

Online Appendix 3 Pleural Aspiration

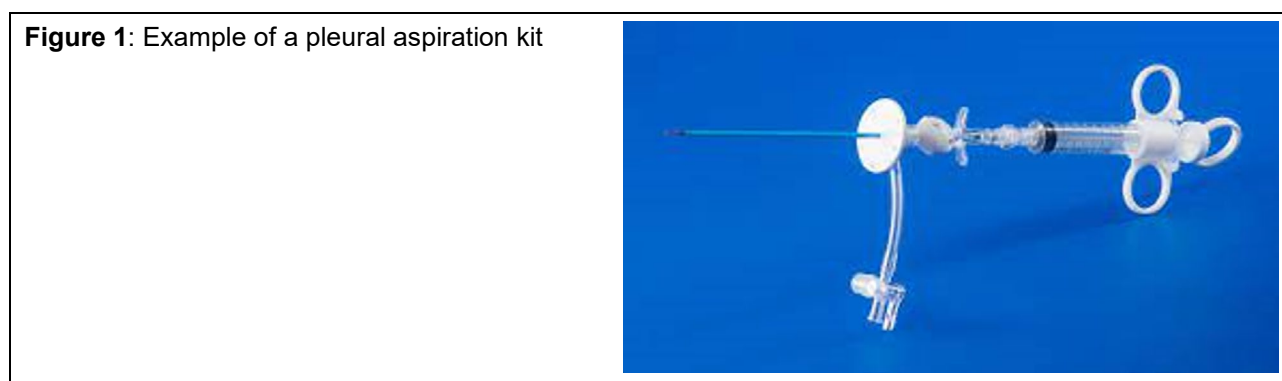
A brief guide to the procedure and equipment required are outlined below.

Equipment needed

Pleural aspiration should be aseptic and therefore sterile gloves, a sterile field, skin sterilising fluid and a clean dressing are needed. For a simple diagnostic pleural aspiration, a 21G/40 mm (green) needle and a 50 ml syringe is sufficient to obtain a sample.¹

If aspiration of air or a larger sample of fluid is required (therapeutic tap), the use of a needle-mounted plastic catheter to access the pleural space is preferred to a rigid needle alone to minimise the risk of damage to surrounding structures, which could occur if the device is inadvertently advanced further into the pleural cavity or moved during the procedure.

There are several commercially available kits to perform a pleural aspiration and one example is shown in Figure 1 below.



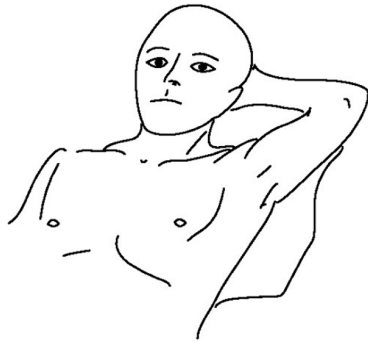
Patient position and site of insertion

The principles for positioning and choice of insertion site are generally the same for pleural aspiration and intercostal drain insertion. The patient should be in a comfortable, stable position with adequate, comfortable access to the chosen aspiration site for the operator. The best position will depend on the location of the pathology, so care should be taken to review the imaging (chest x-ray (CXR), ultrasound (US) and/or computed tomography (CT)) to select the best site. Ideally a site as lateral as possible, directly above a rib in the triangle of safety is used to minimise the chances of damage to the neurovascular bundle. However, an anterior approach in the second intercostal space, mid clavicular line may be needed to aspirate an apical pneumothorax where the lung is tethered at the mid and anterior axillary lines.

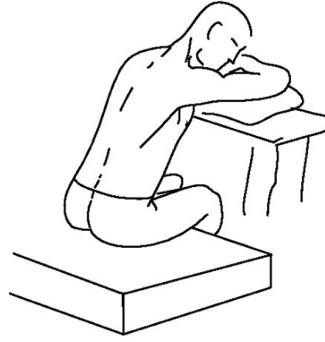
For fluid aspirations, point of care thoracic ultrasound (TUS) must be used to find a safe site for intervention. In cases of fluid collections that are septated or multi-loculated, thoracic ultrasound can be used to identify the largest or least septated loculus.

Positions which widen the rib spaces may make the procedure easier. Possible positions include the patient sitting upright and leaning forward with their arms raised and resting on a table in front of them or lying flat on their side in the foetal position to allow easy access to the safe triangle laterally (Figure 2). These positions are also suitable for intercostal drain insertion. However, for blunt-dissection (large-bore) drains, a sitting position may not be appropriate. When choosing a site for aspiration or intercostal drain insertion. It is prudent to avoid an insertion site very close to the diaphragm because it normally moves cranially after evacuation of the pleural contents and this will lead to the drain rubbing and irritating the diaphragmatic pleura. Similarly, choosing a very high site of intercostal drain insertion in the axilla runs the risk of the drain reaching and pushing on the apical pleura which causes considerable discomfort.

Figure 2: Common patient positions for chest drain insertion:



(a) Semi reclined with hand behind head.



(b) Sitting up leaning over a table with padding.



(c) Lateral decubitus position.

Adapted from Pleural procedures and thoracic ultrasound: British Thoracic Society Pleural Disease Guideline 2010¹

Using aseptic technique, the skin is cleaned and local anaesthetic administered. Air or fluid should be aspirated from the pleural space with the needle used to administer the anaesthetic before the aspiration cannula is inserted. Once the fluid/air are drained the catheter is removed and a simple dressing applied.

Reference

1. Havelock T, Teoh R, Laws D, Gleeson F, on behalf of the BTS Pleural Disease Guideline Group. Pleural procedures and thoracic ultrasound: British Thoracic Society Pleural Disease Guideline 2010. *Thorax*. 2010;65 Suppl 2:ii61-76.