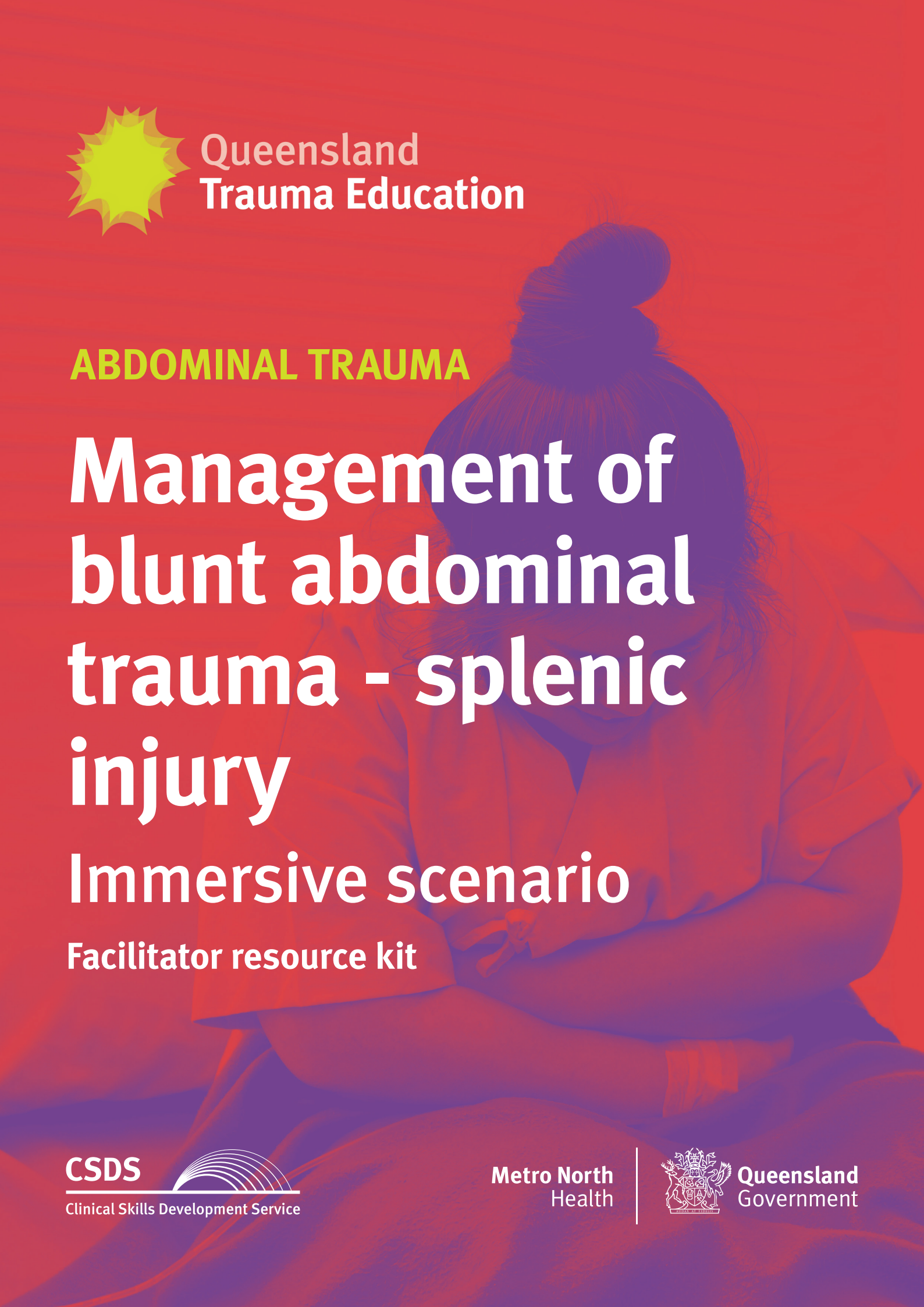
Queensland
Trauma Education

ABDOMINAL TRAUMA

Management of blunt abdominal trauma - splenic injury

Immersive scenario

Facilitator resource kit



CSDS
Clinical Skills Development Service

Metro North Health

Queensland Government

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Queensland Trauma Education
Abdominal Trauma - Management of blunt abdominal trauma - splenic injury: Immersive scenario
Facilitator resource kit
Version 1.0

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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.

National Safety and Quality Health Service (NSQHS) Standards

About this training resource kit

This resource kit provides healthcare workers with the knowledge and skills to assess and manage a patient with blunt abdominal trauma.

Target audience

Emergency department medical and nursing staff.

Duration

45-60 minutes (setup, scenario, and debrief).

Group size

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

Learning objectives

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

- Demonstrate the effective assessment of a patient with blunt abdominal trauma.
- Recognise and effectively manage a patient with haemodynamic compromise.

