.

Background & Aims:

It remains commonplace for the majority of extremely preterm infants to require a period of mechanical ventilation after birth¹. This is not without consequence and is associated with higher incidences of chronic lung disease, intracranial haemorrhage and mortality². It also leads to worse neurodevelopmental outcomes³. Currently, there is no single measure to direct the decision when to extubate an extremely preterm infant and no consensus guidance exists. This study aimed to explore extubation practices in the extremely preterm or extremely low birth weight (ELBW) infants and identify clinical strategies which may influence successful extubation. Composite outcome of mortality and predefined major morbidities were also assessed.

Methods:

A retrospective study was conducted of extremely preterm infants (less than 27 weeks gestational age) or ELBW infants (birth weight less than 1000 grams) admitted to a tertiary neonatal intensive care unit and requiring mechanical ventilation at birth from January 1st to December 31st 2016. Successful extubation was defined as a period of 72 hours or more without needing re-intubation. Data was gathered from BadgerNet, medical case note review and K2 medical systems.

Results:

58.8% infants were extubated within the first 72 hours of life with more than a third requiring mechanical ventilation for over a week. 35.7% achieved successful extubation. A quarter of extremely preterm or ELBW infants only required one episode of mechanical ventilation between birth and discharge home. Earlier extubation did not lead to an increase in major morbidity. It was also not associated with a higher rate of extubation success. As expected, those of a more mature gestation and higher birthweight were more likely to not require re-intubation. Extubation failure was associated with use of sedation, incomplete antenatal steroids and low haemoglobin levels. Higher rates of significant intraventricular haemorrhage and bloodstream infection were seen in infants who failed extubation.

Conclusions:

Early extubation is feasible in the extremely preterm population if pre-extubation conditions are optimised. Findings from this study have contributed towards changing current practice and modification of the extubation checklist. A regional review of extubation practices is underway with the aim of establishing a network guideline.

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1. Giaccone A, Jensen E, Davis P, et al. Definitions of extubation success in very premature infants: a systematic review. *Arch Dis Child*. 2014;99(2):F124-127
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7: Exomphalos: 9 year Experience of a Tertiary Neonatal Intensive Care Unit

Dr Sarah Williamson¹, Miss Louise Lawrence¹, Dr Shree Vishna Rasiah¹

¹Birmingham Women's & Children's Nhs Foundation Trust, United Kingdom

Biography:

I am a paediatric trainee in the West Midlands Deanery, currently working as a neonatal simulation fellow. I have a passion for neonatal medicine and aspire to become a neonatal consultant in the future.

Background:

Exomphalos is a frequently seen congenital abnormality, with reported prevalence in the UK of 3.8 per 10,000 births.¹ Exomphalos is an isolated finding in 1.4 per 10,000 cases, whereas 1.2 per 10,000 are associated with multiple abnormalities, and a further 1.2 per 10,000 having chromosomal anomalies². Associated abnormalities have been shown to influence long term survival, 1 year survival in isolated anomalies reported as 91%, compared with 81% in multiple abnormalities, and 27% if associated chromosomal anomalies.

Our aim was to describe our experience key outcomes for infant and families with exomphalos admitted to a single surgical neonatal intensive care unit in the West Midlands.

Methods:

Retrospective case note review of all infants diagnosed with exomphalos and admitted to a single surgical neonatal intensive care unit (NICU) over a 9 year period. Infants were identified and data collected from Badgernet electronic patient record and paper notes between 1st April 2009 and 31st March 2018.

Results:

29 infants were identified, 55% male (n=16). Mean gestation 36 weeks (28-40), mean birth weight 2965g (1130-4730g). 59% (n=17) were classified as exomphalos major. 26% (n=8) required intubation at delivery, and 17% (n=5) required inotropic support. 83% (n=24) underwent an echo to look for associated cardiac anomalies. 59% (n=17) had structural anomalies, 4 of these were felt to be significant. 34% (n=10) had other congenital abnormalities, most commonly musculoskeletal (n=5), gastrointestinal (n=4), and ENT (n=3). 34% (n=10) had an underlying genetic diagnosis, mostly commonly being Beckwith-Weideman (n=8).

100% of surviving infants with exomphalos major underwent conservatively management, consisting of delayed surgical closure after full epithelialisation of the sac by applying topical antimicrobial agents. 83% (n=10) of infants with exomphalos minor underwent primary closure prior to discharge. Two infants with minor defects were discharged home without surgery. One of these infants underwent surgery at 4 years of age.

Overall mortality was 21% (n=6), all infants having exomphalos major. 2 infants had an underlying genetic diagnosis, and 3 significant underlying congenital anomalies. 5 infants were born preterm (28 - 36 weeks). Time of death ranged from day of birth to 2 years of age.

Conclusions:

Exomphalos major can be effectively managed with conservative management and delayed surgical closure. Daily support from the surgical outreach team, allows these infants to be managed on the NICU, avoiding unnecessary transfer to the tertiary surgical centre.

Our experience suggests that infants with diagnosis of exomphalos major and associated congenital or genetic anomalies are at increased risk of mortality, especially if born premature or require ventilatory and / or inotropic support in the postnatal period.

This review enables us to give parents more detailed information during antenatal counselling in our neonatal unit.

References:

1. Springett A, et al. Birth prevalence and survival of exomphalos in England and wales: 2005 to 2001. Birth Defects Res A Clin Mol Teratol. 2014 Sept;100(9):721-5.
2. Sakonidou S, Kamal A, Farmer I, Hickey A, Greenough A. Mortality and short term morbidity in infants with exomphalos. Pediatrics International. Vol 60, Issue 5. May 2018, p438-441

Table 1

Associated Anomalies	Number of Infants
Atrial Septal Defect (ASD)	7
Patent Ductal Arteriosus (PDA)	7
Patent Foramen Ovale (PFO)	6
Cardiac Hypertrophy	4
Ventricular Septal Defect (VSD)	4*
Double Outlet Right Ventricle (DORV)	1*
Total Anomalous Pulmonary Venous Drainage (TAVPD)	1*
Digit Anomalies	3
Inguinal Hernia	3
Thoracic Scoliosis	1
Fixed Talipes	1
Pulmonary Hypoplasia	1
Laryngomalacia	1
Hypospadias	1
Cerebral Atrophy	1
Choanal Atresia	1
Single Kidney	1
Duodenal Atresia and Congenital Volvulus	1
Outer Ear Anomaly	1
Petrology of Cantrell	1

*Cardiac lesions deemed significant

8: Expressed breast milk on the neonatal unit – when do mothers stop expressing and how we are promoting sharing of good practice

Dr Claire Blythe¹, Dr Elizabeth Pilling²

¹Future Leaders Programme, Health Education England, Sheffield, United Kingdom, ²Jessop Wing, Sheffield Teaching Hospitals NHS Foundation Trust

Biography:

I am currently working as a Leadership fellow across Yorkshire and Humber Operational Delivery Network reviewing use of expressed breast milk in pre-term infants. From August I will return to the neonatal GRID programme.

Objectives: To gather information regarding patterns of expressed breast milk (EBM) use to try to discern when mothers stop expressing. To process map EBM use in different units. To circulate the process maps to share good practice across the region to improve breast feeding rates.

Methods: This was a retrospective analysis of anonymized Badger data supplied by the Yorkshire and Humber Operational Delivery Network (ODN) for babies admitted and discharged to one unit of all gestations from March 2017-April 2018. The data relates to a single care episode for each baby. Feeding data was analyzed on day 1 of life and every 7 days until day 56 and at discharge. Comparison was made of the number of babies receiving any EBM against the number of babies receiving any milk. For the 4 NICUs data relating to babies on NICU and Transitional Care was also analyzed, as were babies <33weeks gestation on NICU + TC.

Currently process mapping is underway, reviewing practice relating to EBM use such as antenatal interventions, admission documentation, maternal education regarding expressing, diminishing milk supply, numbers of pumps/ screens/ parent rooms, fridges and access to these, support to establish breast feeding, use of fortifier and community support. This will be shared across the units in the ODN; individual teams can then decide whether to implement feasible practices that may improve expressing when applied within their unit and population. It is hoped that local QI projects will be commenced in response to this.

