G204(P) MODELLING HIGH DEPENDENCY IN THE LOCAL NEONATAL UNIT

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Aim To evaluate service in an English local neonatal unit in regard of capacity issues with high dependency, which represents a lynchpin resource within the Perinatal Network System.

Methods. The research was performed in collaboration with a District General Hospital and a University Department of Computer Science. With the consent of the regional Research Ethics Committee, Standardised Electronic Neonatal Database (SEND) data cleaned by local neonatal unit ward clerks was analysed and patient pathways through high dependency modelled.

Results The unit configuration was one intensive care and four high dependency cots. During 2009–11, high dependency idle time was 0.14, whilst oversubscription was 0.07. 90% of daily changes in occupancy for high dependency were by up to one cot. The mean Length of Stay (LOS) was 5.5 days. For those patients requiring high dependency care after first being admitted to a different level of care, the mean prior stay on intensive care was 4.7 days and that on special care 2.9 days. In the population needing any high dependency, it represented a backward step in their care pathway in 4.7%.

Diagnostic patient groups have differing LOS profiles. Those receiving high dependency for Neonatal Abstinence Syndrome (NAS) or Continuous Positive Airways Pressure for Chronic Lung Disease not only had the longest stays but also iterated between special care and high dependency. NAS accounted for 20% of high dependency work.

To achieve a less than even chance of overload in high dependency, spare capacity of two cots is needed. Having one unoccupied cot gives a 70% probability of overload. Up to 63 days per year are normally expected to be short of one or more nurses, assuming full nursing establishment and no absence.

Conclusion High dependency cot activity lurched between extremes. Economies of scale are difficult in medium sized local neonatal units. For a patient network, Game Theory tells us that load balancing of the whole system means running different occupancies in each component unit. We hope that this work contributes to understanding of patient networks and guides operations management, which is challenged by rota gaps.

G205(P) FEASIBILITY STUDY OF A NOVEL ASSAY FOR DETECTION OF BACTERIA IN NEONATAL CSF

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Aims An assay based on 16S rDNA PCR technology has been designed to detect a single intact bacterium whilst eliminating free DNA from dead bacteria, thus offering unprecedented sensitivity and scope to the analysis of bacterial carriage in

clinical specimens. We hypothesised that application of such an assay to neonatal CSF will enable accurate, fast and inexpensive discrimination of bacteria-free specimens, and will have a small but clinically acceptable false-positive rate.

Methods Design of PCRctc – a novel assay based on 16S rDNA PCR technology utilising ethidium azide for elimination of free bacterial DNA and optimised for neonatal CSF – was presented at this conference in 2016. In this prospective study lasting 12 months, the feasibility of PCRctc was investigated in CSF specimens obtained from newborn babies tested for meningitis. Following interim analysis, sterile snap-top tubes (Eppendorf™) replaced standard universal containers for collection of CSF, and ChloraPrep™ replaced Unisetas the choice of antiseptic. Study received National REC and HRA approvals and was funded by the MRC.

Results Fifty-two specimens of CSF were tested before the interim analysis (1st phase) and 21 after (2nd phase). In phase 1, the assay detected bacteria in 19 specimens (36%) and sequencing revealed several organisms of Flavobacteriaceae family (Cloacibacterium, Flavobacterium, Hymenobacter), as well as Ochrobactrum (Brucellaceae), Sneathia amnii (Leptotrichiaceae), Pseudomonas spp, Acinetobacter, Sphingomonadaceae, Oscillatoriales (Cyanobacteria), Ureaplasma urealyticum, Staphylococcus auricularis, Streptococcus spp, Bdellovibrio, Aerococcus christensenii, Methylobacterium, and Pedobacter (Sphingomonadaceae). In phase 2, bacteria were detected in two specimens (9.5%) and sequencing revealed Geobacter in one and mixed spp in the other. No clinical cases of neonatal bacterial meningitis occurred during the study. A positive signal was detected in only one out of 23 negative controls designed to test for environmental contamination (4%), sequencing revealed Bacillus.

Conclusion The assay's rate of positive results decreased significantly following simple steps to reduce the risk of contamination at the time of CSF collection. Using additional inexpensive measures it may be possible to reduce the rate further and begin to explore the introduction of the assay into practice.

G206(P) GROWTH AND HEALTHCARE UTILISATION IN PREMATURE BABIES DISCHARGED ON HOME OXYGEN

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Background Premature infants with bronchopulmonary dysplasia (BPD) are a vulnerable group of babies. Home oxygen provision facilitates early discharge, with the aim of minimising disruption to family life, hopefully optimising growth and reducing the financial burden on the NHS. We carried out a study to evaluate the growth and healthcare utilisation after discharge.

Method Data was collected retrospectively from electronic patient records for infants born between 2011–2014, discharged on home oxygen and followed up in clinic until 2 years old. This was evaluated against a comparison group who did not need home oxygen, matched for gestation. Weight SD scores were calculated using LMS calculator for Microsoft Excel. Data was analysed using SPSS.

