Health District/Network  
Northern NSW LHD

Final RCA Report

Reference Numbers (where applicable)

<table>
<thead>
<tr>
<th>Reference Numbers</th>
<th>MoH RIB No:</th>
<th>IIMS No:</th>
<th>LHD TRIM No:</th>
<th>LHD File No:</th>
<th>RCA No:</th>
<th>LHD RIB No:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RI18/977</td>
<td>2696653-20</td>
<td>RI18/977</td>
<td>20</td>
<td>18.36</td>
<td></td>
</tr>
</tbody>
</table>

Incident Details

Date of Incident: 14/11/2018
Date of Incident Notification in IIMS: 14/11/2018

Feedback Details

Staff member/s responsible for feedback to staff: Director of Medical Services
Director of Nursing
Patient Safety Officer

Staff member/s responsible for feedback to patient/support person: Director of Medical Services

By When: 23/02/2019

2018

Final RCA report signed off by RCA Team on: 18/12/2018
Date Report due to CE: 22/01/2019
Date signed by CE: 08/01/2019
Date due to be submitted to NSW Ministry of Health: 23/01/2018
Date submitted to NSW Ministry of Health: 08/01/2019

Notifications

RCA Decommissioned: YES / NO (select)
Section 20O Health Administration Act: YES / NO (select)

Comments

Referral to other committees/agencies

Health Care Complaints ☐    Coroner: ☒
Commission: ☒
TMF notified: ☒    Other: ☐
Other (please specify)

Contact Details

LHD/SHD contact person  
Angela Sutherland, Patient Safety and Corporate Risk Manager
NNSWLHD
Telephone Number 0429 778 923
Email Address angela.sutherland@.health.nsw.gov.au
Final RCA Report

Description of incident that was investigated
Unexpected hypoxic ischaemic encephalopathy and subsequent death of a newborn baby after a low risk delivery.

Background and medical history
Neonate female born with apgars one at one minute, zero at five minutes and one at ten minutes requiring full resuscitation, intubated, ventilated and retrieved to higher care at five hours of age.

Mother’s past medical history
- Asthma
- First pregnancy – low risk and under the Shared Care model
- Rhesus positive
- Rubella immune
- Mother’s sibling has history of epilepsy and severe autism

Timeline
27/12/2018 – 22/07/2018
The patient had antenatal ultrasounds attended at 7+4/40, 13+2/40 and 18/40 gestation. She had a total of 12 antenatal visits and eight antenatal short stay visits due to signs and symptoms of bleeding, decreased fetal movements, gastroenteritis and abdominal and back pain. On 13 July 2018 at an antenatal visit the patient was found to be tachycardic at 105 – 110 beats per minute (bpm). This finding was discussed with her and she commented that she always had a ‘fast heart rate’ even prior to pregnancy. She reported having nil previous investigations or associated symptoms. Her haemoglobin was within normal range. The patient was advised to attend the emergency department if she became symptomatic. On 20 July 2018 the patient had an ultrasound which was reported as normal and the baby was described as a frank breech with legs extended and head flexed.

23/07/2018 – 24/07/2018
The patient presented to the antenatal short stay unit at 37+2/40 gestation for an External Cephalic Version (ECV) for the breech presentation. The ECV was attended successfully. She then represented on 24 July 2018 with decreased fetal movements and was noted to complain of feeling tender on her abdomen since the ECV. A Cardiotocography (CTG) was attended with reassuring Electronic Fetal Heart Rate Monitoring (EFM) and a head down presentation confirmed by bedside ultrasound scan.

12/08/2018
The patient presented at 40+2/40 gestation post spontaneous rupture of membranes at 04:00. She had a bedside ultrasound that confirmed the baby’s head was down.

13/08/2018
09:37
The patient re-presented and advised that contractions had become strong at 06:00 and were occurring twice every ten minutes and lasting 60 seconds. She reported good fetal movement, denied fever and described liquor as remaining clear and slightly pink. EFM was commenced and noted to be reassuring. The medical officer discussed augmentation of labour with oxytocin as well as the risks associated with prolonged rupture of membranes, such as infection which would increase with longer early labour. The patient and her husband expressed their preference for expectant management and were documented to understand what had been explained. A plan was documented to monitor fetal movements, contractions, liquor and the patient’s temperature at home. The patient was directed to call the birthing suite if she had any concerns and a backup appointment for the following morning was made if the labour did not establish that day.
16:00 – 18:45
The patient presented in stage one labour. The Fetal Heart Rate (FHR) was auscultated at 135 – 145 bpm with no decelerations\(^\dagger\) heard. The patient had a vaginal examination at 17:00 which identified the cervix to be fully effaced and dilated to seven centimetres. She expressed her wishes for a water birth and the midwife explained the policy and procedure for water birth to her and her husband. The patient entered the bath. The midwife attended the FHR monitoring by auscultation with a Doppler intermittently.

