Countess of Chester Hospital NHS
NHS Foundation Trust

Thematic Review of Neonatal Mortality 2015 – Jan 2016

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8th Feb 2016

Attendees:

S Brearey	Neonatal lead
Doctor V	Consultant
N Subhedar	LWH consultant
E Powell	NNU manager
A Murphy	Lead nurse Children's services
L Eagles	NNU nurse
D Peacock	Quality improvement facilitator

Apologies:

C Green	Pharmacy

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Purpose of Meeting:

There was a higher than expected mortality rate on NNU in 2015. Cases have been reviewed at NNIRG, perinatal mortality review or neonatal review meetings and action plans have been made (See **Appendix 1**). An obstetric thematic review did not identify any common themes or identifiers that might be responsible for the rise in mortality in 2015. The aim of the neonatal meeting was to review the cases again as a multidisciplinary team with an external reviewer and tertiary level neonatologist to assess:

- Were all action points completed
- Any new areas of care improvement
- Any possible common themes
- Discuss if further action is required

Patient electronic record, written notes, radiology images and Meditech entries in addition to previous reviews were available.
It was noted by NS that there was a clear and strong governance culture in CoCH which was evident at the meeting and that the number of PMs undertaken was impressive and indicated a willingness to learn and improve.

Summary of mortality cases discussed

Case:	Date of death:	Diagnosis and summary of discussion:	Actions:	Date complete:
I&S	5th Apr 2015	**Severe HIE**. Baby transferred to Arrowe Park for continued cooling but died there on day PD. Obstetric review identified some areas of care improvement. PMM agreed neonatal care before transfer was appropriate and timely. 2015 audit of HIE identified excellent neonatal care in the 4 cases of HIE and good outcomes in 3 cases. CoCH actively cool babies prior to transfer.	Nil	

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Child A	8th Jun 2015	**Coroner's PM: Unascertained** **Irrelevant & Sensitive** severe hypertension and CVA aged 22. Twin born at 31 weeks gestation initially in good condition. UVC inserted and lying in left lobe of liver. Peripheral long line inserted with a view to remove UVC once long line in situ. Long line reported later as projected over the junction of the innominate vein and SVC which is satisfactory position. Registrar that evening felt it required withdrawing a little. Sudden unexpected arrest aged **PD** Twin also arrested **PD** hrs later. Delay in staff debrief. No PM evidence of line or UVC related complication. Crossed pulmonary arteries on PM. Agreement today that line related complication very unlikely to have caused arrest.	Inquest 23rd March 16	
Child C	14th Jun 2015	**PM:** **1a. Widespread hypoxic ischaemic damage to heart** **1b. Immaturity of lung** **1c. Severe maternal vascular under perfusion** 30 week gestation severe IUGR, AEDF and oligohydramnios. Delayed cord clamping. Brief period of ventilation. UVC displaced on handling. Raised lactate and infection markers. Never opened bowels and bile stained aspirates. Respiratory arrest on day **PD** Agreed PM report but no cause for deterioration identified.	Delayed cord clamping policy confirm with staff. UVC fixation policy Ranitidine in preterm babies – revise guidance based on evidence. Hyperglycaemia policy.	
Child D	22nd Jun 2015	**PM: 1A: Pneumonia with acute lung injury** PROM from 36^{+6} but delivery at 37 weeks. No antibiotics given before delivery. Dusky episode at 12 min of age probably should	Continuing to emphasise to trainee doctors	

		have led to admission to NNU. Admitted at 3.5 hrs of age in poor condition but then treated appropriately and improved, being extubated the following day. Arrest and deterioration on day PD Group felt initial delay in starting antibiotics very unlikely to be contributory to death. Uncertain of cause for deterioration after initial improvement. UVC was withdrawn to a "low" position contrary to draft BAPM guidance. Current guideline (CoCH or LWH) does not specify acceptable position for UVC. Pulse oximetry as part of NEWS chart might help staff detect unwell babies earlier.	importance of following early sepsis guideline at inductions and teaching. Revise UVC guideline re position T8-9. Discussion with midwifery team re introduction of pulse oximetry in NEWS charts.	
Child E	4th Aug 2015	**1a) Necrotising enterocolitis** **b) Prematurity (No PM)** 29^{+5} gestation twin 1327g. Delayed cord clamping. Signs of maladaptation (high glucose, bile stained aspirates). Large amount of blood (12ml) from NGT prior to arrest despite clotting being only mildly deranged. Teicoplanin not started with Cefotaxime as per guideline. AXR some time before arrest showed no obvious evidence for NEC. No major haemorrhage policy for neonates currently but not in LWH either or any national guidance.	Delayed cord clamping policy confirm with staff. Ranitidine in preterm babies – revise guidance based on evidence.	
I&S	4th Sep 2015	**PM:** **1a) Ebstein anomaly with recurrent supraventricular tachycardia and cardiac failure** **b) Peripartem asphyxia with metabolic acidosis** Term baby with meconium at delivery and HR 260 (SVT) for 3 hours before resolving spontaneously. CXR normal heart size. 12 lead ECG normal, UAC monitoring normal BP. Occasional brief episodes of SVT in day 1 and 2 despite establishing feeds well. Day PD possible seizure and screened for infection. Bradycardic arrest and unsuccessful resuscitation.		

