CLINICAL PROFILE OF PLEURAL EFFUSION PATIENTS: A TERTIARY CARE HOSPITAL STUDY

Harish G. M[1], Vivek K. U[2]

[1]Ex-Resident, Department of Pulmonary Medicine, Bhagwan Mahaveer Jain Hospital, Bangalore.
[2]Ex-Senior Resident, Department of Pulmonary Medicine, KIMS, Bangalore.

ABSTRACT

OBJECTIVE

Pleural effusion refers to the excessive or abnormal accumulation of fluid in the pleural space. Pleural effusion is commonly encountered medical problem and caused by a variety of underlying pathological conditions. It is important to establish an accurate etiological diagnosis, so that the patient may be treated in the most appropriate and rational manner.

METHODS

This was a prospective study of 56 pleural effusion patients who are attending OPD and admitted cases in the Pulmonary Medicine department in Bhagwan Mahaveer Jain Hospital, Bangalore. The patients were subjected to through clinical history and examination. Thoracocentesis did under aseptic conditions and pleural fluid sent for investigations like protein, sugar, LDH (Lactate Dehydrogenase), ADA (Adenosine Deaminase), gram staining, AFB smear and culture by BACTEC method, cell type, cell count, and malignant cytology. Pleural biopsy was done for those who are willing for the same. Depending upon the history and clinical examinations and laboratory investigations, patients were classified as having exudates and transudates.

RESULTS

The total of 56 patients with pleural effusion was studied. Mean age of the study group was 43±14.6 years. 39(69.42%) patients were male and 17(30.58%) patients were female. The commonest type of effusion being tuberculosis (34) followed by malignancy (8), transudative effusion (7), synpneumonic (5) and 2 cases of empyema. The commonest presenting complaints were cough (78.32%) and breathlessness (74.76%). Polymorphs were predominant in synpneumonic effusion and empyema and lymphocytes in tubercular effusion. Pleural fluid cytology revealed elevated lymphocytes in tubercular and polymorphs in acute infections. Cytology for malignant cells was positive in 4 cases. The mean increase in ADA level in tubercular pleural effusion, malignant pleural effusion and transudative pleural effusion were 79±19.9 IU/L, 42.6±9.3 and 28.4±8.2 respectively and it was statistically significant ($p < 0.001$).

CONCLUSION

Even in the advanced diagnostic approaches, still detailed clinical history and examination of the patient is important to make a clinical diagnosis. All suspected cases of pleural effusion undergo sonography of the thorax along with routine chest x-ray. Fluid cytology should be done to confirm tuberculosis or to rule out malignancy, which guides Pulmonologist for further evaluation of the patient if required. In the differential diagnosis of pleural effusions simultaneous determination of serum-pleural fluid protein ratio, ADA and LDH are to be included along with the routine analysis of pleural fluid glucose and total protein which helps to differentiate between exudates and transudates. It also helps to differentiate between tubercular and non-tubercular effusion.

KEYWORDS

Pleural effusion, ADA, Exudates, Transudates.

HOW TO CITE THIS ARTICLE: Harish GM, Vivek KU. Clinical profile of pleural effusion patients: A tertiary care hospital study. J. Evid. Based Med. Healthc. 2016; 3(13), 417-420. DOI: 10.18410/jebmh/2016/97

INTRODUCTION: Pleural effusion refers to the excessive or abnormal accumulation of fluid in the pleural space. Pleural effusion is commonly encountered medical problem and caused by a variety of underlying pathological conditions.[1] It is important to establish an accurate etiological diagnosis, so that the patient may be treated in the most appropriate and rational manner.

