Safe Insertion of a Chest Drain

Dr. Richard Morris

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  – Mary Dunford
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  – Caesar Ursic
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Some Anatomy & Physiology

Pleural Pressures [cmH2O]

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Pathological Fluids:

- Air
- Blood
- Effusions

Chest tube drains fluid from pleural space
Pneumothorax

- **Closed**
  - Tear or bleb in lung
  - Can reabsorb or tension [esp. IPPV]

- **Open**
  - Connects to outside
  - SV: lung collapses
  - IPPV: lung OK

- **Tension**
  - Pleural air under pressure
  - Subcut. emphysema, deviated trachea
  - Distorts meadiastinum
  - Causes circulatory collapse
  - Urgent to convert to open or drain it.
Blood, Pus & Effusions

• Haemothorax
  – Need a large drain
  – Operate when:
    >1000 mls loss
    >200 mls/hr X2

• Empyema
  – Pneumonia, TB
  – May be loculated

• Effusions
  – Can use small drain
  – Transudate
    bilateral
    low protein
    CCF, chroisis, renal
  – Exudate
    unilateral
    high protein
    infections, cancer, inflammatory.
Insertion Problems in Reviews

- Daly [3 in 164]
  - 1 subcutaneous, 1 postpleural space and 1 in lung
- Deneuville [9 in 134]
  - 5 subcutaneous, 2 in lung, 1 diaphragm and 1 subclavian vein
  - All with trocar
- Bailey [0 in 57]
- Heng [0 in 211].

0 to 7%
Infection Problems in Reviews

- Daly [3 in 164]
- Deneuville [3 in 134]
- Bailey [7 in 57]
- Heng [5 in 211]

- Careful aseptic technique is vital.

2% to 12%
Case Reports

- Cardiac tamponade secondary to chest tube placement
- Chest wall arteriovenous fistula: an unusual complication after chest tube placement
- Acute diaphragmatic paralysis caused by chest tube trauma to phrenic nerve
- Delayed perforation of the esophagus by a closed thoracostomy tube
- Silicone thorax: a complication of tube thoracostomy in the presence of mammary implants.
Incident Reporting
Australian Patient Safety Foundation

- Disconnection of tubes when moving patient
- Drains inadvertently pulled out
- Connections round the wrong way
- No water in the bottle
- Cap left on vent
- High suction used
- Drain left clamped till reviewed
- Non standard drainage systems failing.
Inserting a Chest Tube
Preparation:

• Confirm it is needed & safe
• Gain consent & premedicate
• Prepare the equipment
• Position the patient, confirm the side
• Use careful aseptic technique.
BTS guidelines for the insertion of a chest drain

Diagram to illustrate the "safe triangle".
Infiltrate, check position
Cut skin, blunt dissect tissues
Enter pleural cavity

From Atlas of Bedside Procedures, Slam et al.
Check for adhesions
Guide tube in with clamp
Do Not
Use a
Trochar.
Pass tube up & back
Completing the Insertion

- Connect drainage system
- Put in sutures to close skin & secure tube.
- Put on the required dressing
- Check drain is working properly & CXR.
Small Bore Pigtail Catheters

- Used for air & effusions
- Problems blocking with empyema & haemothorax
- Can be flushed with aseptic technique to unblock
- Easier to put in & more comfortable
- Popular with the physicians & patients.
Now let’s have some practice at inserting a chest tube

We will use the SimCentral chest drain simulator.
Your Mission

• Two people on each side of a manikin
• Use the instruments to insert the drain
• Put in local to start
• Suture it in at the end
• Apply an appropriate dressing
• Practice removal and wound closure.
To buy a chest drain simulator visit:

www.simcentral.com.au