Pleural tuberculosis presenting as a pleural based mass in an adult patient in a low resource setting: plain radiographic findings and a case report

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Abstract

Pleural tuberculosis is the most common extrapulmonary presentation of tuberculosis after tuberculous lymphadenitis, this may occur as a complication of primary disease or long-term effect of dissemination following initial infection years later.

A 45-year-old farmer referred for a plain chest radiograph from a peripheral healthcare facility on account of cough, night sweats, weight loss, fatigability, loss of appetite, hemoptysis and occasional dyspnea for about six months prior to presentation.

The chest radiographs show widespread streaky and patchy opacities with cystic lung changes involving both lung fields with an extensive pleural based opacity of soft tissue density, this shows a convex border medially causing compression of adjacent right lung field and deviation of the hilar vessels away from it. The right costophrenic angle is hazy while the left is free. The heart and mediastinum are within normal limit. The left lateral film showed free mediastinal spaces.

The bony thorax shows degenerative changes most especially on the spine. The pleural tap yielded Mycobacterium tuberculosis.

A diagnosis of pleural tuberculosis coexisting with pulmonary tuberculosis was established, the patient was placed on antituberculous drugs; Directly Observed Therapy Short course (DOTS) comprising of Isoniazid, Rifampicin, Pyrazinamid and Ethambutol (2HRZE/4HR).

We present a case of pulmonary tuberculosis with extrapulmonary presentation as loculated pleural effusion presenting as a pleural based mass in a 45-year-old farmer due to its peculiar presentation.

Keywords: pleural based mass; tuberculosis; pleural effusion; mycobacterium

Introduction

Pleural tuberculosis (pTB) is the second most common form of extrapulmonary tuberculosis, although curable, tuberculosis remains one of the most common cause of pleural effusion globally most especially in the developing nations[1].

Pleural tuberculosis is the most common extrapulmonary presentation of tuberculosis after tuberculous lymphadenitis, this may occur as a complication of primary disease or long-term effect of dissemination following initial infection years later [2,3].

Pleural tuberculosis (pTB) is regarded as the most common cause of pleural exudates globally most especially in tuberculous (TB) endemic areas and in the human immunodeficiency virus (HIV) positive population [4].

Pleural TB often present as effusions which are mostly exudates with high adenosine deaminase, lymphocyte-rich, straw-colored and free flowing, with a low yield on mycobacterium culture. However, these effusions could present as loculated neutrophil predominant effusions often resembling parapneumonic effusion or rarely may present as TB empyema with abundance of mycobacterium[4].

Tuberculosis is caused by Mycobacterium tuberculosis, and remains the leading infectious cause of death worldwide, with pTB as one of the most frequent causes of pleural exudate, thereby requiring adequate awareness of its presence with appropriate diagnosis and treatment [4,5].
Pleural TB can be acute or subacute, has varying signs and symptoms, these include cough, chest pain, fever, anorexia, weight loss, night sweats and varying degree of dyspnea, with the commonest presentation been that of unilateral chest pleural effusion[6,7].

In diagnosis of pTB, microbiological or molecular detection of Mycobacterium tuberculosis in pleural fluid or tissue samples remains the gold standard for the diagnosis [6].

Radiological imaging play vital role in diagnosis of pTB, these are basically chest radiography and computed tomography of the chest for detection of the pleural fluid, these have sensitivities of about 20% and 40-85% for chest radiography and CT respectively[6].

Case Report

A 45-year-old farmer referred for a plain chest radiograph from a peripheral healthcare facility on account of cough, night sweats, weight loss, fatigueability, loss of appetite, hemoptysis and occasional dyspnea for about six months prior to presentation.

The patient is conscious and alert, mildly pale and mildly dehydrated, anicteric and acyanosed, slight respiratory difficulty, no finger clubbing and no pedal edema.

The packed cell volume was 25%, blood electrolyte, elevated white cell count of 14000 white blood cells per microliter with elevated lymphocyte count of 8000 lymphocytes per microliter, urea and creatinine levels were normal for the patient’s age range.

The erythrocyte sedimentation rate was 85mm/hour, the Mantoux test was positive with value greater than 10mm.

The pleural fluid was straw colored with a mean protein of about 5.5gram/liter, the sugar was about 57milligram/deciliter. Pleural biopsy yielded a granulomatous lesion with caseation.

The chest radiographs show widespread streaky and patchy opacities with cystic lung changes involving both lung fields with an extensive pleural based opacity of soft tissue density with an obtuse angle with the lateral chest wall, measuring about 28cm x 12cm in craniocaudal and mediolateral dimensions, this shows a convex border medially causing compression of adjacent right lung field and deviation of the hilar vessels away from it. The right costophrenic angle is hazy while the left is free. The heart and mediastinum are within normal limit; the cardiothoracic ratio (CTR) is 12/28 (figure 1). The left lateral film showed free mediastinal spaces and bony thorax showing degenerative changes most especially on the spine (figure 2). The pleural tap yielded Mycobacterium tuberculosis.

