Diagnosis of 8 mm Left Upper Lobe Nodule

Dr. Susan Garwood

CASE STUDY

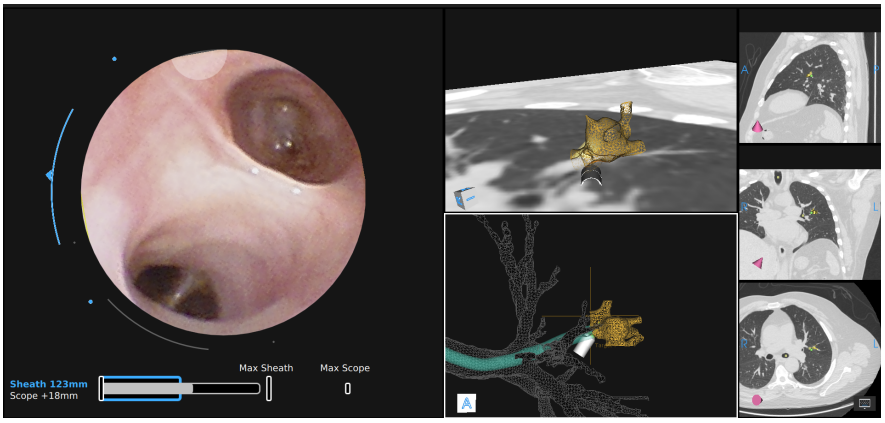


Fig 1. CT scan showing 8 mm nodule in left upper lobe

BACKGROUND

A 60 year-old male with a history of multiple basal cell skin carcinomas now presents with an incidental 8 mm non-calcified left upper lobe nodule. The most recent bout of basal cell carcinoma in 2019 yielded focal squamous cell differentiation of the left arm. A chest CT was ordered and revealed a subcutaneous mass in the left axilla extending into the pectoralis. CT guided biopsy results were also consistent with basal cell carcinoma. The patient was referred to oncology for further evaluation. A follow up PET/CT conveyed hypermetabolic uptake of the axillary mass along with a small sub-centimeter nodule located in the left upper lobe (**Fig. 1 & 2**). Interventional radiology declined biopsy due to location and size of the nodule. The patient was referred to pulmonary for Robotic-Assisted Bronchoscopy. The patient was a never-smoker with no history of other malignancy.

PLANNING/PROCEDURE SUMMARY

Examination of CT revealed no discernable bronchus sign but nearby adjacent airway and large vessel suggesting airway may pass close enough to allow successful biopsy. Pre-procedural planning focused on exiting airway away from intervening vasculature.

After initialization, time to target was just under 2 minutes. By maintaining a central position of the MONARCH® scope within the airways, full visualization was maintained out to the target area of interest and the endobronchial nodular component was clearly visible (**Fig. 3**). Radial EBUS (REBUS) confirmed concentric nature of the probe position (**Fig. 4**), and was noted under fluoroscopic imaging. Of note, the fluoroscopy image clearly revealed a well-rounded solid structure just apical to the established REBUS location. Visualization confirmed this to be the vessel noted during pre-procedural planning which could have easily been mistaken for the nodule (**Fig. 5**). Onsite pathology evaluation of needle aspirate revealed malignancy on the first pass. Due to the need for multiple immunohistochemical stains to determine site of origin of malignancy, multiple biopsies were performed for large volume tissue acquisition with a 21G flexible biopsy needle, biopsy forceps and bronchoalveolar lavage. Final pathology resulted in basal cell carcinoma (**Fig. 6**). Time from navigation to the onsite pathology call was just under 10 minutes.