		BC grew alpha haemolytic strep in <24 hrs – possibly contributory. Murmur detected on day 2 along with SVT might have indicated a cardiology opinion but would not have changed management. Consultant written to parents to discuss but no reply – might have moved outside UK.		
I&S	27th Sep 2015	**PM:** **1a) Severe multiple congenital anomalies (oral facial digital/OFD Syndrome type 6/Varadi syndrome)** Birth abnormalities noted included Cleft lip and palate, Polydactyly, Low set ears,Short arms, Heart murmur and Micro-penis. Poor respiratory effort shortly after birth. Intubated but poor chest movement. Arrest at PD of age. Abnormalities of tracheal rings on PM.		
Child I	23rd Oct 2015	**Awaiting PM – preliminary report no evidence of NEC** 27 week gestation born at LWH. Multiple transfers between LWH, COCH and APH. Treated conservatively for NEC. Arrests on 13th, 14th and 15th October, rapid improvement after each arrest. Discussion with neonatologist rather than or as well as surgeon would have been appropriate on 13th Oct. Agreed plan with neonatologist from LWH on 14th Oct to stay in CoCH probably inappropriate in retrospect. Decision to transfer to APH rather than LWH on 15th also probably inappropriate as LWH should be considered surgical centre. Awaiting joint meeting with CoCH, LWH and AH surgical colleagues. Already reviewed at network level.	To clarify neonates with surgical or cardiology conditions should be discussed with LWH and transferred there in preference to APH. Network review of case.	
I&S	13th Dec 2015	**1a) Prematurity with Sepsis** **b) Maternal rupture of membranes with chorioamnionitis (No PM)** Concealed pregnancy, delivered on day of booking, no antenatal steroids or antibiotics. Maternal CRP 266, baby CRP 245. Foul smelling liquor. Antibiotics started. Extubated at 2 hours of age.	To discuss with Microbiology negative results.	

		Gentamicin frequency changed by consultant to 24 hrs. Following day advice by pharmacist to withhold gentamicin until result and if elevated to delay dose. Advice contrary to guideline and prescription sheet but followed by reg and nurse. Arrest at PD hrs, second dose of gentamicin given at PD hrs. Antibiotics subsequently changed to second line. Delay in transfer of baby to LWH so that she was too unstable to transfer by the time the transport team arrived. Initial estimate for arrival time given was 4 hrs and they arrived after 10.5 hrs. Difficulties in prioritising transfers for transport team. Discussed alternatives such as NEWTS and Manchester team.	To discuss with Pharmacy and clinical team re error in advice given by junior pharmacist and not questioned by clinical team. Transport problems reviewed by neonatal network. Alternatives to Cheshire and Merseyside Transport team to be circulated to staff.	
I&S	8th Jan 2015	**Awaiting PM – probable prematurity and sepsis** Mum type 2 diabetic, AEDF, twin. 30 weeks gestation 1547g. Delayed cord clamping. Intubated on NNU, curosurf. UVC in a high position – not pulled back. Raised lactate and increasing oxygen requirement and ventilation pressures. CXR review sticker not used. Antibiotics changed on advice from LWH con and then again on advice from APH consultant. Arrest on day PD at similar time to twin brother who was transferred to NICU at APH. Discussed possibility of nCPAP on resuscitaire in delivery room.	Delayed cord clamping policy confirm with staff. Revise UVC guideline re position T8-9. Await PM result. Antibiotic policy discussed at network level. ? align policy with APH.	

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Themes identified during discussion of all cases

There was no common theme identified in all the cases. One baby had severe HIE and the Trust's rate of HIE in 2015 was low and similar to previous years. One baby had severe multiple congenital abnormalities with a very poor prognosis. One baby had a significant congenital heart disease and probable sepsis. 2 babies (possibly 3 pending PM result) died of sepsis despite timely antibiotic treatment. 2 babies (possibly 3 depending on PM result) the cause of death is uncertain despite having PMs. Themes identified in more than one baby reviewed included:

1. **Sudden deterioration**
   Some of the babies suddenly and unexpectedly deteriorated and there was no clear cause for the deterioration/death identified at PM.

2. **Timing of arrests**
   6 babies (from 9 deaths reviewed) had arrests between 0000 – 0400.

   Action: SB and EP to review all these cases focusing on nursing observations in the 4 hours before the arrests. Aim to identify if unwell babies could have been identified earlier. Identify any medical or nursing staff association with these cases.

3. **Delayed cord clamping in preterm deliveries**
   3 babies had delayed cord clamping when hospital guidance says this is only for term babies. There is national recommendations and evidence to support delayed cord clamping in preterm babies but the obstetric, midwifery and paediatric teams have not yet been able to ensure adequate temperature control for all preterm babies close to Mum during delayed cord clamping. Hypothermia is associated with increased neonatal preterm mortality However, there were no cases of severe hypothermia and only one case of mild hypothermia in the cases reviewed.

   Actions: Teams have already agreed and disseminated current policy
   Multidisciplinary work to enable safe delayed cord clamping in preterm babies

4. **Ranitidine in preterm babies**

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Summary Action Plan

Outstanding Action	Lead	Update	Completion Date
Delayed cord clamping policy: Confirm with staff that this is not current hospital policy for preterm babies.	Brearey Brigham Grimes	Completed All staff informed	Feb 2016
Revise UVC guideline to include standardised fixation policy and specification for T8/T9 optimal position as per BAPM draft guidance	Brearey Farmer	Awaiting ratification of BAPM draft guidance before revision of CoCH policy.	Dec 2016
Ranitidine in preterm babies – revise guidance based on evidence.	Brearey	All consultant paediatricians informed of evidence of risk. Department to discuss best way to alert prescribers to potential risk. SB to share with neonatal network	Completed. April 2016
Complete a neonatal hyperglycaemia policy	Brearey	To appoint a trainee doctor with this task in March 2016	Sep 2016
Continuing to emphasise to trainee doctors of the importance of following early	Brearey **Doctor ZA**		Ongoing

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