Results: Three key points in the EBM journey have been focused on:

- Percentage of babies receiving EBM at day 14- to represent the number of mothers establishing expressing, range 36-90%
- The point at which EBM fall by greater than 10% to represent a discontinuing in expressing (or 5% if no 10% fall), range from 21 days onwards
- The difference between the day 14 and at discharge to represent the number of mothers choosing to not express/breast feed at discharge, decrease at discharge from 0-31%

Process mapping is showing variation in practice at different units. There are some common themes but it is interesting the range of interpretation of how best to support mothers in expressing.

Conclusions: No specific time point can be identified when mothers 'stop' expressing. From this data set the key to the babies receiving EBM for the longest time period appears to be establishing milk expression. Process mapping is revealing the variation and similarities in units across the network. Next steps in this project include sharing of the process maps allowing sharing of good practice and allowing unit specific changes to be implemented.

9: Group B streptococcal sepsis: Experience of one tertiary neonatal unit. A 12-year review.

Dr Nicola McMullan¹, Cora Hiatt¹, Dr Puneet Nath¹

¹University Hospital Coventry, United Kingdom

Biography:

West Midlands paediatric trainee with interest in neonatal GRID

Background

Group B streptococcus (GBS) is one of the most common causes of neonatal sepsis, and can lead to significant morbidity and mortality. The aim of this retrospective review was to review cases of GBS sepsis in a tertiary neonatal unit.

Method

A retrospective review of neonates admitted over a 12-year period between 2007 and 2019 with positive blood cultures for GBS was conducted. Eligible babies were identified from microbiology records, and further data obtained from clinical notes and Badgernet. Early-onset infection was defined as infection occurring <7 days of life, and late-onset infection >7 days of life.

Results

Over a 12-year period, 33 episodes of GBS sepsis were identified on the neonatal unit. The overall incidence was 0.482 per 1000 live births in University Hospital Coventry, although this data excludes babies developing GBS sepsis outside of the neonatal unit. The overall incidence of GBS sepsis per 1000 neonatal admissions was 1.6 per 1000 between 2014 and 2019. Early-onset GBS sepsis accounted for 75.76% of cases, and late-onset GBS sepsis for 24.24%.

56% of early-onset GBS affected term infants. All babies were symptomatic within 14 hours of birth, and there were no risk factors for sepsis in 71.43%. The most common presenting feature was respiratory distress in 85.71%, and 14.29% were asymptomatic and screened at birth due to maternal sepsis. In these babies, 64.3% of mothers had not been screened for GBS colonisation during pregnancy (22% of whom had tested positive in a previous pregnancy). High vaginal swabs were conducted in 35.7% of women, with a negative result in 60% (3 swabs), and a positive result in 40% (2 swabs). The women with positive swabs did not receive intrapartum antibiotics. Mean maximal CRP was 84 (range <3-232). Meningitis was confirmed in 14.29%. Mean length of admission due to GBS sepsis was 8.14 days (range 5-14 days). All babies survived with no known complications based on data available.

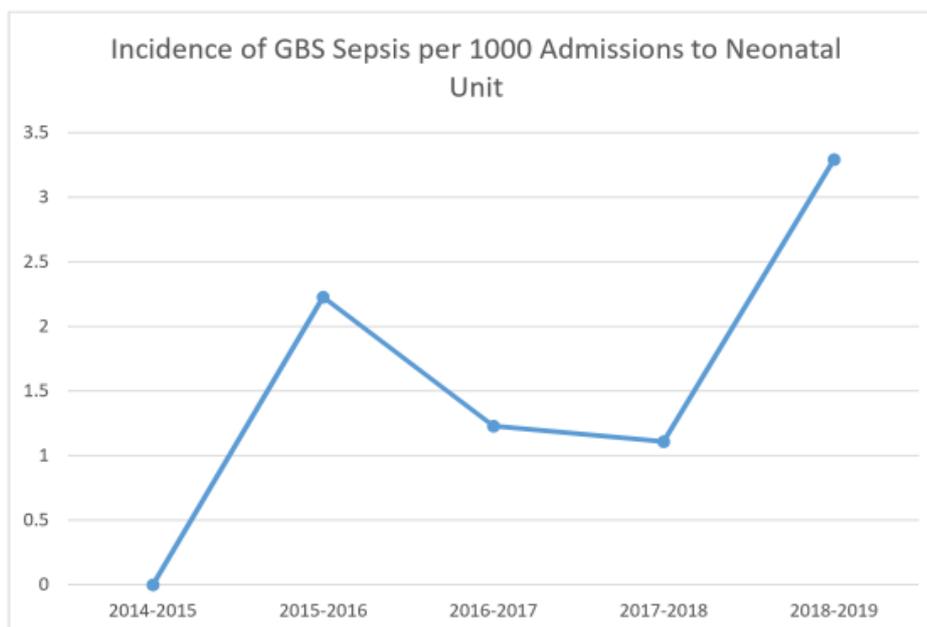
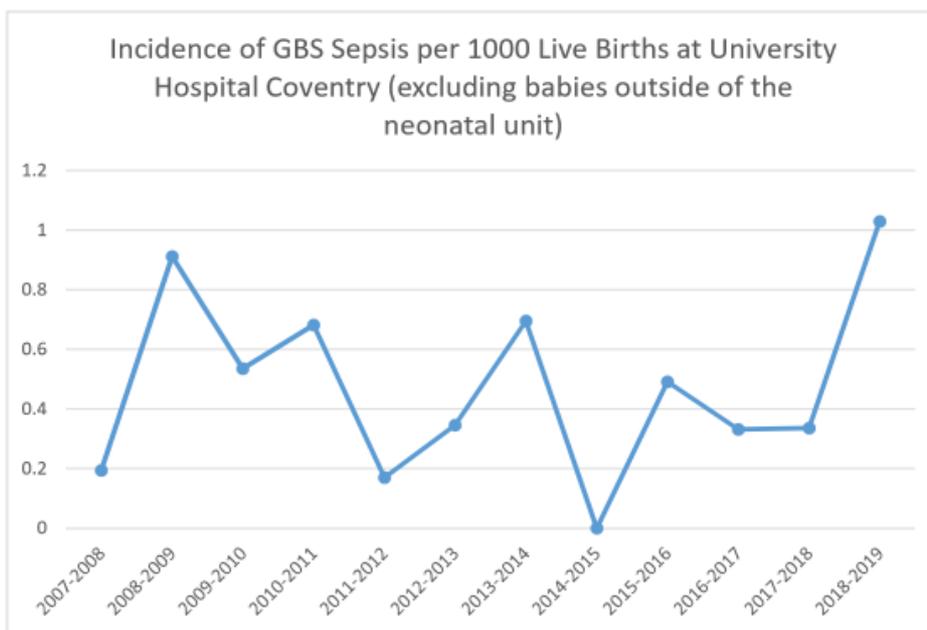
Pre-term infants accounted for 44% of early-onset GBS sepsis (gestations between 22+6-35+2 weeks). Of these babies, 90.9% were screened at birth due to sepsis risk factors including prolonged rupture of membranes (63.6%) and maternal sepsis (36.3%). Mean maximal CRP was 52 (range 4-154). One baby was treated for meningitis, and developed post-haemorrhagic hydrocephalus requiring VP shunt insertion. The mortality rate was 18.2% (2 babies) in this group, however both infants were extremely premature.



Late-onset GBS sepsis accounted for 24.24% of cases (gestations between 28+2-33+2 weeks). Infants presented with signs of sepsis between days 10-69 of life. The most common presenting features were respiratory distress (87.5%), and altered behaviour (50%). Necrotising enterocolitis was initially suspected in 37.5%. Mean maximal CRP was 128 (range 41-295). Meningitis was confirmed in 12.5%. No deaths were reported in this group, with no significant morbidity reported in the data available.

