Countess of Chester Hospital NHS
NHS Foundation Trust

Thematic Review of Neonatal Mortality 2015 – Jan 2016

Contents

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		

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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 24 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 **I&S** 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 PD 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				

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I&S				
I&S				
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				

I&S

I&S

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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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NS advised group of increased risk of death in preterm babies given ranitidine. 2 babies in CoCH were given ranitidine. It is still in common usage in most neonatal units and CoCH are unlikely to be an outlier in its use.

Action: NS to send paper re risk of ranitidine in preterm babies. Practice change based on this evidence.

5. **UVCs in preterm babies**
   3 babies had care issues around UVCs. One was used when too low, one was used when too high and one was displaced and came out. NHS England has recently reviewed UVC incidents and BAPM has recently published draft guidance. CoCH guidance could be improved by revising guidance to include correct position and standardising fixation.

   Action: Revise UVC guidance once BAPM draft guideline finalised

Other suggestions for improving practice

1. **CESDI grading system**
   Introduce CESDI grading system for all future mortality reviews as already used in network mortality meetings.

2. **Resuscitation drugs proforma**
   Staff have highlighted difficulties recording rescusitation drug administration now that electronic prescribing is used. A draft sheet to record resuscitation drugs has been proposed and will be shared with neonatal network.

3. **Simulation training**
   Simulation training is becoming more popular in many neonatal units with use of sim babies and sim centres. The paediatric department should look to start simulation training for nursing and medical staff on a regular basis. This will need investment in equipment and training of trainers.

4. **HERO score on NNU**
   HERO score calculates a measure for heart rate variability which is displayed on monitors and can be used to assist clinical staff in predicting clinical deterioration. Some evidence that its use reduces mortality

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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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sepsis guideline at inductions and teaching.			
Discussion with midwifery team re introduction of pulse oximetry in NEWS charts.	Brearey Grimes		Dec 2016
Network to discuss case I&S of multiple transfers between hospitals	Subhedar	Table top meeting took place on 26th Feb – awaiting report	
To discuss with Microbiology re I&S why all micro samples were negative.	Brearey		April 2016
Discussion regarding Pharmacist cover on NNU as inappropriate advice given	Green Brearey		April 2016
Transport problems reviewed by neonatal network. Alternatives to Cheshire and Merseyside Transport team to be circulated to staff.	Powell	Staff notified and poster on NNU with process	Complete
Antibiotic policy discussed at network level. ? Align policy with APH.	Brearey Webster		Dec 2016
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	Brearey Powell	Only one case identified possible delay in starting second line antibiotics earlier based on nursing observations. 1 Action below has come from this review	Complete Observations prior to collapse review.docx

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cases.			
Every A4 section of obs charts should have patient details, a date and time – to assist reviewing scanned Evolve records.	Powell Farmer		Dec 2016
Introduce CESDI grading system for all future mortality reviews as already used in network mortality meetings.	Brearey		April 2016
Develop a resuscitation drugs proforma to assist with record keeping during resuscitations.	Brearey	Second draft completed and under review	
Develop a neonatal simulation training programme	**Doctor V** Farmer		March 2017
Consider adopting Hero score on NNU monitors	Brearey		March 2017

S Brearey
2nd March 2016

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APPENDIX 1: Neonatal Mortality January 2015-January 2016

NEONATAL MANAGER: Eirian Lloyd Powell

Baby's name	DOB	Gest	Review	Reason for admission	DOD & AGE	Cause of death	Staff allocated	Staff on duty
I&S							Transferred to APH on day 1	NA
Child A Con: MS Resus: RJ	**PD** 06/15 20.31hrs	31/40	 PERINATAL MORBIDITY AND MOI	PREM	08/06/15 21.00hrs **PD**	Maternal SLE	Care handed to Lucy Letby at 20.00hrs	Caroline Bennion(RN) **Nurse T** Mary Griffith (RN) Lisa Walker (NN) Liz Marshall (NN)

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Baby's name	DOB	Gest	Review	Reason for admission	DOD & AGE	Cause of death	Staff allocated	Staff on duty
Child C Con: MS Resus JG	PD/06/15 15.31hrs	30/40	NEONATAL MORTALITY MEETING OSR: Child C doc	PREM IUGR AEDF	14/06/15 05.58hrs PD	PM: 1a. Widespread hypoxic ischaemic damage to heart 1b. Immaturity of lung 1c. Severe maternal vascular underperfusion	Sophie Ellis initially and handed over to Melanie Taylor	Nurse W Mel Taylor (RN) Lucy Letby (RN) Nicky Dennison (NN) Liz Marshall (NN)
Child D Con EN Resus EN	PD/06/15 16.01hrs	37/40	Child D draft addendum.doc	Dusky episode in labour ward	22/06/15 04.25hrs PD	PM: 1A: Pneumonia with acute lung injury.	Caroline Oakley	Nurse X (RN) Lucy Letby Kate Ward Liz Marshall

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Baby's name	DOB	Gest	Review	Reason for admission	DOD & AGE	Cause of death	Staff allocated	Staff on duty
Child E Con: JG Resus: Doctor ZA	PD /07/15 17.53hrs	29/40	Child E Review SB.docx	PREM REDF	04/08/15 01.40hrs PD	NEC	Lucy Letby	Shelley Tomlins (RN) Caroline Oakley (RN) Belinda Simcock(RN) Lisa Walker (NN) Val Thomas (NN)
I&S							Nurse X	Mel Taylor (RN) Lucy Letby (RN) Ashleigh Hudson(RN) Jenny Jones (NN) Val Thomas (NN)

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Baby's name	DOB	Gest	Review	Reason for admission	DOD & AGE	Cause of death	Staff allocated	Staff on duty
I&S							Laura Eagles	Kate Ward (RN) Ashleigh Hudson (RN) Kate Bissell (RN) Liz Marshall (NN) Night staff Chris Booth (RN) Shelley Tomlins (RN) **Nurse W** Lucy Letby (RN)
Child I Con: **Doctor V** Resus: JG	**PD** 08/15	27/40	**Child I** Review SB.docx NEONATAL MORTALITY MEETINC	PREM	23/10/15 0230hrs **PD**	Awaiting PM 6 admissions Lwh/Aph/Coch	Ashleigh Hudson	Chris Booth (RN) Mel Taylor (RN) Lucy Letby (RN) Val Thomas (NN)

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Baby's name	DOB	Gest	Review	Reason for admission	DOD & AGE	Cause of death	Staff allocated	Staff on duty
I&S							Kate Ward	**Nurse W** Lucy Letby
I&S							Lucy Letby (days) Caroline Bennion (nights)	Caroline Oakley (caring from **I&S**) **Nurse Z** Yvonne Farmer Laura Eagles

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