Facilitator guide

1. Facilitator to provide participant resource kit to the learner.
2. Facilitator to discuss the pre-simulation briefing and deliver the immersive scenario on blunt abdominal trauma.
3. Utilise the supporting documents to maximise the learning throughout immersive scenario.
4. Utilise the debriefing guide to evaluate participant performance and provide feedback.

Participant resource kit

- Learning objectives.
- Overview of blunt abdominal trauma: assessment and management.
- Further reading.
- Supporting resources:
  — Structured assessment in trauma - infographic poster.

Supporting resources

- Structured assessment in trauma - infographic poster.

Overview of blunt abdominal trauma

Blunt abdominal injury often occurs as a result of road traffic crashes and falls. It is a common body region injured, with up to 22% of traumatic injury following trauma. Blunt abdominal injury can often be challenging to diagnose with significant injury present without external signs of trauma.[1] A direct blow to the abdomen can cause solid organ rupture, visceral damage and haemorrhage, contamination from peritoneal contents and peritonitis. The spleen, liver and small bowel are commonly injured following blunt trauma.

Significant injury should be suspected with the presence of a seatbelt injury, peritonitis- with rebound tenderness or guarding, hypotension (SBP ‹90mmHg) and other associated trauma.[2]

Haemodynamic assessment to determine:

- Investigation profile.
- Urgency of diagnosis.
- Resuscitation strategies.
- Definitive care.

Further reading

Australian Trauma Quality Improvement (AusTQIP) Collaboration (2019). *Australia New Zealand Trauma Registry, Management of the Severely Injured*, 1 July 2017 to 30 June 2018. Alfred Health, Melbourne, Victoria. Retrieved from https://static1.squarespace.com/static/5b761ed3f93fd491065f7839/t/5f5ede7f02b4ba0be6129464/1600052899945/ATR_Annual+Report_18-19_FINALAUGUST_web.pdf

Diercks, D. C. (2016, 12 18). *Initial evaluation and management of blunt abdominal trauma in adults*. Retrieved from Up to date: http://www.uptodate.com/contents/initial-evaluation-and-management-of-blunt-abdominal-trauma-in-adults

Radiopaedia Splenic Trauma https://radiopaedia.org/articles/splenic-trauma

AAST Spleen Trauma Classification
https://wjes.biomedcentral.com/articles/10.1186/s13017-017-0151-4/tables/1

Bloom BA, Gibbons RC. (2020). *Focused Assessment with Sonography for Trauma*. Retrieved January 13, 2021 from https://www.ncbi.nlm.nih.gov/books/NBK470479/

Primary Clinical Care Manual 10th edition, Abdominal injuries, p.183
https://qheps.health.qld.gov.au/__data/assets/pdf_file/0027/2354850/PCCM-10th-Edition.pdf

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ABDOMINAL TRAUMA

Structured assessment in trauma

Primary survey

A

Airway/C-spine

Rapidly assess, maintain or secure airway and C-spine.

Life threats

Airway obstruction, Blunt/penetrating neck injury.

B

Breathing/Ventilation

Rapidly assess, support ventilation/oxygenation.

Life threats

Tension pneumothorax, Massive haemothorax, Open pneumothorax
Flail chest, Ruptured diaphragm.

C

Circulation with Haemorrhage control

Rapidly control, assess and support haemodynamics.

Life threats

Exsanguinating external haemorrhage, Cardiac tamponade,
Penetrating cardiac injury.

D

Disability

Rapidly assess and protect neurological status.

Life threats

Catastrophic cerebral haemorrhage.

E

Exposure

Expose patient, assess for further injuries, maintain normothermia.

Simulation event

This section contains the following:

1. Pre-simulation briefing poster.
2. Immersive scenario.
3. Resource requirements.
4. Handover card.
5. Scenario progression.
6. Supporting documents.
7. Debriefing guide.

Pre-simulation Briefing

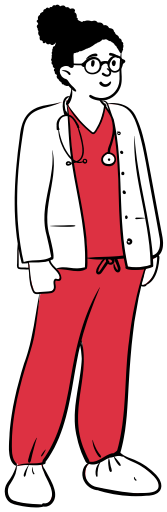
Establishing a safe container for learning in simulation.

1 Clarify objectives, roles and expectations

- Introductions.
- Learning objectives.
- Assessment (formative vs summative).
- Facilitators and learners' roles.
- Active participants vs observers.

2 Maintain confidentiality and respect

- Transparency on who will observe.
- Individual performances.
- Maintain curiosity.



3 Establish a fiction contract

Seek a voluntary commitment between the learner and facilitator.

- Ask for buy-in.
- Acknowledge limitations.

4 Conduct a familiarisation

- Manikin/simulated patient.
- Simulated environment.
- Calling for help.

5 Address simulation safety

Identify risks.

- Medications and equipment.
- Electrical or physical hazards.
- Simulated and real patients.

Note: Adjust the pre-simulation briefing to match the demands of the simulation event, contexts or the changing of participant composition.

