“Dry” Pleural Mesothelioma Successfully Diagnosed on Endobronchial Ultrasound (EBUS)-guided Transbronchial Needle Aspiration (TBNA)

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Abstract

The acquisition of histologic material is obligatory in order to establish the diagnosis of malignant pleural mesothelioma (MPM). In particular, tissue acquisition in cases of “dry” MPM (focal pleural thickening without pleural effusion or mediastinal lymph node involvement) is usually performed via a thoracoscopic pleural biopsy. In contrast, the techniques for performing echoendoscopic (transbronchial or transesophageal) needle aspiration of pleural lesions have only rarely been reported due to the theoretical limitations of tissue acquisition in such cases. We herein report the first case of “dry” MPM successfully diagnosed via endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) in a 73-year-old man presenting with a pleural mass in the right costovertebral recess, adjacent to the carina. The patient underwent radical resection, and a definitive pathological examination confirmed the diagnosis of epithelioid MPM.

Key words: pleural mesothelioma, EBUS, EBUS-TBNA

Case Report

A 73-year-old man with a previous unremarkable history (no tobacco or asbestos exposure) underwent a radiological evaluation of increasing long-lasting chest pain. Chest radiography and chest computed tomography (CT) revealed a 43-mm×28-mm right pleural mass in the right costovertebral recess adjacent to the carina. Positron emission tomography (PET) showed an isolated radiometabolic uptake (SUVmax = 14.1) at the level of the pleural mass (Fig. 1). Suspecting a primitive pleural tumor (a differential diagnosis of a solitary fibrous tumor and localized mesothelioma) or primary lung cancer lesion invading the pleura, even considering the anatomical localization of the pleural lesion (Fig. 1), we attempted to perform endobronchial ultrasound ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) in order to obtain a tissue specimen to diagnose the disease. After obtaining the patient’s consent, EBUS-TBNA was performed by an experienced endosonographer (L.A) using a conventional linear echoendoscope, as already reported (1, 2).

EBUS confirmed the presence of the pleural mass adjacent to the posterior wall of the carina and the right main bronchus (Fig. 2A). Adequate tissue was obtained from the pleural mass using a 22-gauge needle (Olympus NA-201SX-4022) under direct EBUS guidance (Fig. 2B). After the first needle pass, no ultrasonographic signs of vascular damage were detected. Therefore, due to the unavailability of an onsite cytopathologist, two additional passes were performed. The patient was observed for one hour in the recovery room then for the following 12 hours without evidence of complications.

The specimens obtained via EBUS-TBNA were examined cytologically, histologically and immunohistochemically (Fig. 3A-D). The morphologic and immunostaining findings showed an epithelial tumor involving the lung parenchyma.

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TTF-1 was not expressed by the tumor cells, highlighting the presence of normal parenchyma with TTF-1-positive pneumocytes. In contrast, the areas of tumor proliferation strongly expressed mesothelial markers (calretinin, CK5/6 and WT-1), but not BerEP4 or carcinoembryonic antigen (CEA), thus clearly supporting the diagnosis of an epithelioid-type malignant mesothelioma infiltrating the lung tissue.

Consequently, the patient underwent radical surgical resection (via lateral thoracotomy) of the pleural mass together with the entire parietal pleura. The definitive pathological examination confirmed the diagnosis of epithelioid malignant pleural mesothelioma.

The patient’s postoperative course was unremarkable, and he received adjuvant platinum-based chemotherapy.

Discussion

Common chest CT findings of malignant pleural mesothelioma (MPM) include pleural effusion with focal pleural thickening, even in the early stage. In contrast, pleural thickening without effusion (“dry mesothelioma”) is only seldom observed as the first clinical presentation of MPM (3).

The definitive diagnosis is commonly made on a histological examination of pleural biopsy specimens obtained via invasive procedures (surgical or medical thoracoscopy) (4). Indeed, the role of mini-invasive techniques (percutaneous or endoscopic procedures) in such patients is limited and remains controversial, even considering the need for “large” and “deep” specimens to achieve a definitive diagnosis. In such cases, the echoendoscopic approach (transbronchial or transesophageal) has only been attempted very rarely (3-6) and is usually reserved for cases in which mediastinal lymph node involvement is detected.

We herein presented the first case of “dry” MPM that was directly diagnosed via EBUS-TBNA (to our best knowledge), suggesting that, when the anatomical localization of the pleural lesion is favorable, 1) EBUS-TBNA of the pleural mesothelioma can be technically performed without complications and 2) the tissue obtained using this technique provides sufficient material to make a certain diagnosis of the disease, confirming EBUS-TBNA as a valid alternative option to “standard” thoracoscopic biopsies.

Although seeding of MPM has not been previously reported in cases in which EUS-FNA (that is, the same method as EBUS-TBNA) was adopted to sample mediastinal lymph node metastases of MPM (7), the accumulation of cases in the future is needed to confirm the low risk of seeding associated with EBUS-TBNA.

In conclusion, EBUS-TBNA is a valid diagnostic procedure for establishing the diagnosis of MPM in very select patients with a favorable location of pleural thickening. Nevertheless, the role of thoracoscopic pleural biopsies in diagnosing MPM remains undisputed due to the additional ability to stage the disease and administer immediate palliative treatment (pleurodesis).

The authors state that they have no Conflict of Interest (COI).

**Figure 1.** Radiological Findings: An fluorine-18 fluorodeoxy glucose (18F FDG) positron emission tomographic (PET)-CT scan showed a 43-mm×32-mm pleural lesion located in the right costovertebral recess adjacent to the azygos vein and carina; an intense pathological uptake (SUVmax=14.1) was detected at this level.

**Figure 2.** EBUS-Findings: EUS confirmed the presence of the pleural mass in contact with the posterior wall of the carina and the right main bronchus without clear signs of invasion (A). Therefore, TBNA using a 22-gauge needle was performed (B), without signs of complications.
Figure 3. The tissue obtained from the cell block showed fragments of normal lung parenchyma involved by the interstitial neoplastic growth of epithelioid tumor cells (A, Hematoxylin and Eosin staining). TTF-1 stained the pneumocytes (B), while the mesothelioma showed positivity for calretinin (C) and Wilms tumor-1 (D).

References


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