

Convex Probe Endobronchial Ultrasound (CP-EBUS)

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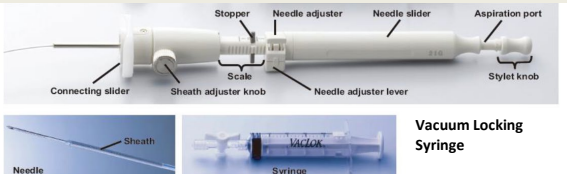
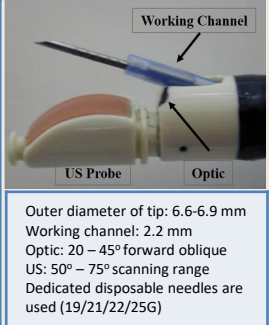


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Introduction
CP-EBUS combines bronchoscopy with ultrasound (US), allowing US guided transbronchial needle aspiration (TBNA)

- Indications**
- Staging or re-staging non-small cell lung carcinoma
 - Sampling lymph node/s
 - Obtaining tissue for diagnosis on large central lung tumours
 - Workup of lymphadenopathy
 - Diagnosis or "ruling out" sarcoidosis, TB, lymphoma, or metastatic disease (non-lung)
 - Sampling mediastinal masses
 - Usually superior and anterior mediastinal tumours
- Before the advent of EBUS: cervical mediastinoscopy was used to stage

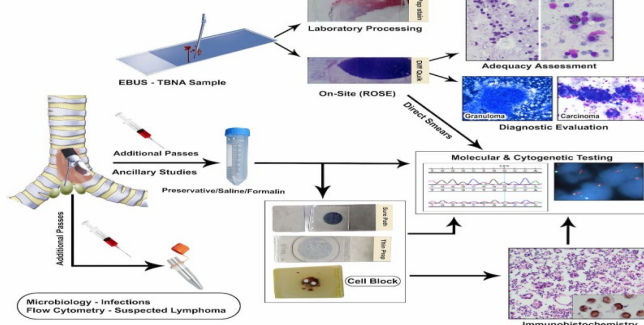
- Advantages**
- Ability to sample lung and mediastinal lesions
 - Less invasive than mediastinoscopy or surgery
 - More cost effective than surgical mediastinoscopy
- Generally safe, complications are relatively uncommon
- Agitation, cough, blood, infection, pneumothorax, pneumomediastinum
- Equivalent to Mediastinoscopy**
Sensitivity, NPV, Diagnostic Accuracy



Vacuum Locking Syringe

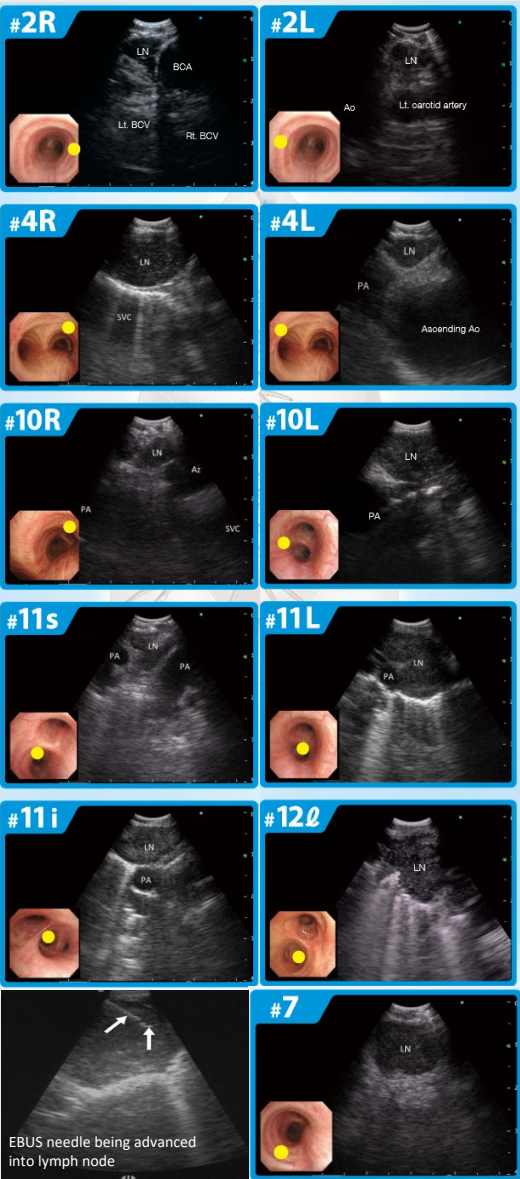
EBUS FNA and rapid on-site evaluation (ROSE) [not employed universally]

