



Queensland
Trauma Education

TRAUMA AND THE OLDER PERSON

Major pelvic trauma

Case discussion

Facilitator resource kit

CSDS



Clinical Skills Development Service



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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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Trauma and the Older Person – Major pelvic trauma: Case discussion – Facilitator resource kit Version 1.0

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About this training resource kit

This resource kit provides healthcare workers with the knowledge of assessment and management of major pelvic injury in the geriatric population.

National Safety and Quality Health Service (NSQHS) Standards



Target audience

Emergency department medical and nursing clinicians.

Duration

30 minutes.

Group size

Small group participation.

Learning objectives

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

- Recognise high risk mechanism of injury (MOI) for major trauma in geriatric population.
- Understand the challenges with haemodynamic assessment in the older population.
- Discuss the indications for CT angiogram acquisition in pelvic trauma.

Facilitation guide

1. Facilitator will need electronic device to open and play links within the question and answer guide.
2. Facilitator to provide participant resource kit to participants.
3. Facilitator to deliver case discussion and utilise the question and answer guide to promote discussion.
4. Utilise supporting documents to reinforce learning throughout case discussion.

Overview of elderly major pelvic trauma

Major pelvic trauma is uncommon in patients > 80 years, despite pelvic injury being a common presentation to major trauma centres. In geriatric patients any injury to the pelvis should be considered higher risk for haemorrhage and more significant injury profile due to their increased co-morbidities and osteopenia.¹

Further reading

Survivorship and severe complications are worse for octogenarians and elderly patients with pelvis fractures as compared to adults: data from the national trauma data bank

Publication Journal of Osteoporosis 2012

Link <https://doi.org/10.1155/2012/475739>

Pelvic Fractures and Associated Genitourinary and Vascular Injuries: A Multisystem Review of Pelvic Trauma

Publication American Journal of Roentgenology

Link <https://doi.org/10.2214/AJR.18.21050>

Primary Clinical Care Manual 10th edition, Fractured Pelvis, p.190

Organisation Queensland Health

Link https://qheps.health.qld.gov.au/_data/assets/pdf_file/0027/2354850/PCCM-10th-Edition.pdf

Procedure: Haemodynamically Unstable Pelvic Trauma Guideline

Organisation Queensland Health

Link [PAH | PSQU - Procedure: Haemodynamically Unstable Pelvic Trauma Guideline \(01233\) \(health.qld.gov.au\)](https://www.health.qld.gov.au/pah-psqu-procedure-haemodynamically-unstable-pelvic-trauma-guideline-01233)

CT polytrauma (technique)

Organisation Radiopaedia

Link <https://radiopaedia.org/articles/ct-polytrauma-technique>

CT polytrauma (approach)	
Organisation	Radiopaedia
Link	https://radiopaedia.org/articles/ct-polytrauma-approach

Case discussion

Geriatric high velocity trauma is uncommon but can result in significant life-threatening injuries. Prompt recognition and treatment of these following a systematic approach to assessment and resuscitation will improve survival.

This case focusses on the assessment and management of a pedestrian struck by a motor vehicle who develops haemorrhagic shock and requires advanced imaging for ongoing diagnosis and management.

Case study

84yr old female struck by car ~60km/hr whilst crossing the road when out walking her dog. She was struck and thrown over the bonnet landing 5 metres down the road.

PMHx: glaucoma, bronchiectasis, ex-smoker. No regular medications. Nil allergies.

Vital signs within normal limits with the ambulance, she has been given 5mg IV morphine with good effect.

On arrival to the ED, her vital signs are:

- Airway patent, cervical collar in situ.
- Equal AE, no bruising/tenderness or crepitus to chest wall. Sats 98% RA and RR 24.
- HR 95, BP 145/80, well perfused peripherally.
- GCS 14 (confused to place), moving all limbs. Bruising around eyes, PEARL.
- Pelvic binder in situ, abdomen soft, no bruising/wounds.
- Multiple abrasions and superficial wounds to L upper and lower extremities.

