



One-stop-shop: Lung cancer and pheochromocytoma diagnosed by robotic-assisted bronchoscopy and EBUS scope on a single endoscopic event

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Abstract

Lung cancer is the deadliest cancer worldwide, therefore, early and prompt diagnosis is essential for better patient outcomes. It is known to have a high predilection for metastasis to the adrenal glands; however, two-thirds of adrenal masses in patients with lung cancer will turn out to be benign, so timely detection is crucial. We present a case of a lung squamous cell carcinoma diagnosed by shape-sensing robotic-assisted bronchoscopy (ssRAB), negative mediastinal and hilar staging with endobronchial ultrasound (EBUS) and transbronchial needle aspiration (TBNA), and a pheochromocytoma diagnosed through endoscopic ultrasound with bronchoscope (EUS-B) fine needle aspiration (FNA) all in the same endoscopic procedure.

KEYWORDS

endobronchial ultrasound, endoscopic ultrasound with bronchoscope, robotic-assisted bronchoscopy

INTRODUCTION

Globally, lung cancer is the leading cause of cancer death (approximately 1.8 million deaths annually) in both men and women.¹ Metastasis to distant organs has a significant impact on prognosis and lung cancer metastasis has a high predilection for adrenal glands.² About 4%–7% of patients with potentially resectable lung cancers have adrenal masses, of which approximately two-thirds of masses are benign adenomas.³ Therefore, a biopsy is crucial to rule out malignancy in patients with suspected mass. The published guidelines recommend endosonography for tissue verification from the adrenal lesion suspected of metastases.³ Sampling of the left adrenal gland (LAG) performed by endoscopic ultrasound-guided fine needle aspiration (EUS FNA) using a conventional gastrointestinal (GI) echo endoscope is used extensively.³ EUS-FNA is highly accurate, with a sensitivity of 86%.³ An endobronchial ultrasound (EBUS) scope can also be used to biopsy LAG with a diagnostic yield similar to EUS-FNA.⁴ Here we present a case of lung and adrenal

unrelated malignancies diagnosed by shape-sensing robotic-assisted bronchoscopy (ssRAB) and EBUS-guided biopsy, respectively, and mediastinal staging within the same endoscopic procedure.

CASE REPORT

An 84-year-old woman on follow-up for 1 year for a left upper lobe (LUL) lung mass presented with shortness of breath on exertion and intermittent productive cough. Computed tomography (CT) scan showed a LUL spiculated 18 × 13 mm nodule (Figure 1A). Additionally, there was a suspicious left adrenal nodule. Positron emission tomography (PET) scan showed increased uptake in LUL (Figure 1B) and LAG (Figure 2C).

Shape-sensing robotic-assisted bronchoscopy, 3D fluoroscopy, and radial EBUS were used for transbronchial lung biopsy of the LUL nodule using a 21G needle, under general anaesthesia. After the robotic portion was completed, EBUS

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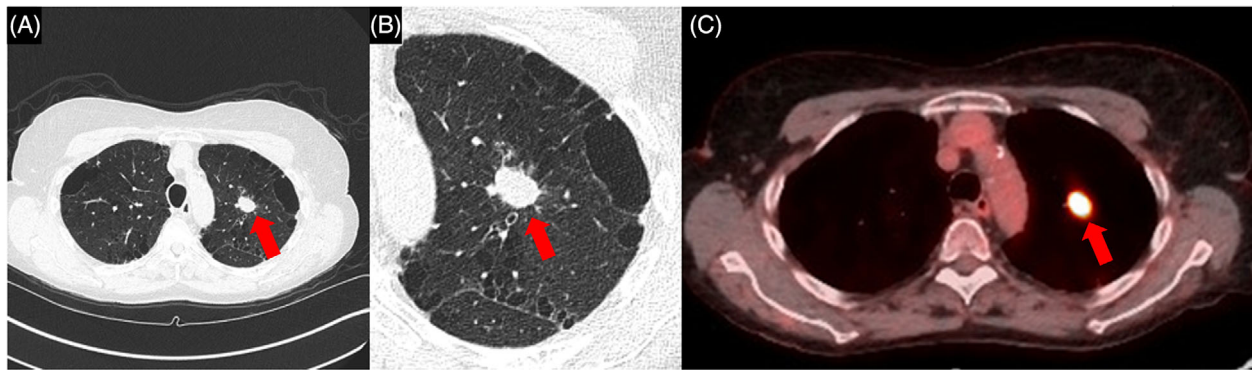


FIGURE 1 (A) Computed tomography axial view of the 18 × 13 mm nodule in the left upper lobe (red arrow). (B) Close up view of the left upper lobe nodule in chest CT (red arrow). (C) Positron emission tomography scan showing maximum SUV uptake of 18.9 in left upper lobe nodule (red arrow).