- Onsite cytopathologist, allows preliminary info to be relayed
- Specimen triage for ancillary studies
 - Flow cytometry, Microbiology, Molecular testing, Cell block preparations
- Sampling can be stopped when diagnostic material is obtained



Probe Manufacturers:
Olympus (original)
Pentax
Fuji

Needle Manufacturers:
Olympus 19/21/22G
Medi-Globe 22G
Cook Medical 22/25G
Boston Scientific 22/25G

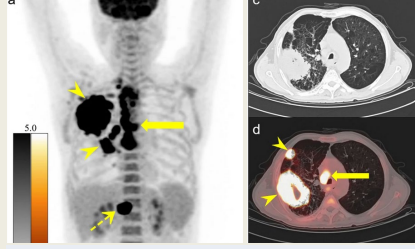
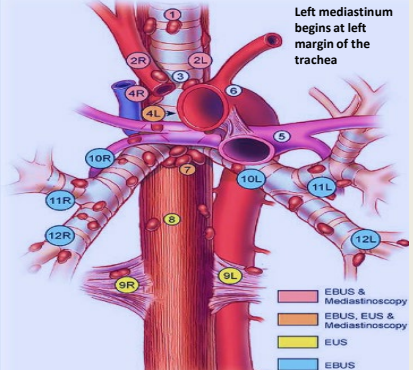


EBUS-TBNA in Staging of Lung Cancer

Yasafuku. Chest 2006;130:710-718	Sensitivity	Specificity	Diagnostic Accuracy
Chest CT	76.9%	55.3%	60.8%
PET CT	80%	70.1%	72.5%
EBUS-FNA	92.3%	100%	98%

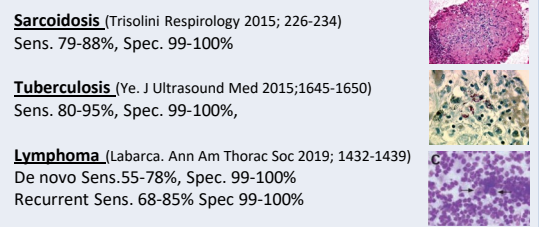
Cumulative Diagnostic Values for EBUS-TBNA in NSCLC "How many passes?"

Seok Lee. Chest 2008; 134:368	1	2	3	4
Sensitivity	69.9%	83.7%	95.3%	95.3%
Specificity	100%	100%	100%	100%
PPV	100%	100%	100%	100%
NPV	86.5%	92.2%	97.6%	97.6%
Accuracy	89.7%	94.4%	98.4%	98.4%



EBUS is indicated if PET negative when N1 node on CT or Tumour >3cm or Central tumour

- EBUS Procedure**
- Bronchoscopic examination of the airway should be performed with a regular flexible bronchoscope before EBUS
 - The bronchoscope is introduced into the airway until the desired lymph node station is reached
 - Sampling should begin from the highest staging LN. (ie. Contralateral to lesion. N3 -> N2 -> N1)
 - Balloon (if present) is inflated with normal saline to achieve a maximum contact with the tissue of interest
 - The tip of the EBUS is flexed and gently pressed against the airway
 - Ultrasonically visible vascular landmarks are used to identify the specific lymph node stations
 - Fibreoptic image of the airway is simultaneously visualized to localize the insertion point of the needle.
 - The dedicated TBNA needle is fastened on to the working channel of the bronchoscope.
 - The sheath adjuster knob is loosened, the length of the sheath adjusted so sheath can be seen on the endoscopic image
 - The bronchoscope is flexed up for contact and the lymph node is visualized again on ultrasound image
 - After the needle-adjuster knob is loosened, the needle can be passed through the airway into the lymph node.
 - The internal stylet is then removed and negative pressure is applied with the Vaclok syringe.
 - Under vacuum, the needle is agitated back and forth inside the lymph node to obtain samples.
 - Finally, the needle is retrieved inside the outer sheath and the entire needle is removed from the bronchoscope.



Tips: Don't forget to remove vacuum before removing the entire needle
Non-diagnostic **DOES NOT** mean negative
Lymph node size on CT scan and EBUS and round or oval shape by EBUS are predictors of malignancy, but no single characteristic can exclude a visualized lymph node from biopsy