Severe Mediastinal Abscess after Endobronchial Ultrasound with Transbronchial Needle Aspiration

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Endobronchial ultrasound with transbronchial needle aspiration (EBUS-TBNA) is a minimally invasive and safe technique which is universally accepted for the mediastinum and/or hilum lymph node biopsy. Severe infectious complications following EBUS-TBNA were occasional, but sometimes life-threatening.[1] Two patients with severe mediastinal abscess after EBUS-TBNA were treated successfully with surgical drainage in our department, and we reported here to improve our clinical vigilance to this disease.

A 59-year-old Chinese man experienced chest pain combined with a cough for about 4 months. Chest computed tomography (CT) was performed in other hospital and showed right hilum expansion and mediastinum lymph node enlargement. EBUS-TBNA (UC260FW, Olympus, Tokyo, Japan) was performed to puncture the right tracheobronchial lymph node (#4R) under pharynx nasalis local anesthesia with lidocaine on July 03, 2015. Moreover, this patient was pathologically diagnosed with lung adenocarcinoma through using EBUS-TBNA specimens [Figure 1a].

Three days after EBUS examination (July 06, 2015), the patient developed a high fever, increased the degree of cough and chest pain. He was admitted to our department. Blood examination showed that white blood cell count (WBC) was normal with the increased ratio of neutrophils, and C reactive protein (CRP) was increased. Echocardiographic showed a little pericardial effusion. Chest CT (July 08, 2015) showed an enlargement of the right tracheobronchial lymph node, with some air-like low-density shadow in it [red arrow], and a small amount of pericardial effusion [white arrow]; [Figure 1b]. We then diagnosed him with possible mediastinal infection because of a patient with suspicious lymph node abscess and fever plus increased CRP level. Moxifloxacin was used as initial antibiotics to treat the infection, but high fever persisted. The 7th day after admission (July 10, 2015), the patient’s blood pressure dropped off to 67/43 mmHg even after resuscitation with adequate fluid infusion. Echocardiography was performed and showed high amount of pericardial effusion. Then, septic shock induced by mediastinal abscess or pericardial tamponade was considered. Antibiotics in combinations using intravenous imipenem and teicoplanin were prescribed and emergent

Figure 1: (a) Histopathology of the biopsied specimen, pathological diagnosis was lung adenocarcinoma (H&E staining, original magnification ×200); (b and c) computed tomography imaging of mediastinal abscess in case 1, performed on 5 days of EBUS-TBNA, showed an enlargement of the right tracheobronchial lymph node, with some air-like low-density shadow in it (red arrow), and a small amount of pericardial effusion (white arrow); (d) computed tomography imaging of mediastinal abscess in case 2, performed on 25 days of EBUS-TBNA, showed a cystic mass in posterior mediastinum (red arrow), moderate pericardial effusion (white arrow), and bilateral pleural effusion. EBUS-TBNA: Endobronchial ultrasound with transbronchial needle aspiration.

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pericardial fenestration was performed under general anesthesia. About 800 ml of pus was drained from the pericardial cavities. Antibiotics were continued to use for about 4 weeks after the operation. The body temperature was gradually decreased to normal, and the inflammation indexes such as CRP and WBC decreased within normal values; reexamination on echocardiography showed no pericardial effusion existing; chest CT (August 13, 2015) showed an enlargement of the right tracheobronchial lymph node without air-like low-density shadow, a few amount of pericardial effusion and no pleural effusion; the patient was discharged; and one month later, he received anti-cancer chemotherapy.

The second patient was a 52-year-old Chinese man who denied any chronic disease histories. In his yearly routine medical examination, chest CT (August 04, 2016) revealed a cystic mass in the posterior mediastinum. EBUS-TBNA was performed to puncture the subcarinal lymph node (#7) on August 17, 2016. Pathological examination of EBUS-TBNA specimens showed some cellulose-like degeneration materials and no malignant or granulomatous findings. The diagnosis was mediastinal cysts.

The patients experienced chest pain, a slight fever, and had an episode of syncope after 25 days from the EBUS-TBNA (August 29, 2016). He returned to our hospital and was admitted in cardiological care unit with initially diagnosis of the acute coronary syndrome (ACS). Blood examinations showed us increased WBC, CRP, and erythrocyte sedimentation rate (ESR). Echocardiography showed moderate pericardial effusion. Chest CT (August 30, 2016) demonstrated a mass in posterior mediastinum with moderate pericardial effusion and bilateral pleural effusion [Figure 1d]. Based on the above symptoms and examinations, acute pericarditis and mediastinal abscess were considered. Under general anesthesia and extracorporeal circulation, pericardial fenestration was performed using thoracoscopy and about 800 ml of pus was drained. Intravenous cefoperazone sodium was administered for one more week after the operation, and chest CT (September 06, 2016) was rerun and demonstrated a cystic mass in posterior mediastinum without pericardial and bilateral pleural effusion. The patient recovered and discharged after then.

Infectious complications (mediastinitis, pneumonia, pericarditis, cyst infection, and sepsis) after EBUS-TBNA were rare with the incidence of 0.19%, among them, mediastinitis was accounted for 0.10% of these cases. Symptoms of mediastinal abscess were nonspecific including fever, new productive cough, chest pain, hemoptysis, shortness of breath, and arrhythmia. Differential diagnosis should rule out, including ACS. In some cases, the symptoms manifested relatively late even 60 days after manipulation of EBUS-TBNA. Clinical consciousness and awareness of observing the signs of infection were important to diagnose this infrequent complication after the operation. Blood examination often indicated an inflammatory process with elevated WBC, CRP, and ESR. Echocardiography and chest CT showing enlargement of lymph node with an inner low-density shadow and pericardial effusions could provide key clues for the diagnosis of mediastinal infection.

Previous studies reported that the most common bacteria identified in mediastinal abscess were of oropharyngeal origin, such as Klebsiella pneumoniae, Actinomycetes, hemolytic Streptococcus, and Streptococcus intermedius, suggesting that the translocation of oral and nasopharyngeal bacteria to deep mediastinal tissues through the tracheobronchial or transtracheal passage of the needle were the most possible causes of mediastinitis or mediastinal abscesses. In addition, the infection may also be caused by bacteremia spread through the punctured wound. When the puncture site was necrotic or cystic, blood flow was slight that was convenient for bacteremia colonization and dissemination. Therefore, ensuring with the right location of the needle tip was very important. Further investigation should be carried out to investigate whether prophylactic antibiotic should be routinely prescribed after EBUS-TBNA.

Mortality associated severe infectious complications have been reported. Indeed, in our two patients, hypotension had occurred due to septic shock or pericardial tamponade in one case, and an episode of syncope occurred in another. Even broad-spectrum antibiotics were administrated; surgical drainages were more effective to control the infections.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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**Conflicts of interest**

There are no conflicts of interest.

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