



GUIDELINE

Intercostal Catheters and Needle Thoracocentesis

Scope (Staff):	All Emergency Department Clinicians
Scope (Area):	Emergency Department

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Intercostal Catheters and Needle Thoracocentesis

Needle Thoracocentesis

- Needle Thoracocentesis provides rapid emergency decompression of a tension pneumothorax
- It is a temporary life saving procedure – a definitive chest drain will be required to stabilise the ongoing air leak

Indications

Clinical evidence of a tension pneumothorax:

- Hypoxia
- Hypotension
- Tachycardia
- Decreased air entry +/- hyperresonance on side of pneumothorax
- Deviated trachea to opposite side
- Increased difficulty in ventilation

Radiographic evidence of a tension pneumothorax in a haemodynamically stable patient

Equipment

- 14g or 16g cannula
- 3-way tap
- 10mL syringe
- 2% Chlorhexidine/70% isopropyl alcohol

Procedure

- Identify the second intercostal space, mid clavicular line of affected hemi thorax
- Cleanse the skin
- Consider local anaesthetic in the conscious child (if time permits)
- Attach 10mL syringe to the end of the cannula
- Insert the cannula into the lower half of the second intercostal space, at 90° to the chest wall
- Aspirate the syringe as the needle enters
- Continue advancing the cannula until you aspirate air (3-4ml of 0.9% saline in the syringe may help with presence of air bubbles) or until you insert to the maximum depth
- At either of these end points remove the syringe and needle, leaving the cannula in the chest wall
- Check for improvement of the child's clinical condition
- A 3-way tap may be applied for ongoing aspiration, if required
- Consider a second needle decompression if there is no apparent improvement
 - 1cm adjacent to the original cannula
- Proceed to chest drain insertion as soon as possible when patient is stabilised
- Perform the CXR **after** the formal chest drain has been placed

Intercostal Catheter Insertion

- An intercostal catheter provides drainage of pleural air, blood or fluid

Indications

- Following a needle decompression of tension pneumothorax
- Large pneumothoraces (> 20%)
- Most traumatic haemothoraces
- Large pleural effusions

Equipment

- 2% Chlorhexidine/70% isopropyl alcohol
- Sterile surgical drapes, gown, mask
- Sterile gloves
- Local anaesthetic, syringe and needle
- Gauze
- Scalpel blade
- Forceps for blunt dissection
- Chest drain - without trocar
- Suture - 2.0 silk
- Sterile transparent occlusive dressing
- Atrium draining system (underwater seal drain)
- 2 x large chest drain clamps

Chest Tube Size

Size: approximately (in Fr) 4 x ETT size (in mm)

Age	Chest tube size (Fr)
Newborn	8-12
Infant	14-20

Child	20-28
Adolescent	28-36


Procedure

- Position Patient
 - Supine or sitting 30° upright
 - Arm on affected side positioned above the shoulder behind the head
- ✗ Consider the need for adjunctive analgesia or sedation
 - Within limits of patient safety as determined by the clinical scenario
 - e.g. intranasal fentanyl or intravenous morphine
- Identify insertion site
 - Typically 5th intercostal space anterior to mid-axillary line
- ✗ Prepare skin with 2% Chlorhexidine/70% isopropyl alcohol
- Drape area
- Infiltrate local anaesthetic
 - Superficially under the skin
 - Advance needle fully until air aspirated from pleural cavity
 - Slowly withdraw and infiltrate from deep to superficial
- Perform skin incision in the identified rib space parallel to rib (above the lower rib to avoid neurovascular bundle)
 - Length: approximately twice the width of the drain
 - Depth: until subcutaneous fat is on view
- Blunt dissect through remainder of the chest wall using blunt dissection forceps
 - Continue until the pleural space is penetrated (evidenced by a “give” or air hiss)
- Remove instruments and insert finger through the tract into the pleural space
 - Perform a single sweep with finger internally within the pleural space
 - This is only possible in older children
- Insert chest drain, **without trochar**, into pleural space
 - Using forceps to guide the drain, if necessary
 - Aim for apex if draining air and base if draining fluid
- Insertion depth is approximately the width of the hemithorax – ensure all holes in chest drain are within pleural space
- Connect chest drain to underwater seal drain
- Check for fogging of the tube, bubbling of underwater seal or swing of blood, fluid
- Suture drain in place
- Place an occlusive dressing over the area
- Confirm position with CXR
- Secure connection of chest drainage system with cable ties

This open technique for chest drain insertion should be used for all trauma patients. A Seldinger technique using commercial intercostal drain kits may be used for spontaneous pneumothoraces or pleural effusions after discussion with senior clinicians.

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