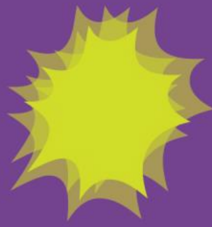

TRAUMA IN PREGNANCY

Resuscitative hysterotomy

Immersive scenario

Facilitator resource kit

Queensland Trauma Education

The resources developed for Queensland Trauma Education are designed for use in any Queensland Health facility that cares for patients who have been injured as a result of trauma. Each resource can be modified by the facilitator and scaled to the learners needs as well as the environment in which the education is being delivered, from tertiary to rural and remote facilities.

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Queensland Trauma Education
Trauma in Pregnancy – Resuscitative hysterotomy: Immersive scenario – Facilitator resource kit
Version 2.0

Published by the State of Queensland (Clinical Skills Development Service), 2024

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About this training resource kit

This resource kit provides healthcare workers with the ability to recognise the indications and perform a resuscitative hysterotomy in a pregnant patient who has sustained significant trauma.

National Safety and Quality Health Service (NSQHS) Standards

Target audience

- Emergency department medical and nursing clinicians
- Obstetric medical and midwifery clinicians

Duration

45-60 minutes

Group size

4-6 participants (or team composition applicable to local area)

Learning objectives

By the end of this session the participant will be able to:

- Recognise the severely injured pregnant trauma patient
- Perform a detailed clinical assessment to identify life threats following major trauma
- Understand the indications and contraindications for resuscitative hysterotomy
- Understand the technical skill of resuscitative hysterotomy
- Understand the Crisis Resource Management (CRM) principles when managing maternal cardiac arrest.

Facilitation guide

1. Facilitator to discuss the pre-simulation briefing and deliver the immersive scenario on maternal resuscitative hysterotomy.
2. Utilise the supporting documents to maximise the learning throughout immersive scenario.
3. Utilise the debriefing guide to evaluate and support participant performance and provide feedback.

Supporting documents (in Printable resources)

The following supporting documents are provided for this immersive scenario:

1. Online video of a real-time simulation scenario of a perimortem caesarean section (see web page)
2. Pre-simulation briefing poster
3. Initial assessment and management of the pregnant trauma patient flowchart
4. Specific management poster
5. Structured assessment poster
6. Resuscitative hysterotomy considerations poster
7. Venous blood gas
8. CXR: normal
9. Pelvic Xray: ring intact, incomplete film, fetal skeleton insitu
10. EFAST: RUQ/Morrisons: negative
11. EFAST: LUQ/splenorenal: negative
12. EFAST: Bladder/pelvic: negative
13. EFAST: Cardiac/subxiphoid: negative

Simulation event

This section contains the following:

1. Immersive scenario
2. Resource requirements
3. Handover card
4. Scenario progression
    a. State 1
    b. State 2
    c. State 3
    d. State 4
    e. State 5
5. Debriefing guide

Immersive scenario

Type	Immersive scenario
Target audience	• Emergency Department medical & nursing staff • Obstetric medical staff/midwives and neonatal team (if available in your local area)
Overview	This resource is for facilitators to explore the indications for a resuscitative hysterotomy and perform the technical skill in an immersive scenario. The scenario also incorporates the decision making, timing and crisis resource management principles required to manage traumatic maternal cardiac arrest. **Emergency Department presentation:** A 34yo G1,P0 29+4/40 gestation is brought via ambulance to the ED following a high speed RTC at 100km/hr on the freeway. She is the single occupant of the vehicle which was seen to veer into the central barriers to avoid collision with a merging vehicle. Airbags deployed, seatbelt worn. Prolonged extrication (30 minutes) by the QLD Fire and Emergency Services due to position of the vehicle against the concrete barrier. Pre-hospital notification of vital signs: GCS 14 (confused), HR 120, BP 90/60, sats 100% NRB, temp 37.4. On arrival in the Emergency Department her vital signs are unchanged and she has received 100microg fentanyl IV and 500mL Sodium Chloride 0.9% IV. She complains of severe abdominal and chest pain with a seatbelt mark across her chest and abdomen.
Learning objectives	By the end of this session the participant will be able to: • Recognise the severely injured pregnant trauma patient • Perform a detailed clinical assessment to identify life threats following major trauma • Understand the indications and contraindications for resuscitative hysterotomy • Understand the technical skill of resuscitative hysterotomy • Understand the Crisis Resource Management (CRM) principles when managing maternal cardiac arrest.
Duration	45-60 minutes, including debrief

