Queensland
Trauma Education

PRE-HOSPITAL RETRIEVAL

Blunt chest trauma

Immersive Scenario

Facilitator resource kit

CSDS
Clinical Skills Development Service

Queensland
Government

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.

Developed by

Dr Anja Dehn, Staff Specialist – Retrieval Services Queensland
Dr Frances Williamson, Staff Specialist Emergency Physician – Metro North Health

Reviewed by
Tracey McLean, Nurse Educator, Simulation – CSDS

Education Working Group, Statewide Trauma Clinical Network – Clinical Excellence Queensland

Queensland Trauma Education
Pre-Hospital care – Blunt Chest Trauma: Immersive scenario – Facilitator resource kit
Version 1.0

Published by the State of Queensland (Clinical Skills Development Service), 2022

About this training resource kit

This resource kit provides pre-hospital clinicians with the skills to assess and manage a patient with blunt chest and extremity injury following trauma.

National Safety and Quality Health Service (NSQHS) Standards

Target audience

Pre-hospital / Retrieval / Rural and Remote clinicians

Duration

45-60 minutes

Group size

Suited to small group participation.

Learning objectives

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

1. Understand the importance of pre-hospital limb reduction and splinting.
2. Demonstrate understanding of the priorities in managing blunt chest trauma in the awake patient.
3. Consider the impact of flight physiology on the trauma patient.

Facilitation guide

Use the facilitation guide and resources to deliver the learning objectives outlined.

Overview of pre-hospital management of blunt trauma

Pre-hospital assessment and management of the trauma patient has different challenges when compared to the in-hospital environment. In addition to team composition, the environment and equipment available in addition to the platform in which the patient will then be moved to hospital will impact on management considerations.

With major chest trauma, the ability to perform the assessment and management of a tension pneumothorax becomes challenging in an aircraft due to space, noise, and access to the patient. Therefore, these procedures are often performed prior to leaving the primary scene if concern for deterioration during transfer exists. (1).

Chest decompression using finger thoracostomy is preferred to needle decompression due to high failure rate when a catheter is used. (2)

Further reading

Trauma patients are safe to fly 72 hours after tube thoracostomy removal.	
Authors	David Zonies, Joel Elterman, Christopher Burns, Vincent Paul, John Oh, Jeremy Cannon
Link	https://bit.ly/3Ac8yfv

Finger thoracostomy in patients with chest trauma performed by paramedics on a helicopter emergency medical service	
Authors	Liam Hannon,Toby St Clair,Karen Smith,Mark Fitzgerald,Biswadev Mitra,Alexander Olaussen,John Moloney,George Braitberg,Rodney Judson,Warwick Teague,Nuala Quinn,Yesul Kim,Stephen Bernard
Link	https://bit.ly/3APh57e

Is a chest tube necessary prior to Air Medical Transport of patients with Pneumothorax?	
Authors	Gregory Pirkl, Darren Braude
Link	https://bit.ly/3zItWrm

Clinical Practice Guideline: Blunt Chest Trauma	
Organisation	Queensland Health, Clinical Excellence Queensland
Link	https://bit.ly/3QBcmw5

Life-saving or life-threatening? Prehospital thoracostomy for thoracic trauma	
Authors	Zane Perkins, Matthew Gunning
Link	https://bit.ly/3Afk2ik

M-mode ultrasound for the detection of pneumothorax during helicopter transport	
Authors	Matthew Lyon MD, Stephen A Shiver MD, Perry Walton DO
Link	https://bit.ly/3JM5FW2

Simulation event

This section contains the following:

1. Pre-simulation briefing poster
2. Immersive scenario
3. Resource requirements
4. Handover card
5. Scenario progression
    a. State 1
    b. State 2
    c. State 3
    d. State 4
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

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

5 Address simulation safety

Identify risks:

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

V2 Effective: 1/7/2021. 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.