Submission 29-12-2015, Peer Review 16-01-2016,
Acceptance 22-01-2016, Published 15-02-2016.
Corresponding Author:
Dr. Vivek K. U,
Ex-Senior Resident,
Department of Pulmonary Medicine,
KIMS, Bangalore.
E-mail: vivek.kotyal@gmail.com
DOI: 10.18410/jebmh/2016/97

Pleural effusion is commonly encountered by chest physicians accounting for approximately 4% of attendance to chest clinics. However, pleural effusion often presents a common diagnostic dilemma, as no cause may be found in about 20% of cases, in spite of careful evaluation. Pleural effusion is of two types depending on the underlying pathophysiology i.e., 'transudates' and 'exudates'. Transudates occur when the mechanical factors influencing the formation or reabsorption of pleural fluid are altered, like a decrease in plasma or elevated systemic or pulmonary hydrostatic pressure. Exudate results from inflammation or irritation or other disease process involving the pleura, resulting in increased permeability.[2]

MATERIAL AND METHODS: This was a prospective study of 56 pleural effusion patients who are attending OPD and admitted cases in the Pulmonary Medicine department in Bhagwan Mahaveer Jain Hospital, Bangalore between February 2009 to February 2012. The study was approved by the Ethics Committee of Bhagwan Mahaveer Jain Hospital, Bangalore.

AIMS AND OBJECTIVES:

- To evaluate the causes of pleural effusion in patients attending Pulmonary Medicine OPD and admitted cases in Bhagwan Mahaveer Jain Hospital.
- To conduct a clinical and etiological study of pleural effusion by conventional methods.
- To evaluate the cytological profile of pleural effusion.

Inclusion Criteria: All patients of age 15 yr and above with pleural effusion.

Exclusion Criteria: Already diagnosed cases of pleural effusion.

The patients were subjected to through clinical history and examination and following investigations were done: complete hemogram, liver function test, renal function test, serum electrolytes, RBS, chest radiograph, Mantoux test. Thoracocentesis did under aseptic conditions and pleural fluid sent for investigations like protein, sugar, LDH (Lactate Dehydrogenase), ADA (Adenosine Deaminase), gram staining, AFB smear and culture by BACTEC method, cell type, cell count, and malignant cytology. Pleural biopsy was done for those who are willing for the same. Depending upon the history and clinical examinations and laboratory investigations, patients were classified as having exudates and transudates.

RESULTS: The total of 56 patients with pleural effusion was studied. Mean age of the study group was 43±14.6 years. 39(69.42%) patients were male and 17(30.58%) patients were female.

56 patients with pleural effusions of different aetiology were studied- the commonest type of effusion being tuberculosis (34) followed by malignancy (8), transudative effusion (7), synpneumonic (5) and 2 cases of empyema. Pleural effusion was commonly seen in males (69.2%) as compared to females (30.58%), with maximum number of cases in the age group of 31 to 60 years (58.74%) followed by 21 to 30 years (22%). The mean age in cases of tubercular effusion was 33.9±9.49 years and it was more common in the lower socioeconomic strata.

The commonest presenting complaints were cough (78.32%) and breathlessness (74.76%). Among the cases with tuberculous effusion, 29.41% gave a history of contact with tuberculous persons in the family.

53.57% (30 cases) of the patients had a right – sided effusion and 35.71% (20 cases) had a left- sided effusion. The majority of the patients (37 cases -65.86%) had a moderate amount of pleural effusion and 4 cases had massive pleural effusion. The commonest clinical sign of pleural effusion was a stony dull note on percussion, which was seen in most of the patients.

ESR was significantly elevated in case of tubercular effusion. Total leucocytes were significantly elevated in acute infections like synpneumonic effusion and empyema. Polymorphs were predominant in synpneumonic effusion and empyema and lymphocytes in tubercular effusion. Pleural fluid cytology revealed elevated lymphocytes in tubercular and polymorphs in acute infections. Cytology for malignant cells was positive in 4 cases.

We have observed increased concentration of pleural fluid total protein, along with increased ADA and LDH activity, whereas pleural fluid concentration of glucose is decreased in tubercular effusion.

The mean increase in ADA level in tubercular pleural effusion, malignant pleural effusion and transudative pleural effusion were 79±19.9 IU/L, 42.6±9.3 and 28.4±8.2 respectively and it was statistically significant ($p < 0.001$).

We have observed increased concentration of pleural fluid total protein and LDH activity, whereas pleural fluid concentration of glucose is decreased in malignant pleural effusion.

We have observed that pleural fluid concentration of glucose is more, whereas pleural fluid concentration of total protein, cholesterol, activity of ADA and LDH are decreased in transudative pleural effusion.