Adapted from Rudolph, J., Raemer, D. and Simon, R. (2014). Establishing a Safe Container for Learning in Simulation. Simulation in Healthcare: Journal of the Society for Simulation in Healthcare, 9(6), pp.339-349.

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Immersive scenario

Type	Immersive scenario
Target audience	Emergency department medical and nursing staff.
Overview	26-year-old female restrained driver travelling at 60km/hr versus a telegraph pole. Initially encapsulated and transported to ED complaining of diffuse abdominal pain with obvious seatbelt bruising to abdomen. Her haemodynamic state worsens, requiring initiation of fluid resuscitation, activation of MTP and definitive care.
Learning objectives	By the end of this session participants will be able to: • Demonstrate the effective assessment of a patient with blunt abdominal trauma. • Recognise and effectively manage a patient who is haemodynamically unstable suffering blunt abdominal injury.
Duration	45 minutes including debrief.

Resource requirements

Physical resources

Room setup	Resus bay in emergency.
Simulator/s	1 manikin – SimMan 3G/ ALS simulator.
Simulator/s set up	• Street clothes lying supine. • Cervical collar and pelvic binder insitu. • Moulage: driver seatbelt bruising/abrasion to abdomen. • HM 10L/min insitu.
Clinical equipment	• Standard Precautions PPE. • Resus/trauma bay role identification stickers (if applicable to local area). • Standard Resus bay equipment: Monitors, Resus trolley, Infusion pumps, blood warmers. • Fluids/blood products: N/saline, Hartmanns, Packed Red blood cells/blood components. • Medications: IV analgesia, Tranexamic Acid 1g.
Access	2 x IVC setups. 16G cannula L) ACF with empty N/S 0.9% 250ml bag, No IV sticker attached to R) arm.
Other	ED chart and relevant paperwork.

Human resources

Faculty	2 facilitators (doctor/nurse with debriefing experience) to take on roles of scenario commander and primary debrief.
Simulation coordinators	1 for manikin set up and control of simulator.
Confederates	Junior RN and optional QAS officer for handover.
Other	Trauma team composition - 2 nurses and 3 doctors in room (or team composition applicable to local area).

Handover card

Handover from ambulance officer

This is Anna. Anna is 26 years old and is the driver of a single occupant RTC about 2 hours ago. She states she swerved to avoid a dog at 60km/hr in the street and crashed into a telegraph pole snapping it in half. She was encapsulated until the Fire Service could remove her door. She was wearing a seatbelt and the airbags deployed.

She has always been GCS 15, alert and complaining of pain in her abdomen. Her heart rate was initially within normal limits, but during the trip to hospital she became more tachycardic and her vital signs are now: HR 120, BP 110/80, sats 100% 10L HM and respiratory rate 22. She is afebrile and her BSL is 7.

We have placed a 16G cannula in her L ACF and given her 10mg IV morphine in total, 8mg IV ondansetron and 250mls N/Saline IV. She has a cervical collar for mechanism but had no neurological deficits or neck pain.

She has no known past medical history and no known allergies.

Thank you for continuing her care.

Scenario progression

<table>
<tr><th colspan="4">STATE 1: INITIAL ASSESSMENT</th></tr>
<tr><th>Vital signs</th><th>Script</th><th>Details</th><th>Expected actions</th></tr>
<tr>
<td>ECG: ST
HR: 120
SpO2: 100% 10L/min HM
BP/ART: 110/80
RR: 22
Temp: 36.5
BGL: 7
GCS: 15</td>
<td>Anna Can I have more pain relief? My belly hurts.</td>
<td>Primary survey results
A intact, maintaining own.
B equal breath sounds, no chest wall tenderness/crepitus or subcutaneous emphysema.
C cool peripherally, pink, equal radial pulses.
D GCS 15, PEARL 3mm, nil neurological deficits.
E temp and BSL NAD.</td>
<td>Commence Primary Survey
❑ Recognise the abnormality in circulation.
❑ Gain further IV access.
❑ Call for help – identify available resources relevant to local area.
Management
❑ Provide analgesia.</td>
</tr>
</table>

STATE 2: ONGOING MANAGEMENT / SECONDARY ASSESSMENT

Vital signs	Script	Details	Expected actions
ECG: ST **HR:** 120 **SpO2:** 99% 10L/min HM **BP/ART:** 90/60 **RR:** 24 **Temp:** 36.5 **BGL:** 7 **GCS:** 15	**Anna** Ongoing c/o pain to abdo, distressed by pain. *Moaning*. **Confederate** *Point out seatbelt bruising to abdo.*	• Worsening distress from pain if no analgesia given. • Increase tachycardia and hypotension if no recognition of circulatory compromise. **Secondary survey results** **Adbomen** – diffusely tender, seatbelt abrasion across abdomen, no wounds. **Pelvis** – non-tender, bony margins aligned. **Long bones** – no deformity, non-tender. **Log roll** – nil bony midline tenderness, no bruising/wounds, perianal sensation normal.	**Secondary survey** ❑ Recognition of abdominal injury. **Initiate investigations** ❑ Blood tests: FBE, chem20, lipase, coags, blood group and hold/XMatch, ROTEM/TEG (if applicable). ❑ Point of care tests: Hemocue, Istat CG4 (if applicable). ❑ Bedside tests: UA, ECG, VBG, BHCG. ❑ Imaging: CXR, pelvis Xray and EFAST. **Manaagement** ❑ Commence fluid resuscitation. • Initiate crystalloid bolus. ❑ Discuss minimising crystalloid – plan for haemostatic resuscitation.

