Novel treatment (new drug/intervention; established drug/procedure in new situation)

Hilar lymph node eroding into the pulmonary artery diagnosed by endobronchial ultrasound-guided transbronchial needle aspiration

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Summary

Endobronchial ultrasound (EBUS)-guided transbronchial needle aspiration (TBNA) is a novel minimally invasive procedure useful for the evaluation and diagnosis of mediastinal lymph nodes and the lung parenchymal lesions. A 75-year-old woman diagnosed as a case of infiltrating duct adenocarcinoma of left breast 15 years back for which she underwent a modified radical mastectomy followed by radiotherapy and chemotherapy. The patient presented to us with haemoptysis. During EBUS, the enlarged left hilar lymph node was seen to be eroding into the left pulmonary artery leading to a filling defect in the left pulmonary artery. This filling defect was first sampled by EBUS-guided TBNA followed by sampling of left hilar lymph node. The results of cytomorphology revealed malignancy which was compatible with a metastasis from a carcinoma breast. EBUS-TBNA is a novel, safe and minimally invasive procedure with a few complications.

BACKGROUND

Endobronchial ultrasound (EBUS)-guided transbronchial needle aspiration (TBNA) is a novel minimally invasive procedure useful for the evaluation and diagnosis of mediastinal lymph nodes and the lung parenchymal lesions. Two types of EBUS are currently available. Linear EBUS enables real-time TBNA of mediastinal lymph nodes and juxta-bronchial lesions under the guidance of ultrasound. Radial EBUS allows evaluation of central airways (including airway invasion) and sampling of lung parenchymal lesions. Ultraminiature radial probe is used for sampling of peripheral lung lesions while radial balloon probe is used for central airway evaluation. We present a rare case of metastatic breast cancer to the left hilar lymph node eroding directly into the left pulmonary artery diagnosed by EBUS-guided TBNA.

CASE PRESENTATION

A 75-year-old woman was diagnosed as a case of infiltrating duct adenocarcinoma of left breast 15 years back for which she underwent a modified radical mastectomy (MRM). MRM was followed by 25 cycles of radiotherapy. She also received chemotherapy in the form of tamoxifen for 5 years. Thereafter, she remained asymptomatic for almost 6 years. The patient presented to another hospital in October 2011 with complaints of left-sided chest pain and mild haemoptysis. Her chest x-ray did not reveal any significant abnormality. She underwent a contrast-enhanced CT of the thorax, which revealed a thrombus in the descending branch of the left pulmonary artery along with upto 1 cm left hilar lymph node. No significant parenchymal lesion was seen to explain haemoptysis. Bronchoscopy was done, which revealed bleeding

from anterior segment of the left upper lobe bronchus. Bronchoalveolar lavage (BAL) was taken from the involved segment and was sent for microbiological and cytological examination. BAL fluid was negative for infective organisms and malignancy. Ultrasonography and Doppler imaging of the deep-venous system of the legs was normal and did not reveal any thrombus. The patient was put on conservative management and discharged in a week after the haemoptysis was controlled. The patient was planned to be started on oral anticoagulants for left pulmonary artery thrombus but patient was lost to follow-up.

She was asymptomatic for the next 6 months but presented to our hospital with complaints of increased haemoptysis of around 200 ml in 24 h in May 2012. A chest x-ray was done, which was again normal. Since the patient had a history of breast malignancy and a previous contrast-enhanced CT of the thorax showing a pulmonary artery thrombus, a positron emission tomography (PET) CT thorax with CT pulmonary angiography was planned in the same sitting. CT pulmonary angiography revealed a non-enhancing hypodense filling defect in the descending branch of the left pulmonary artery, which was contiguous with the enlarged left hilar lymph node (figures 1–3). PET CT thorax revealed a fluorodeoxyglucose (FDG)-avid (SUV of 8.9) filling defect in the descending branch of left pulmonary artery along with FDG-avid (SUV of 10.4) left hilar lymph node (figures 4 and 5). EBUS-guided TBNA was planned to sample the left hilar lymph node. During EBUS, the enlarged left hilar lymph node was seen to be eroding into the left pulmonary artery leading to a filling defect in the left pulmonary artery (figures 6 and 7). This filling defect was first sampled by EBUS-guided TBNA

Figure 1 CT pulmonary angiography showing enlarged left hilar lymph node contiguous with the thrombus in the descending branch of left pulmonary artery.

