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A case of bilateral recurrent tuberculous pleural effusion in a middle-aged male

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Abstract

Accumulation of excess fluid in pleural cavity is known as pleural effusion. It can be one-sided or may involve both sides. Bilateral effusion usually occurs in Congestive heart failure (CHF), renal failure, malignancy etc. Tuberculosis (TB) sometimes also lead to bilateral pleural effusion. In our case, a 53 years old male farmer developed chest pain on right side, shortness of breath, on & off high-grade fever without rigors and weakness. He has a protracted history of over 4-5 months and previously diagnosed with pleural effusion followed by pleural fluid aspiration which showed raised Adenosine Deaminase (ADA) and lymphocyte predominance. Further Chest X-ray (CXR) showed a large effusion on the right side. Aspiration & analysis of pleural fluid along with thoracoscopic biopsy & Gene Xpert studies confirmed the diagnosis of tuberculosis. The patient was started on anti-tubercular drugs (ATT) but developed left-sided effusion with a high fever within 2 days. The patient was put on low dose steroid with ATT which resolved the fever. Left-sided pleural fluid aspiration was done and pleural fluid showed similar biochemistry like the right-sided fluid.

Keywords: Pleural effusion, aspiration, tuberculosis, adenosine deaminase, thoracoscopy

Introduction

Pleural effusion is the accumulation of fluid in between parietal & visceral pleura also known as pleural cavity. Pleural effusion can develop spontaneously or may the result of lung parenchymal diseases like infection, malignancy or inflammatory conditions. Pleural effusion is one of the major pulmonary causes of morbidity & mortality.

Every healthy individual has a small amount of pleural fluid which helps to lubricate the layers of the pleura and facilitates normal lung movements during respiration. This delicate balance of fluid is maintained by the oncotic & hydrostatic pressure and lymphatic drainage; disturbance in either or all can lead to fluid build-up in pleural cavity.

Common causes of pleural effusion are Congestive heart failure (CHF), pneumonia, malignancy, pulmonary embolism, viral diseases, cirrhosis with ascites, and cardiac surgeries like coronary artery bypass surgery^[1]. Bilateral pleural effusion usually occurs in CHF, renal failure, hypoalbuminemia, malignancy etc. though more often than not a combination of aetiology is present^[2].

Here, we present a case of bilateral exudative pleural effusion in a middle-aged male.

Case History

A 53 year old male farmer presented to our clinic with complaints of right sided chest pain, breathlessness on exertion, high fever which was waxing & waning in nature and weakness for the past 2 months. The patient had no history of addiction to smoking or alcohol. On further probing the chest pain seemed to be pleuritic in nature. Patient also revealed that he had similar problem 2-3 months ago and was diagnosed with recurrent right sided pleural effusion for which chest drainage and pleural fluid aspirations were done in another hospital. Reports of the past investigations showed that pleural fluid was exudate with lymphocyte predominance and his ADA levels were raised. On examination his blood pressure, pulse rate, respiratory rate were within normal limits. Chest auscultation revealed decreased breath sounds over right lung base. Patient was admitted and Chest X-ray (CXR) was done as preliminary investigation. CXR showed massive right sided pleural effusion (Figure 1). For further management & diagnosis, a medical thoracoscopy was done which showed diffuse

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pleural adhesion and small pleural nodules. Pleural fluid was aspirated and sent for investigations. Pleural fluid analysis showed raised ADA (57.1 IU/L) and LDH (971 IU/L). Total protein in pleural fluid was 4.5mg%. Total white cell count was 200 with 95% lymphocytes. Biopsy specimen of right parietal pleura collected during thoracoscopy revealed histopathological features of lymphogranulomatous inflammation suggestive of tuberculous pleurisy. No signs of malignancy were found. Gene Xpert for mycobacterium Tuberculosis (MTB) in pleural fluid detected a very low yield of tubercle bacilli and Rifampicin resistance assay (RIF) showed positive resistance. Patient was diagnosed with Tubercular pleural effusion (TPE) and put on an anti-tubercular treatment (ATT) with Multi-drug resistant (MDR) regimen.

