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Transbronchial EBUS-guided aspiration of a loculated pleural collection following right superior bilobectomy: a case report

Güntuğ Batıhan[1,2*] and İhsan Topaloğlu[3]

Abstract

Background Postoperative loculated pleural collections can mimic empyema and present diagnostic challenges, especially when transthoracic access is limited due to altered anatomy.

Case presentation We present the case of a 67-year-old male who developed a pleural collection six months after right superior bilobectomy for central squamous cell lung carcinoma. Due to mediastinal shift and limited transthoracic access, EBUS was used under LMA ventilation to access the loculated pleural pocket adjacent to the right paratracheal region. This unconventional but anatomically justified approach allowed safe sampling when standard ultrasound-guided thoracentesis was not feasible, demonstrating a minimally invasive diagnostic alternative in complex postoperative thoracic anatomies. A total of 15 cc pleural fluid was aspirated, which grew Streptococcus pneumoniae. The patient responded well to antibiotics and remains asymptomatic at 9 months.

Conclusions This case highlights a novel application of EBUS in post-surgical thoracic anatomy, offering a minimally invasive alternative when conventional aspiration routes are inaccessible.

Keywords EBUS, Empyema, Pleural effusion, Bilobectomy, Bronchoscopy, Loculated collection

Background

Postoperative loculated pleural collections can persist after lung resection, especially when complicated by prolonged air leak or incomplete lung expansion. These collections may remain asymptomatic or become infected, necessitating sampling and microbiologic diagnosis [1–3]. Conventional transthoracic aspiration may be limited by altered thoracic anatomy, posing a significant clinical challenge.

We present a unique case in which EBUS was used to access a pleural collection following a right superior bilobectomy, overcoming limitations imposed by mediastinal shift and inaccessible thoracic windows.

Case presentation

A 67-year-old male patient with a history of right superior bilobectomy performed six months prior for central squamous cell lung carcinoma (pT3N0M0) presented with elevated CRP, leukocytosis, and clinical signs of infection. The postoperative period had been complicated by prolonged air leak and limited expansion of the remaining right lower lobe. CT imaging had revealed a sterile, loculated pleural pocket in the upper right hemithorax.

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On current admission, chest CT demonstrated a loculated pleural pocket with air-fluid levels in the right upper hemithorax. Conventional transthoracic aspiration was deemed unsafe due to mediastinal shift, scapular obstruction, and proximity to subclavian vessels and ribs (Fig. 1). EBUS-guided aspiration was planned for the patient, who was informed about the potential risks of the procedure—including infection and bleeding—and provided written informed consent prior to intervention.

An endobronchial ultrasound (EBUS) was performed under general anesthesia with laryngeal mask airway (LMA) ventilation (Additional file 1). Via a right paratracheal approach, the pleural pocket was successfully visualized (Fig. 2). Using a standard 22-gauge EBUS-TBNA needle, approximately 15 cc of pleural fluid was aspirated, showing floating debris and increased echogenicity. During the EBUS procedure, a small amount of secretion was also aspirated for microbiological analysis, which showed no bacterial growth. Blood, urine, and sputum cultures, as well as a pneumococcal antigen test, were negative for bacterial infection However, microbiologic analysis of the aspirated pleural fluid revealed Streptococcus pneumoniae. The patient was treated with intravenous ceftriaxone for 14 days, followed by oral amoxicillin–clavulanate for an additional two weeks. The patient showed steady clinical improvement with normalization of inflammatory markers, was discharged in good condition, and remains asymptomatic at 9-month follow-up.

Discussion and conclusions

Postoperative pleural space complications are relatively common following major lung resections, particularly in cases where the remaining lung does not fully re-expand to occupy the hemithorax [3, 4]. Residual pleural spaces may persist due to limited compliance or parenchymal fibrosis and can become the site of sterile or infectious collections over time. In most cases, these spaces gradually resolve; however, when sterile, they may still provoke inflammatory responses or, in rare instances, become secondarily infected, leading to empyema formation.

In the present case, the patient developed an infectious syndrome six months after undergoing a right superior bilobectomy. Imaging revealed a heterogeneous, loculated pleural collection with air inclusions, suggestive of possible empyema. However, standard percutaneous thoracentesis was not feasible due to anatomical challenges—specifically, mediastinal shift, scapular obstruction, and proximity to vital vascular structures such as the subclavian artery and vein.