CSDS Clinical Skills Development Service

Queensland Government

Immersive scenario

Type	Immersive scenario
Target audience	Clinicians involved in prehospital care
Overview	Competing priorities requiring assessment and management in the pre-hospital setting. Consideration for concurrent management of the orthopaedic and chest trauma in addition to the impact of flight on trauma physiology.
Learning objectives	• Understand the importance of pre-hospital limb reduction and splinting. • Demonstrate understanding of the priorities in managing blunt chest trauma in the awake patient. • Consider the impact of flight physiology on the trauma patient.
Duration	45 minutes, including debrief

Resource requirements

Physical resources

Room setup	Outside environment
Simulator/s	3G or ALS Manikin
Simulator set up	• Street clothes lying supine • Moulage*:* normal patient, moulage for pulseless R arm with compound fractures, cervical collar • iSimulate for patient monitor
Clinical equipment	• QAS equipment • Intubation medications and equipment • Finger thoracostomy set up +/- ICC (Intercostal Catheter) and drain • Pelvic binder, limb splint equipment • US machine
Access	2 x PIVC setup with 'No IV' stickers in place
Other	Relevant paperwork Radiological resources

Human resources

Faculty	2x facilitators (Dr/Nurse/Paramedic with debriefing experience) to take on roles of scenario commander and primary debrief
Simulation coordinators	• Facilitators to control simulated monitor • 1x for manikin set up and control
Confederates	Ambulance Officer
Other	Team composition as appropriate for environment

Handover card

Handover from ambulance officer

This is Brian. He was reportedly witnessed to crash into a tree on his motorbike. He was then thrown about 10 meters from the bike.

Witnesses pulled over and found him dazed but awake. We arrived on scene about 7 minutes later.

On our arrival he was confused and dazed. Notably tachypnoeic and hypoxic- Sats 89% before we put O2 on him. First blood pressure was 90mmHg and HR 110.

He’s still on the ground but we’re just getting an IV into him.

The helicopter is en-route and about 20 minutes away. We don’t know anything else about him yet.

Scenario progression

STATE 1: INITIAL ASSESSMENT				
Vital signs		**Script**	**Details**	**Expected actions**
ECG	ST	**Brian:** *(Moaning)* 'Oh, my chest hurts' 'I can't breathe'	**Primary survey results** **A:** Intact, cervical collar **B:** Decreased BS R, bilateral chest wall tenderness, R side crepitus and subcutaneous emphysema in axilla **C:** Poorly perfused peripherally, HS dual, tachycardic **D:** Confused to place, unable to move R arm – obvious compound injuries **E:** Afebrile	**Commence primary survey** ❑ Identify respiratory distress and chest injury **Management** ❑ Increase O2 delivery ❑ Provide analgesia ❑ Plan for management of priorities
HR	110			
SpO_2	91% 10L NRB			
BP	90/60mmHg			
RR	40			
Temp	36.9			
BGL	6			
GCS	14 (E4V4M6)			

STATE 2: ONGOING MANAGEMENT / SECONDARY ASSESSMENT				
Vital signs		**Script**	**Details**	**Expected actions**
ECG	ST	**Brian:** *(Less responsive)* *(Mumbling words only)* *(Localizing to pain)*	**Secondary survey results** • No external evidence of facial or head injury • Abdo soft, non-tender • Pelvis aligned, no tenderness • Right upper limb (RUL) deformity, open wounds, no palpable pulse, hand pale and cold **Results EFAST:** • RUQ/LUQ/subxiphoid/pelvis: NAD • R lung: no pleural sliding • L lung US: normal	**Secondary survey** ❑ Head to toe assessment ❑ Identify compromised R upper limb **Investigations** ❑ EFAST **Management** ❑ Pelvic binder application
HR	120			
SpO_2	94% 15L NRB			
BP	90/60mmHg			
RR	38			
Temp	36.9			
BGL	6			
GCS	11 (E3V3M5)			