STATE 3: ONGOING CIRCULATORY COLLAPSE, DEFINITIVE CARE			
Vital signs	**Script**	**Details**	**Expected actions**
ECG: ST	**Anna** What's going on... I am in so much pain, can you help me? *Moaning*.	Progression of hypotension and circulatory collapse despite fluid and haemostatic resuscitation. **Results** EFAST: positive free fluid in splenorenal angle.	**Assessment** ❑ Worsening circulatory collapse SBP<90. **Investigations** ❑ Positive EFAST for free fluid. **Management** ❑ Commence Haemostatic resuscitation. • Commence PRBC. • Administer Tranexamic Acid 1g. ❑ Activate massive haemorrhage protocol **or** give blood products as per local guidelines. **Referral for surgical management or consult RSQ for retrieval.**
HR: 120			
SpO2: 99% 10L/min HM			
BP/ART: 70/40			
RR: 28			
Temp: 36.5			
BGL: 7			
GCS: 14			

STATE 4			
Vital signs	**Script**	**Details**	**Expected actions**
ECG: ST **HR:** 120 **SpO2:** 99% **BP/ART:** 70/40 **RR:** 28 **Temp:** 36.5 **BGL:** 7 **GCS:** 14	**Phone call from surgeon to trauma bay:** *"We won't be able to take this patient to OT, we've got someone open on the table and no anaesthetist backup. You will have to keep this patient in your department."*	**Discussion with surgeon for operative management.** Senior participants: • push back from surgical team for OT ›30minutes to table • interpretation of ROTEM/TEG.	**Management** ❑ Use of TEG/ROTEM for guided haemostatic resuscitation.

Supporting documents

The following supporting documents are provided for this immersive scenario:

1. Protocols and guidelines.
2. EFAST: Splenorenal/LUQ: Positive.
3. EFAST: Pelvis: Negative.
4. EFAST: Subxiphoid/cardiac: Negative.
5. Chest XRAY: NAD.
6. Pelvic XRAY: NAD.
7. ROTEM: Trauma induced coagulopathy (TIC).

Protocols and guidelines

Please refer to local policy and procedure.

Statewide Guideline
Massive Haemorrhage Protocol
https://www.health.qld.gov.au/__data/assets/pdf_file/0012/142320/f-pph-mhp.pdf

RBWH Red Blanket Protocol
http://hi.bns.health.qld.gov.au/rbh/policies/procedures/001733.pdf