Conclusion

Over a 12-year period, 33 episodes of GBS sepsis were identified on our tertiary neonatal unit. This has a significant impact on babies, and their families. More research is needed to prevent GBS neonatal sepsis.



10: How effective is Helping Babies Breathe training for practitioners delivering babies in non-facility settings?

Miss Grace Mupanemunda¹

¹University Of Bristol, United Kingdom

Biography:

Grace Mupanemunda is a medical student in her third year at the University of Bristol. In July 2018, she graduated with a BSc in Global Health, also from the University of Bristol, having intercalated the academic year. She has a keen interest in paediatrics, and attended the Helping Babies Breathe master training course in Bristol, which partially inspired her dissertation. Following the master training course, she conducted a survey of practitioners who had been trained under this programme to assess its effectiveness in low income settings. This survey would then provided the basis of the dissertation, which serves as a basis for further research.

Background

Birth asphyxia before, during or immediately after birth is a leading cause of early neonatal mortality worldwide. In addition to the high number of stillbirths due to birth asphyxia, many preventable neonatal deaths occur in babies presumed dead at birth who may have survived with clinical intervention. Neonatal resuscitation is a simple and effective intervention that can reduce neonatal mortality in asphyxiated newborns. Helping Babies Breathe (HBB) is a training programme developed by the American Association of Paediatrics that teaches the theory and skills required to deliver effective neonatal resuscitation and essential newborn care especially in low resource environments. This programme has been shown to improve neonatal outcomes, specifically reducing neonatal mortality and stillbirth rates.

Methods

Data was obtained from a mixed questionnaire completed by eleven practitioners and trainers from all of the main world regions, bar Europe. These practitioner and trainers were recruited via email and participant selection was made on an opt-in basis. The respondents' details were obtained from a register of practitioners and a maximum of two reminders were sent to those who agreed to participate. Data from five participants was not used as they did not meet the criteria. The qualitative data obtained was organised into themes and then analysed in order to determine how far the training in non-facility settings was beneficial.

Results

Questionnaire results from eleven respondents were included in this study. All respondents reported a benefit to implementing the training for non-facility deliveries. Where outcomes were measured, improvement was seen, both in obstetric practices and neonatal outcomes. Trained practitioners reported improved confidence in initiating neonatal resuscitation including keeping the baby dry and warm.

- Better thermal control
- Less respiratory distress
- Quantify outcomes



REaSoN



Conclusion

Many women in low income countries still choose to give birth outside of medical facilities, but still require birth attendants that can provide adequate obstetric care and effective resuscitation if required. HBB training is beneficial for non-facility births in low income countries and should be advocated for in these settings, as it allows women to deliver safely outside of facility environments.

11: HOW LOW IS TOO LOW? NEONATAL MORBIDITY, MORTALITY AND SHORT-TERM HEALTH OUTCOMES FOR TERM INFANTS BORN WITH ARTERIAL CORD PH 7.0-7.1

Mr Thomas Munro^{1,2}, Ms Alice Shiner^{1,2}, Dr Rose Marion¹, Dr Sarah Bates^{1,2}

¹Great Western Hospital, United Kingdom, ²University of Bristol, , United Kingdom

Biography:

I am a 4th year medical student at the University of Bristol with an interest in neonatology, recently having completed a paediatric placement at Great Western Hospital, Swindon.

Background: Current evidence supports a higher risk of adverse neurological outcomes in neonates born with a cord pH<7.0. Therefore, treatments including therapeutic hypothermia are currently supported in these neonates. More recently, it has been suggested that the absolute risk of these outcomes increases under pH 7.1, this being at its lowest at pH 7.26-7.31. Determining the risk in neonates born with cord pH 7.0-7.1 could result in the wider use of these therapies to include those with a cord pH<7.1.

Aim: Evaluate and compare early outcomes in term neonates born with a cord pH 7.0-7.1 and those born with an 'ideal' cord pH 7.26-7.31 at one institution.

Patients/Methods: 8994 neonates delivered between 01/01/16 and 31/12/17 were initially included. Those with gestation under 36+6 were excluded. In the exposure group (cord pH 7.0-7.1) those with venous pH<6.999 were excluded to yield 175 neonates. Random selection amongst the 765 in the control group (cord pH 7.26-7.31) matched this number. Patient notes were reviewed for several outcomes including neonatal death, admission to the Neonatal Intensive Care Unit (NICU), need for resuscitation, APGAR scores and number of hospital attendances in the first year of life. Within the cohort admitted to NICU; further in-hospital outcomes were measured.

Results: A risk ratio (RR)= 4.45(2.39-8.38), 2.5 (0.49-12.76),1.72 (0.18-16.16) was seen for neonates in the exposure group for APGAR score<7 at 1, 5 and 10mins respectively. A RR=1.92 (1.23-3.00) was seen for admission to NICU. Of these; RR=6 (1.54-23.33) for respiratory morbidity and RR=2.60 (0.32-21.08) for encephalopathy. A RR=3.22 (1.98-5.24) was seen for requiring resuscitation. No difference was seen in mortality between groups. A RR=0.84 (0.65-1.09), 0.46 (0.25-0.87), 1 (0.56-1.79) and 0.91 (0.59-1.41) was seen for Emergency Department, Admission Unit, Inpatient and Outpatient attendances respectively in the first year of life. These RR were 0.86 (0.49-1.54), 1.50 (0.25-8.87), 0.75 (0.17-3.30) and 1.1 (0.48-2.52) when repeated (2 or more) attendances were considered.

Discussion/Conclusion: This study demonstrates no evidence for an increase in mortality amongst neonates born with cord pH 7.0-7.1. No statistically significant difference in hospital attendances were observed in the first year of life. However, they are at increased risk of being born in poorer condition and requiring resuscitation. They are also more likely to require admission to NICU. We suggest that the identification of this cohort of neonates has prognostic importance in short-term morbidity. More study is required to elucidate longer term health outcomes and evaluate the suitability of this cohort for interventions currently reserved for those born with cord pH<7.0.

12: Implementing a Birthday Cuddle is safe and enjoyed by parents and staff alike

Magdalena Fuller¹, Filomena Mayra A. Leita¹, Dr Peter Reynolds¹

¹Neonatal Intensive Care Unit, St. Peter's Hospital

Aims:

Inspired by the presentation from the Norwich Neonatal Unit at last year's Reason Meeting, we felt that introducing a planned "birthday cuddle" in the delivery room fitted very well with our unit's ethos of minimally invasive management and culture centred around the whole family unit.

Methods:

We collected prospective data on staff and family experience during the implementation of the birthday cuddle, as well as data on admission temperature and blood gas including blood sugar results. We wrote a guideline to enable up to 5min of a newborn's "birthday cuddle" for those babies who would normally be taken to the neonatal unit. Parents were supported and reassured by the neonatal staff throughout the cuddle, with staff aiming to be as quiet as possible during these key moments. Some members of staff volunteered to be "cuddle champions" driving the project forward, supporting and teaching others how to do it safely. Where available questionnaires were paired (staff and parents together) and responses were analysed.

Results:

54 individual babies received a birthday cuddle with median birthweight 1098g and gestation 29+3 weeks. There were 30 paired questionnaires involving responses from 36 members of staff and 33 parents. There were an additional 17 unpaired staff questionnaires and 5 unpaired parents' questionnaires. The median length of the cuddle was 5 minutes. The median admission temperature was 36.8°C, median pH was 7.30 and median blood sugar level on blood gas on admission was 2.7mmol/L. Other blood gas parameters were within expected range.

The feedback showed a positive response from both parents and staff. Staff were happy that the cuddle did not compromise medical management either of the baby nor the mother. They felt it was an emotional moment for the parents and that it was greatly appreciated. Staff commented on how "smooth, relaxed and calmly co-ordinated amongst the whole team" the cuddle was and how it gave them "great clinician's satisfaction". Parents were happy with the communication and care delivered by the neonatal team. They appreciated their baby's response to them and felt comfortable at the time, one describing it as "the most amazing experience of our lives". Many more comments have been collected during the audit and will be presented.