STATE 3: AIRWAY MANAGEMENT				
Vital signs		**Script**	**Details**	**Expected actions**
ECG	ST	**Confederate** Prompt team of respiratory distress - consider options for delivery of oxygen/airway protection	• Recognition of deterioration in conscious state requiring airway support. • Consider chest decompression vs intubation timing. • Perform other procedures in timely fashion- fracture reduction/ splinting and resuscitation.	**Assessment** ❑ Identify shock state ❑ Recognise competing priorities: improving oxygenation, chest decompression, volume expansion and fracture reduction **Management** ❑ Consider intubation for oxygenation/ventilation- protective lung strategy ❑ Sedative agents- reduction in dose to hemodynamic (HD) state ❑ Finger thoracostomy on R- ICC placed if not intubated ❑ Sedation dose appropriate to HD state ❑ Commence blood transfusion ❑ PRBC, calcium, FFP, TXA ❑ Reduce and splint RUL, wound care management ❑ Liaise with Retrieval Services Queensland for retrieval
HR	120			
SpO_2	93% NRB			
BP	100/80mmHg			
RR	35			
Temp	36.9			
BGL	6			
GCS	11 (E3V3M5)			

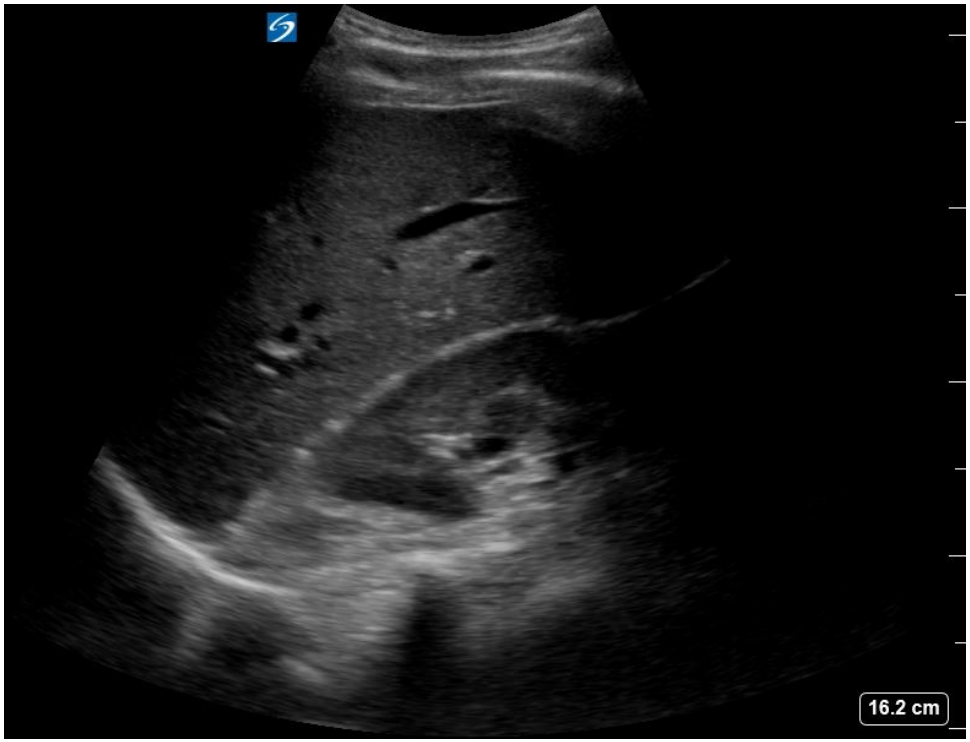
STATE 4: PREPARING FOR RETRIEVAL				
Vital signs		**Script**	**Details**	**Expected actions**
ECG			Improvement in vital signs when chest decompression performed. Haemodynamic state improves post blood resuscitation. Perfusion improves with limb reduction and splinting.	❑ Review primary and secondary survey ❑ Confirm improved neurovascular status in RUL post reduction and splinting ❑ Consider the following prior to the flight: 1. adequate IV access points 2. access to chest- R ICC vs re-exploration if deteriorates 3. analgesia 4. ongoing resuscitation plan 5. documentation and notification to receiving hospital
HR				
SpO_2				
BP/ART				
RR				
Temp				
BGL				
GCS				