(figure 8) followed by sampling of left hilar lymph node. The slides were sent for cytological examination. Some of the slides from each sampled site were air dried while others were fixed in 95% alcohol. The procedure was uneventful. In spite of sampling the thrombus in the pulmonary artery, there was no significant bleeding postprocedure. Care was taken not to do the jabbing movements when the dimpled part of EBUS fine-needle aspiration cytology needle was near the vessel wall. Patient was stable after the procedure. The cytological examination revealed malignancy which was compatible with metastasis from carcinoma breast (figure 9). Following the diagnosis the patient was given first cycle of chemotherapy (Paclitaxel) which was tolerated well by the patient.

DIFFERENTIAL DIAGNOSIS

- ▶ Pulmonary embolism
- ▶ Tubercular mediastinal lymphadenopathy.

Figure 2 CT pulmonary angiography showing thrombus in the descending branch of left pulmonary artery.

Figure 3 Coronal section of CT pulmonary angiography showing thrombus in the descending branch of left pulmonary artery.

OUTCOME AND FOLLOW-UP

The patient has tolerated the chemotherapy well and is being continued on chemotherapy.

DISCUSSION

EBUS TBNA enables sampling of upper and lower paratracheal (stations 2 and 4), subcarinal (station 7), hilar (station 10) and interlobar (station 11) lymph nodes¹ with a sensitivity of about 90% and a specificity of 100%.¹⁻⁵ The yield of EBUS-guided TBNA is reported to be higher in comparison with the yield with the conventional TBNA which is a blind procedure.⁶ Hence, in our case we decided to sample the hilar lymph node using the EBUS TBNA. This hilar lymph node was FDG avid on

Figure 4 Positron emission tomography scan showing fludeoxyglucose-avid left hilar lymph node.

Figure 5 Coronal section of positron emission tomography scan showing fludeoxyglucose-avid thrombus in the descending branch of left pulmonary artery.

PET scan. The overall sensitivity of PET scan for determining malignant involvement of mediastinal lymph nodes is 80–84% while the specificity is 70–89%.^{1–7} However, lymph nodes showing no FDG uptake are not always free of malignancy. Up to 10% of patients showing no FDG-avid mediastinal lymph nodes on PET scan may have hilar or mediastinal metastases.⁸

On EBUS, the left hilar lymph node was found to be eroding into the left pulmonary artery. The filling defect in the left pulmonary artery and the left hilar lymph node were sampled. The cytomorphology revealed malignancy compatible with metastases from a carcinoma breast. Such cases of metastatic mediastinal lymph nodes invading into the pulmonary artery are rare and may sometimes mimic pulmonary artery tumour embolism.⁹

Figure 6 Endobronchial ultrasound showing left hilar lymph node contiguous with the thrombus in the left pulmonary artery.

Figure 7 Endobronchial ultrasound showing filling defect in the left pulmonary artery.

Mediastinal lymph node smaller than 10 mm may also directly invade the pulmonary artery.¹⁰ Apart from the mediastinal lymph nodes the lung mass can also directly invade into the pulmonary vessels.¹¹ EBUS-TBNA has also been found to be useful in diagnosing pulmonary artery sarcoma¹² and in diagnosing metastatic tumours from renal cell cancer¹³ and thyroid cancer¹⁴ to mediastinal lymph nodes.

There was no complication associated with EBUS-guided TBNA in our case. EBUS-TBNA is associated with a few complications like pneumothorax, pneumomediastinum and haemomediastinum. The risk of bleeding due to the puncture of the pulmonary artery during EBUS-TBNA is usually very low. This was demonstrated by Vincent *et al*¹⁵ as they traversed the pulmonary artery and biopsied a left hilar mass with no significant bleeding. Other rare complications of EBUS-TBNA include mediastinal abscess,¹⁶ endobronchial polyp,¹⁷ lung abscess and pericardial effusion.¹⁸

Figure 8 Sampling of the thrombus in the descending branch of left pulmonary artery by endobronchial ultrasound-transbronchial needle aspiration.

Figure 9 Cluster of tumour cells in a background of blood (May-Grunwald-Giemsa stain).

Learning points

- ▶ Endobronchial ultrasound-transbronchial needle aspiration (EBUS-TBNA) is a novel, safe and minimally invasive procedure with a few complications.
- ▶ EBUS-TBNA is useful for diagnosing mediastinal lymphadenopathy and lung parenchymal lesions along with staging of the lung cancer.
- ▶ The role of EBUS-TBNA is gradually expanding to diagnose lesions in the pulmonary vessels.

Competing interests None.

Patient consent Obtained.

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Dhamija A, Agarwal A, Basu A, Bakshi P. Hilar lymph node eroding into the pulmonary artery diagnosed by endobronchial ultrasound-guided transbronchial needle aspiration. *BMJ Case Reports* 2012;10.1136/bcr-2012-007438, Published XXX

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