

**DR. KENNETH K. SAKATA – MAYO CLINIC
ARIZONA**

Robotic-assisted Bronchoscopy to Diagnose Malakoplakia

Fig. 1

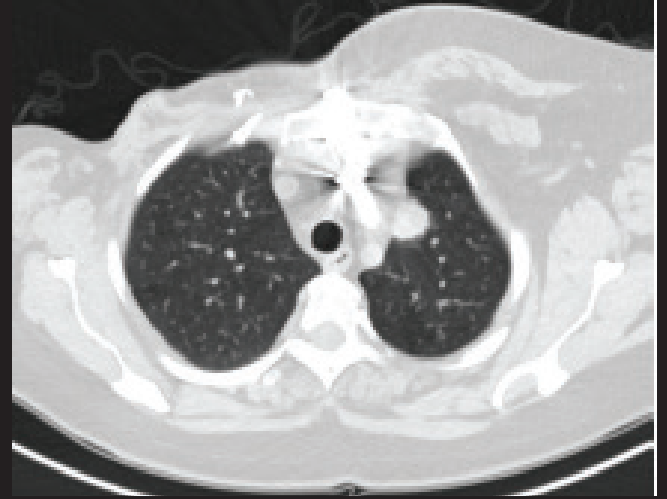


Fig. 2

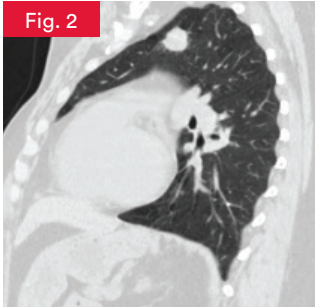


Fig. 3

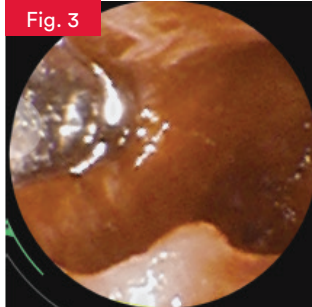
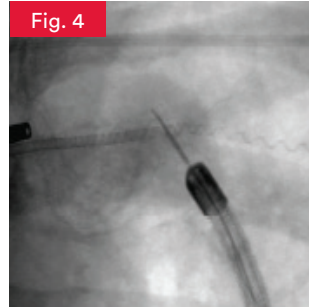


Fig. 4



Nodule Characteristics

Lobar Location
Left Upper Lobe (LUL)

Nodule Size
16 mm

Case Information

Navigation Time (min.)
3:00

Total Procedure Time (min.)
58:00

Background

A 58-year-old female with a history of a orthotopic heart transplant in 2019 on tacrolimus and mycophenolate, bilateral breast cancer in remission, and follicular thyroid carcinoma status-post total thyroidectomy presented to the pulmonary clinic for evaluation of an enlarging left upper lobe (LUL) pulmonary nodule.

A chest computed tomography (CT) that was ordered two months prior revealed a 16 mm LUL nodule sitting adjacent to the mediastinum. When she returned for a 5-week follow up, the CT showed that the nodule had quickly increased in size to 20 mm. (Fig. 1 & Fig. 2) She was diagnosed with *Escherichia Coli* from a urinary tract infection 10 days prior to her follow up. A Robotic-Assisted Bronchoscopy (RAB) was ordered to diagnose the growing nodule.

Planning/Procedure

A negative bronchus sign was noted during the initial planning phase of the procedure. Once initialization was achieved, navigation was completed within minutes. Due to the tortuous anatomical location of the nodule, a 270-degree turn was required to access the area of interest. A cavitary nodule was noted under direct visualization with the MONARCH™ scope (Fig. 3) negating the need to confirm location with a radial probe ultrasound image. In addition to the robotic-assisted guided needle biopsy, a bronchoalveolar lavage and forceps biopsies were obtained. (Fig. 4) The patient tolerated the procedure without any complications.

The biopsies showed non-necrotizing granulomatous inflammation with histologic features consistent with malakoplakia. (Fig. 5 & Fig. 6) The bacterial cultures from the bronchoalveolar lavage grew *Escherichia coli*. Susceptibilities from the urine and lung samples were identical. She was treated with a 4-week course of amoxicillin-clavulanate. A follow-up chest CT showed that the nodule had decreased in size.

Fig.1. 20 mm nodule seen abutting the left mediastinum on the transverse plane
Fig.2. Same nodule seen on sagittal plane in the left upper lobe
Fig.3. Direct bronchoscopic image of the forceps within the cavitary left upper lobe nodule
Fig.4. Fluoroscopic view of the RAB guided needle biopsy of the left upper lobe nodule

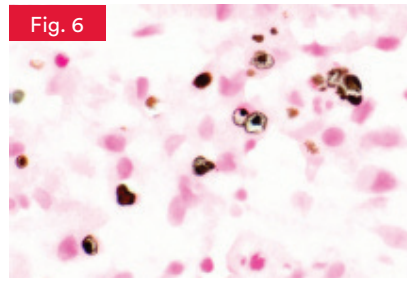
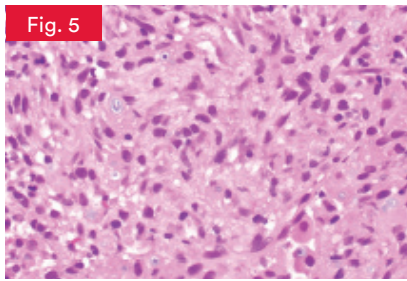



Fig.5. Transbronchial biopsy specimens demonstrated sheets of oval to spindled histiocytes some of which had light purple cytoplasmic inclusions
Fig.6. Von Kossa staining highlights the diagnosis of malakoplakia

Conclusion

This case highlights the advantages of the MONARCH™ platform over conventional bronchoscopy in establishing a diagnosis for a difficult to reach pulmonary lesion. Based on the location of the pulmonary nodule, the risk of bleeding and pneumothorax were felt to be too high via CT guided biopsy. Determining a tissue diagnosis with a lung biopsy was imperative due to the rapidly enlarging nodule and the patient's underlying history of cancer and immunosuppression. The robotic system is designed to improve peripheral reach, provide direct continuous visualization, and offer precise control of instruments which proved to be superior to other biopsy techniques.

 *The introduction of Robotic-Assisted Bronchoscopy has made procedures like this successful because of vision and control*

– Dr. Kenneth K. Sakata



About Kenneth K. Sakata, MD

Dr. Sakata is based in Phoenix Arizona. He is board certified in internal medicine, interventional pulmonology, and critical care medicine. His primary focus revolves around bronchoscopy, lung cancer and pleural diseases.

Bronchoscopy Indications for Use: The MONARCH™ Platform and its accessories are intended to provide bronchoscopic visualization of and access to patient airways for diagnostic and therapeutic procedures.

Bronchoscopy Important Safety Statement: Complications from bronchoscopy are rare and most often minor, but if they occur, may include breathing difficulty, vocal cord spasm, hoarseness, slight fever, vomiting, dizziness, bronchial spasm, infection, low blood oxygen, bleeding from biopsied site, or an allergic reaction to medications. It is uncommon for patients to experience other more serious complications (for example, collapsed lung, respiratory failure, heart attack and/or cardiac arrhythmia).

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