Conclusion:

There has been an overwhelmingly positive response from both parents and staff to the birthday cuddle project, and we have been reassured that this is safe and practicable. As a result it is now part of our routine neonatal practice in the labour ward and theatres. We recommend it to others and are happy to share our guideline and audit forms.

13: Is fluid bolus therapy effective in the management of circulatory failure in the early life period of VLBW preterm infants?

Dr Camilla Menis^{1,2}, Dr Alexandra Scrivens¹, Dr Sanja Zivanovic¹, Miss Margherita Lazzerini¹, Dr Paola Roggero², Dr Fabio Mosca², Dr Charles Christoph Roehr¹

¹Newborn Services, John Radcliffe Hospital, Oxford University Hospitals, NHS Foundation Trust, Oxford, United Kingdom, ²Università degli Studi di Milano, Milano, Italy

Biography:

Camilla graduated as a Medical Doctor from the University of Milan, Italy and completed a postgraduate course in neonatal intensive care. She's currently completing her specialty training in paediatrics and neonatology. She joined the Newborn Services, John Radcliffe Hospital, Oxford University Hospitals in September 2018 for a research program. Her principal research interests include neonatal intensive care, hemodynamic management of preterm babies and neonatal trajectories of growth.

Background: During the early hours of life, very low birth weight (VLBW) preterm infants are at particularly high risk of hemodynamic instability, leading to circulatory failure. The administration of intravenous fluid boluses in the management of hemodynamic instability in this population is a common practice in neonatal units around the world. However, there is little evidence on the efficacy and the safety of fluid bolus therapy and there are no evidence-based recommendations for the type of fluid administered, velocity of infusion or indications for fluid bolus therapy.

Aim: To investigate the practice and the effects of the administration of fluid boluses in preterm infants <1500g on blood pressure, acid-base equilibrium and short-term outcome.

Methods: Six month retrospective single-centre study of all the inborn VLBW (<1500g) infants admitted to the NICU of the John Radcliffe Hospital (Oxford) between July and December 2018. Baseline information (birth weight, gestational age, pregnancy and delivery), fluid boluses within the first 72 hours since birth (indication, fluid type, volume, velocity of infusion), clinical data including mode of respiratory support, blood pressure, as well as outcomes at discharge: survival, bronchopulmonary dysplasia (BPD), sepsis, necrotizing enterocolitis (NEC), patent ductus arteriosus (PDA), intraventricular haemorrhage (IVH), periventricular leukomalacia (PVL) were collected. Statistical analysis included comparison of clinical parameters, blood gas parameters and clinical condition before and 1 to 4 hours after the administration of each bolus.

Results: 82 infants were born during the study period, 59 of which were eligible. 15 neonates (25.4%) received fluid boluses in the first 72 hours. Infants receiving boluses were of lower mean gestational age (25.89 vs 28.97 weeks gestation, $p < 0.05$) and birth weight (822.29 vs 1076 g, $p < 0.05$) than those not receiving boluses, but no statistically significant differences in sex, mode and reason of delivery, prenatal steroids and admission temperature were seen. There was a higher rate of IVH, NEC, PDA, inotropes and all-cause mortality in the bolus group ($p < 0.05$); but no differences in PVL and BPD. The mean number of boluses per baby was 2.42 (SD=1.52). The fluids used were 0.9% NaCl (47.4%), packed red blood cells (PRBC, 36.8%), fresh frozen plasma (FFP, 10.5%) and 0.45% NaCl (5.3%). The volumes infused were 10 mL/kg in 20 min for NaCl and 15 ml/kg in 4 hours for PRBC. There was an improvement in terms of clinical assessment, mean blood pressure, pH, lactate level, bicarbonate level and base deficit ($p < 0.05$), while we did not find any difference in chloride, haemoglobin and heart rate.



REason



Conclusion: The administration of fluid boluses (most commonly 0.9% saline) in VLBW preterm infants is a common practice in this tertiary NICU. Infants with a lower birth weight and gestational age are more likely to receive boluses. Administration of boluses in these infants shows a short-term improvement in clinical and biochemical parameters. Infants who received a bolus had a higher rate of mortality, IVH, NEC and PDA requiring treatment. Further work is required to determine the potential benefits or harms of fluid bolus administration in neonates.

14: LIPID OVERDOSE IN A PRETERM NEONATE: LESSONS LEARNT FROM MEDICATION ERROR

Dr Sonal Datir¹, Charlotte Sewsarran¹, Dr Gopa Sarkar¹

¹Neonatal unit, Stoke Mandeville Hospital, Aylesbury, United Kingdom

Biography:

I am a Paediatric Registrar, working at Stoke Mandeville Hospital. I have a special interest in neonatology and am passionate about my work. I have completed my postgraduate training in Paediatrics (M. D. Paediatrics) in India. Thereafter, I came to the UK to broaden my experience in neonatology. I completed my MTI neonatal fellowship from John Radcliffe Hospital, Oxford, and also worked in Neonatal unit at Luton and Dunstable Hospital. I have enjoyed working in these tertiary Neonatal units which were amazing units to work, with amazing people; The experience in these units has not only strengthened my neonatal skills but also provided me with excellent opportunities to involve in various audits and quality improvement projects and to be able to make a change. I would like to continue my efforts further to contribute to the developments in neonatal care.

BACKGROUND:

Medication errors can cause significant harm, but are a preventable cause of morbidity and mortality in the presence of effective intervention strategies. The complexity of intravenous medication administration in neonates involves an increased risk of medication errors¹. Also, neonates have a less capacity to buffer the unintended consequences of the medication error due to physiological immaturity².

Lipids are considered as high alert medication and overdose can cause significant complications including hypertriglyceridemia, respiratory failure, metabolic acidosis, hemolysis, liver dysfunction, and pancreatitis. Long-term complications include pulmonary hypertension, bronchopulmonary dysplasia, and neurodevelopmental delays.³

AIM:

The aim was to highlight the intervention strategies and learning involved in a medication error due to lipid overdose.

CASE:

A baby boy born at 29 weeks was commenced on Parenteral Nutrition (PN) at corrected 32 weeks for suspected Necrotising Enterocolitis (NEC). The infusion was 'checked' by two trained nurses at the start and at two handovers; with hourly pump readings. Later, the infusion pump delivering lipid alarmed as the bag was empty which prompted a review of fluid chart balance only to note that the infusion rate of lipids was set incorrectly; 120mls of lipid was infused; instead of expected 17.1mls (7 times higher).

INTERVENTIONS:

The baby had mild respiratory distress; observations were stable. The lipid infusion was discontinued. The triglyceride levels were very high 83.8mmol/l (Normal 0.34 – 2.08 mmol/l). The baby was transferred to tertiary NICU, required respiratory support, and received a double volume exchange transfusion. Parents were updated and supported throughout.

National Patient Safety Agency (NPSA) alert was raised. A serious incident root-cause analysis was carried out to identify the opportunities to minimise the recurrence of the error.

This case illustrated a lack of robust checking system and no clearly identifiable process to differentiate between multiple infusions. This emphasised on independent checks by two trained nurses, and cot side checklist during handover (to be signed by two qualified nurses) to allow checking of pumps and rates to overcome involuntary automaticity.

The process of the administration of PN in neonatal unit was reviewed to include a detailed workflow diagram to identify specific problem areas. The bags were colour coded, clear labels were used and infusions were set to run for a maximum of 4 hours.

A competency based workbook was developed to improve uniformity in practice with regards to administrations of medication including PN.

Debrief session and shared learning was organised for all staff, reinforcing the lessons learnt and incorporating into neonatal mandatory training.

Our investigation led to a major change in manufacturing nationwide. Based on the recommendations, the volume in lipid bags was reduced to 60 mls and changed to red coloured bags.

CONCLUSIONS:

Exchange transfusion remains the mainstay of treatment for lipid overdose to prevent acute and delayed complications.

