Chest Drains in Trauma - Adult

INTRODUCTION

- Chest trauma is common.
- A minority of patients with chest trauma require surgical intervention.
- Insertion of an appropriately sized correctly positioned chest drain is the only procedure required in the management of most chest injuries.

SCOPE OF THIS GUIDELINE

- This guideline covers the indications for chest drain insertion and the management of patients with chest drains. The technique for insertion is as per ATLS.

INDICATIONS FOR A CHEST DRAIN

- Potentially life-threatening conditions identified in the primary survey requiring a chest drain are
  - Tension pneumothorax
  - Open pneumothorax, in conjunction with closing / covering the open wound
  - Massive haemothorax
- Other indications are
  - 'Large' simple pneumothorax not under clinical tension
    - If unsure as to whether or not to drain an asymptomatic pneumothorax visible on CXR then discuss with thoracics.
  - Any pneumothorax in a haemodynamically unstable patient
  - Bilateral pneumothoraces
  - Large pleural effusions - which in the context of trauma will almost invariably be haemothoraces.
- The presence of surgical emphysema is *not* an indication for a chest drain if no pneumothorax can be identified on imaging
  - Consider a chest drain in worsening surgical emphysema
- The identification of an asymptomatic pneumothorax on a Trauma CT scan is *not* an indication for a chest drain in an otherwise stable patient.
- Consider a chest drain in a patient with an asymptomatic pneumothorax who is to be intubated and ventilated for theatre.
- The presence of needle catheters in the 2nd intercostal space, mid-clavicular line that have been inserted prior to arrival in A&E does not mandate the insertion of a chest drain unless clinically indicated.

CAUTIONS

- There is no evidence to support *not* inserting a chest drain in a patient with a symptomatic large haemothorax, for fear of releasing the tamponade effect. Such large effusions usually cause tension, and these patients have a 'B' problem due to their lung collapse as well as a 'C' problem.

CXR PRIOR TO CHEST DRAIN INSERTION

- It is important not to delay decompressing a suspected tension pneumothorax; however, there may be enough time to obtain a chest x-ray whilst setting up for the insertion of a chest drain,
- This is *not* the same as a patient who has suffered a traumatic cardiac arrest or a patient in extremis with a suspected chest injury, who will most likely require immediate bilateral thoracostomies.

INSERTION OF A CHEST DRAIN

- All doctors expected to be able to insert a chest drain should be trained using a combination of didactic lecture, simulated practice and supervised practice until considered competent.
- A 28fr chest drain is sufficient in most situations. In the trauma situation, small bore Seldinger drains should be avoided unless there is a specific indication after discussion with an appropriate specialist team.
- Insertion is in the triangle of safety, as per ATLS guidelines on chest drain insertion.
    - All 'trauma' drains must be inserted using blunt dissection: trocars must NOT be used.
    - A second drain must not be inserted through the site of a previously dislodged drain because of the increased risk of infection (BTS 2010)
- In a conscious alert patient, give sufficient local anaesthetic & give it enough time to work.
- Written consent should be gained whenever possible. Complications of the procedure include pain, intra-pleural infection, wound infection, drain related visceral injury and drain blockage. All of these possible sequelae should be detailed in the consent process.
- Having inserted the chest drain, secure it in place and connect it via the drain tubing to an underwater seal rocket bottle.
- A simple dressing around the drain site is all that is required. This allows inspection of the drain insertion site.
- Obtain imaging to ensure correct positioning of the chest drain – either a chest x-ray or CT scan if the patient is en route to the scanner.

CAUTIONS

- Trauma patients are not the patients on whom to practice inserting your first chest drain. If you're not happy or experienced in chest drain insertion, assist a more experienced colleague.
- Be aware of the patient who has obvious scars on their chest or who gives a history of previous thoracic surgery: there are likely to be adhesions.

- Be aware of the patient who has a history of COPD. Bullous disease can be mistaken for a pneumothorax.
- A ruptured left hemidiaphragm and intrathoracic stomach can mimic a pneumothorax.
- A ruptured right hemidiaphragm and intrathoracic liver can mimic an effusion.
- If, after chest drain insertion or after imaging, there is concern that the chest drain is in the incorrect place, seek advice from a more experienced colleague or ask Thoracic surgery for advice. The patient may need a new drain and advice about how to deal with the existing one.
- NEVER clamp a chest drain.

PROPHYLACTIC ANTIBIOTICS

1/ Penetrating chest trauma:

All patients who require insertion of an intercostal drain or open surgery need a minimum of 3 doses of iv prophylactic antibiotics. If the drain is to remain in for longer than 24 hours antibiotics should be continued whilst the drain remains in situ to a maximum of 72 hours. Further management should be in consultation with a microbiologist.

