



Endobronchial Ultrasound-guided Transbronchial Needle Aspiration (EBUS-TBNA)

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Abstract

We described our technique for performing endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) among 80 patients with mediastinal lymphadenopathy using a curved linear array ultrasonic bronchoscope that allowed aspiration biopsy under real-time ultrasound imaging. All of the patients underwent the procedure using general anesthesia. EBUS-TBNA provided definitive diagnosis for benign diseases such as tuberculosis and accurate staging of lung cancer. The overall diagnostic yield was 93.7%. There was no complication during the procedure.

Mediastinal lymph node biopsies are essential to accurately stage lung cancer and to plan treatment.¹ Locoregional cancer spread involves mediastinal lymph nodes and is a major determinant of surgical resectability. Scanning imaging technologies, such as computed tomography (CT) and positron emission tomography, although useful, are not sufficiently sensitive or specific to determine mediastinal nodal involvement. Therefore, lymph node biopsy result remains the most accurate determinant of nodal

status. For many years, mediastinoscopy has been the reference standard for staging the mediastinum, but it is invasive, expensive, and requires general anesthesia.² Although it allows good access to the anterior mediastinum, access to the posterior and inferior mediastinum is limited. As a result, its sensitivity for detecting cancer in mediastinal lymph nodes varies between 80 and 90%. The increasing use of minimally invasive techniques and day case procedures has renewed interest in transbronchial needle

aspiration (TBNA) for obtaining biopsies of mediastinal lymph nodes. However, conventional TBNA relies on “blind” needle puncture guided only by static CT scans. The technique is highly operator dependent; reported sensitivities vary between 15 and 78%.^{3, 4} In addition, many operators are so discouraged by the result of their initial experience with the technique that only 20 to 30% of pulmonologists use TBNA.^{5, 6} Endobronchial ultrasound-guided TBNA (EBUS-TBNA) is a minimally invasive real-time procedure which has been shown to have a high yield for the evaluation of the mediastinum.⁷⁻¹² Here we reported our experiences of EBUS-TBNA for mediastinal lymphadenopathy.

Materials and Methods

Convex probe endobronchial ultrasound

The convex probe endobronchial ultrasound (BF-UC160F-OL8/BF-UC260F-OL8; Olympus Medical System Corp. Tokyo, Japan) is similar to a standard bronchovideoscope. It has an outer diameter of 6.9 mm, a 2.0-mm instrument channel, and a 30-degree forward oblique-viewing optics. A 7.5 MHz electronic curved linear array ultrasonic transducer mounted at the ultrasound is 20 to 90 mm. Image processing is performed by an endoscopic ultrasound center (EU-C60/EU-C2000; Olympus Medical Systems Corp. Tokyo, Japan).

Needle Aspiration

The inner diameter of the instrument channel is 2.0 mm. A dedicated 22-gauge needle (NA-201SX-4022 Olympus Medical Systems Corp. Tokyo, Japan) is used to perform EBUS-TBNA. The inner diameter of this needle is nearly equal to that of a conventional 21-gauge needle, which allows sampling of histologic cores in some cases. The needle is also equipped

with a stylet, which is withdrawn after passing the bronchial wall, avoiding contamination during EBUS-TBNA. The needle can be visualized through the optics and on the ultrasound image.

EBUS-TBNA is performed by passing the needle through the airway wall and into the lymph nodes under real-time ultrasound control. Integrated Color Power Doppler mode can be used to identify intervening vessels immediately before needle puncture.

Patients selection

Patients whose computer scan of the chest revealed mediastinal lymphadenopathy were considered to undergo endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA). Patients with bleeding tendency, active pulmonary tuberculosis, or on respiratory support with positive end expiratory pressure were excluded. Informed consent was obtained in all patients. All of the patients underwent the method using general anesthesia.

Results

Three patients were excluded, one had active tuberculosis, the other two had bleeding tendency. Eighty patients underwent EBUS-TBNA. The average of the short axis diameter of the mediastinal lymph nodes was 1.2 cm (range 0.5 cm - 5 cm). There were 45 females and 55 males. Their ages ranged from 25 to 70 years old. Fifty-six were Thai, twenty were Japanese, one each from Cambodia, Kenya, Dubai and Canada. EBUS-TBNA successfully sampled lymph node tissue from 75 out of 80 patients (93.7%). There were thirty-one cases of tuberculosis, thirty-six cases of adenocarcinomas, three of squamous cell carcinoma, two of metastatic carcinoma and one was malignant lymphoma. Normal lymphoid tissues were

obtained from ten patients. Two patients were diagnosed as sarcoidosis. There were no complications during all of the procedures.

Discussion

The diagnostic yield of EBUS-TBNA was 93.7% in our current study. This high yield would offer advantage in managing patients with mediastinal lymphadenopathy in terms of making diagnosis and staging of lung cancer.

EBUS-TBNA was very helpful in a patient who developed carcinoma in situ at the carina with a 2-cm short axis diameter subcarinal node. The subcarinal lymph node was disclosed to be tuberculosis via EBUS-TBNA. Electrocautery technique was employed to destroy the carcinoma in situ completely. The patient's diagnosis of inoperable lung cancer due to carinal involvement and likely to be stage 4 turned out to be a curable lung cancer and tuberculosis of mediastinal lymph node. Without this definite diagnosis, she may have undergone a chemotherapy program treatment and may have suffered from spreading of tuberculosis. Three months later, following the antituberculous drugs, the mediastinal node completely disappeared.

EBUS-TBNA has been reported to be useful in the diagnosis of sarcoidosis with the diagnosis yield of 91.8%¹². In our current series we experienced 2 cases of sarcoidosis. In one patient, who presented with blurred vision due to uveitis, mediastinal lymphadenopathy was present. EBUS-TBNA revealed non-caseous granuloma.

Lymphoma could be detected in one case. The disease is quite difficult to be diagnosed, only 50% of the cases can be proved by EBUS-TBNA⁹.

Conclusion

The diagnostic yield of our EBUS-TBNA was 95%. The technique offered correct tissue diagnosis and staging of lung cancer.

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คณะผู้รักษา ได้ใช้เทคนิคการเจาะต่อม้ำน้ำเหลืองในช่องเมดิแอสติแน้ม โดยใช้กล้องส่องหลอดลม ร่วมกับอัลตราซาวด์ ได้ผลร้อยละ 93.7 จากผู้ป่วย 80 ราย โดยพบพยาธิสภาพเป็นวัณโรค, ซาคอยโดซิส, มะเร็งปอด, มะเร็งต่อม้ำน้ำเหลือง และต่อม้ำน้ำเหลืองที่ไม่มีพยาธิสภาพ ทำให้ได้ผลการวินิจฉัยที่ถูกต้อง และทราบระยะของมะเร็งปอดได้แม่นยำ โดยไม่ต้องผ่าตัดเปิดทรวงอก