Results Thirty-six babies discharged with home oxygen were evaluated against a comparison group of 19 babies born

between 22+6 weeks and 30 weeks gestation. Babies discharged on home oxygen were ventilated longer (Mean=25.1 days vs 11.4 days) and were discharged a month after the comparison group (mean discharge gestation 43.9 weeks vs 39 weeks). Babies discharged with home oxygen were smaller at birth (25th centile vs 43rd centile, $p<0.05$), but there was no statistical significant difference in their weight centiles from 28 days to 2 years corrected. Both groups show poor growth in the first 28 days on NICU but they regained their birth centile by 4 months corrected. There was no statistical significance between the groups in the number of babies needing at least one Accident and Emergency (A and E) attendance or in-patient admission in the first year. A and E attendances were relatively common but only half resulted in admissions and very few required PICU admission ($n=6$) in the first year. **Conclusion** Although babies on home oxygen were smaller and spent a longer period of time on the ventilator, their weight were similar to their preterm peers from 28 days old with catch up growth by 4 months corrected. Home oxygen requirement did not appear to additionally impact upon the A and E attendances, but the frequency of attendance suggests that improving parent education and enhancing community support for discharged preterm infants might reduce the burden on acute paediatric hospital services.

G207(P) HYPERNATREMIA IN EARLY NEONATAL LIFE- CAN IT BE PHYSIOLOGICAL?

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Aims To monitor serum sodium levels (in mEq/l) in healthy term/near-term infants in early neonatal period. To identify risk factors for hypernatremic dehydration and possible early interventions.

Methods Only healthy term/near-term inborn babies were included. They were examined on days four, seven and ten of life. Blood samples were collected on days four and ten of life, serum was separated and stored at -20°C for subsequent analysis for sodium. Serum sodium was compared with weight loss and different risk factors were analysed for association with hypernatremia.

Results 184 healthy term/near-term neonates were included. Mean serum sodium was 149 ± 6.0 (135–172). Sodium levels were normal (135–145) in 47 (25.5%) neonates; hypernatremia of varying severity was detected in 137 (74.5%). 62 (33.7%) neonates had serum sodium levels between 146 and 150, 62 (33.7%) between 151 and 159, and 13 (7%) had serum sodium ≥ 160 . By day 10 of life sodium levels had normalised in all except one, who was hospitalised on day 5 of life with hypernatremic dehydration. His day 4 serum sodium was subsequently found to be 172. Association of different risk factors with hypernatremia is in the table 1. Signs of dehydration were discernible in only nine patients and all of them had hypernatremia, however, most of the babies didn't have obvious dehydration signs.

Conclusion Mild to moderate hypernatremic dehydration is quite common in early neonatal period and adequate breastfeeding is an effective and safe intervention.

Abstract G207(P) Table 1 Comparison of variables between two groups

	Hypernatremic neonates	Neonates with normal sodium	P-value
Maternal age	30.1 $\pm$ 3.4	28.7 $\pm$ 3.9	0.07
Birth wt	3.09 $\pm$ 0.46	3.11 $\pm$ 0.41	0.77
Symp/asymptomatic	49/88	7/40	0.009
Oliguria	13	0	0.04
Nipple problem	3	0	0.57
Decreased milk production	21	1	0.016
Signs of dehydration	9	0	0.11
Wt loss>10%	13	2	0.36
Daily wt loss>2%	47	12	0.28
Caesarean/Normal	87/50	20/27	0.016
Delivery			
first-born/late-born	50/87	26/21	0.026

G208(P) NEONATAL CONGENITAL HEART BLOCK – MANAGEMENT AND OUTCOME ON CASES ADMITTED TO A REGIONAL NEONATAL INTENSIVE CARE UNIT

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Aim Congenital heart block (CHB)^{1,2} detected at or before birth is strongly associated with maternal autoimmune antibodies, anti -La and anti Ro. The majority of cases are diagnosed between 18–24th weeks of gestation. Most mothers carrying auto-immune antibodies are not aware until their child is diagnosed with CHB. Our aim was to review the presentation, management and outcome of neonates admitted with CHB to a regional neonatal intensive care unit (NICU).

Method We conducted a retrospective case notes review of all infants admitted with CHB to NICU over an 8 year period, 07/2009 to 08/2017.

Results 14 babies, 8 females and 6 males were admitted during the study period. 12 cases were diagnosed during the antenatal period and 2 cases postnatally (including undiagnosed CHB presenting with foetal bradycardia at 27 weeks). All 14 infants were born by caesarean section in view of foetal bradycardia (range 35–90 bpm). The median gestational age was 36 weeks (27–39 weeks) and the mean birth weight was 2442 g (1138 g–3360 g). The reasons of CHB in these 14 babies are explained as follows:

- 10 cases had maternal Anti-Ro and Anti-La antibodies (3 cases of Sjögren's syndrome, 2 cases of Systemic Lupus Erythematosus and 5 cases were asymptomatic).
- 3 cases associated with Congenital heart disease (1 congenitally corrected TGA, 1 Left atrial isomerism and 1 VSD, ASD, PDA).
- 1 case of Long QTc syndrome with KCNH2 genetic mutation

They were admitted to NICU and assessed with 12-lead and 24 hour ECG, echocardiography and electrolyte analysis (Potassium, calcium and Magnesium). 3 infants developed life threatening arrhythmias with pulseless ventricular tachycardia