Within 48 hrs of starting ATT, patient developed high-grade fever and CXR showed left-sided pleural effusion (Figure 2). Patient was prescribed a low dose oral steroid and subsequently, the fever subsided. Diagnostic & therapeutic Ultrasonography (USG) guided pleural aspiration was done on the left side & 410 ml of fluid was aspirated and sent for investigation. Left-sided pleural cavity showed gross septation during examination. Left-sided pleural fluid also showed raised ADA & LDH along with lymphocyte predominance. Table 1. Shows comparative values of pleural fluid analysis from both sides.

Pathophysiology of tuberculous effusion

Tuberculous pleural effusion (TPE) can occur without bacteriologically confirmed TB either as a sequel to mycobacterial infection or reactivation [3]. Tuberculous pleural effusion usually develops as delayed hypersensitivity reaction to mycobacterial antigen. This inflammation causes lymphocytic pleuritis which hinders fluid absorption from pleural space. Increased fluid production due to inflammation along with reduced absorption due to decreased lymphatic drainage gives rise to accumulation of fluid in pleural space causing pleural effusion [4].

Incidence of tuberculous pleural effusion

Incidence of tuberculous pleural effusion usually greatly varies from region to region and in different population group. TPE is the second most common extrapulmonary manifestation of TB and occurs quite frequently in TB endemic areas [5, 6]. Literature from different countries showed a wide range of incidence of TPE. Table 2. [Adapted from Zhai *et al.* Tuberculous pleurisy] showed the proportion of TPE diagnosed among a total number of pleural effusions diagnosed by medical thoracoscopies which can vary from 0 to >80% in some cases [5].

Presentation of tuberculous pleural effusions (TPE)

TPE are usually unilateral. In a case series of 333 patients reported by Wang Z *et al.* [16] left sided effusion was present in 127 (38.1%) patients, right-sided effusion occurred in 161 (48.4%) of patients and bilateral effusion developed in only 45 (13.5%) cases. The percentage of small, moderate & large effusions were 20.4%, 19.2% and 60.4% respectively [16]. Around 20% of TPE cases has also coexisting parenchymal disease [17]; but this proportion usually increased with more sensitive diagnostic methods like Computed tomography (CT) scan to 40-85% cases [18, 19, 20].

Table 1: Pleural fluid analysis

Parameters	Right	Left
PH		
Glucose (mg/dl)	<20	83
Protein (gm/dl)	4.7	4.4
Albumin (gm/dl)	2.1	1.9
ADA (IU/L)	57.1	53.2
LDH (IU/L)	971	788
Total Cell count	200	200
RBC (unit)	0.003	0.66
Lymphocyte	95%	95%
Neutrophil	5%	2%
Monocyte	0	3%

Table 2: [Adapted from Zhai *et al.* Tuberculous pleurisy]

% of TPE in total pleural effusions diagnosed by medical thoracoscopy		
Country	n	TPE (%)
China [7]	833	40
South Africa [8]	51	82.4
India [9]	68	23.5
New Zealand [10]	51	5.9
United Kingdom [11]	56	5.6
Spain [12]	93	3.2
France [13]	149	2.7
Denmark [14]	146	2.1
United States [15]	51	0

