CASE REPORT

Image guided biopsy of the pleura: a useful diagnostic tool even when fluid is minimal

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SUMMARY

A man in his late thirties presented with left-sided chest pain, recurrent fever and cough. Radiographical study revealed left pleural effusion which on ultrasonographic imaging was minimal and non-tappable. Image guided trucut pleural biopsy yielded pleural specimens which helped in confirming the diagnosis of tuberculosis.

BACKGROUND

Pleural tuberculosis is a common extrapulmonary form of the disease. Diagnosis of tuberculosis of pleura is not candid in all cases. Exudative lymphocytic fluid with high adenosine deaminase (ADA), positive tuberculin skin test, histopathology of pleural biopsy specimen demonstrating caseating granuloma and positive mycobacterial culture of the specimen aid in accurate diagnosis.¹ Closed pleural biopsy may be difficult in those cases where the fluid is minimal and non-tappable.² We present a case of pleural tuberculosis without tappable pleural effusion where diagnosis was carried out by ultrasound guided pleural trucut biopsy.

CASE PRESENTATION

A 39-year-old man, a non-smoker, presented with left-sided chest pain, cough and fever of 4 months duration. Chest pain was of a dull aching type and fever mild and intermittent. His cough was mostly dry and he had four episodes of streaky haemoptysis which ultimately subsided. He had noticed a weight loss of around 5 kg during this period. His history was not significant except for a surgery for renal calculi. General examination revealed stable vital signs and pallor. His respiratory system examination showed features of left-sided pleural effusion.

INVESTIGATIONS

Biochemical and haematological investigations were normal except for low haemoglobin (10.6 mg/dL) and haematocrit (31.9%) and erythrocyte sedimentation rate of 30 mm/1 h. Chest radiograph revealed homogeneous opacification of left lower zone with obliteration of costophrenic and cardiophrenic angles suggestive of left-sided pleural effusion (figure 1). Ultrasound examination of thorax revealed minimal non-tappable pleural collection with thickened pleura. Contrast enhanced CT of thorax showed minimal left-sided pleural effusion with pleural thickening and underlying consolidation (figure 2). Tuberculin skin test showed an induration of 13 mm. Sputum culture showed heavy growth of *Streptococcus pneumoniae*, but

Figure 1 Radiograph of chest showing haziness in left lower zone with obliteration of costophrenic angle suggestive of effusion.

sputum Ziehl-Neelsen staining for acid-fast bacilli was negative. Fibre optic bronchoscopy was performed which was reported as normal and microbiological as well as cytological examination of bronchial washing were normal. Ultrasound guided trucut biopsy of pleura was attempted. The aspirate and tissue fragments showed granulomas with central caseation, multinucleated Langhans giant cells, plasma cells and lymphocytes suggestive of tuberculosis (figure 3). Hence diagnosis of pleural tuberculosis was carried out.

DIFFERENTIAL DIAGNOSIS

Exudative pleural effusion can be due to various aetiologies ranging from infective to malignant. Among the infective aetiologies tuberculosis should be considered as a first possibility in view of prolonged constitutional symptoms and in those from countries where prevalence of tuberculosis is high. A positive tuberculin skin test, histopathology demonstrating caseating granuloma and culture of the specimen showing mycobacteria help in arriving at the diagnosis.

Empyema can be another possibility, particularly parapneumonic. Imaging, pleural fluid Gram-stain and bacterial culture assist the diagnosis.

Non-mesothelioma malignant effusion can be yet another possibility. Pleural fluid cytology, histopathology of pleura, evidence of parenchymal lesion on

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Figure 2 Contrast enhanced CT scan, axial (A) and coronal (B) images showing minimal left-sided pleural effusion along with parietal pleural thickening. Minimal consolidation of adjacent lung segments is also seen.

imaging studies and fibre optic bronchoscopy help in confirming the diagnosis.

