

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 <7days)

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 dressing
 - Equipment to be kept outside of the sterile field
 - Portable ultrasound scanner (\pm 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

- *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*
- *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
 - Ask assistant to snap open lidocaine bottle and hold open upside-down
 - Draw up lidocaine using 1st green needle on 10 ml syringe and expel any air
 - 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
 - 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!
 - Wait 1 minute to work

Pleural aspiration

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

Finally

- Dress wound

To complete

- Thank patient and cover them
- Bin waste and gloves, dispose of sharps safely in sharps bin, clean trolley and wash hands
- Label sample tubes and send to lab:
 - 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)
 - 1ml left in syringe
 - pH analysis → run manually on blood gas machine
- Perform venepuncture to determine concurrent blood glucose, serum protein and LDH level (very important for interpretation)
- Fully document procedure in patients notes