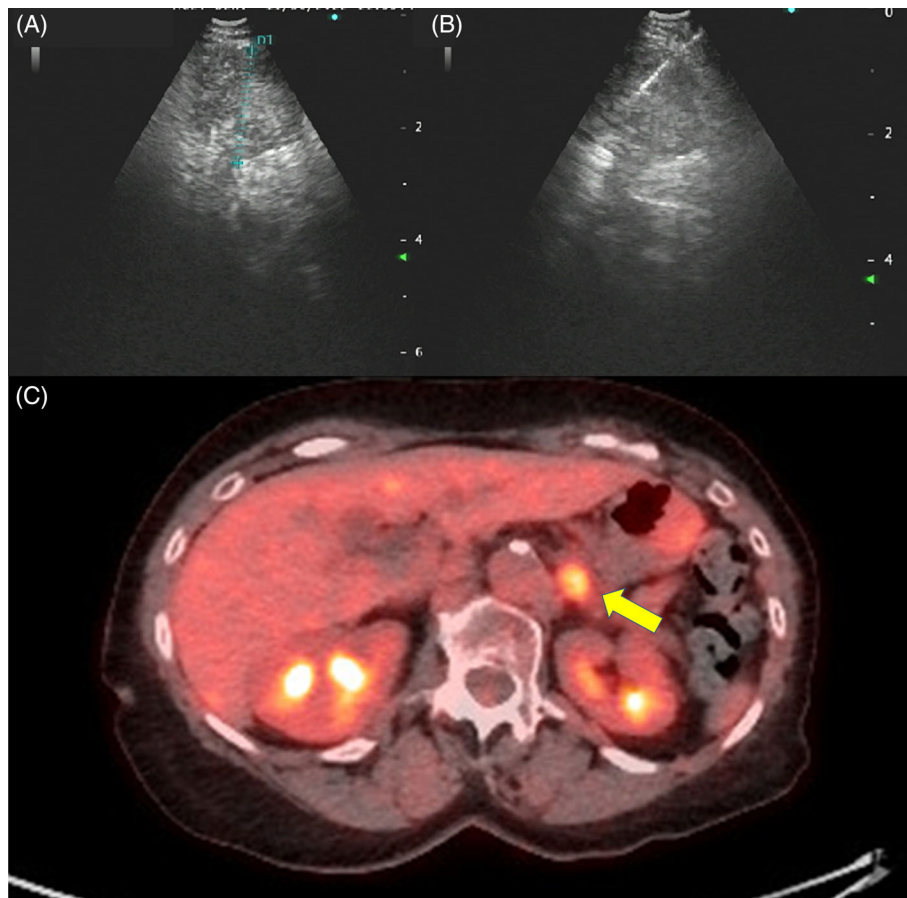


FIGURE 2 (A) Endobronchial ultrasound sound image of left adrenal gland 20 mm nodule. (B) Endobronchial ultrasound guided needle aspiration of left adrenal gland 20 mm nodule. (C) Positron emission tomography scan showing a maximum SUV uptake of 5.2 in left adrenal gland (yellow arrow).

TBNA was performed on lymph node stations 7 and 11 L for mediastinal staging. Once the thoracic procedures were completed, the EBUS scope was passed down through the oesophagus (while instilling air) to the cardia and fundus, and rotated clockwise while visualizing first the liver, then the abdominal aorta and then around left adrenal of about 20 mm (Figure 2A). Needle aspiration was performed to the left adrenal (Figure 2B). The duration of the procedure was

62 min. Subsequently, a recovery period of 60 minutes was observed following the completion of the procedure. No immediate complications were noted after the procedure.

Cytopathology from the LUL nodule showed lung primary squamous cell carcinoma. Mediastinal lymph nodes were negative for malignancy. The LAG was positive for pheochromocytoma. The patient was started on treatment with hypofractionated stereotactic ablative body

radiotherapy (SBRT) for lung cancer and consulted endocrinology for the management of pheochromocytoma.

DISCUSSION

More than 50% of patients with lung cancer present with distant metastases. This delayed diagnosis is due to the non-specific presentation of lung cancer. Adrenal glands are one of the most common sites for metastases from lung cancer,² although most of them are benign.³ Accurate staging of lung cancer is crucial in the management of the patient and is a significant prognostic factor for survival.

In a patient with an adrenal mass suspected of metastasis, endosonography for tissue verification is recommended.³ LAG biopsy is routinely done using EUS with trans gastric FNA.³ Conventionally EUS-FNA is done using a GI echo endoscope and is performed by a gastroenterologist. Alternatively, the EBUS scope can also be used to sample LAG (EUS-B). Although there are several technical advantages in the use of a conventional EUS-endoscope compared to EBUS-endoscope for the oesophageal approach, for example, better stability in the stomach and larger ultrasound device, there are certain barriers to more widespread use, such as the requirement of additional training in the use of EUS endoscopes. EUS-B is found to have a similar diagnostic yield as with the use of conventional GI EUS scope⁴ and can be performed by an interventional pulmonologist who works with EBUS for mediastinal staging.

RAB is designed to allow endobronchial navigation into the lung periphery while maintaining catheter stability to maximize precision in sampling⁵ and is shown to facilitate biopsy from peripheral lung lesions with a high diagnostic yield and has an excellent safety profile, with low rates of pneumothorax and bleeding.⁵ ssRAB combined with EBUS allows for lung nodule biopsy and mediastinal staging in the same procedure. In this patient the same EBUS scope was used for mediastinal staging and to biopsy the LAG, allowing biopsies from three separate locations in a single endoscopic procedure.

In a single endoscopic procedure, RAB was used to sample a malignant LUL nodule and a single EBUS scope was used to sample mediastinal nodes for staging and a LAG pheochromocytoma. This approach has logistical and practical advantages, and in this case allowed for two separate thoracic and extrathoracic diagnoses of malignancy and non-malignancy, respectively.

AUTHOR CONTRIBUTIONS

All the authors participated in the conceptualization or design of the work, the acquisition, analysis or interpretation of data for the work; drafting the work or revising it critically for important intellectual content; and final approval of the version to be published.

CONFLICT OF INTEREST STATEMENT

None declared.

DATA AVAILABILITY STATEMENT


Data available on request due to privacy/ethical restrictions.

ETHICS STATEMENT

The authors declare that appropriate written informed consent was obtained for the publication of this manuscript and accompanying images.

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