Resource requirements

Physical resources

Room setup	Resus bay in Emergency Department
Simulator/s	Sim Mom (with resuscitative hysterotomy insert). *See additional 'RH Manikin setup guide' & 'RH bundle'*
Simulator set up	• Street clothes lying supine • C-collar insitu • Moulage: 30/40 pregnant abdomen. Driver seatbelt bruising to chest and abdomen
Clinical equipment	• Standard resuscitation bay equipment • Standard delivery bundle pack • Resuscitative hysterotomy procedural kit • Fetal Doppler (or Ultrasound machine for fetal HR) • Resuscitaire setup (if applicable to local unit)
Access	• 16G L) ACF with empty Sodium Chloride 0.9% 500mL bag • No IV sticker R side
Other	See RH Manikin Setup Guide

Human resources

Faculty	2 facilitators (Dr/Nurse with debriefing experience) to take on roles of scenario commander and primary debrief
Simulation coordinators	1 for manikin set up and control
Confederates	• QAS officer to deliver handover (optional) • Junior Registered nurse
Other	Resuscitation team in resus bay to receive QAS handover

Handover card

Handover from ambulance officer

This is Mary. She is a 34yo G1P0 29+4/40 gestation that has been involved in a high speed RTC at 100km/hr on the freeway approximately 1 hour ago. She is the single occupant of the vehicle which was seen to veer into the central barriers to avoid collision with a merging vehicle.

Her airbags had deployed, she was wearing a seatbelt. A prolonged extrication (30 minutes) was required by the Qld Fire and Emergency Services due to position of the vehicle against the concrete barrier.

As mentioned, her vital signs initially were: GCS 14 (confused), HR 120, BP 90/60, sats 100% NRB, temp 37.4.

Just now on arrival to the Emergency Department her vital signs are unchanged, and she has received 100microg fentanyl IV and 500mLSodium Chloride 0.9% IV via a 16G PIVC in her L) ACF.

She complains of severe abdominal and chest pain and I have noticed a seatbelt mark developing across her chest and abdomen.

There is no PV discharge and she has not felt the baby move since the accident. Her antenatal care to date has been normal. Her PMHx is unremarkable, with no known allergies. Her husband was contacted by the QPS officer on scene and is on his way up to hospital.

Thanks for taking over Mary's care - I will just be in the write up room if you need further details.

Scenario progression

<table>
<tr><th colspan="5">STATE 1: Initial assessment</th></tr>
<tr><th colspan="2">Vital signs</th><th>Script</th><th>Details</th><th>Expected actions</th></tr>
<tr><td>ECG</td><td>ST</td><td rowspan="9">Mary: ‘Please help me, I am in so much pain. Is my baby okay?’ *Confused, worried, crying, anxious*

Confederate:</td><td rowspan="9">Primary survey results
A: maintaining own, cx collar, nil anterior neck injury
B: tachypnoeic, nil increased resp effort, bilateral BS, tender across chest wall where seatbelt marks are, tender sternum, nil crepitus/subcut emphysema
C: nil external bleeding sources, cool peripherally, nil PV loss
D: GCS E4V4M6, PEARL 4mm. No motor deficits
E: seatbelt marking across chest and abdomen