Antibiotic choice: **as per open fracture guidance**

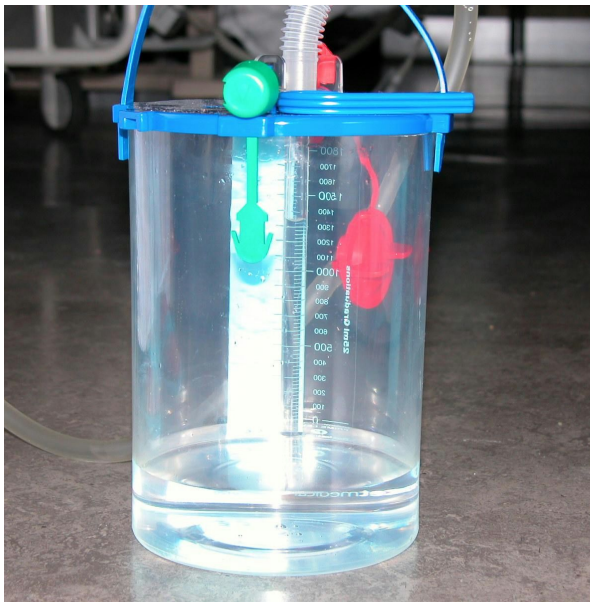
Patients with penetrating trauma who do not require operative intervention (including chest drain insertion) do not require antibiotic cover.

2/ Blunt chest trauma:

Prophylactic antibiotic cover is not required for intercostal drains inserted for blunt trauma.

GOVERNANCE

- All trusts should conduct regular audit of chest drain insertion
- A lead for training of all staff involved in chest drain insertion should be identified
- All incidents should be reported via local incident reporting systems and regularly reviewed.



MANAGEMENT OF THE PATIENT WITH A CHEST DRAIN

- see example chest drain observation sheet at end of guidance

- What to measure:
  - Swinging or not
  - Presence of an air leak
    - Constant
    - On expiration
    - On coughing
  - Fluid
    - Volume
    - Colour / consistency

- When to measure
  - Hourly
  - 24hour total

- Inspect the drain site

- Suction
  - Avoid suction on chest drains unless advised by thoracic surgery

CAUTIONS

- In most trauma situations, the effusion is likely to be haemorrhagic.

- Involve thoracic surgery early if there is significant blood loss of greater than 1000ml on insertion or ongoing blood loss of ≥ 100ml per hour, or persistent air leak of >24 hours.
- If the effusion is consistent with gastric contents, consider oesophageal rupture, or ruptured diaphragm and an intragastric drain. In these situations, seek advice from a more experienced colleague or from Thoracic surgery.

WHEN TO REMOVE A CHEST DRAIN

- When the reason for the chest drain insertion is gone, the drain should be gone.
- When the drain has stopped draining it is no longer needed or has stopped functioning properly.
    - With regard to pneumothoraces, there should be no air leak for 24 hours prior to removal.
- Ensure that there is a stitch that can be used to close the drain hole.
- Chest drain removal is usually a two-person job – one person to remove the drain and the other to secure the wound with the stitch.
    - There is some evidence (following elective thoracic surgery) that removing the drain at the end of full expiration leads to a lower incidence of non-clinically significant pneumothorax.
- It is not mandatory to obtain a chest x-ray following drain removal, if the patient remains well and there are no concerns on auscultation. If in any doubt, a chest x-ray is indicated.

CAUTION

- Occasionally drains stop working because they have become blocked or kinked, or dislodged. They can be sitting in the soft-tissues or on the floor.

SUMMARY

- A chest drain is usually the only procedure required in the management of most chest injuries.
- If a patient with a chest injury is to be managed conservatively, they need to be also in an appropriate environment, where any deterioration in their breathing can be recognised and acted upon.
- Inserting the drain is usually the easy part; the most important aspect of chest drains is the management of a patient *with* a drain. In other words, there is a patient at one end, drain tubing and a collecting system at the other.

West Yorkshire Major Trauma Network CHEST DRAINS ONLY				PATIENT DETAILS / ADDRESSOGRAPH				
Date	Time	DRAIN ONE		DRAIN TWO		DRAIN THREE		TOTAL VOLUME DRAINED
		Volume drained	Action (e.g.bubbling) & suction (mmHG)	Volume drained	Action (e.g.bubbling) & suction (mmHG)	Volume drained	Action (e.g.bubbling) & suction (mmHG)	