A diagnosis of pleural tuberculosis coexisting with pulmonary tuberculosis was established, the patient was placed on anti-tuberculous drugs; Directly Observed Therapy Short course (DOTS); these are Isoniazid, Rifampicin, Pyrazinamide and Ethambutol for the first two months, later followed by Isoniazid and Rifampicin for the following four months; 2HRZE/4HR. The patient is currently on the DOTS anti-tuberculous therapy and responding clinically.

**Figure 1:** Plain chest radiograph;
Posterior-anterior view demonstrating widespread and bilateral streaky and patchy opacities with cystic lung changes. An extensive pleural based radio-opacity of soft tissue density having a convex border medially, forming an obtuse angle with the lateral chest wall and seen compressing the right lung parenchyma with deviation of the hilar vessels, there is associated haziness of the right costophrenic angle most likely from effusion. This opacity measures about 28cm x 12cm in cranio-caudal and mediolateral dimensions; the loculated pleural fluid collection of pTB with associated pulmonary changes. The heart size is normal with a CTR of 12/28.

**Figure 2:** Lateral view of a plain chest radiograph demonstrating free mediastinal spaces, aforementioned streaky and patchy opacities in the lung fields, blunting of the anterior right costophrenic angle, normal heart and degenerative changes on the demonstrated thoracic spine.

**Discussion**

Tuberculosis (TB) is a leading cause of morbidity and mortality throughout the world, it has an estimated incidence of about 8.7million new cases and 1.4million deaths in 2011, with the highest estimated incidence (of about 356 per 100,000 populations per year) in Africa7-9. The index case is of African descent and lives in Africa which happens to be an endemic zone for TB, thereby conforming to these literatures.

Pleural tuberculosis often present as a reactivation of pulmonary tuberculosis as reported by some authors10,11, however Khan et al[7], reported that pTB may also be part of a primary infection, also found on right unilateral lung and more prevalent in the male sex, these findings were also observed in the index case. Thereby conforming to that reported by Khan et al [7].

Pleural TB can be acute or subacute, has varying signs and symptoms, these include cough, chest pain, fever, anorexia, weight loss, night sweats and varying degree of dyspnea, with the commonest presentation been that of unilateral chest pleural effusion [6,7]. The case under review also had similar signs and symptoms thereby conforming to this literature.

Pleural TB often present as effusions which are mostly exudates with high adenosine deaminase, lymphocyte-rich, straw-colored and free flowing, with a low yield on mycobacterium culture4. The pleural aspirate from the index case is mainly an exudate, lymphocyte-rich, straw colored and yielded a positive culture and smear of mycobacterium, thereby conforming to this literature.

Tuberculosis is the most common cause of pleural effusion in developing nations and also difficult to diagnose due to its paucibacillary nature, about 25% of positive cultures in HIV negative cases, though there may be an increase to about 75% with HIV infection12,13. The index case is a HIV negative patient with a positive Mycobacterium smear and culture. Thereby conforming to these literatures.

Radiological imaging play vital role in diagnosis of pTB, these are basically chest radiography and computed tomography of the chest for detection of the pleural fluid, these have sensitivities of about 20% and 40-85% for chest radiography and CT respectively [6]. The case under review had plain radiography of the chest in the posterior-anterior and lateral views; these demonstrated the pleural involvement with coexisting pulmonary changes, he however had no CT done.
Pleural biopsy is regarded as the investigation of choice for the diagnosis of pTB, most especially in poor and underdeveloped countries, the finding often shows features of granulomatosis with or without caseation and chronic inflammation [14]. The case under review is in a developing country in a setting of low-resources, also had pleural biopsy for diagnosis of the pTB that yielded a granulomatous lesion with caseation, thereby conforming to this literature.

Pleural tuberculosis, once diagnosed is often treated by combination of drugs (DOTS); these are oral isoniazid, rifampicin, pyrazinamide and ethambutol for two months then continuation of isoniazid and rifampicin for additional four months, these are sufficient for most cases of pTB [7,15]. The index case is not an exception, he is currently on the anti-tuberculous regimen, thereby conforming to these literatures.

Conclusion
Cases of pleural based masses on plain radiographs should be adequately investigated by culture and smear of aspirate for mycobacterium, once this has been established close anti-tuberculous chemotherapy should be instituted to prevent associated morbidity and mortality of TB in endemic areas such as ours.

References

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