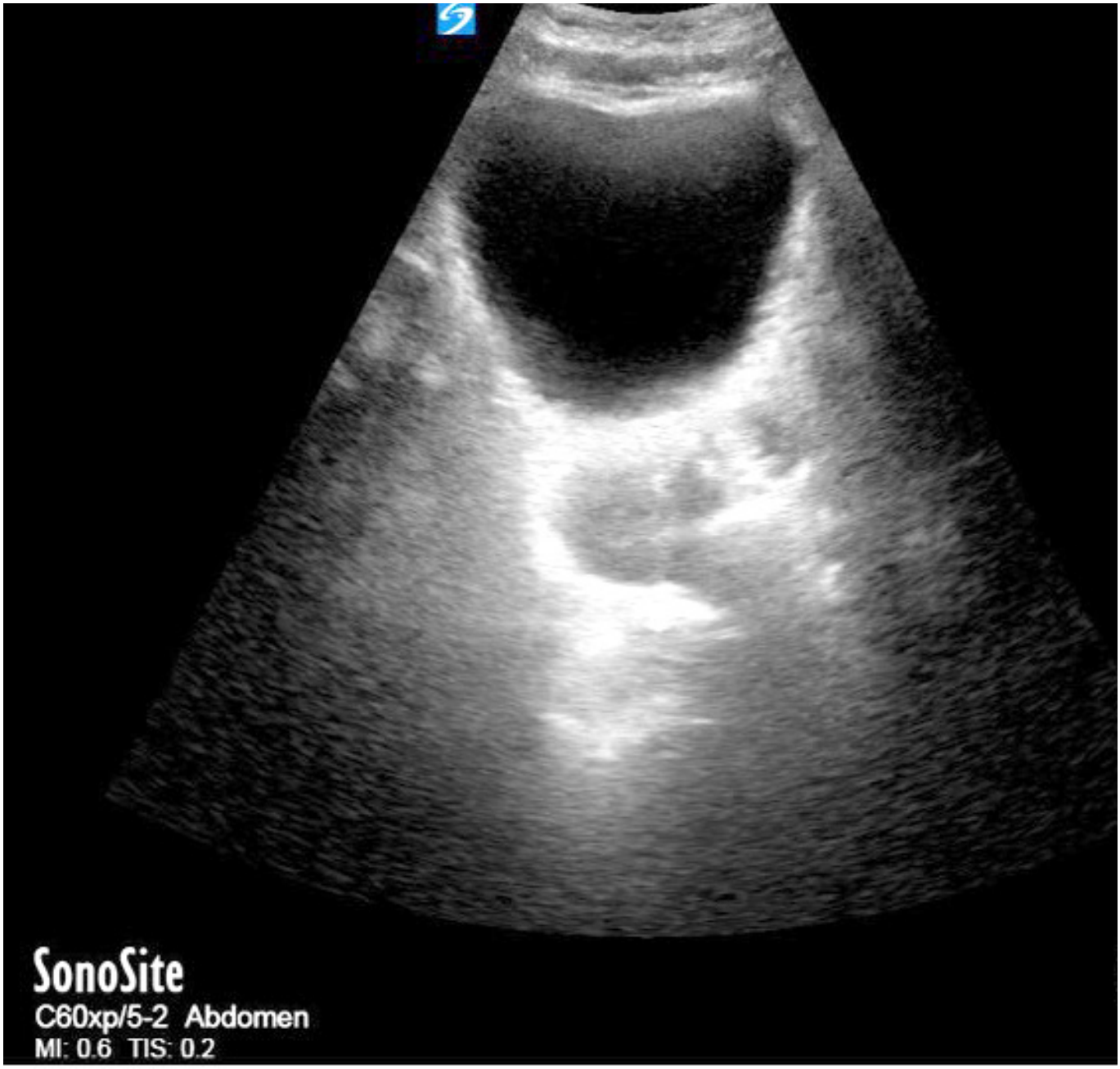
RBWH Major Haemorrhage Transfusion Protocol
https://qheps.health.qld.gov.au/__data/assets/pdf_file/0032/2477705/massive-transfusion.pdf

GCUH Massive Haemorrhage Protocol
http://gchweb.sth.health.qld.gov.au/documents/PRO1225

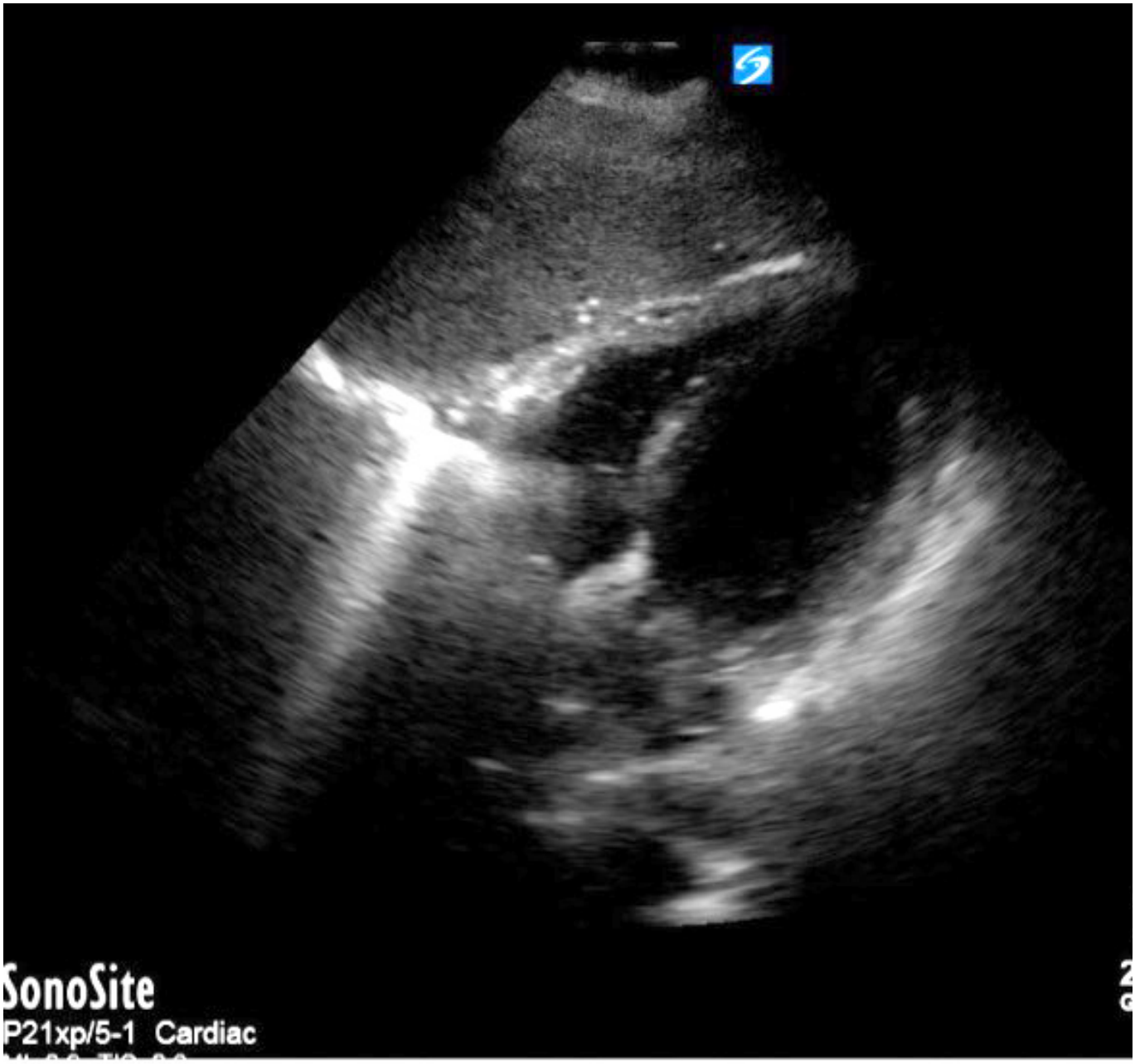
GCUH Red Blanket Protocol
http://gchweb.sth.health.qld.gov.au/documents/PRO1426