Question and answer guide

1. Based on the presentation, what injury profile should be considered?

- Traumatic brain injury
- Pelvic and extremity trauma

Given age and mechanism of injury, chest/abdominal and spinal trauma also needs consideration and investigation.

2. What initial tests will be performed in the resuscitation bay and provide a rationale for each?

Bedside:

- **ECG** - for abnormalities concerning for myocardial contusion.
- **BSL** - given altered conscious state.
- **UA** - macroscopic haematuria given mechanism.

Laboratory:

- **FBE** - baseline Hb (even if bleeding, Hb will be normal initially).
- **UEC/LFTS/CK/lipase** - organ injury/baseline measure/soft tissue injury.
- **VBG/POCT** - rapid Hb/metabolic assessment, cardiac enzymes - if ECG abnormalities.
- **Coags/ROTEM** - assessment of coagulopathy in trauma.
- **Group and Hold/XMatch** - early anticipation/preparation for haemostatic resuscitation if becomes haemodynamically unstable.

Radiological:

- **CXR** - chest wall injury, pneumo-haemothorax.
- **Pelvic Xray** - pelvic injury (may have pelvic binder in situ).
- **Limb Xray** - if injury identified.
- **EFAST** - assessment of free fluid in peritoneal or thoracic space or lung sliding.

3. She has a chest and pelvic Xray performed as primary assessment in the resuscitation bay. What do they show?

Facilitator to issue CXR and Pelvic Xray 1 to participants for discussion of findings.

CXR: No rib #/Pneumothorax/Haemothorax, normal mediastinum, previous L shoulder ORIF, monitoring leads, artefact (?sheets)

Pelvic Xray 1: Comminuted pelvic fractures involving the para-symphyseal region with bilateral sup and inf pubic rami and L acetabulum. SIJ normal. Pelvic binder in-situ.

4. a) Following the plain film acquisition, she is reassessed. Her HR is stable at 95, and BP now 118/72. What further CT imaging is required to investigate and define her injury and why?

- CT brain non-contrast - GCS 14.
- CT cervical spine - age and mechanism.
- CT arterial chest/abdomen - age, mechanism, exclude solid organ injury.
- CT portal venous abdomen/pelvis - solid organ injury delineation, hollow viscus injury.
- CT arterial pelvis - abnormal pelvic Xray, high risk of bleeding in elderly patient.

b) If CT imaging is not available, what decision making and further management considerations are required for optimal patient management?

- Given mechanism of injury and risk of severe injury profile, patient would ideally require early RSQ notification and referral to tertiary facility for ongoing investigations and management.

5. Whilst in CT her cannula fails resulting in a limited image profile. What injuries are noted on her CT below?

Facilitator to use CT images to discuss injury profile and findings.

Download imaging video B412124: <https://bit.ly/3k0CNOB>

CT findings:

1. Multiple bilateral rib fractures, as described. Bilateral lower lobe bronchiectasis, more pronounced on the right than the left.
2. Multiple pelvic fractures as detailed above with contrast extravasation associated with the inferior pubic ramus fracture on the right. Fracture of the superior, posterior aspect of the left iliac crest (in addition to the right side). Given extent and severity of pelvic fractures and free fluid surrounding the bladder, injury to the bladder is a possibility. If this is suspected clinically - retrograde CT cystogram for leak could be considered.
3. No solid organ injury identified.

6. After CT she is moved back to the resuscitation area. She complains of more pain and is noted to have a change in her vital signs. Her GCS remains 14, with no new neurological deficits. HR 110, SBP 67/40mmHg, cool peripherally. Abdo remains soft, non-tender.

Her only vascular access failed during CT. What options for replacement are there?

- Standard PIVC insertion
- Use of US for USG PIVC
- Central vascular access
- Intra-osseous

7. You are successful in gaining peripheral IV access. What management steps should be undertaken next?

1. Haemostatic resuscitation: PRBC, FFP/platelets or VHA, TXA bolus and infusion
2. Definitive care: pelvic bleeding- ortho/surgical/IR options: given limited imaging, needs consideration of CTA pelvis to define vascular extravasation.
3. Supportive care: analgesia, IDC, antiemetics.