> *Navigation was completed within two minutes, highlighting not only the accuracy of the system but the precision and time savings this technology can afford.*

NODULE CHARACTERISTICS

Lobar Location
Left upper lobe anterior segment

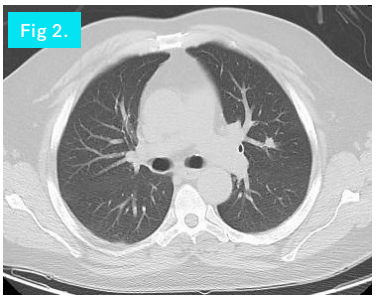
Nodule Size
8 mm

Procedure Details

- 11:03 am – Time out
- 11:10 am – MONARCH® Initialization
- 11:12 am – Navigation
- 11:14 am – Radial EBUS & biopsy
- 11:21 am – Positive call on first pass
- 11:22 am – Additional biopsies
- 11:35 am – MONARCH® scope removed
- 11:38 am – Procedure ended

Navigation Time:
Within 2:00 minutes

Total Procedure Time:
35:00 minutes



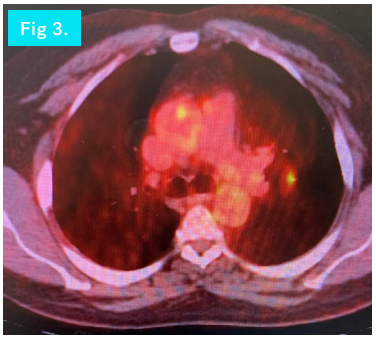
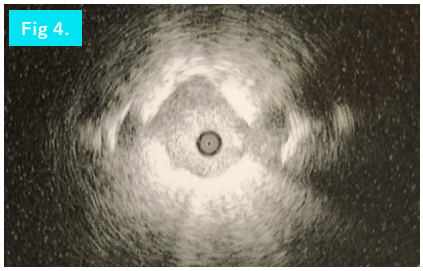
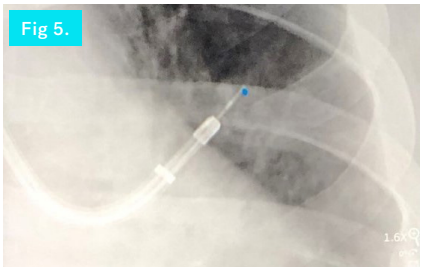


Fig 2. PET scan (SUV 4)

Fig 3. MONARCH fused navigation leads to visualization of endobronchial nodule





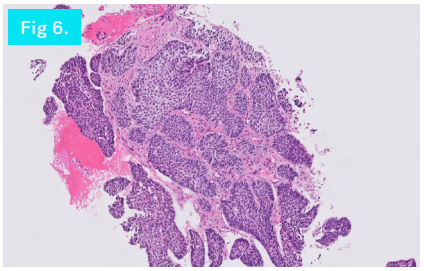


Fig 4. Concentric REBUS pattern

Fig 5. Fluoroscopy showing actual nodule position (blue dot) and potential false positive vessel end on (just apical to scope)

Fig 6. Pathology slide confirming diagnosis in the room

CONCLUSIONS

1. Collaboration

Working with interventional radiology partners to establish appropriate referral practices for small, hard to reach nodules is extremely important. Many nodules are high risk for our radiology colleagues, but are often left to watchful waiting due to presumed inability to biopsy by other means.

2. Vision & Control

MONARCH® technology shines when full visualization is maintained throughout navigation and biopsy, allowing proceduralists to diagnose nodules even if they are sub-centimeter and/or have no visible airway on CT (**Fig. 7**).

With greater visualization, greater attention to potential fluoroscopic false positives is an important consideration, especially if the fluoroscopic "nodule" is not in alignment with the navigated target and confirmed with REBUS. As demonstrated in this case, if care is not taken, it may result unwanted complications and an unsuccessful procedure.

3. Efficiency

Navigation was completed in just under two minutes, highlighting not only the accuracy of the system but the precision and time savings this technology can afford. It is essential to educate referral sources about the benefits of the technology to avoid more invasive techniques and treatment delays.

Fig 7. Dr. Garwood performing a MONARCH® Robotic-Assisted Bronchoscopy

Dr. Susan Garwood

Dr. Garwood is based in Nashville, TN. She is the Medical Director of Thoracic Oncology for Tristar Health, National Physician Lead of the Pulmonary Service Line for HCA Clinical Service Group, & Co-Chair of the Thoracic Surgery Council for the HCA Clinical Service Group.

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