Fetal assessment:
• Abdominal palpation= 29 weeks
• Longitudinal lie
• Abdomen firm and tender
• FHR 170 with doppler
• No fetal movements since accident</td><td rowspan="9">Commence Primary Survey
❑ Assess airway
❑ Assess breathing
❑ Assess circulation:
• Position left lateral 15-30deg tilt
• Confirm bilateral large bore PIVC
• Assess for PV loss
❑ Assess disability
❑ Expose patient to identify other injuries
❑ Perform fetal assessment
❑ Obtain obstetric history
❑ Perform abdominal examination including for PV loss
❑ Obtain gestational age
❑ Determine fetal wellbeing
• Auscultate fetal HR
• Discuss fetal movements
❑ Correct format</td></tr>
<tr><td>HR</td><td>120</td></tr>
<tr><td>SpO_2</td><td>99%NRB</td></tr>
<tr><td>BP/ART</td><td>90/60mmHg</td></tr>
<tr><td>RR</td><td>28</td></tr>
<tr><td>Temp</td><td>37.4</td></tr>
<tr><td>BGL</td><td>5</td></tr>
<tr><td>GCS</td><td>14 (E4V4M6)</td></tr>
<tr><td></td><td></td></tr>
</table>

<table>
<tr><th colspan="5">STATE 2: Ongoing management/ secondary assessment</th></tr>
<tr><th colspan="2">Vital signs</th><th>Script</th><th>Details</th><th>Expected actions</th></tr>
<tr><td>ECG</td><td>ST</td><td rowspan="9">Mary: *moaning*

Confederate: 'Should we check the baby again?'</td><td rowspan="9">Secondary survey results
Head- nil injury noted
Chest- significant seatbelt marks R upper chest extending to L lower chest
Abdomen- seatbelt mark over anterior abdomen
Limbs- no injury noted
Spine- no tenderness/wounds

Results- see supporting documents
• Bloods: VBG
• CXR/Pelvis X-ray: NAD
• EFAST: NAD
• FHR: 60</td><td rowspan="9">Secondary survey
❑ Perform head to toe assessment

Investigations
❑ Bedside Ixn- bloods, ECG, urine
❑ CXR and Pelvic Xray
❑ EFAST
❑ Repeat FHR

Management
❑ Recognise significant injury profile
❑ Notification to Surgical team for urgent attendance
❑ Referral to O&G and neonatal team for urgent attendance- may use hospital activation process
❑ Prepare team for intervention for deterioration</td></tr>
<tr><td>HR</td><td>130</td></tr>
<tr><td>SpO_2</td><td>96</td></tr>
<tr><td>BP/ART</td><td>70/50</td></tr>
<tr><td>RR</td><td>30</td></tr>
<tr><td>Temp</td><td>37</td></tr>
<tr><td>BGL</td><td>5</td></tr>
<tr><td>GCS</td><td>12 (E3V3M6)</td></tr>
<tr><td></td><td></td></tr>
</table>

STATE 3: Deterioration				
Vital signs		**Script**	**Details**	**Expected actions**
ECG	SB	**Mary:** Unresponsive *snoring/obstructed sounding respirations* **Confederate:** (may prompt if required) 'I don't think Mary is responding anymore'	BP, HR and SpO2 decrease over 2 minutes and decrease conscious state **Primary survey results** **A:** snoring **B:** poor respiratory effort, shallow respirations **C:** no palpable pulse felt **D:** no response to painful stimuli	**Assessment** ❑ Repeat primary survey and recognise peri-arrest state ❑ Declare traumatic cardiac arrest ❑ Commence ACLS as per algorithm **Investigations** ❑ Can use USS to assess for cardiac contractility during pulse checks **Management** ❑ Standard ACLS ❑ Recognition of need to displace gravid uterus off IVC ❑ Commence crystalloid/haemostatic resuscitation ❑ Rapidly assess for and treat reversible causes including chest decompression ❑ Involvement of surgical/obstetric and neonatal teams (if available)
HR	40			
SpO_2	nil trace			
BP/ART	unrecordable			
RR	10			
Temp	36			
BGL	5			
GCS	3 (E1V1M1)			