8. She receives 2 units of warmed PRBC, 1g TXA bolus and her BP improves to 110/80mmHg. A repeat CT arterial pelvis is performed showing bleeding from the bone injury without contrast extravasation, and the haematoma size is stable.

What further imaging should occur now?

Ensure haemodynamic stability then:

- Perform repeat Pelvic Xray with binder removed to assess for bony stability - this will aid operative management. If there is diastasis or haemodynamic compromise once the binder is removed this may be an indication for operative management. In this scenario the binder is replaced.

Facilitator to issue Pelvic Xray 2 to participants for discussion of findings.

Pelvic Xray 2: IDC noted. There is small amount of contrast in the bladder. Bladder diverticulum noted. There is no contrast extravasation to the pelvis.

Multiple displaced fractures involving the bilateral superior and inferior pubic rami, pubic body is noted. Fractures of the left acetabular roof. Sacral ala fractures are difficult to appreciate on plain radiograph.

9. When deciding on the following CTs for trauma presentations, what are each phase used for?

Non-Contrast: identification of intracranial and bony pathology.

Arterial: to delineate active bleeding with contrast extravasation.

Portal Venous: useful to assess for contrast pooling/contrast extravasation indicative of active bleeding.

Delayed (renal excretory phase): useful in patients with traumatic renal injuries (to assess for urinoma and upgrade AAST grading).

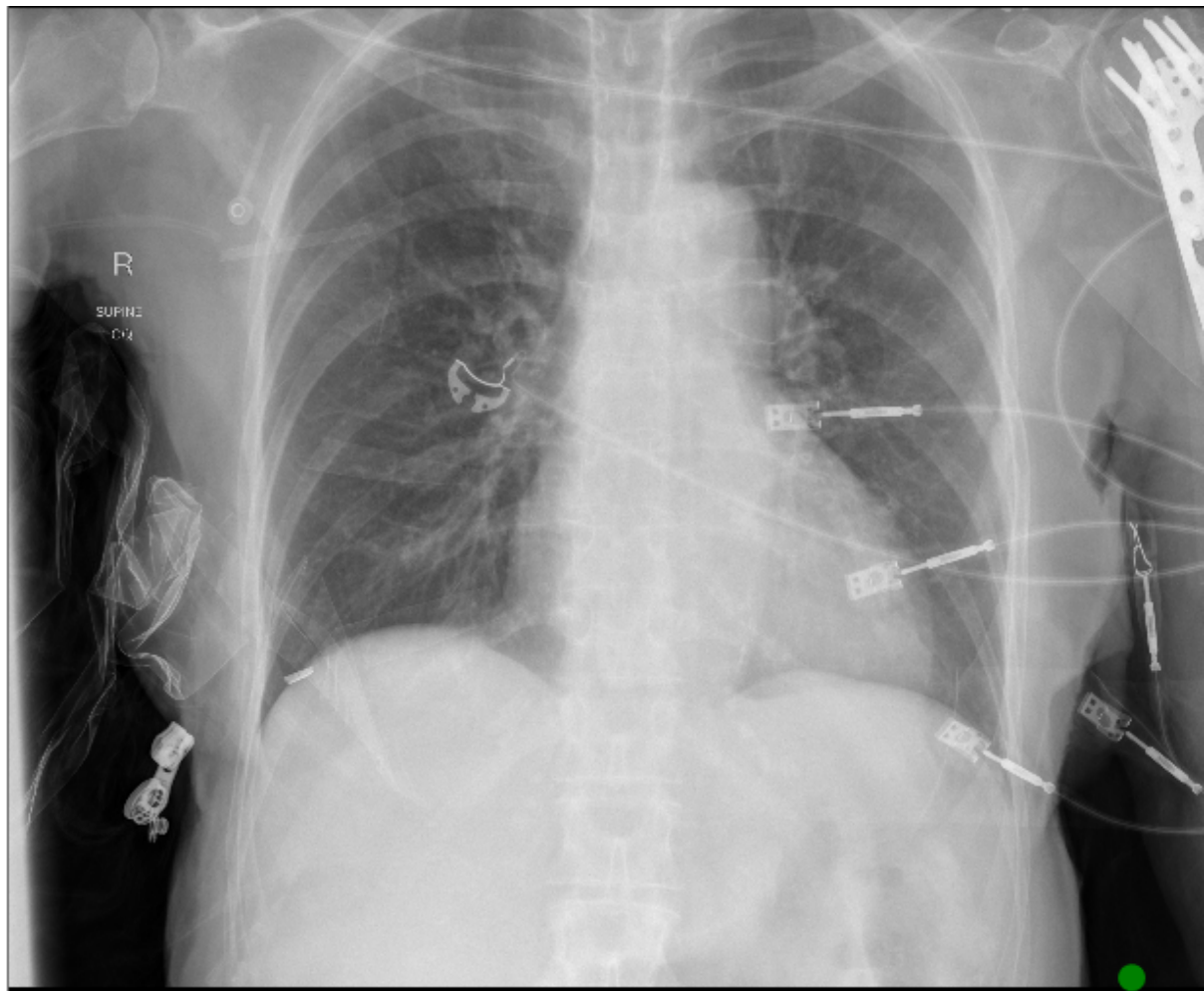
CT cystogram: assess for bladder injury.