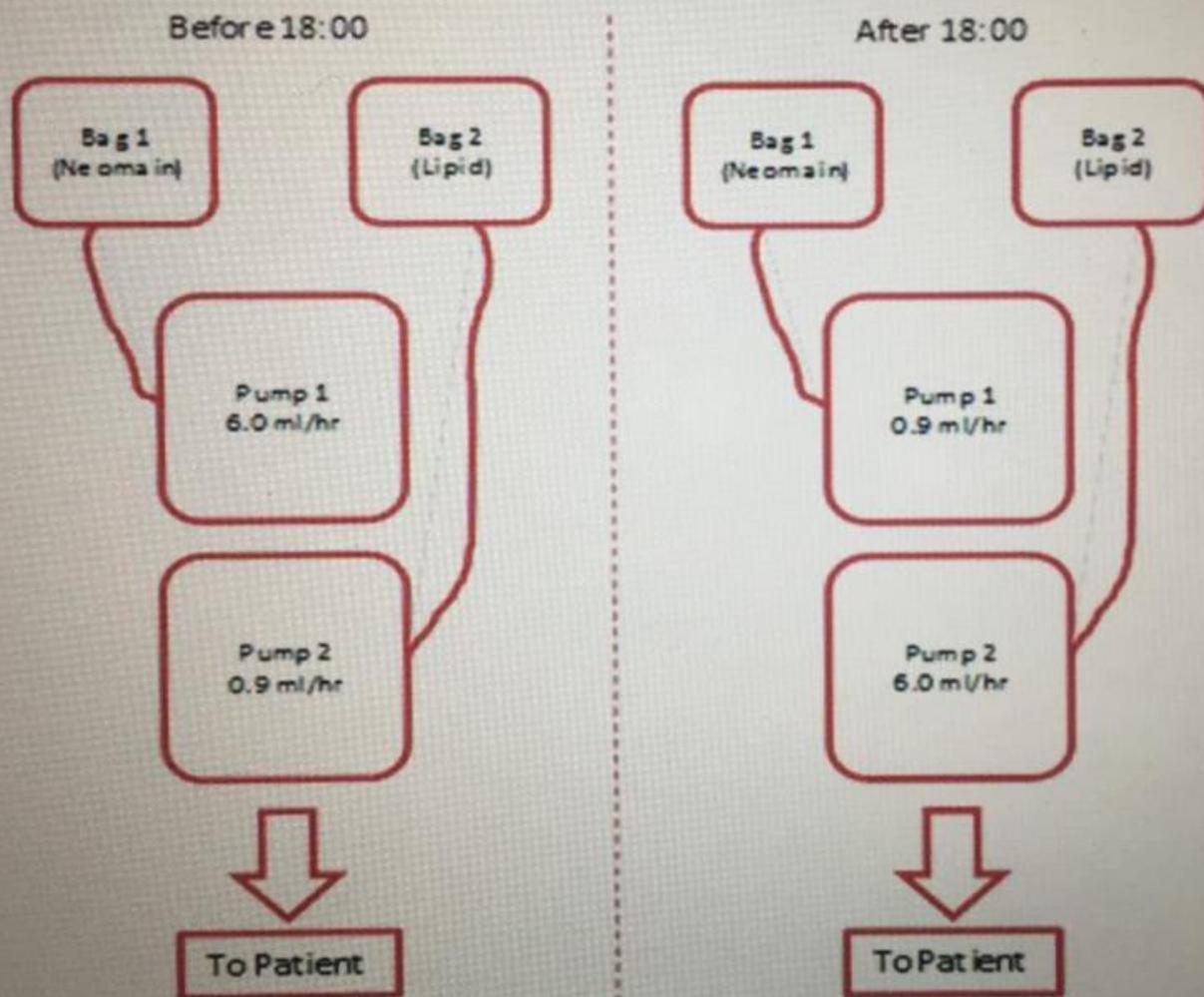
Human factors play a crucial role. Identifying human errors and developing robust intervention strategies is challenging but very important.

Medication safety in neonatal care involves education and training of the staff; debriefs and shared learning from errors, and timely review of the practices.

References: 1)Chedoe I et al. Incidence and nature of medication errors in neonatal intensive care with strategies to improve safety. *Drug Saf* 2007; 30:503- 513 2)Samra HA et al. Patient safety in the NICU: a comprehensive review. *J Perinat Neonatal Nurs* 2011; 25:123- 132 3)Salama GS et al. Intravenous lipids for preterm infants: a review. *Clin Med Insights Pediatr.* 2015;9:25–36



Diagrammatic representation of the infusions highlighting the medication error



15: Lying or sitting lumbar punctures – what do the nurses think?

Dr Alexandra Scrivens¹, Dr Andrew Marshall¹, Miss Rhea Navani³, Miss Charlotte Bannink⁴, Dr Charles Roehr¹

¹Oxford University Hospitals and University of Oxford, Oxford, United Kingdom, ²Oxford University Hospitals, Oxford, United Kingdom, ³Monash University, Australia, ⁴University of Tasmania, , Australia

Biography:

I am an ST5 registrar, currently working as a clinical research fellow on the NeoCLEAR study at Oxford university hospitals.

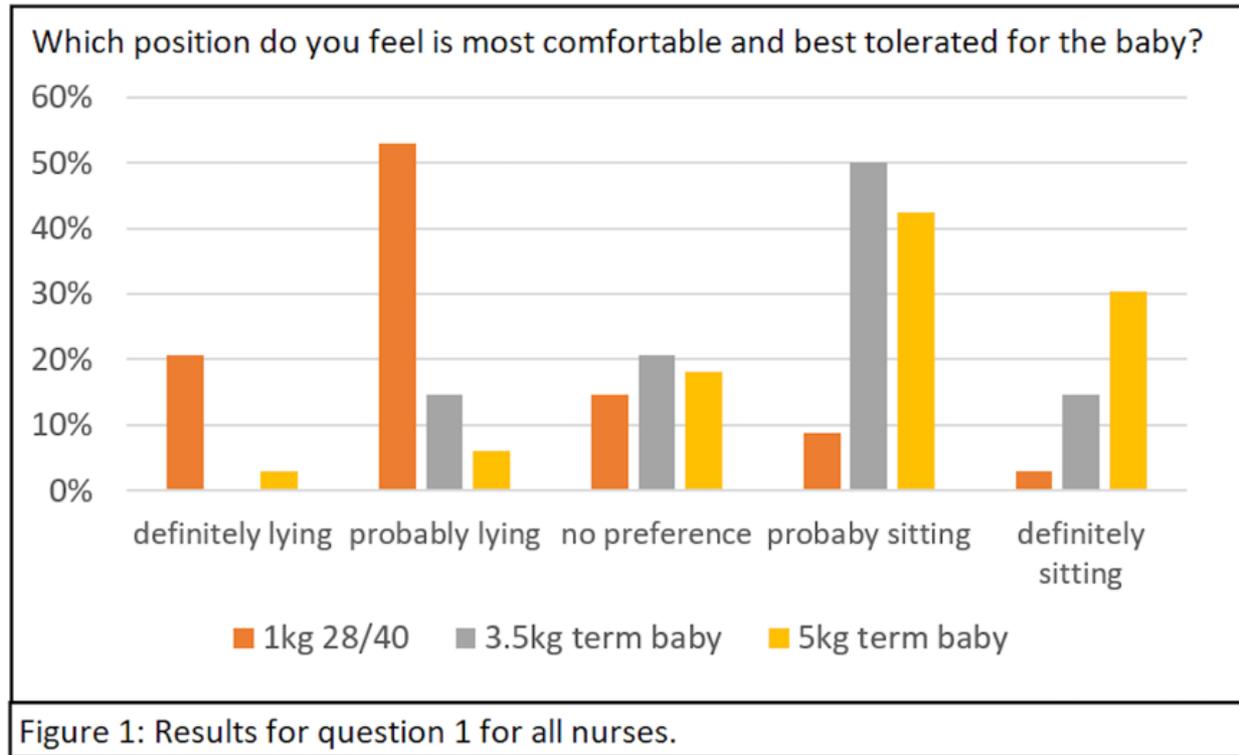
Background: Neonatal lumbar punctures (LP) require skill in positioning the needle in the intervertebral space and also a skilled holder to keep the baby still during the procedure, a task often allocated to the nurse caring for the baby. As part of a study to determine the optimal position for neonatal LP, the sitting position was introduced as an alternative to the traditional lying position for lumbar punctures at a tertiary neonatal unit. Whilst data will soon be available comparing lying and sitting LP success rates, the opinions of nurses who regularly hold for LPs are very valuable in assessing infant comfort and ease of holding.