Supporting documents

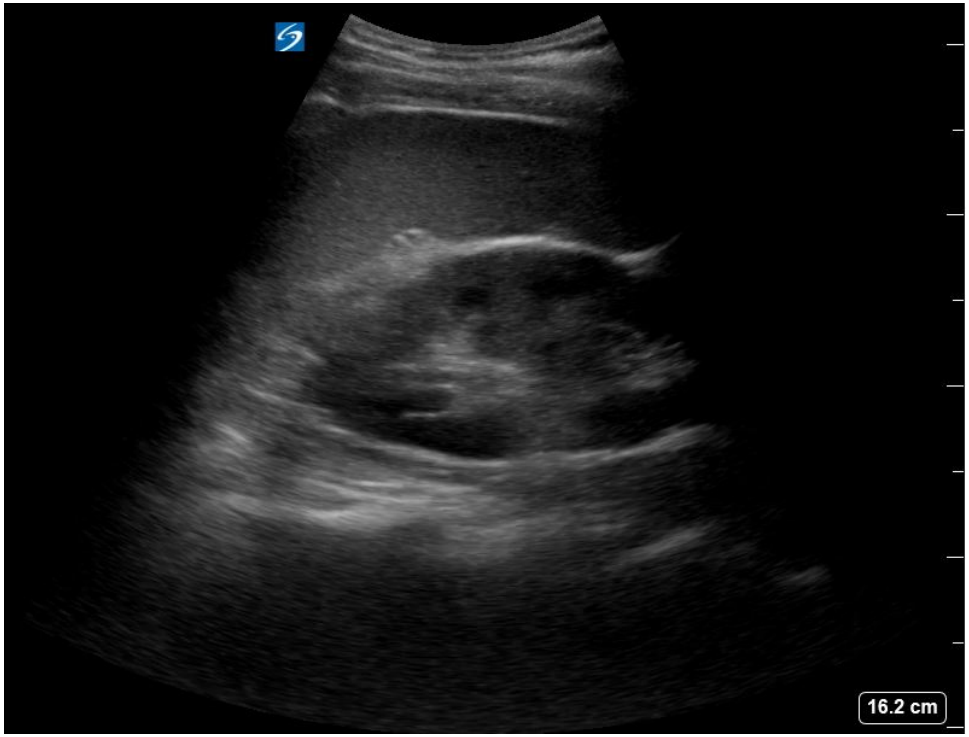
The following supporting documents are provided for this immersive scenario.