EFAST: Splenorenal/LUQ

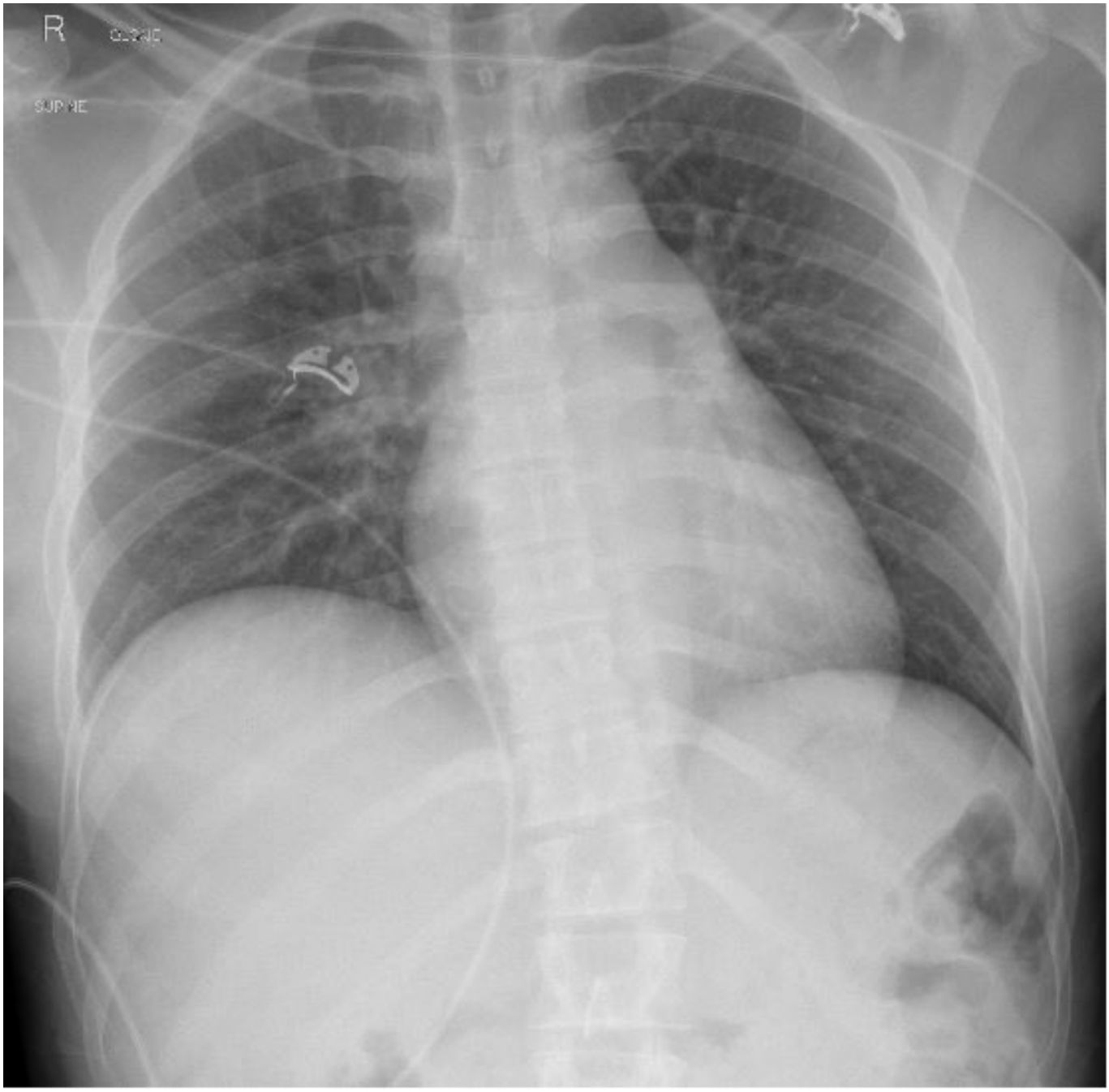
EFAST: Pelvis



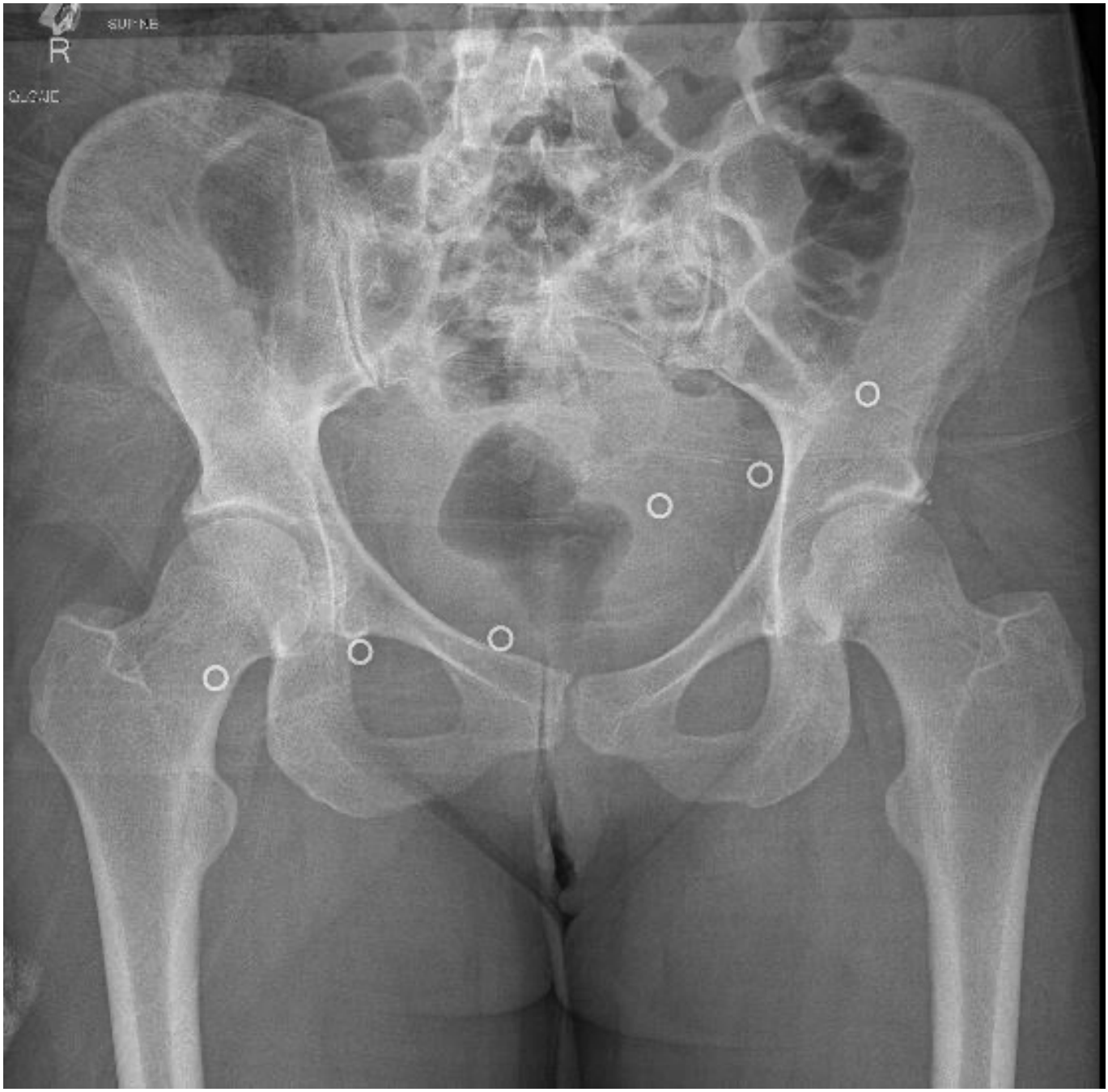
EFAST: Subxiphoid/cardiac



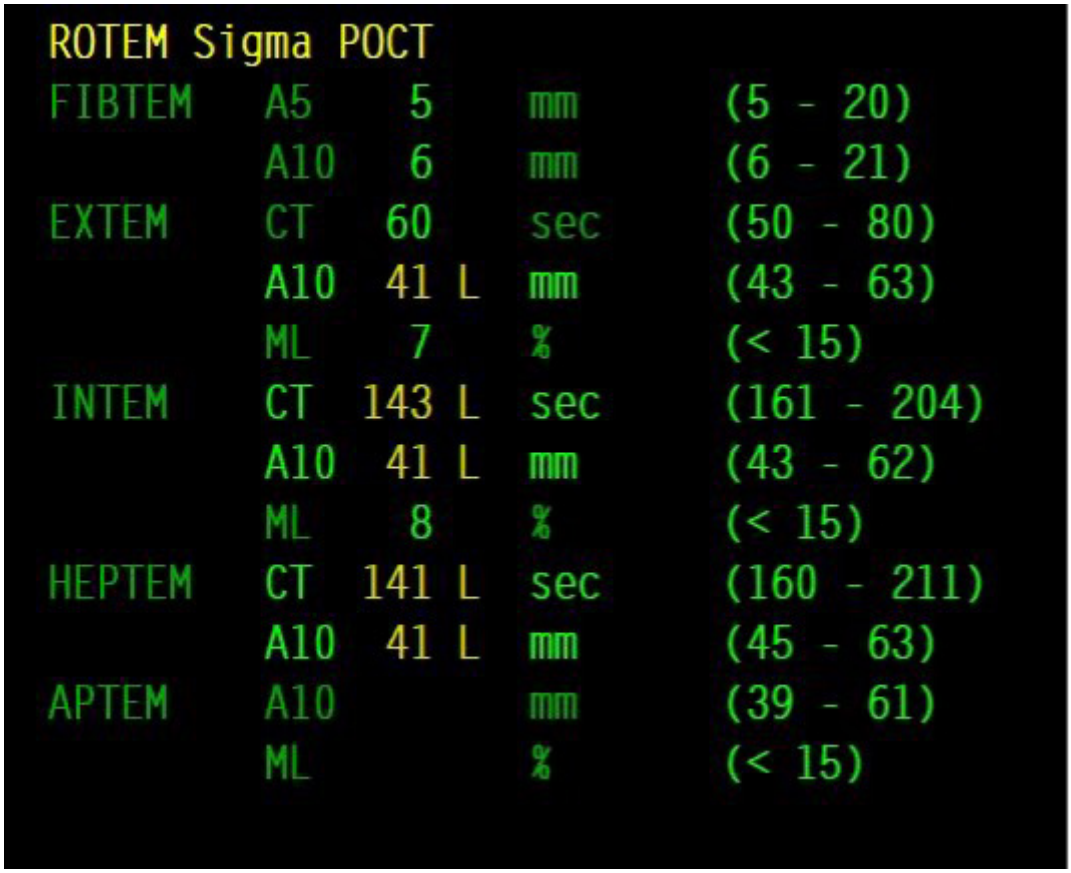
Chest XRAY



Pelvic XRAY



ROTEM



Debriefing guide

Scenario objectives

- Demonstrate the effective assessment of a patient with blunt abdominal trauma.
- Recognise and effectively manage a patient who is hemodynamically unstable suffering blunt abdominal injury.

Example questions

Exploring diagnosis

- What role does an EFAST play in the assessment of blunt trauma?
- When should an EFAST be performed?
- What is a 'positive' EFAST?
- Have you seen a Diagnostic Peritoneal Aspirate/Diagnostic Peritoneal Lavage performed?
- Do you always need a CT scan to confirm the injury profile?
- What blood tests are useful for diagnosis of injury in blunt trauma cases?