STATE 4: Management of Maternal Cardiac Arrest				
Vital signs		**Script**	**Details**	**Expected actions**
ECG	SB	**Mary:** unresponsive **Confederate:**	**Assessment** **A:** BVM, LMA or ETT without disrupting ACLS **B:** high flow O2 via delivery device **C:** CPR position with uterus displacement (following decompression of chest) **D:** no response to painful stimuli	❑ Ensure team effectively communicate patient priorities **Investigations** ❑ Can use USS to assess for cardiac contractility during pulse checks **Management** ❑ Continue ACLS as per algorithm- identify traumatic arrest and consider reversible causes ❑ Prioritise early intubation and optimise oxygenation ❑ Team leader to communicate plan for resuscitative hysterotomy and ensure procedure preparation/readiness
HR	25			
SpO_2	nil trace			
BP/ART	unrecordable			
RR	nil			
Temp	36			
BGL	5			
GCS	3 (E1V1M1)			

<table>
<tr><th colspan="5">STATE 5: Perform Resuscitative Hysterotomy and post-procedure care</th></tr>
<tr><th colspan="2">Vital signs</th><th>Script</th><th>Details</th><th>Expected actions</th></tr>
<tr><td>ECG</td><td>SB- SR</td><td rowspan="9">Mary: *localising to painful stimuli following ROSC*

Confederate: (prompt if required) ‘She seems to be moving her arms’</td><td rowspan="9">ROSC will occur with delivery of baby and uterine compression

End scenario following ROSC and Team leader discussion about patient disposition and ongoing management</td><td rowspan="9">Management
❑ Timing of RH performed ASAP but no later than 4-5minutes following onset of maternal cardiac arrest
❑ Performance of resuscitative hysterotomy
• Stepwise procedure
• Hand off baby to team
• Continue CPR/resuscitation of mother
• Perform uterine compression post procedure
❑ Move patient to OT to formalize resuscitation</td></tr>
<tr><td>HR</td><td>40 - 85</td></tr>
<tr><td>SpO_2</td><td>nil trace – 85% FiO2 1.0</td></tr>
<tr><td>BP/ART</td><td>Unrecordable – 75syst</td></tr>
<tr><td>RR</td><td>0-10</td></tr>
<tr><td>Temp</td><td>36</td></tr>
<tr><td>BGL</td><td>5</td></tr>
<tr><td>GCS</td><td>3</td></tr>
<tr><td></td><td></td></tr>
</table>

Debriefing guide

Scenario objectives

- Recognize the severely injured pregnant trauma patient
- Perform a detailed clinical assessment to identify life threats following major trauma
- Understand the indications and contraindications for resuscitative hysterotomy
- Familiarize the learner with the technical skill of performing a resuscitative hysterotomy
- Understand the issues pertaining to CRM with maternal cardiac arrest

Example questions

Exploring diagnosis

- How did you recognise the clinical deterioration in this pregnant patient who sustained traumatic injuries?
- What physiological variables are different in each trimester of pregnancy? How does this impact on the assessment of hypovolaemia following trauma?

Discussing management

- What was different in the management of this patient compared to the ‘standard’ trauma patient?
- How is a cardiac arrest following trauma managed differently to the resuscitation in medical conditions?
- In particular- what is the role of the resuscitative hysterotomy?
- What gestational age does this become important to aid haemodynamics?

Discussing teamwork / Crisis Resource Management

- What available resources do you have in your environment/hospital to assist with managing critically unwell pregnant trauma patients?
  - → How do you rapidly notify speciality teams and what teams are available?
  - → Do you have any cognitive aids to assist around your department?
  - → Are you able to have specific teams to care for the baby and mother?

Key moments

- Recognition of critically unwell pregnant trauma patient
- Performing a structured assessment
- Correct positioning and impact on haemodynamics
- Performance of traumatic cardiac arrest algorithm
- Performance and understanding of role of resuscitative hysterotomy and after care
- Understand the importance of clinician wellbeing in emotive resuscitations

Acronyms and abbreviations

Term	Definition
CPR	Cardiopulmonary resuscitation
RH	Resuscitative hysterotomy
ACLS	Advanced cardiac life support
ROSC	Return of spontaneous circulation
IVC	Inferior vena cava
RTC	Road traffic collision
QPS	Queensland police service
QAS	Queensland ambulance service
FHR	Fetal heart rate
PV	Per vaginal

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