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## Severe mediastinitis and pericarditis after endobronchial ultrasound-guided transbronchial needle aspiration: A case report

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### Abstract

#### BACKGROUND

Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) is a safe and minimally invasive diagnostic tool for mediastinal and hilum evaluation. However, infectious complications may occur after EBUS-TBNA. Among these, mediastinitis and pericarditis are rare.

#### CASE SUMMARY

A 67-year-old woman was referred to our hospital due to paratracheal lymph node enlargement on chest computed tomography (CT). EBUS-TBNA was performed on the lymph node lesions, and prophylactic oral antibiotics were administered. Seven days after EBUS-TBNA, the patient visited the emergency room with a high fever and chest pain. Laboratory test results revealed leukocytosis with a left shift and elevated C-reactive protein level (25.7 mg/dL). Chest CT revealed the formation of a mediastinal abscess in the right paratracheal lymph node and pericardial and bilateral pleural effusions. The patient received intravenous antibiotic treatment, cardiac drainage through pericardiocentesis, and surgical management. The patient recovered favorably and was discharged 31 d after the operation.

#### CONCLUSION

Mediastinitis and pericarditis after EBUS-TBNA are rare but should be considered even after the use of prophylactic antibiotics.

**Key Words:** Endoscopic ultrasound-guided fine needle aspiration; Complication; Mediastinitis; Pericarditis; Antibiotics; Case report

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**Core Tip:** Acute mediastinitis and pericarditis are rare complications of endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA). This case presented with acute mediastinitis and pericarditis that developed despite prophylactic antibiotic use after EBUS-TBNA and improved after antibiotic and surgical management.

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## INTRODUCTION

Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) is used to biopsy enlarged lymph nodes in the mediastinum and hilum to stage patients with lung cancer and to provide a definitive diagnosis of lymphadenopathy. Although EBUS-TBNA is a safer and less invasive procedure than mediastinoscopy, severe complications can occur; A major complication rate of 0.3% was found in one meta-analysis[1]. Complications such as massive bleeding, cardiac tamponade, hemomediastinum, pneumomediastinum and pneumothorax have been reported as a complication of TBNA[1,2]. However, mediastinitis and pericarditis rarely occur after EBUS-TBNA. Here, we report the successful use of cardiac drainage and exploratory thoracotomy for drainage of a mediastinal abscess in a patient who developed acute severe mediastinitis with pericarditis after EBUS-TBNA.

## CASE PRESENTATION

### Chief complaints

The patient presented with a high fever and chest pain. Seven days after EBUS-TBNA, she visited the emergency room.

### History of present illness

A 67-year-old woman was referred to our hospital because of lymph node enlargement on chest computed tomography (CT) (Figure 1). EBUS-TBNA of the right paratracheal lymph node was performed using a 22-gauge needle to obtain the tissue core. A total of 11 punctures were performed due to insufficient tissue cores. Prophylactic antibiotics (amoxicillin/clavulanate) were administered to prevent infectious complications after the procedure. Histological examination of the specimen revealed negative malignant cells and no bacteria.

### History of past illness

The patient had no comorbidities.

### Personal and family history

The patient and families were previously healthy.

### Physical examination

On physical examination, the patient appeared acutely ill with a clear mental status. The patient was febrile (37.8°C) and had a stable blood pressure of 100/68 mmHg, pulse rate of 107 bpm, respiratory rate of 18/min, and body temperature of 37.8°C. The breath sounds on the left side of the chest were decreased.

### Laboratory examinations

Laboratory tests revealed leukocytosis with a left shift and the following results: White blood cell count: 14410/mm<sup>3</sup>; neutrophils: 81.3%; hemoglobin: 9.8 g/dL; platelet count: 198000/mm<sup>3</sup>. Blood chemistry showed elevated total bilirubin (1.40 mg/dL), aspartate



**Figure 1** Chest computed tomography before endobronchial ultrasound-guided transbronchial needle aspiration demonstrated enlargement of the right paratracheal lymph node.

aminotransferase (132 U/L), and alanine aminotransferase (137 U/L) levels in a normal renal panel. The cardiac enzyme level was normal, and the NT-proBNP level was slightly high (562.6 pg/mL). C-reactive protein level was elevated (25.7 mg/dL) and lactic acid level was within the normal range.

### **Imaging examinations**

Chest radiography revealed left lung field haziness with pleural effusion and cardiomegaly (Figure 2). Emergency echocardiography revealed pericardial effusion of > 1 cm, and the blood pressure dropped (85/51 mmHg) after emergency echocardiography; cardiac drainage through the pericardiocentesis was performed. Chest CT showed a mediastinal abscess formation in the right paratracheal lymph node and pericardial and bilateral pleural effusions (Figure 2).