- What constitutes a Massive Transfusion Protocol (MTP)?
- How do you activate a Massive Transfusion Protocol in your facility?
- What end points do you use to determine the massive transfusion?
- What is a ROTEM/TEG?
- How do you interpret the ROTEM/TEG?

Discussing management

- How would you approach this scenario in your department?
- Are there any protocols or guidelines to seek urgent help?
- What are your strategies if you encounter a difference of opinion from the surgical team?

Key moments

- Recognition and response to hypotension in trauma.
- Utilisation of bedside investigations to identify bleeding source.
- Early referral to surgical team or retrievals/tertiary facility for definitive care.
- Use of adjunct investigations to provide haemostatic resuscitation for critically bleeding trauma patient.

Acronyms and abbreviations

MTP	massive transfusion protocol
PRBC	packed red blood cells
OT	operating theatre
EFAST	extended focussed assessment with sonography in trauma
VBG	venous blood gas
UA	urinalysis
ECG	electrocardiogram
CXR	chest XRAY
FBE	full blood count
NAD	nil abnormalities detected
BHCG	beta-human chorionic gonadotropin

References

1. Australian Trauma Quality Improvement (AusTQIP) Collaboration (2019). *Australia New Zealand Trauma Registry, Management of the Severely Injured*, 1 July 2017 to 30 June 2018. Alfred Health, Melbourne, Victoria. Retrieved from https://static1.squarespace.com/static/5b761ed3f93fd491065f7839/t/5f5ede7f02b4ba0be6129464/1600052899945/ATR_Annual+Report_18-19_FINALAUGUST_web.pdf
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https://www.surveymonkey.com/r/3FWL3ZD

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