Endobronchial ultrasound (EBUS) is a well-established, minimally invasive technique that allows real-time ultrasound-guided visualization and sampling of mediastinal and hilar structures via the tracheobronchial tree. It has

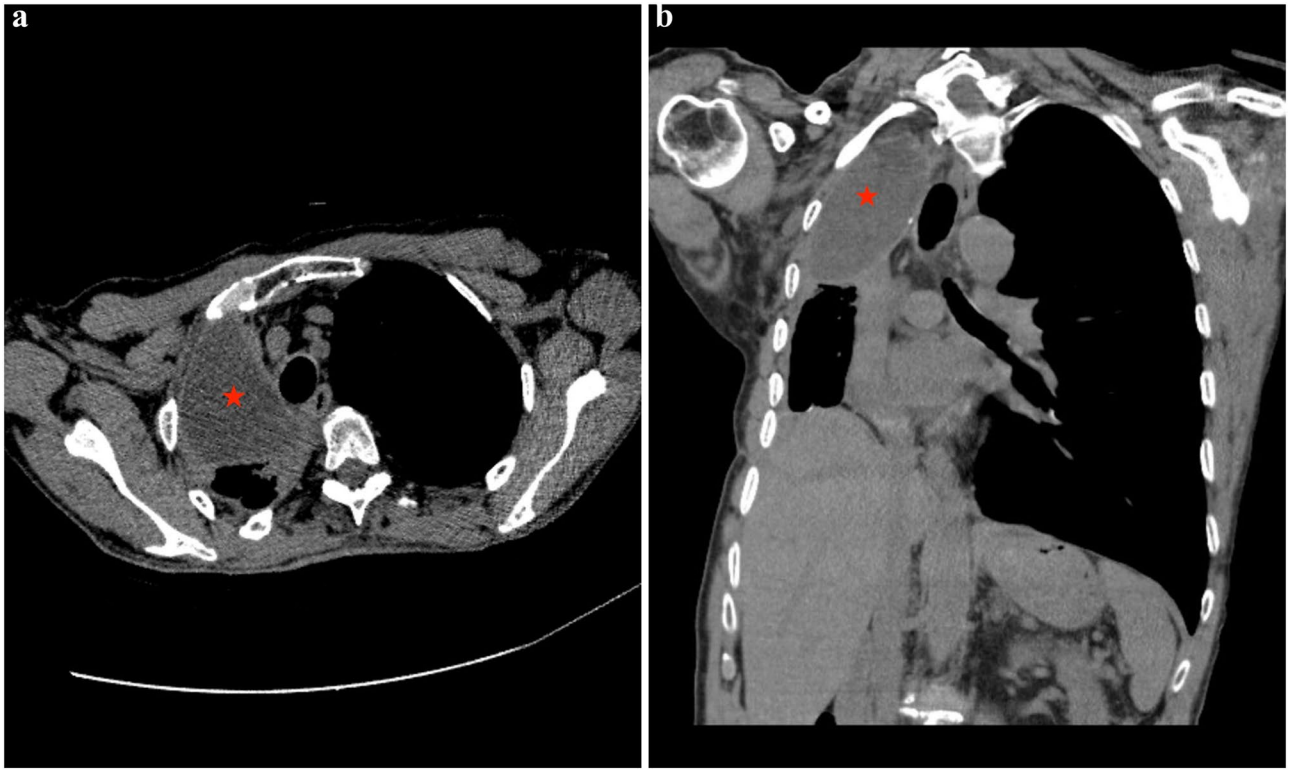

Fig. 1 Axial (**a**) and coronal (**b**) CT sections show a pleural pocket located in the right upper lung zone. The area marked with an arrow indicates the pleural pocket

