Pleural Fluid Aspiration

Indications: to aid in the diagnosis of the cause of a pleural effusion (not a therapeutic procedure)
Contraindications: coagulopathy (INR >1.4, platelets <50, oral anticoagulant <24 hours, clopidogrel <7 days)

Introduction
- Wash hands, Introduce self, Patients name & DOB & wrist band, Explain procedure and get written consent
  - Risks: pain; bleeding; infection; organ puncture & damage (lung, heart, liver); persistent site leak; pneumothorax
- **Check patients clotting screen, platelet count and if they have been on an oral anticoagulant/clopidogrel**
- Ensure assistant is available
- Confirm the correct side to aspirate (3 point check)
  1. Review chest X-ray
  2. Examine patient’s chest
  3. Confirm position and size with portable ultrasound scanner

Preparation part
- Wash hands and apply apron
- Clean a trolley
- Gather equipment onto bottom of trolley (think through what you need in order)
  - Sterile pack
  - Cleansing snap-sponge (iodine or alcohol/chlorhexidine) x2
  -OPTIONAL: Sterile drape with hole in centre (or 2-3 drapes without holes in)
  - 10ml syringe and 3 needles (1 orange 25G, 2 green 21G) for local anaesthetic
  - For pleural fluid aspiration
    - Green 21G needle
    - 50ml syringe
  - Cotton gauze swabs (used whenever needed throughout procedure to dry/clean sterile area)
  - Sterile dressings
  - Equipment to be kept outside of the sterile field
    - Portable ultrasound scanner (± sterile probe cover and gel if you want to re-scan after sterilising)
    - Sterile gloves
    - 10ml 1% lidocaine (maximum 3mg/kg – note 1ml 1% lidocaine = 10mg)
    - 4 white-topped sample collection bottles (labelled 1-4)
- Walk to patient
- Wash hands
- Open sterile pack to form a sterile field on the top of the trolley
- Open packets (without touching the instruments themselves) and drop sterile instruments neatly into the sterile field
- Pick up waste bag from sterile pack without touching anything else and stick to side of trolley

Patient part
Positioning and exposure
- Expose patient’s chest
- Position patient sitting on chair or edge of bed with raised arms (crossed arms leaning on a bedside table or hands on head)
- Locate insertion point:
  - 5th intercostal space, mid-axillary line
  - Within the safe triangle formed by
    - Anterior border of latissimus dorsi
    - Lateral border of pectoralis major
    - Horizontal line from the nipple (5th intercostal space)
  - Just above a rib (to avoid neurovascular bundle)
- Use different site if there is overlying infection
- Confirm effusion is present at proposed entry site using portable ultrasound scanner (different sites may be used if there is more fluid elsewhere)
- Mark insertion point with a skin pen/indentation

Preparation
- Wash hands
- Apply sterile gloves using sterile technique (open pack on a side surface)
- Sterilize area
  - Work from middle outwards in one spiral motion (using cleansing snap-sponge)
  - Repeat with second cleansing snap-sponge
o **Discard used snap-sponges as they are no longer sterile, but note all equipment used after this (including all needles) can be returned to the sterile field after use**

  o **OPTIONAL:** Apply the sterile drape over the patient’s body so that the hole is in the correct place to allow access to the insertion site (or apply 2-3 drapes centred around exposed insertion site if no holes)

- **Anaesthetise tract**
  
  o Ask assistant to snap open lidocaine bottle and hold open upside-down
  
  o Draw up lidocaine using 1st green needle on 10 ml syringe and expel any air
  
  o Change to the orange needle and insert at an acute angle to form a single subcutaneous bleb around insertion site in order to anaesthetise the skin
  
  o Change to the 2nd green needle and insert perpendicular to the skin to anaesthetise the insertion tract
    
    - This is done by instilling lidocaine in small increments of increasing depth – only anaesthetise the intercostal muscles and pleura (the fat inbetween has no nerves)
    
    - **Always aspirate when advancing the needle** (so you know when you get to the pleural cavity) and **aspirate before injecting lidocaine** (to check you are not in a vessel)
    
    - When fluid (from pleural cavity) is aspirated, note entry depth, then withdraw the needle
    
    - **DO NOT PROCEED** if you do not get an aspirate!
  
  o Wait 1 minute to work

- **Pleural aspiration**
  
  o With 50ml syringe on a new green needle, insert perpendicular to the skin into the insertion tract
  
  o Aspirate during infiltration
  
  o As soon as fluid is aspirated, stop advancing the needle and aspirate 50ml (or as much as possible)
  
  o Withdraw the needle

- **Finally**
  
  o **Dress wound**

- **To complete**

  o Thank patient and cover them
  
  o Bin waste and gloves, dispose of sharps safely in sharps bin, clean trolley and wash hands
  
  o Label sample tubes and send to lab:

    o **White sample tubes**
      
      - MC&S x2 → microbiology
      
      - Protein, glucose and LDH → biochemistry
      
      - Cytology → histopathology
      
      - Other tests to consider: amylase (pancreatitis), Ziehl-Neelsen stain (TB), haematocrit (if bloody effusion), triglycerides/cholesterol/chylomicrons (chylothorax), rheumatoid factor/complement (rheumatic disease)

    o **1ml left in syringe**
      
      - pH analysis → run manually on blood gas machine

  o **Perform venepuncture to determine concurrent blood glucose, serum protein and LDH level** (very important for interpretation)
  
  o **Fully document procedure in patients notes**