Peripheral Airway Bronchoscopy Using a Combination of Thin/Ultrathin Bronchoscopes, Radial Endobronchial Ultrasound and 2D Fluoroscopy

Ali Sadoughi MD, Sahil Virdi MD, David Schecter MD, Shwe Synn MD, Christine Chan MD

Albert Einstein College of Medicine
Montefiore

New York City
NY, USA

Background:

- Diagnosis of peripheral lung lesions remains a challenge despite the development of different technologies.
- Miniaturized bronchoscopes are reported to increase diagnostic yield (DY) by improving visualization of small caliber airways.

Methods:

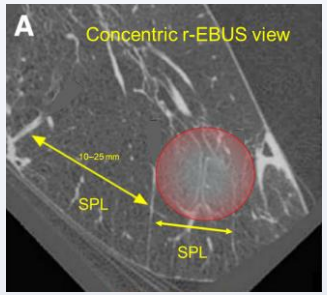
- This is a retrospective cohort study of patients referred for peripheral lung lesion biopsy.
- We routinely use thin bronchoscopes with the guide of radial endobronchial ultrasound (rEBUS) and 2D fluoroscopy.
- If the lesion is not localized with a concentric rEBUS view or the tip of the scope is far from the lesion, we use an ultrathin bronchoscope [3.0 mm outer diameter at tip and 1.7 mm working channel].
- Sampling tools include aspiration needles, forceps, brushing and bronchoalveolar lavage.

Diagnostic Yield Definition:

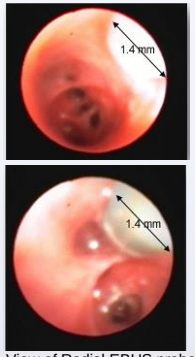
- Successful bronchoscopy is defined as either detection of a malignant, infectious, or inflammatory process which can explain the clinical scenario.
- If none of these are achieved, the lesions are followed either by surgical or transthoracic biopsy or at least a 12 months of radiologic imaging surveillance.

Results

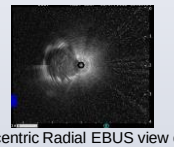
- From March 2019 to January 2021, n#121 patients, n#126 peripheral lung lesions
- The mean and median of the longest nodule diameter of the lesions was 2.69 cm and 2.2 cm (range 0.7 to 7.4 cm), respectively.
- Diagnosis was made in 106 lesions (DY 84%).
- 62 out of 72 patients were diagnosed with malignancy via bronchoscopy (sensitivity 86%).
- Localizing the lesion was successful in 124 (98%) cases and concentric rEBUS view was found in 118 (95%) cases.
- There was only one patient with pneumothorax post procedure, and there was no major complication.



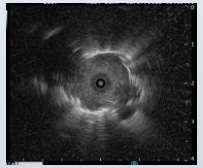
Secondary Pulmonary Lobule (SPL) with a schematic view of a small lung nodule (red circle) relative to a terminal bronchiole



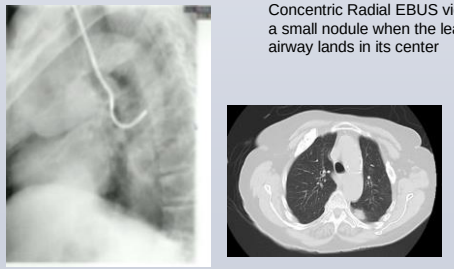
View of Radial EBUS probe (1.4 mm OD) relative to peripheral airways



Eccentric Radial EBUS view of a small nodule when the leading airway lands adjacent to nodule



Concentric Radial EBUS view of a small nodule when the leading airway lands in its center

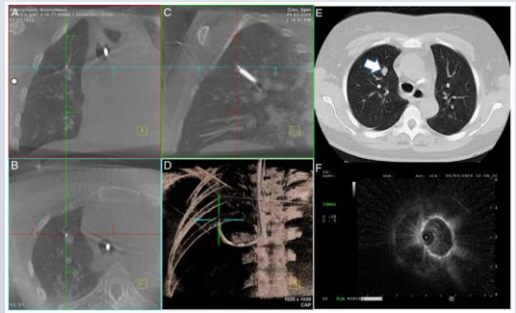


Ultrathin bronchoscope capable of reaching to areas not accessible by conventional bronchoscope

Conclusions

- A combination of thin and ultrathin bronchoscopes with rEBUS and 2D fluoroscopy surveillance during peripheral airway bronchoscopy can provide a diagnostic yield comparable to CT-scan guided sampling.
- The success rate of achieving a diagnostic yield with relatively low costs and complication rates makes this approach favorable for diagnosis of small and anatomically difficult to reach lung lesions.

Extra Validation by 3D imaging



-Ultrathin bronchoscope touching a 12mm right upper lobe nodule, with rEBUS probe inside the nodule, confirmation by a 3D mobile CT scan, coronal (A), axial (B), sagittal (C) plane views
-Representative CT scan image (E)
-Concentric rEBUS view (F)

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