18:15
The patient noted to have some bleeding in the bath and some involuntary pushing.

18:57
The patient was noted to be pushing intermittently with contractions. The FHR was assessed and noted to be reassuring. The patient’s bowels opened and she was unable to pass urine. The midwife informed the in-charge midwife and no concerns were identified.

19:13
The oncoming midwife received handover.

19:32
The patient was in the bath pushing involuntarily with contractions. There was a student midwife present. The patient’s contractions were reported as strong. The midwife performed intermittent auscultation of the FHR and noted it to be reassuring.

19:40
The midwife performed a vaginal examination in the bath and noted the patient to be in stage two labour and fully dilated. The FHR was recorded as 134-140 bpm.

20:05
The FHR remained reassuring at 138-145 bpm and nil decelerations were audible during, or following contractions. The midwife reported a small amount of the baby’s head visible on pushing.

20:10
The midwife called for a second midwife to assist and prepare for delivery.

20:30
The patient was assisted out of the bath and was standing and squatting down with contractions. The baby’s head was visible and she was encouraged to actively push. The midwife noted the FHR as remaining reassuring at 132-140 bpm.

20:42
The CTG was applied for EFM as the patient had been actively pushing for 60 minutes. The FHR was noted as 145-155 bpm. The patient was now on the birthing stool with contractions recorded as strong.

20:50
The patient’s pulse was noted not to be recording effectively on the EFM despite the midwife adjusting the probe. The midwife monitored the patient’s pulse by hand and documented the result on the EFM.

21:03
The midwife noted the FHR to be 160-165 bpm for a five minute period.

21:12

\(^\dagger\) A decrease in the FHR below the baseline of more than 15 bpm lasting longer than 15 seconds.
he registrar reviewed the patient and noted the baby’s head to be slowly advancing. The midwife discussed the FHR tachycardia with the registrar and also discussed with the patient the need for an episiotomy due to the fetal tachycardia.

21:23
The midwife noted infiltration to perineum, the FHR to be 160-170bpm and patient pulse to be 98 bpm.

21:26
The patient had an episiotomy performed. The baby’s head was born and shoulders delivered in a McRoberts manoeuvre which progressed to a vaginal birth of a live female infant weighing 3,500gm. The baby was observed to have the cord once around her neck tightly and apgars of one at one minute, zero at five minutes and one at 10 minutes. Assisted ventilation was commenced. She was noted to be apnoeic, floppy, pale and had a heart rate of 40-60 bpm. Cardiopulmonary Resuscitation (CPR) was commenced and the paediatric registrar arrived and assisted. The paediatrician on call was contacted and the rapid response team arrived. The baby was intubated.

21:36
The baby was documented to have no heart rate and an intravenous cannula was inserted. She continued to receive CPR and adrenaline and intravenous fluids were administered. At 21:42 CPR was stopped and the baby’s heart rate remained at greater than 100 bpm with continuation of respiratory support. The cord gases were recorded as arterial with a low pH of 7.05, low oxygen of 29 mmHg and high carbon dioxide of 55 mmHg. The venous cord gases were recorded as low pH of 7.08, low oxygen of 29 mmHg and high carbon dioxide of 53 mmHg.

21:50
The baby was transferred to the special care nursery and intermittent positive pressure ventilation continued with ongoing improvement of her oxygen saturations.

22:50
The midwife noted the baby to have seizure activity. She received IV medication with good effect. The baby was given antibiotics and passively cooled. The mother and father were present at the bedside and the paediatrician explained the resuscitation and the plan for transfer of the baby once she was further stabilised.

14/08/2018
00:24hrs
The newborn and paediatric emergency transport service team arrived and the baby was retrieved to the referral hospital at 02:25hrs accompanied by her father. The mother was discharged and transferred to the referral hospital at approximately 09:30hrs.

14/8/2018 – 25/8/2018
The baby was diagnosed with a grade three hypoxic ischaemic encephalopathy. The baby continued to deteriorate despite multiple interventions at the referral hospital. On 24 August 2018 the baby and her family were seen by the palliative care team and a plan was made for her to be moved to a children’s hospice facility the next day.