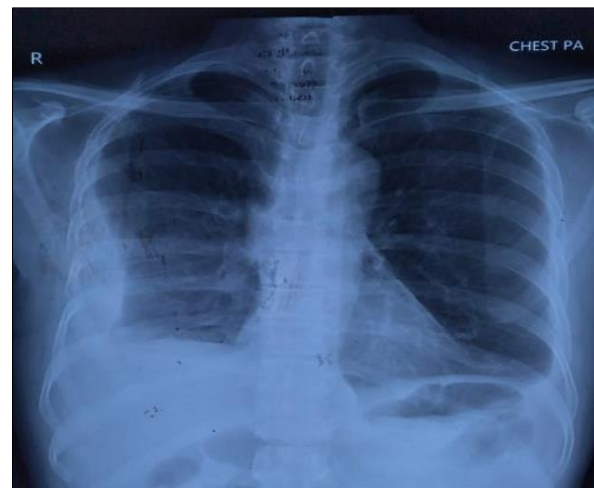


Fig 1: Showing right sided pleural effusion at presentation

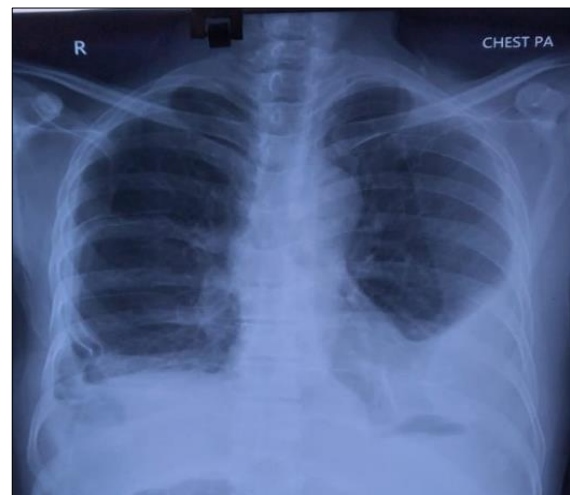


Fig 2: showing emergence of left sided pleural effusion after starting ATT

Case Discussion

Common causes of bilateral pleural effusion have been discussed previously. Other rare causes include gastric carcinoma as reported by Lombardi C.V et. al. [21] in a recent case report. Development of bilateral pleural effusion following atezolizumab treatment in Lynch syndrome related urothelial carcinoma was published as a case report [22]. Multiple myeloma patients may sometime suffer from bilateral pleural effusion [23, 24]. In recent years even post-covid patients have been seen to develop bilateral pleural effusion [25, 26].

In our case the patient presented with right sided pleural effusion which is the commonest presentation of TPE as discussed earlier. But with start of treatment with ATT, developed left sided effusion which probably was a delayed hypersensitivity reaction to antitubercular drug. The patient has a consistently high ADA levels. Pleural fluid ADA levels are routinely checked in TB endemic countries [5]. The most accepted cut-off value is level above 40 IU/l for diagnosis of TPE [6]. In our case, patient has repeated measurement of ADA in excess of 50 IU/L on three occasions before & during the treatment. Pleural fluid LDH is also high which signified inflammation in the pleural space [6]. Pleural fluid Gene Xpert studies showed MTB and Rifampicin resistance. Pleural biopsy also showed lymph granulomatous inflammation which also corroborated with the diagnosis of TPE. A study by Valdes L *et al.* needle biopsy of pleura of 248 patients of TPE revealed granulomas in 80% of patient, acid fast bacilli (AFB) was demonstrated in 25.85 patients and 56% of patient were culture positive [28]. Treatment of TPE does not differ from regular TB regimen [27]. This patient was put on MDR regimen with Pyrazinamide, Levofloxacin, Ethambutol, Amikacin, Linezolid and Ethionamide in ward. Therapeutic thoracentesis was also carried out first on the right side and then on the left side to relieve symptoms.

During the course of treatment patient again developed fever and fluid accumulation on the left side which was thought to be due to hypersensitivity to ATT for which a very low dose oral steroid was prescribed. Steroid treatment helped in subsiding fever. One month after discharge the patient came for follow up and he had improved both clinically and radiologically. He was subsequently referred to DOTS centre for further treatment.

The main conclusion from this report is that bilateral pleural effusion could be of tuberculous origin more frequently than that mentioned in literature. Large series of such reports need to be published to document the exact frequency.

Conflict of Interest

Not available

Financial Support

Not available

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