Queensland Trauma Education

CHEST TRAUMA

Chest Trauma Management

Case Discussion

Facilitator resource kit

Clinical Excellence Queensland
JAMIESON TRAUMA INSTITUTE
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.

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Queensland Trauma Education
Chest Trauma – Chest Trauma Management: Case Discussion – Facilitator resource kit
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About this training resource kit

This resource kit provides an opportunity to explore the assessment and management of patients who sustain chest trauma.

National Safety and Quality Health Service (NSQHS) Standards

Target audience

Emergency department nursing clinicians.

Duration

20 minutes.

Group size

Suited to small group participation.

Learning objectives

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

1. Identify the high-risk assessment features for chest injury
2. Understand the principles of chest decompression
3. Facilitate a plan for oxygenation

Facilitation guide

1. Use case example to step learners through common assessment and management questions in blunt chest trauma presentations
2. Explore understanding of chest trauma management

Supporting documents (in Printable Resources)

1. CXR normal
2. CXR L rib fractures and subcutaneous emphysema
3. CXR L tension pneumothorax
4. CXR L tension pneumothorax post ICC

Case discussion

Case study

A 78yr old man is brought to ED after a MVC. He was the restrained driver, wearing a seatbelt and airbags deployed. He was travelling at 60km/hr when he was t-boned on the driver's side of the vehicle by a car that ran a red light.

He was helped out of the car by bystanders and was sitting on the footpath on ambulance arrival.

He complains of chest pain post-crash and has a seatbelt bruise across his chest.

The ambulance has administered 1g po paracetamol, 50microg IV fentanyl and applied 2L NP O2 as his saturations were 91% RA. His other vital signs are: GCS 15, HR 95, BP 140/80mmHg, afebrile and BSL 10.

Question and answer guide

1. **What injuries are suspected in this patient?**

Mechanism: chest, abdominal, spinal most likely, however given age, higher risk of significant injury from trauma requiring through assessment.

2. **What assessment features should be looked for when examining a patient with suspected traumatic chest injuries?**

General appearance- respiratory distress, saturations, air hunger, cyanosis, positioning, agitation

Obvious injury to the chest- bruising, seatbelt abrasion, flail segment, wounds/sucking

Chest wall tenderness, crepitus, subcutaneous emphysema, unequal chest wall movement

Auscultation- decreased breath sounds- this can be tricky in a loud trauma room!

Perfusion- signs of obstructive shock (tension haemo-pneumothorax)- peripheral pulse and saturations

Note- tracheal deviation is a sign of upper airway compromise and should not be relied upon for mediastinal shift causing obstructive shock

3. **What investigations can help diagnose chest injuries?**

Location	**Test**	**Use**
Bedside	ECG	Identification of cardiac complication or precipitant
Laboratory	VBG	Ventilation effects
	Cardiac enzymes (troponin)	Cardiac contusion
Imaging	Chest X-Ray	Major trauma injuries- large haemo/pneumothorax, mediastinal widening, pulmonary contusions, rib fractures
	CT/A chest	Defined details including major vascular injury
	ECHO/EFAST	Cardiac function, pericardial and pleural effusions

4. Who needs a chest drain (ICC)?

A chest drain is used to manage a haemo or pneumothorax. Decision making for 'who and when' relates to the clinical state of the patient (haemodynamic stability and trend, respiratory function/oxygen requirement) and size of the air/blood collection.

Importantly when the patient has signs of obstructive shock (tachycardic, hypotension and hypoxia) the priority is on decompression of the chest to relieve the shock state, NOT the insertion of a drain.

5. What size drain is used?

Again, this will depend on the indication and clinical state. In general, a larger drain is used for blood/fluid collections and a small drain for air. Chest drains are considered 'big' if they are 28-32F. Smaller drains are considered 20-24F.

In some hospitals, pigtail drains are used if the patient is clinically stable.

6. Who needs an ECG?

An ECG is useful for patients in whom there is concern that the patient had a cardiac event leading to a trauma (ie arrhythmia or ischemia) or has a complication from the injury (haemodynamic instability from blunt cardiac injury, eg myocardial contusion).

For most patients, this will not be the priority, and often the ECG is performed as part of the secondary survey once the initial life-threatening injuries are identified and managed.

7. Who needs cardiac enzymes (troponins)?

Cardiac enzymes are a sensitive test for myocardial injury. In patients who have a normal ECG they can provide an absolute rule out if they are negative. However, in most patients this is not required as a normal ECG in a patient who is haemodynamically stable, with no evidence of a new arrhythmia or pre-hospital hypotension, is adequate in ruling out severe cardiac injury, with a negative predictive value 95%.

There is no relationship between severity of injury and troponin level, so is used in most algorithms to decide if further tests are required (ECHO/CT) and inpatient disposition (ward/CCU/ICU).

8. How do you manage hypoxia in blunt chest trauma?

Firstly, oxygenation therapy is escalated using various delivery devices. If need be, this can include High Flow, positive pressure (NIV) and invasive ventilation.
The presence of a pneumothorax is not a contraindication to positive pressure- but close observation must occur to ensure features of obstructive shock from an enlarging pneumothorax can be managed. In some patients, the placement of an ICC will greatly improve their oxygenation due to release of tension physiology, removal of the haemo/pneumothorax and increased lung volumes contributing to gas exchange.

Acronyms and abbreviations

Term	Definition
ECG	Electrocardiogram
ICC	Intercostal catheter
VBG	Venous blood gas
CT/A	Computed tomography/arterial contrast
ECHO	Echocardiography
EFAST	Extended Focussed Abdominal Sonography in Trauma
CXR	Chest Xray
NIV	Non-invasive ventilation

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