20/09/2019
The baby died at the children’s hospice and the case is referred to the coroner.

Summary of RCA team findings and recommendations
The RCA team was comprised of Local Health District (LHD) multidisciplinary clinical staff from obstetrics and midwifery services. As part of the investigation, the team undertook review of the patient and baby’s health care records, interviewed staff involved in the management of the patient and baby and interviewed their family.
At the time of this investigation the Coroner’s report was complete and whilst an autopsy was not performed, authorisation of the Cause of Death Certificate was completed. It stated the Cause of Death was hypoxic ischaemic encephalopathy. The RCA team were unable to identify a root cause in this case. It was considered that while there were systems improvement opportunities there was no point during the management of this patient’s labour and delivery where different treatment would have been likely to have changed the outcome.

No issues were identified regarding the resuscitation and post-natal care of the baby prior to her transfer interstate.

System issues
Prolonged rupture of membranes
The RCA team found that when the patient presented on 12 August 2018 following spontaneous rupture of membranes at 04:00, a bedside ultrasound was performed and the baby was determined to have her head down. A CTG was performed and the patient was discharged. The RCA team found no documentation of the management plan for the patient following spontaneous rupture of membranes or any evidence to suggest discussions regarding active and expectant management had taken place with the patient and her husband as per the Northern NSW LHD Pre-Labour Rupture of Membranes (PROM) clinical procedure (NNSW-LHD-PRO-0180-17). As per the PROM clinical procedure expectant management is to await spontaneous labour and many women will go home until labour commences. The RCA team identified this re-presentation as a missed opportunity to discuss and document the care of the patient with PROM.

When the patient re-presented for assessment on 13 August 2018 at 09:37 the medical officer documented prolonged PROM and assessed the patient to be in early labour. A discussion was held with the patient and her husband regarding active management with oxytocin or expectant management. The patient and her husband were noted to prefer expectant management. The RCA team identified that the patient was assessed and determined to fit the criteria for expectant management as she was group B streptococcus negative, lived within five minutes of the hospital, had been determined as having a low risk pregnancy, had reliable transport and the baby was engaged with her head down. The patient and her husband were given instructions to monitor fetal movement, contractions, liquor and her temperature at home and to call if they had any concerns. The RCA team identified that a back-up appointment was made for the following morning if labour did not establish with a plan for induction of labour. The RCA team identified that this management of the patient was appropriate and well documented.

The RCA team identified that the patient then returned at 16:00 on 13 August 2018 in established labour with PROM of 36 hours. The RCA team found, as per the NSW Health FHR Monitoring Guideline (GL2016_001) that PROM greater than 24 hours is a risk factor requiring intrapartum continuous EFM. On this basis the patient should have been commenced on continuous EFM. The RCA team identified through interview that the midwife considered EFM and reviewed the PROM procedure and the Northern NSW LHD Use of Water Immersion for Labour and Birth clinical guideline (NC-NNSW-GUI-6864-13) however the midwife did not identify that the patient met the criteria for intrapartum continuous EFM when she reviewed these procedures and guidelines. The RCA team found that this was a system improvement opportunity to provide information in the PROM clinical procedure that would specifically indicate the need for continuous intrapartum EFM.

The RCA team identified that there was limited evidence available regarding the consideration of antibiotics given the patient’s PROM and group B streptococcus negative status. Through interview it was evident that there are inconsistencies in practice in regard to administration of intravenous antibiotics in for patients with prolonged rupture of membranes and the practice is dependent on the obstetrician on call. The RCA team found that it is included in the NNSW LHD PROM procedure to escalate to a consultant on call if the clinician is not sure if antibiotics are required. The RCA team identified this as an opportunity to gain best practice consistency by developing firmer guidance around this.
Fetal heart rate monitoring
The RCA team identified that the patient met the criteria for intrapartum continuous EFM due to her prolonged rupture of membranes greater than 24 hours. The RCA team identified that when the patient presented on 13 August 2018 at 16:00 the FHR was auscultated via a Doppler as 135 – 145 bpm with nil decelerations heard and the liquor was clear. The patient had a vaginal examination at 17:00, findings identified her cervix to be fully effaced and seven centimetres dilated. Through interview it was found that the midwife determined these findings as reassuring and clear signs of fetal wellbeing and not indicative of fetal distress. The RCA team identified that the midwife sought, but did not identify a guideline for the continuous EFM in the policies, guidelines and procedures reviewed and therefore treated the patient as per the low risk FHR guideline which states “for women with no risk factors, there is no evidence to support the use of routine EFM on admission in labour and therefore, CTG for low risk women in established labour should not be performed.”