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## **FINAL DIAGNOSIS**

The final diagnosis in the present case was mediastinitis and pericarditis after EBUS-TBNA.

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## **TREATMENT**

Intravenous antibiotic treatment was initiated. Exploratory thoracotomy was performed by consulting the thoracic and cardiovascular surgery department. Surgical observation revealed whole lung adhesions, mediastinal abscesses, and effusions in the lymph node area. Surgery was completed after adhesiolysis, irrigation, and drainage.

Postoperatively, laboratory findings and the patient's general condition gradually improved. The cardiac drainage tube and chest drainage were removed 4 d and 16 d postoperatively, respectively (Figure 3). No bacterial pathogens were detected in the specimens obtained from the pericardial and abscess drainage.

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## **OUTCOME AND FOLLOW-UP**

The patient recovered favorably and was discharged 31 d after the operation. There was no evidence of recurrence within the 12 mo follow-up period.

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## **DISCUSSION**

Convex-probe EBUS-TBNA is a minimally invasive diagnostic technique for peritracheal and peribronchial areas[3]. EBUS-TBNA identifies the puncture site through real-time ultrasound guidance, allowing accurate sampling from lesions and cytological and histological diagnosis. The cumulative sensitivity of EUBS-TBNA is



**Figure 2 Chest X-ray radiograph and computed tomography.** A: Chest X-ray radiograph showed both pleural effusion and cardiomegaly; B and C: Chest computed tomography performed 7 d after ultrasound-guided transbronchial needle aspiration demonstrated (B) an increased size and mediastinal abscess formation in the right paratracheal area and (C) newly developed moderate amounts of pericardial effusion with diffuse pericardial thickening.



**Figure 3 Chest X-ray radiograph and computed tomography.** A: Chest X-ray radiograph findings improved after removal of the chest tube and drainage catheter; B and C: Chest computed tomography demonstrated (B) a decrease in size of the right paratracheal lymph node and (C) decreased amount of pericardial effusion and improvement in diffuse pericardial thickening.

88%-93% and the cumulative specificity is 100% in lymph node staging of lung cancer [4,5].

The overall major complication rate of this procedure was found to be 0.23%-1.23% in a previous meta-analysis[1,2]. Pneumothorax, hemopericardium, and infections such as mediastinitis, pericarditis, and abscesses are reportedly caused by EBUS-TBNA[1,2]. In 7345 EBUS-TBNA cases in Japan, hemorrhage was the most frequent complication (0.68%), followed by infection (0.19%, mediastinitis,  $n = 7$ ; pneumonia,  $n = 4$ ; pericarditis,  $n = 1$ ; cyst infection,  $n = 1$ ) and pneumothorax (0.03%)[2]. As such, the probability of mediastinitis and pericarditis occurring as a complication of EBUS-TBNA is very low. In addition, case reports revealing the occurrence of mediastinitis or pericarditis after EBUS-TBNA are rare[6-12].

Antibiotic prophylaxis is not used in most EBUS-TBNA cases. However, in this case, mediastinitis and pericarditis occurred even with the use of prophylactic antibiotics. Antibacterial precautions are not recommended for routine diagnostic bronchoscopy, unless there is a previous history of spleen removal, artificial heart valves, or endocarditis[13]. This patient with an enlarged, homogeneous right paratracheal lymph node underwent diagnostic EBUS-TBNA with a 22-gauge needle to obtain the tissue core. A total of 11 punctures were performed because of insufficient tissue cores. Multiple needle passes would have caused mediastinitis and pericarditis in this patient. There are no definitive guidelines regarding which prophylactic antibiotics should be used and for which patients. Despite the use of amoxicillin/clavulanate in this patient, infectious complications occurred; therefore, further research is needed to determine the optimal antibiotic course.

In this case, the patient recovered with the help of antibiotics, pericardial drainage, and surgery. Mediastinitis, with a mortality rate of approximately 50%, is a life-threatening condition that requires aggressive treatment with both broad-spectrum antibiotics and surgical intervention[14]. Appropriate antibiotic therapy and

pericardial drainage may be helpful in treating infectious pericarditis. If vital signs are unstable, immediate pericardial drainage can help prevent pericardial tamponade in patients[15].

## CONCLUSION

In conclusion, we reported a patient who developed mediastinitis and pericarditis as complications of EBUS-TBNA, even after the use of prophylactic antibiotics. Although EBUS-TBNA is a minimally invasive diagnostic and treatment option, the possibility of serious complications needs to be considered. Further research is needed to determine which type of prophylactic antibiotic should be used in at-risk patients.

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