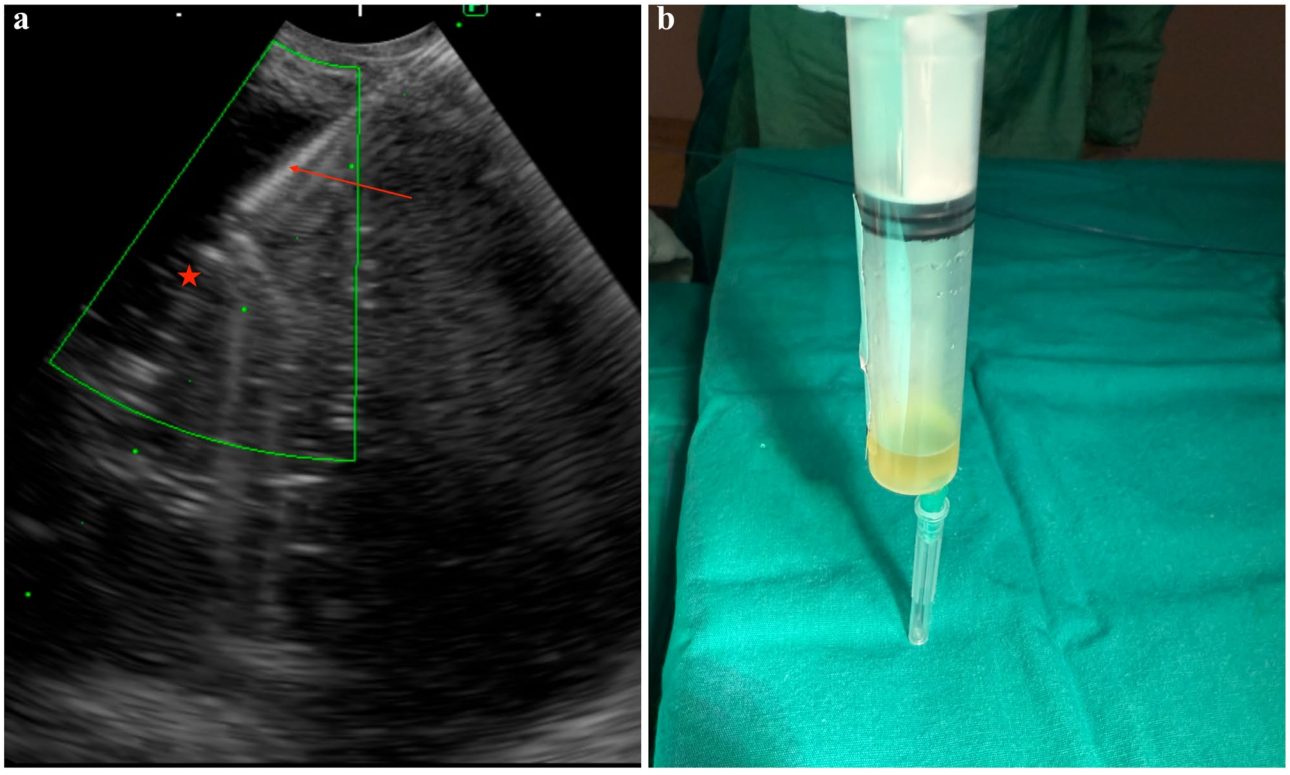

Fig. 2 **(a)** EBUS view showing the pleural pocket accessed via the right paratracheal route (asterisk). This unconventional approach was selected due to limited transthoracic access following right superior bilobectomy. **(b)** The aspirated pleural fluid was sampled for pathological and microbiological analysis

become an essential tool in the diagnostic workup of lung cancer, sarcoidosis, and various infectious or malignant lymphadenopathies [5, 6]. In selected cases, EBUS can serve not only as a diagnostic tool for mediastinal and hilar lymphadenopathy, but also as a valuable alternative route to access and sample pleural collections [7, 8]. The right paratracheal approach may enable safe transbronchial access to the pleural space when conventional methods are limited or contraindicated. In the present case, the decision to perform EBUS-guided aspiration was driven by the patient's post-bilobectomy anatomy, which caused mediastinal shift and restricted intercostal access, making a transthoracic route unsafe. While EBUS-TBNA is well established for mediastinal lymph node sampling, its application for pleural fluid aspiration remains unconventional and should not be regarded as standard practice. In this context, EBUS offered a minimally invasive, anatomically justified alternative that allowed safe sampling and diagnostic confirmation of Streptococcus pneumoniae, illustrating its potential value in selected postoperative scenarios where conventional access is not feasible.

In conclusion, this case underscores the evolving utility of interventional bronchoscopy in managing pleural space complications, especially in surgically altered thoracic anatomies.

Abbreviations

EBUS	Endobronchial ultrasound
LMA	Laryngeal mask airway
CT	Computed tomography
CRP	C-reactive protein

Supplementary Information

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Supplementary Material 1

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Authors' contributions
GB performed the intervention and drafted the manuscript. IT contributed to clinical follow-up and reviewed the manuscript. All authors read and approved the final version.

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Data availability
All data generated or analyzed during this study are included in this published article.

Declarations

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Consent for publication
Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Competing interests
The authors declare no competing interests.

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Publisher's Note

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