The RCA team identified that at this time the patient was unable to tolerate lying down and elected to get in the bath for pain relief. The midwife documented discussing the guideline and policy regarding the water immersion and birth with the patient and her husband. The RCA team found that during the time the patient was in the bath the FHR was monitored every 15 minutes via Doppler auscultation. At interview it was identified that the FHR monitoring technique was to count for more than 60 seconds and included monitoring after contractions to determine if decelerations were present. During this time no decelerations were identified. The RCA team identified that this practice is compliant with the FHR Monitoring Guideline. Through interview it was identified that when the patient was examined in the bath and deemed to be fully dilated and after 20 minutes of pushing the midwife identified a small amount of the baby’s head to be visible and encouraged the patient to get out of the bath. At this point the midwife reported the FHR to be reassuring and the patient was still pushing with strong contractions.

The RCA team identified that the midwife commenced the EFM at 20:43 on 13 August 2018 and the initial trace for a period of seven minutes was reassuring however after this period of time the fetal heart rate pattern demonstrated periods of fetal tachycardia and decelerations. Whilst the RCA team acknowledged that EFM was not commenced as per the Fetal Heart Rate Monitoring Guideline, the monitoring of the FHR was consistent and did not indicate any risk to fetal wellbeing until seven minutes after commencement of the EFM.

The RCA team noted that when fetal tachycardia and decelerations were identified the midwife called for a second midwife to prepare for delivery as the baby’s head was visible. The medical officer was also present in the room at this stage and reviewed the non-reassuring features of the fetal heart rate pattern. The need for an episiotomy was identified and the baby was delivered at 21:26 with the umbilical cord around her neck. The RCA team found that the fetal heart rate pattern at 20:55 identified two non-reassuring features of tachycardia and atypical decelerations which gave it an overall classification of a pathological fetal heart rate pattern. The RCA team identified that the interpretation of the FHR pattern and the escalation of the pathological findings were managed appropriately and within the very short timeframe expediting the birth with emergency operative would not have been achievable any more promptly after this recognition and escalation with birth imminent.

Documentation and clinical handover
The RCA team identified a lack of documentation related to patient assessment and care planning in this case particularly for the presentation on 12 August 2018. The documentation was limited and no plan of care could be identified. The RCA team identified that there was only one documentation of the timing of spontaneous rupture of membranes and no reference made to the prolonged rupture of membranes in the documentation throughout the length of stay. The RCA team were not able to clearly identify if the prolonged rupture of membranes was handed over at the medical officer at change of shift. The RCA team were concerned that the risk factor was not identified at handover and saw this as a system improvement opportunity.
Policy, procedures and guidelines
The RCA team identified that the policy, procedure and guidelines for management of this patient and baby were covered by four different guidelines, procedures or policies. The midwife accessed the PROM clinical procedure and it did not clearly indicate that the patient required continuous EFM in established labour. The RCA team identified review of the PROM clinical procedure’s referral to continuous EFM in prolonged rupture of membranes in established labour as a system improvement opportunity.

Through interview with midwives and medical officers the RCA team identified difficulties with staff navigation of the document library. The RCA team also identified review of how staff access policies, procedure and guidelines as a system improvement opportunity.

Following the investigation, the RCA Team:
☐ Was able to identify any root causes or contributory factors
☐ Was able to identify any gaps in service delivery
☒ Identified systems improvement opportunities unrelated to the root causes/contributing factors.
Table 1 – Root Cause / Contributing Factors Table (a requirement when causes have been identified)

Documentation of causation statements is a legislative requirement. All causation statements must comply with the Rules of Causation.

Each root cause displayed must be addressed in the action plan.

Describe the root cause and categorise the cause or contributing factor according to the triage cards and flip chart definitions.