1. EFAST images- RUQ/LUQ/Subxiphoid and pelvic normal
2. L lung normal
3. R lung seashore sign

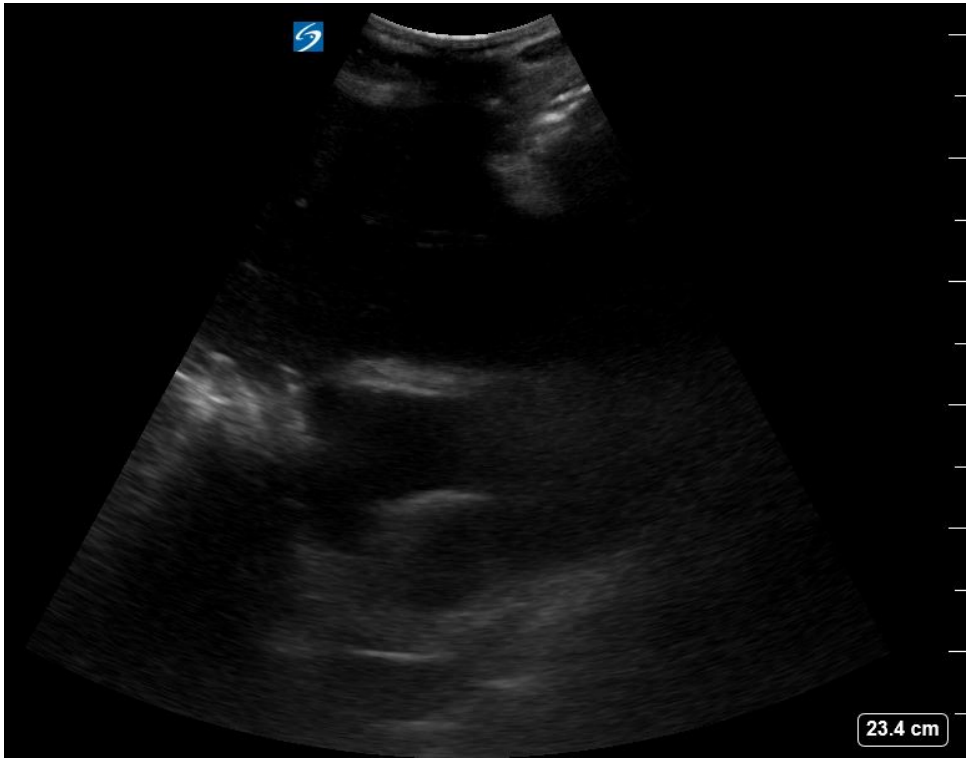
RUQ



LUQ

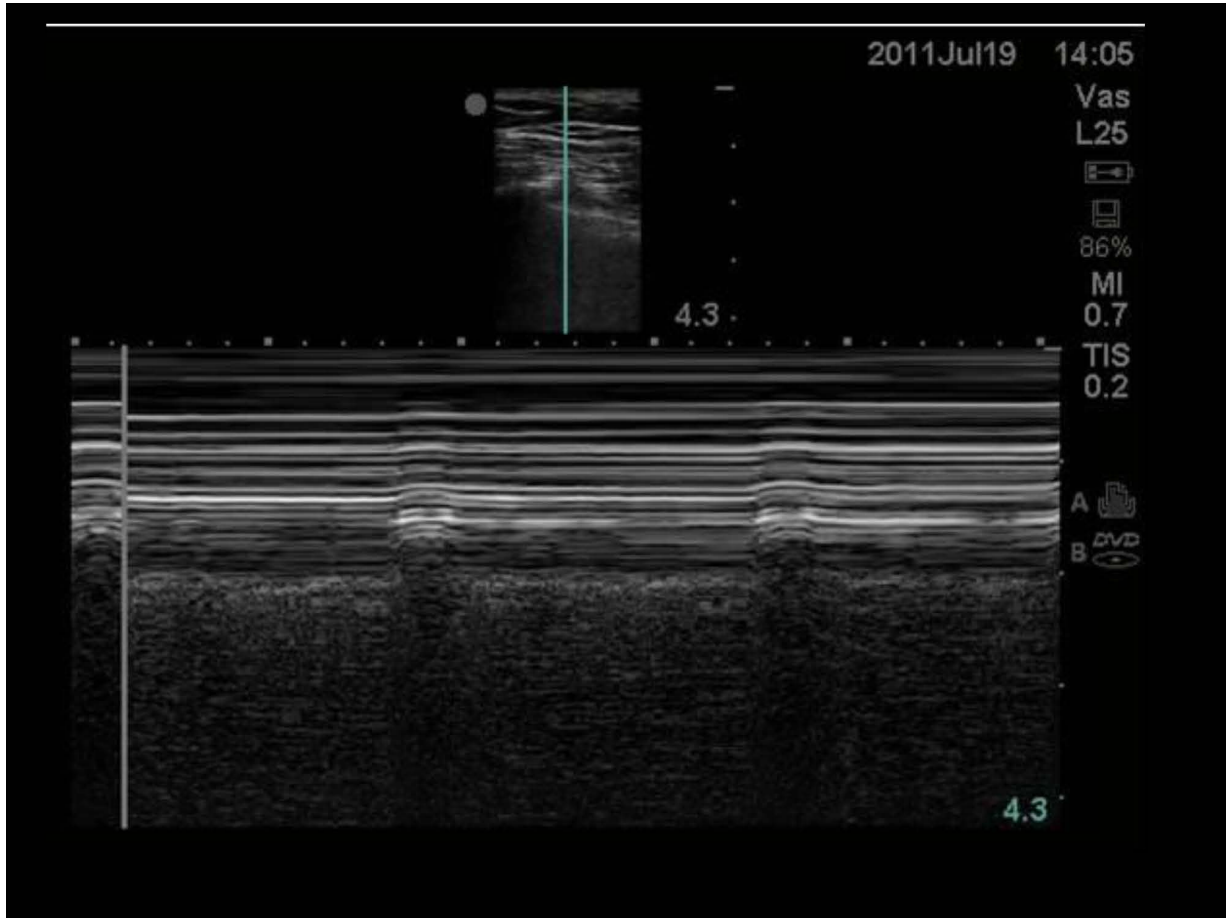


Subxiphoid

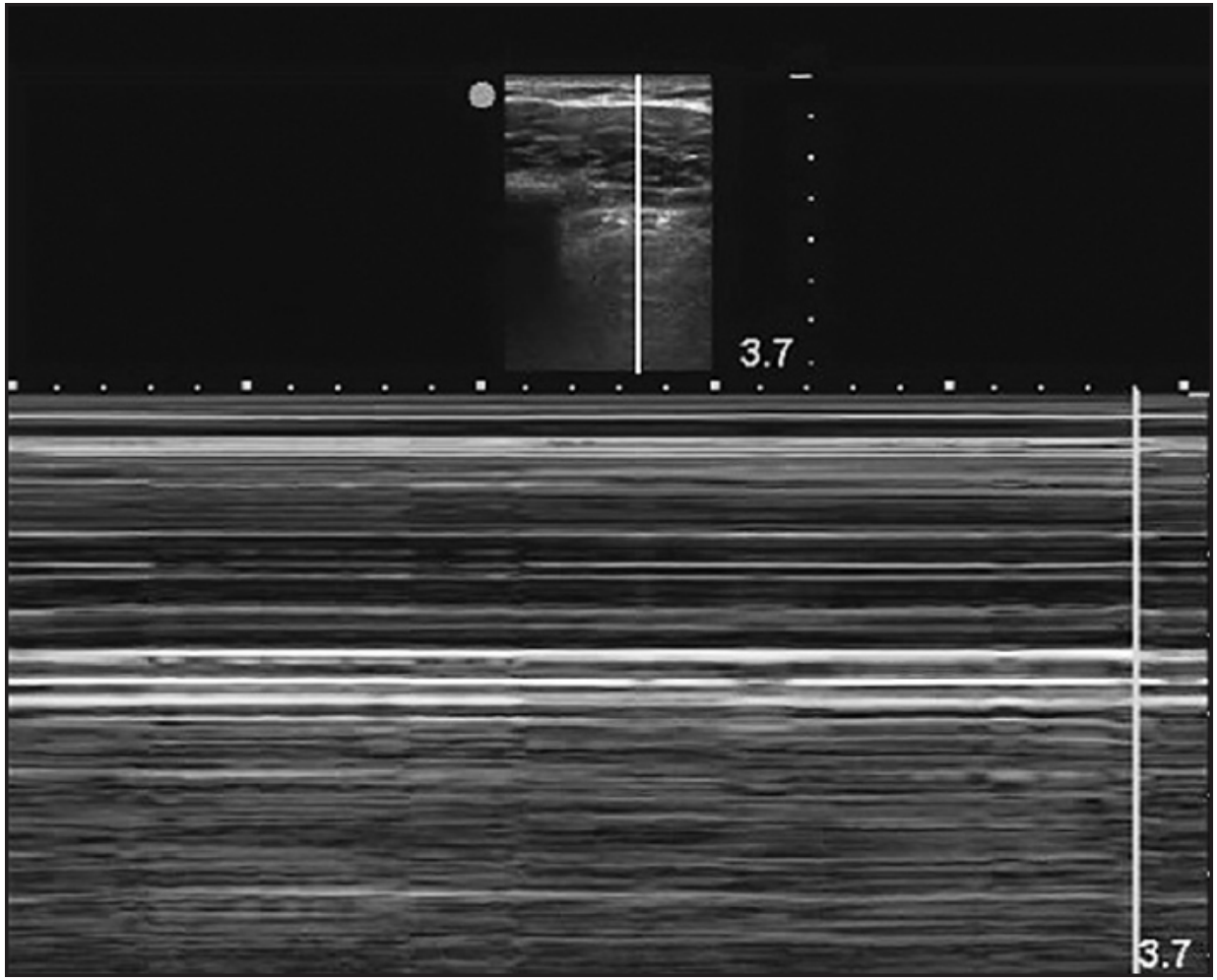


Bladder

L lung US



R lung US



Debriefing guide

Scenario objectives

1. Understand the importance of pre-hospital limb reduction and splinting
2. Demonstrate understanding of the priorities in managing blunt chest trauma in the awake patient
3. Consider the impact of flight physiology on the trauma patient

Example questions

Exploring diagnosis

- Describe the assessment of this patient how it differs in the pre-hospital environment?
- What investigations can be performed in the prehospital setting?
- How is shock determined in the field? Does this differ from 'in hospital'?

Discussing management

- What is the significance of flight physiology and Boyles Law?
- How does this impact on decision making for the intubation and chest decompression timing?
- Is this different for road-based retrieval?