Aim: To gauge the acceptability of the sitting position compared to the lying position to the nursing team.

Method: Nursing staff at a tertiary neonatal unit were surveyed, asking in which LP position do they feel that the baby is most comfortable? In which do they feel it is easier to hold the baby still? And which do they feel is most likely to result in a successful LP? Options were given as 'definitely lying', 'probably lying', 'no preference', 'probably sitting' or 'definitely sitting'. Nurses were asked to consider these options for a 1 kg preterm baby, a 3.5kg term baby and a 5kg term baby.

Results: Of 72 nurses who regularly do ITU/HDU shifts, 34 responded to the survey (47% response rate). Of these, 15 (44%) had held a baby for a sitting LP. Results are summarised in Figure 1. Participants felt that preterm infants tolerated LP best in the lying position (23/34 answered definitely or probably lying); whereas term infants, particularly larger term infants, were more comfortable in the sitting position (19/33 answered probably/definitely sitting for a 5kg baby). Sitting was felt to be easier for the holder in larger babies, yet the nurses felt that it was easier to hold a smaller baby in a lying position. The chances of success were thought to be equal in both sitting and lying, with most (37/96 responses) expressing 'no preference' for all sizes of infant. Overall, nurses who have held an infant for a sitting LP show confidence in the position, particularly for larger babies, and a stronger preference for the sitting position than those who have not held an infant in the sitting position.

Conclusion: The nursing team at this unit feel that lying is more comfortable and better tolerated by smaller babies. The nurses show preference for the sitting position (for comfort and ease of holding) for term babies and larger babies. There is no clear overall position preference for likelihood of success. Most nurses who have never held an infant in the sitting position indicated that, with appropriate training, they would be willing to try this and feel that it may be more suitable in larger infants.



16: Neurodevelopmental outcomes of infants born at < 32 weeks gestation or birth weight <1500 grams in a single-centre level 3 neonatal unit

Dr Rachel Panniker¹, Dr Christina Manea¹, Dr Vennila Ponnusamy¹

¹St Peter's Hospital, Ashford and St Peter's NHS Foundation Trust, Chertsey, United Kingdom

Biography:

I am a Consultant Neonatologist in St Peter's hospital and unit lead for transitional care. My special interests are neonatal nutrition and neurodevelopment. In addition to clinical interests, I am also interested in postgraduate teaching through simulation; improving service through a number of quality improvement projects and promoting research. I lead and deliver regular in-house multidisciplinary simulations. In addition to supporting research activities in our unit, I am also doing a part time PhD in Biomarkers of Brain Injury in Newborn in Queen Mary University of London.

Background

National Neonatal Audit Programme (NNAP) helps to benchmark each unit's outcomes. Despite being a NNAP criteria, nationally only 60% of preterm infants <30 weeks gestation at birth had follow-up data on 2 year neurodevelopmental outcome in 2016 and 2017. Additionally, very low birth weight infants are also at a significantly high risk of developing cerebral palsy. With poor follow-up rates, NNAP has not been able to benchmark neurodevelopmental outcome of preterm infants <30 weeks gestation in the last decade.

Aim

Through a QIP, we improved our 2 year follow-up rates of preterm infants <30 weeks gestation to 90% in 2017-2018. Therefore, we aimed to study the neurodevelopmental outcomes of preterm and very low birth weight infants discharged from our unit.

Method

St Peter's Hospital is Surrey's lead NICU with birth rate of 4,000 per year. We performed a retrospective study on extremely preterm infants (23 to 28 weeks gestation), very preterm infants (28+1 to 31+6 weeks) and very low birth weight infants (<1500 grams). All infants admitted and discharged from our unit fulfilling the above criteria between January 2015 and December 2016 were included.

Analysis was performed in 2 sub-groups: Group 1 includes all preterm infants <30 weeks gestation (NNAP criteria). Group 2 includes non-NNAP criteria infants; 30 to 31+6 weeks gestation and very low birth weight infants <1500 grams not included in Group 1.

A structured neurodevelopmental assessment using Bayley Scales of Infant Development-III (BSID – III) was performed. Complete NNAP data set was also collected through BADGERnet.

Results

In total, 90% of infants from Group 1 and 71% from group 2 attended the clinic appointment (Table 1). The median birth weights in group 1 and group 2 were 920 grams and 1449 grams respectively. Proportion of male infants in group 1 and 2 were 47% and 76% respectively.

Table 2 summarises the neurodevelopmental outcome as categorised by BADGERnet. One infant in group 1 (2%) and 5 infants in group 2 (17%) had severe developmental delay due to language impairment, with only the infant in group 1 having motor delay as well. However, none had a diagnosis of cerebral palsy. Table 3 shows the NNAP multisystem outcome review. This also confirms that only a small proportion of infants had motor impairment.

It was possible to perform full BSID-III assessment in 91% (48/53) of group 1 and 100% (29/29) of group 2 infants. Table 4 shows that the mean composite scores were within the normal range in all 3 domains.

Conclusions

With best follow-up rates of 90% we have been able to interpret our outcome data reliably over the last 2 years. It is interesting to note the change in pattern of severe disability with less motor impairment and more language delay. This seems consistent in extreme and very preterm infants including very low birth weight infants. This could be related to changes in practice in the last decade with increasing non-invasive therapies. We hope to monitor and implement additional support services for language development earlier in the follow-up period.

Table 1 – Follow up rates according to the subgroups and years

	Follow-up rates - 2015 infants	Reasons for lost to follow-up	Follow-up rates - 2016 infants	Reasons for lost to follow-up	Overall follow-up rate
Group 1 (<30 weeks gestation at birth)	25/28 (89%)	3 - OOA	28/31 (90%)	3 - OOA	53/59 (90%)
Group 2 (30 -32 weeks gestation and/ or <1500 grams at birth)	21/30 (70%)	5 - OOA 4 - DNA	8/11 (73%)	1 - OOA 2 - DNA	29/41 (71%)

OOA – moved out of area

DNA – did not attend appointment

Table 2: Overall neurodevelopment outcome according to sub-groups

Both 2015 and 2016 born infants	Eligible infants who attended the follow-up	No disability	Mild Disability	Moderate Disability	Severe Disability
Group 1 (<30 weeks gestation at birth)	53	47%	38%	13%	2%
Group 2 (30 -32 weeks gestation and/ or <1500 grams at birth)	29	48%	17%	17%	17%

Table 3: Additional multi-system NNAP Outcome as required by NNAP and recorded in BADGERnet.

NNAP multisystem outcome criteria	Group 1 (< 30 weeks gestation at birth) % of impairment	Group 2 (30 - 32 weeks gestation and/ or < 1500 grams at birth) % of impairment
Neuromotor impairment	4%	0%
Neurological CP diagnosis	0%	0%
Epilepsy being treated	0%	0%
Hearing impairment	0%	0%
Communication impairment	25%	28%
Vision impairment	2%	7%
Respiratory / Cardiovascular problems	0%	0%
Gastro intestinal / Feeding problems	0%	0%

Table 4: Composite scores according to 3 domains tested

Bayley III Composite scores	Cognitive	Language	Motor
Group 1	94 (22-135)	89 (53-112)	93 (49-121)
Group 2	87 (31-123)	87 (53-115)	90 (61-118)

Values are mean (range)

17: Productive and Cost-effective Neonatal Outreach Services at The Great Western Hospital, Swindon

Dr Keshava Girish Gowda¹, Mrs Catherine Neate¹, Mrs Nikki Taylor¹, Mrs Steph Penny¹, Mrs Rachel Skyes¹, Mrs Gemma Texeira¹

¹Great Western Hospital, England

Biography:

After completing the specialist Paediatric training in Severn Deanery, I have been working as a Consultant Paediatrician/Neonatologist at the Great Western Hospital. Our Neonatal Unit is one of the busy LNU with annual admission rate of around 600. I have been the local lead for ATAIN, Patient Safety, Guideline improvement, QI projects and Data improvement.