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description of root cause/contributory factor</th>
<th>Category (As described in the Checklist Flip Chart for Root Cause Analysis Teams)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Communication</td>
</tr>
<tr>
<td>1</td>
<td>Nil identified</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 – RCA Team Recommendations (a requirement when causes have been identified)

<table>
<thead>
<tr>
<th>Causation statement item no.¹</th>
<th>Recommendations Description of actions to be taken</th>
<th>Risk classification Elimination Control Accept²</th>
<th>Position of person responsible for implementing recommendations</th>
<th>Outcome measures</th>
<th>Completion date</th>
<th>Management concurrence Yes or No</th>
<th>Recommendation has implications for LHD/State</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nil in the absence of a root cause</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

¹ The number here relates to the numbered causation statement in Table 1 ROOT CAUSE / CONTRIBUTING FACTORS TABLE

² Actions can be classified as eliminating, controlling or accepting the risk. If accepting the risk, risk minimisation strategies need to be in place. Weaker actions are those that accept the risk and include redundancy/double checks, warnings and labels, new procedures and policies, new memorandums, training in absence of knowledge deficit and additional study / analysis.

Medium actions are those taken to control the risk and include checklists and cognitive aids, increased staffing, decreased workload, use of read backs, eliminating look-alikes and sound alikes and eliminating or reducing distractions. Stronger actions are those taken to eliminate the risk and include simplified processes that remove unnecessary steps, standardise equipment, processes or care plans.

Pursuant to Division 6C of the Health Administration Act 1982 (NSW), this RCA report cannot be admitted in evidence in any proceedings
Table 3 – Systems improvement opportunities unrelated to root causes or contributing factors (modification of these issues would not have helped to prevent the event)

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Description</th>
<th>Recommendation</th>
<th>Position of person responsible for implementing recommendations</th>
<th>Outcome measures</th>
<th>Completion date</th>
<th>Management concurrence</th>
<th>Recommendation has implications for LHD/State</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Management of Pre-Labour Rupture of Membranes (PROM)</td>
<td>The clinical procedure Care of the Woman with Term Pre-Labour Rupture of Membranes (PROM) should be reviewed and the need for continuous EFM be included to gain consistency with the Fetal Monitoring policy.</td>
<td>The LHD Director of Nursing NNSWLHD Maternity services</td>
<td>There will be consistency between the Care of the Woman with Term Pre-Labour Rupture of Membranes (PROM) Clinical procedure and the Maternity - Fetal Heart Rate Monitoring Guideline</td>
<td>19/04/2019</td>
<td>No</td>
<td></td>
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<tr>
<td>2</td>
<td>Fetal heart monitoring</td>
<td>This case should be presented to all relevant NNSWLHD medical and midwifery staff (as identified by the LHD DON) as a case study. The case study should include, but not be limited to: - Management of PROM - Risks of PROM - Documentation of assessment, interventions and planning - Key components of medical and nursing handover</td>
<td>The LHD Director of Nursing NNSWLHD Maternity services</td>
<td>Management and care of the woman with pre-term rupture of membranes will be as per the Care of the Woman with Term Pre-Labour Rupture of Membranes (PROM) Clinical procedure</td>
<td>19/04/2019</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Documentation</td>
<td></td>
<td>The LHD Director of Nursing NNSWLHD Maternity services</td>
<td>Management and care of the woman with pre-term rupture of membranes will be as per the Care of the Woman with Term Pre-Labour Rupture of Membranes (PROM) Clinical procedure</td>
<td>19/04/2019</td>
<td>No</td>
<td></td>
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<tr>
<td>4</td>
<td>Use of prophylactic antibiotics in PROM</td>
<td>The clinical procedure Care of the Woman with Term Pre-Labour Rupture of Membranes (PROM) section 3.3 Antibiotic prophylaxis should be reviewed to gain best practice and</td>
<td>The LHD Director of Nursing NNSWLHD Maternity services</td>
<td>There will be consistency in the administration of antibiotics for PROM</td>
<td>19/04/2019</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

Pursuant to Division 6C of the Health Administration Act 1982 (NSW), this RCA report cannot be admitted in evidence in any proceedings.
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<tr>
<th>Item</th>
<th>Description</th>
<th>Details</th>
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</thead>
<tbody>
<tr>
<td>5</td>
<td>Clinical handover</td>
<td>An observational audit of medical handover in maternity services should be conducted and the results collated into a quality improvement plan. General Manager</td>
</tr>
<tr>
<td>5</td>
<td>Access to policy and procedures</td>
<td>Consideration be given to surveying staff on using the clinical guideline, procedure and policy document library to identify key issues and guide a quality improvement plan. General Manager</td>
</tr>
</tbody>
</table>

\(^1\) The item no. is the item no. next to the Description in Table 1 above.