- At what stage should the at-risk limb be reduced/splinted?
- What strategy was used to manage the patient's respiratory distress?
- What are 'value adding interventions'?

Discussing teamwork/crisis resource management

- How do you prioritise your team in clinical assessment of the trauma patient?
- What roles are allocated?
- What strategies do you utilise to encourage all team members to voice their concerns/recognition of the deteriorating patient?
- How does the communication pathway occur with on ground and aeromedical teams occur?
- How do you balance 'stay and play' with 'scoop and run' principles?

Key moments

- Decision process for respiratory support- intubation vs chest decompression
- Timing for limb fracture vs chest management interventions

Acronyms and abbreviations

Term	Definition
FFP	Fresh frozen plasma
ICC	Intercostal catheter
PRBC	Packed red blood cells
RSQ	Retrieval Services Queensland
RUL	Right upper limb
TXA	Tranexamic acid
RUQ	Right upper quadrant

References

1. Hannon L., St Clair T, Smith K., Fitzgerald M, Mitra B, Olaussen A, Moloney J, Braitberg G, Judson R, Teague W, Quinn N, Kim Y and Bernard S. (2020), Finger thoracostomy in patients with chest trauma performed by paramedics on a helicopter emergency medical service.
2. Emergency Medicine Australasia, 32: 650-656. https://bit.ly/3BgMtgp
3. Kaserer A, Stein P, Simmen H-P, Spahn D and Neuhaus V. Failure rate of prehospital chest decompression after severe thoracic trauma. Am J Emerg Med. 2017; 35 (3): 469-474.

Share your feedback

Please complete our survey to help make Queensland Trauma Education better

The survey should take no more than 5 minutes to complete.

Scan the QR code or visit:
https://www.surveymonkey.com/r/3FWL3ZD

Queensland Trauma Education

Queensland Trauma Education
Pre-Hospital care – Blunt Chest Trauma: Immersive scenario – Facilitator resource kit

Published by the State of Queensland (Clinical Skills Development Service), 2022

Visit csds.qld.edu.au/qte
Email CSDS-Admin@health.qld.gov.au
Phone +61 7 3646 6500

Queensland Government