Giving birth to a premature or sick neonate is a stressful event for parents. These babies need additional care resulting in prolonged hospital stay usually away from parents. This in turn can have a significant impact on the family wellbeing and function. The separation between such babies and the parents is a threat to the attachment and bonding process. In order to reduce such incidences most neonatal units are now moving towards Family Centred care (FCC) and one of the objectives of FCC is to continue to offer support even after discharge so that parents feel more confident. Recognising the importance of the single point outreach services, NICE made this a quality standard 2 (nice.org.uk/guidance/qs169) published in May 2018. Further results from local parental survey highlighted the gap in neonatal specific support and guidance.

Delivering outreach services pose not only difficulty with the current staffing climate but also increases financial burden. As there was no additional funding allocated for outreach service, we came up with a plan of allocating a Band 5 nurse and Band 4 Nursery Nurses, two days a week with the aim to conduct a total of three to four home visits on all those babies discharged from the neonatal unit irrespective of length of baby's hospital stay. We specifically excluded those babies who were discharged home on oxygen and who were under care of social services, as these babies were already in receipt of multi-agency visits (such as Community Paediatric Team or Social Workers/ Family Nurse Practitioner).

We included trust Information Technology (IT) team in setting up a comprehensive Medway (patient electronic medical records) clinical note to capture such activities on a specific template. The programme went live in August 2018 and is now running successfully. An electronic copy of each consultation is available to relevant health professionals like GPs and Emergency Care team, should the baby face re-admission or assessment for deterioration.

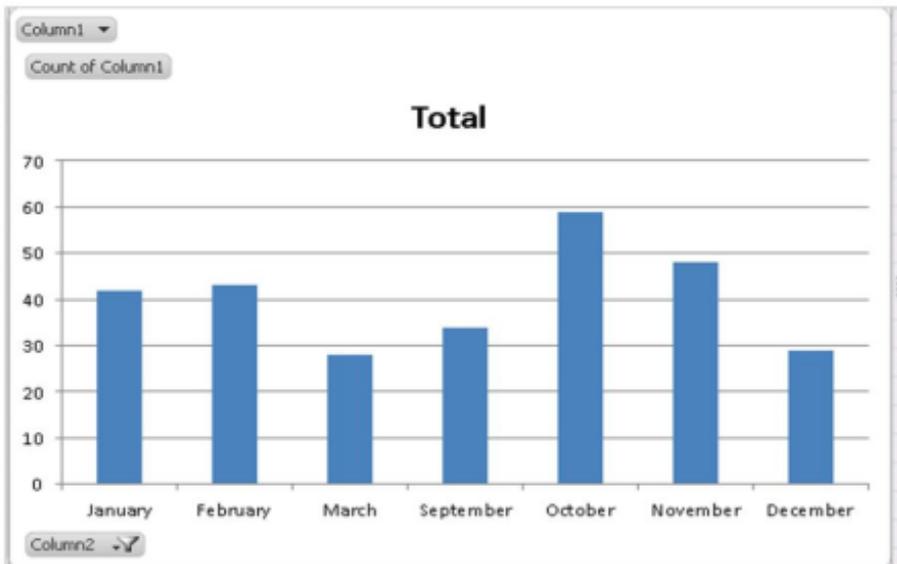
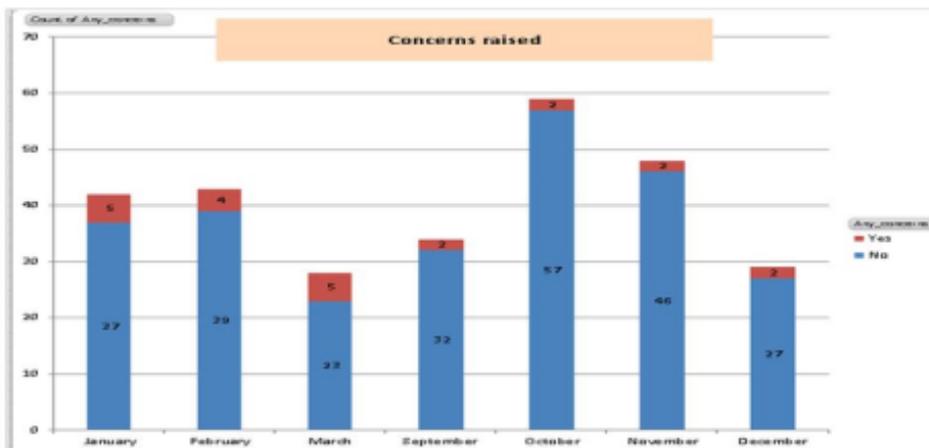
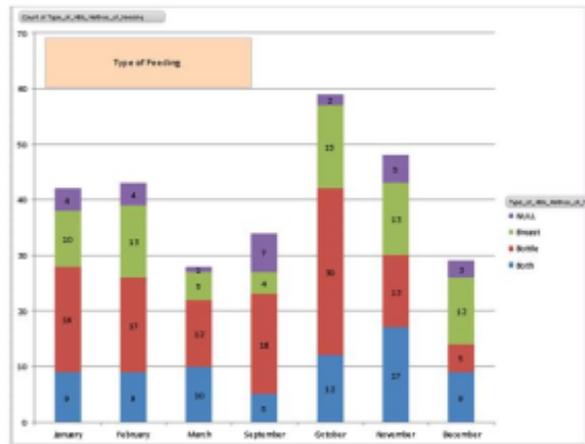
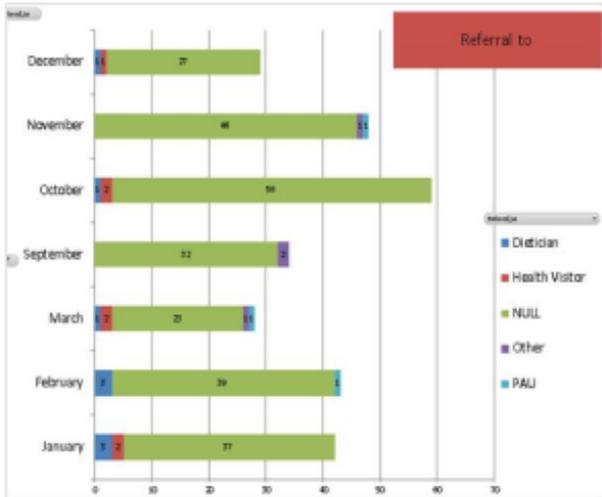
The key areas of improvement we have seen are the accurate data capturing of such activities and continued breast-feeding at four weeks from the time of discharge. The team have also managed to reduce the re-admission rate of such infants for feeding difficulties and weight loss. Only a few babies were referred for additional support through the Paediatric Assessment Unit and excellent liaison with paediatric dieticians allowed prompt advice. Overall, we have brought a smile to those parents who are looking for timely advice and help from the trained professionals. We would like to share our experience with the rest of the medical faculties.



REaSoN



Neonatal Outreach Services Data : September 2018 to March 2019



18: The Correlation Between Early General Movement Assessment and Two Year Neurodevelopmental Outcome in High Risk Preterm Infants

Dr Anneli Allman¹, Mrs Debbie Paris¹

¹Royal Gwent Hospital, Newport, Wales

Biography:

Debbie Paris has been a paediatric physiotherapist in Aneurin Bevan University Health Board for many years. She provides early home based therapy intervention for babies at risk of developmental problems, identifying those infants on the neonatal unit. She has become trained in General Movement Assessments and has been performing these assessments for 2 years. She also works in a health board children's centre supervising and teaching physiotherapy assessments and interventions.

