

Online Appendix 7 Medical thoracoscopy

A full review of the entire medical thoracoscopy procedure is beyond the scope of this appendix. Specific pointers by expert consensus are provided below:

Patient and port site positioning

Patients are usually positioned lying on their side, effusion upwards, facing the operator. A slight bend in the knees will allow stability and the arms should be raised slightly to improve access to the thorax. The patient should be as flat as possible as a concave spine position may reduce rib space diameter. It is also possible for LAT to be conducted with the patient lying supine, achieving access via the mid axillary line, although this practice is less common in the UK. The bed height should be comfortable for the operator, allowing them to place port(s) and scope(s) into the chest with sufficient angle available to obtain samples from the posterior thoracic wall.

Port placement and quantity

Procedural ports should be placed into the largest accessible pocket of fluid following identification of a safe access point using thoracic ultrasound (TUS), but generally near the mid axillary line. Care should be taken to avoid the diaphragm (taking note of likely maximum excursion once fluid pressure has been relieved).

The majority of UK LAT centres prefer a single port approach, with dual (or more) ports usually reserved for more complex thoracic surgical interventions undertaken by surgeons.¹ Benefits of additional ports include the ability to more clearly and continuously visualise the wider biopsy area whilst samples are being taken; allowing multiple working channel if necessary; and facilitating the clearance of septations in advanced cases. However, this approach does introduce the need for further training and greater manual dexterity and visuospatial awareness, especially if an angled-view scope is used to guide biopsies, as this leads to an indirect view of the posterior chest wall.

Pleural biopsy technique

Pleural biopsies should be taken with an understanding of rib anatomy and the potential location of intercostal arteries. Biopsies should be targeted at the underside of a rib. This approach reduces the risk of intercostal artery damage and allows deep pleural samples to be taken. In cases where there is clearly widespread nodular or peduncular abnormality there may be less concern regarding this, however areas to avoid sampling include: the visceral lung/cardiac/vascular surfaces; the diaphragm; the intercostal spaces; and over pleural plaques (as these are likely to have a feeding vessel within them).

Typical pleural biopsies involve a sequential 'stripping' action, which aims to remove sufficient layers of tissue to allow histological examination of pleural membranes and subpleural fat/muscle. To create an 'edge' to strip, it may be necessary to press the closed biopsy forceps into the chest wall for a few seconds before gripping an area of the subsequent indentation. For patients who have had chronic effusions, there may be a thick (1-2 mm) layer of fibrous tissue which may mimic the pleura.

Immediately following a biopsy, the area should be inspected for arterial/brisk bleeding. It is normal for there to be a degree of pleural 'ooze' following biopsies.

A nominal total of 5-10 biopsies should be targeted, adjusted according to patient tolerance and the quality of biopsies being obtained. It is prudent to inspect the thickness and substance of each biopsy as it is removed from the forceps, aiming for the subpleural fat layer to have been sampled (to allow for malignant invasion to be assessed). Once all biopsies have been performed, a final visual check for bleeding should be performed before the port is removed and a chest tube is sited.

There are limited data to suggest that alternative biopsy techniques can be used in the pleural cavity, including cryobiopsy, however these are rare in the UK.²

References

1. de Fonseca D, Bhatnagar R, Maskell NA. Local anaesthetic (medical) thoracoscopy services in the UK. *Respiration*. 2018;96(6):560-563.
2. Bhatnagar R, Maskell NA. Medical pleuroscopy. *Clin Chest Med*. 2013;34(3):487-500.