Supporting documents

The following supporting documents are provided for this case discussion:

1. CXR
2. Pelvic Xray 1
3. Pelvic Xray 2

CXR



Pelvic Xray 1



Pelvic Xray 2



Acronyms and abbreviations

Term	Definition
UA	urine analysis
ECG	electrocardiogram
BSL	blood sugar level
US	ultrasound
USGPIVC	ultrasound guided peripheral intravenous cannulation
VHA	viscoelastic haemostatic assay
PRBC	packed red blood cells
FFP	fresh frozen plasma
TXA	tranexamic acid

References

1. Matityahu, A., Elson, J., Morshed, S., & Marmor, M. (2012). Survivorship and severe complications are worse for octogenarians and elderly patients with pelvis fractures as compared to adults: data from the national trauma data bank. *Journal of osteoporosis*, 2012, 475739. <https://doi.org/10.1155/2012/475739>
2. Lee, M. J., Wright, A., Cline, M., Mazza, M. B., Alves, T., & Chong, S. (2019). Pelvic Fractures and Associated Genitourinary and Vascular Injuries: A Multisystem Review of Pelvic Trauma. *AJR. American journal of roentgenology*, 213(6), 1297–1306. <https://doi.org/10.2214/AJR.18.21050>
3. The Royal College of Radiologists. (2011). *Standards of Practice and Guidance for trauma radiology*. Retrieved from [https://www.rcr.ac.uk/sites/default/files/docs/radiology/pdf/BFCR\(11\)3_trauma.pdf](https://www.rcr.ac.uk/sites/default/files/docs/radiology/pdf/BFCR(11)3_trauma.pdf)
4. Iacobellis, F., Romano, L., Rengo, A. et al. (2020). CT Protocol Optimization in Trauma Imaging: A Review of Current Evidence. *Current Radiology Reports* 8,
5. Trauma Victoria. (2021). Imaging in trauma. <https://trauma.reach.vic.gov.au/guidelines/imaging-in-trauma/indications-for-imaging>
6. Raniga, S. B., Mittal, A. K., Bernstein, M., Skalski, M. R., & Al-Hadidi, A. M. (2019). Multidetector CT in Vascular Injuries Resulting from Pelvic Fractures: A Primer for Diagnostic Radiologists. *Radiographics : a review publication of the Radiological Society of North America, Inc*, 39(7), 2111–2129. <https://doi.org/10.1148/rg.2019190062>

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