Aims:

It is well known that infants born prematurely have a higher risk of developmental delay across all domains compared with term infants. The Pechtl General Movement Assessment (GMA) is a reliable tool for identifying babies at risk of neuromotor deficit. We sought to compare our GMA results with standardised Bayley's III neurodevelopmental outcomes for a population of babies at a corrected age of 2 years.

Methods:

High risk premature Infants born during 2016 and who received their neonatal intensive care in the Royal Gwent Hospital, Newport were retrieved from neonatal databases. Those infants who had GMA performed were extracted and the GMA results were compared with the results of 2 year standardised neurodevelopmental assessments.

Results:

In 2016, 32 babies born between 23 and 32 weeks gestation had GMA performed between 10 to 15 weeks of age. Most infants had 2 assessments. Their birth weights ranged from 570g to 1850g. 2 babies were lost to further follow up. 30 were invited for Bayley's III neurodevelopmental assessment at a corrected age of 2 years and of these 3 are still awaiting assessment. Of the 27 assessed, 22(82%) have a normal 2 year outcome and 21(95%) of the 22 had normal GMA. One had equivocal GMA. 2(7%) of the 27 babies had unequivocal absent fidgety movements on GMA and both of these infants have severe or moderate delay across all Bayley's domains. 1(4%) infant had absent fidgety movements and did not attend their Bayley assessment but have documented motor delay in standard clinic assessment. 2(7%) infants had moderate cognitive delay on Bayley's testing, but normal motor and speech development and both of these infants had a normal GMA.

Conclusion:

Our study demonstrates a high level of correlation between abnormal GMA and disability as assessed by standardised methods at 2 years. This is most linked with motor dysfunction rather than cognitive. Our numbers are currently small as the GMA service is new to Gwent but preliminary results are encouraging. Abnormal GMA identified in the first weeks of life can be used to target those babies for enhanced intervention thus improving their final outcome.

19: The Management of Necrotising Enterocolitis in a tertiary neonatal surgical unit: A Multidisciplinary Team approach to improve standards of care.

Dr Julia Arthur¹, Dr Shazia Hoodbhoy², Ms Claire Jackson²

¹Luton And Dunstable University Hospital NHS foundation trust., Luton, United Kingdom, ²Addenbrooke's University Hospital Cambridge, Cambridge, United Kingdom

Biography:

I am a neonatal GRID trainee in the UK working in the East of England Deanery. I am 7 years through my paediatric training and 2 years through my specialty neonatal training. I am passionate about neonatal medicine, practising evidence based medicine and improving outcomes in neonatology. My interests include nutrition, growth and improving management of necrotising enterocolitis.

Necrotising enterocolitis (NEC) is a disease of the gastrointestinal tract of premature infants that results in inflammation and bacterial invasion of the bowel wall. It remains a leading cause of morbidity and mortality in this population. Presentation can be varied but is described classically as a triad of abdominal distention, blood in stools and bile stained aspirates/vomits. Stages are classified using Bells staging criteria and treatment is with triple antibiotics and bowel rest +/- surgery depending on the stage of disease. The aim of this service evaluation was to look at NEC management in a single tertiary neonatal surgical unit and to use the information to improve care.

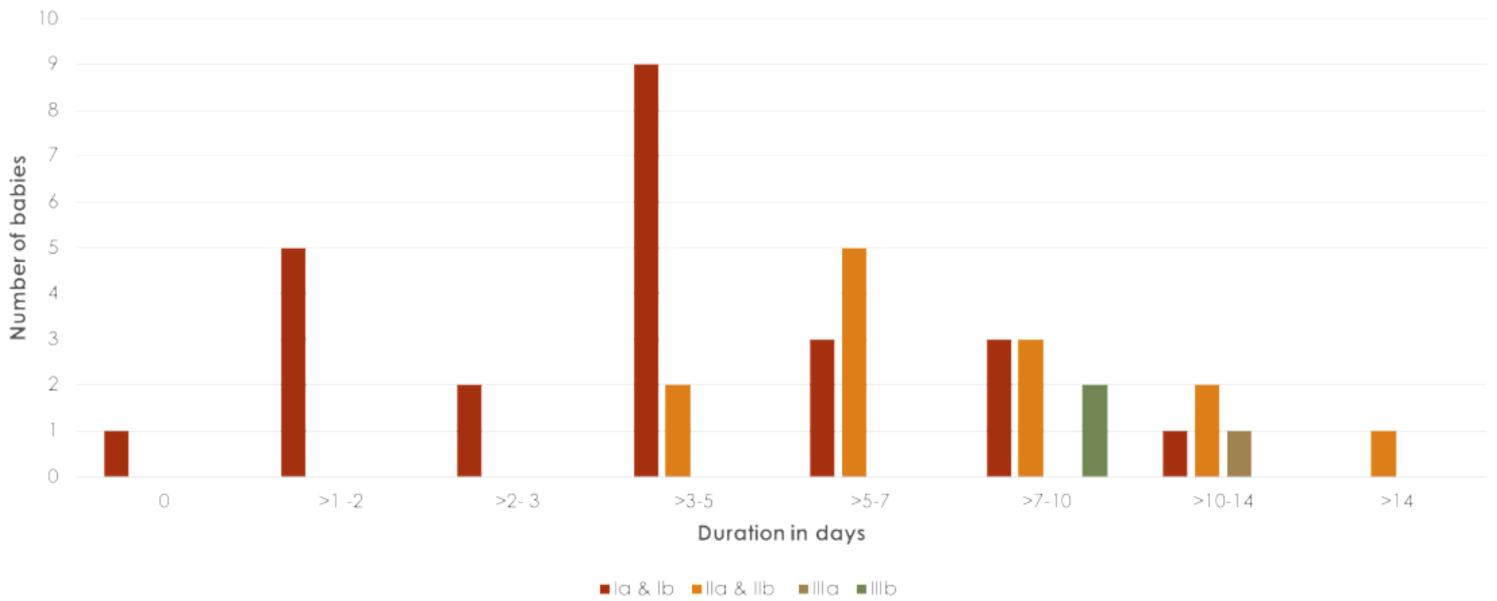
Methodology: 43 NEC episodes were reviewed between March 2016 – March 2017. Patients were identified via Badger database using a keyword search and cases were selected from the generated list by two data collectors.

Results: Using Bells Staging criteria: 58% of cases had suspected NEC; 30% had definite NEC, mildly ill and 12% had definite NEC, severely ill, 80% of which had bowel perforation requiring surgery and 2 had re-direction of care. There was a trend toward babies with more severe NEC having lower mean birth weight and gestation. Abdominal distension and bilious aspirates were the most common presenting features (100% in the severe NEC group). No discriminating presenting features were seen between suspected and definite NEC groups. There was a 95% correlation between X-ray findings by clinicians and radiologist. Pneumatosis was the most common positive X-ray finding (37%). 86% of surgical reviews took place within 6 hours and 100% within 12 hours after request made by the neonatal team. Antibiotic duration in all stages ranged from 2-17 days, with a large variation seen in the suspected NEC group (2-11 days), where 48-72 hours is the recommended treatment duration. The majority of cases in the suspected (72%) and mildly ill groups (43%) were having longer than the recommended duration of antibiotics and nil by mouth. 95% were started on breast milk when re-introducing feeds. Full feeds were achieved after an average of 13 days (range 2-41). On the high-risk protocol 10 days should be the target to reaching full feeds. Stoma losses and feed intolerance delayed establishment of feeds.

Conclusion: This data shows that presenting symptoms of NEC are varied but most commonly include abdominal distension and bilious aspirates. There is variation in our current NEC management especially with the treatment duration and type of antibiotic used and duration of bowel rest. A positive finding is that surgical reviews are prompt when requested and x-ray reports correlate between clinicians and radiologists. A further positive is breast milk is first line feed after an episode of NEC. However, babies are slower than expected to establish full feeds.

Based on these findings a multidisciplinary guideline has been created with emphasis on diagnosis, management, treatment duration, re-introduction of feeds and correct diagnosis documentation. This will help to improve diagnosis, management and overall care of babies with NEC on this neonatal unit.

Duration of antibiotics divided into stages of NEC



Days to reach full feeds divided into NEC stages