Mesothelioma can be a differential diagnosis. Chest pain and shortness of breath are predominant symptoms. Mesothelioma may present as pleural thickening alone or with pleural effusion and shrinkage of affected haemithorax on chest radiograph. Definite diagnosis is based on history of prolonged occupational exposure to asbestos and histopathology of the biopsy specimen.³

Sarcoidosis can also be present with pleural effusion, although rarely. Diagnosis is difficult in such cases as this condition apes tuberculosis. Tuberculin skin test anergy, hilar adenopathy, usually symmetrical, raised serum calcium and ACE and non-caseating granuloma on histopathology aid the diagnosis.⁴

TREATMENT

The patient was treated with intravenous ceftriaxone sodium and standard antituberculosis chemotherapy. Ceftriaxone was discontinued after a week. The antituberculosis chemotherapy included daily isoniazid, rifampicin, ethambutol and pyrazinamide. After the initial intensive phase of 2 months we stopped ethambutol and pyrazinamide and continued with isoniazid and rifampicin for 4 months. Our patient tolerated the drugs well.

OUTCOME AND FOLLOW-UP

The patient improved symptomatically and was stable during the follow-up. The follow-up of chest radiograph revealed resolution of the left pleural effusion/thickening (figure 4).

Figure 3 Histopathology of pleura showing granuloma composed of epithelioid cells and Langhans cells (H&E, ×200).

DISCUSSION

Pleural effusion is a manifestation of many systemic and localised diseases. Among the infective aetiologies of pleural effusion, tuberculosis can be a leading cause particularly in endemic countries. Thoracentesis or pleural fluid analysis is mandatory investigation in all cases of pleural effusion. Diagnosis of tuberculosis is suggested when the fluid is exudative, lymphocytic and with a high ADA level, pleural biopsy demonstrates caseating granuloma, and by positive mycobacterial culture and tuberculin test. Pleural biopsy is a valuable diagnostic tool for exudative pleural effusion, particularly when tuberculosis or malignancy is suspected. Closed pleural biopsy with an Abram or Cope needle is commonly practiced. Thoracoscopy is indicated in all cases undiagnosed with all above-mentioned investigations.⁵

Closed pleural biopsy is performed commonly, particularly in resource poor settings. It can lead to complications like pneumothorax, haemothorax and injury to underlying lung. These complications are lessened with image guided pleural biopsy. An ultrasound guided pleural biopsy yields a better pleural sample as compared to the blind method even in cases with minimal pleural fluid.⁶ Studies have shown that an unguided trucut needle yielded better samples than an Abrams punch and the contrary when performed under image guidance.^{7 8} Though pleural biopsy with a Cope needle can be performed in cases with minimal effusion, most physicians prefer to choose alternative

Figure 4 Post-treatment chest radiograph showing resolution of left-sided pleural effusion.

methods like thoracoscopy.⁹ We did ultrasound guided pleural biopsy with a trucut needle, as thoracentesis did not yield any fluid. Even in cases of minimal pleural thickening and absent or mild effusion, under guidance, thickening can be approached obliquely without any injury to intercostal artery or lungs.¹⁰ Image guided cutting needle biopsy allows safe sampling of those anatomical areas which are difficult to access blindly, such as near midline and diaphragm, where metastasis occur commonly.⁵ According to the literature the diagnosis of tuberculosis is carried out by histopathological examination and mycobacterial culture of the pleural biopsy specimen. The diagnostic accuracy increases when these two tests are combined.¹¹

Our case is presented with the intention of stressing the usefulness of image guided pleural biopsy in cases of pleural effusion, even when fluid is minimal. In resource poor settings where thoracoscopy is not available, image-assisted pleural biopsy can be a handy, safe and cost-effective tool in the diagnosis.

Learning points

- ▶ Tuberculosis is a major infective cause of pleural effusion particularly in countries with a high prevalence.
- ▶ Pleural biopsy is an indispensable investigation in the diagnosis of pleural effusion especially when tuberculosis and malignancy are suspected.
- ▶ Image guided pleural biopsy is useful in cases with minimal fluid where closed blind pleural biopsy may be risky.

Competing interests None.

Patient consent Obtained.

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