We have observed increased concentration of pleural fluid total protein and LDH activity, whereas pleural fluid concentration of glucose is decreased in synpneumonic pleural effusion and empyema.

The Mantoux test was positive in 22 of the 34 cases of tubercular pleural effusion

Pleural fluid laboratory parameters	Mean	Standard deviation
Glucose(mg/dl)	59.82	14.13
Protein (mg/dl)	3.90	1.09
ADA (U/L)	64.93	27.02
LDH (U/L)	290.41	210.52
Pleural fluid protein: serum protein ratio	0.60	0.20
Pleural fluid sugar: serum sugar ratio	0.78	0.57
Cell count	1506.89	1498.85

Table 1: Pleural fluid parameters in the study group

SYMPTOMS	NUMBER (%)
Cough	45 (80.3%)
Breathlessness	41 (73.21%)
Fever	40 (71.42%)
Weight loss	42 (75%)
Loss of appetite	36 (64.3%)
Chest pain	26 (46.4%)
Hemoptysis	10 (17.8%)

Table 2: Symptomatology in the study group

Causes	Frequency (%)
Congestive cardiac failure	3 (42.85%)
Renal	2 (28.57%)
Cirrhosis	2 (28.57%)
Total	**7**

Table 3: Causes of transudates in the study group

Causes	Frequency (%)
Tuberculosis	34 (69.38%)
Malignancy	8 (16.32%)
Syn-pneumonic effusion	5 (10.2%)
Empyema	2 (4%)
Total	**49**

Table 4: Causes of transudates in the study group

DISCUSSION: 56 patients with pleural effusion were studied of which 60.52% were cases of tubercular effusion and 39.48% were cases of non-tubercular effusion. The present study is particularly relevant in regions with high prevalence of tuberculosis.

Similar to other studies,[3,4] in the present study tubercular and malignancy are the major causes of pleural effusion. Most of the patients in the present study belong to lower socioeconomic status. This is consistent with the fact that tuberculosis is a disease more commonly seen among people living in crowded, unhygienic conditions and lower socioeconomic status. Tubercular effusion found in lower age group (33.9±9.49), whereas the malignant (62.4 ±7.01) and transudative effusion (46.6±8.23) in higher age group similar to study conducted by Lesley J. Burgess et al.[5] The commonest presenting symptoms in the present study was cough followed by breathlessness, fever, weight loss, chest pain, loss of appetite and haemoptysis in decreasing order, in contrast to one study,[6] where fever followed by chest pain and weight loss were the presenting symptoms. The Mantoux test was positive in 22 of the 34 cases of tubercular pleural effusion. The patients with tuberculous effusion, in whom the Mantoux test was negative, were poorly nourished and emaciated which was probably the reason for decreased sensitivity, thus producing a false negative response to the Mantoux test.

In the present study, out of the 34 cases of tubercular effusion, only in 9 cases sputum for acid fast bacilli (AFB) was positive (26.46%). Detection of tubercular bacilli depends upon the associated lung parenchymal lesion. In the present study 19 patients (33.92%) had associated pulmonary lesions, which is similar to other studies.[6] In one study, sputum positivity rate was 11%.[7] Also among those patients with tubercular pleural effusion, 10 patients gave a history of contact with tubercular persons in the family.

High ADA activity in tubercular pleural effusion is local cellular immune response by T- lymphocytes.[5,7,8,9,10,11,12,13] Value >45 IU/L is a sensitive method to differentiate tuberculous from non-tuberculous effusion. Similar to other studies,[8,14] in the present study, pleural fluid ADA level was elevated (79±19.9 IU/L) in tubercular effusion.

Similar to studies conducted by Inma Ocana et al, Strankinga et al and Subhakar et al, the present study also showed a higher number of lymphocytes in the pleural fluid of patients with tubercular effusion. Similarly, neutrophils predominate in synpneumonic effusion.[15,16]

Among the 56 patients in the study group, 49 patients (87.5%) were exudates and 7 patients (12.5%) were transudates according to light's criteria. The cell count is higher in exudate group (1748±1561) as compared to transudate group (520.55 ±509.99). Cardiac aetiology is the most common cause of transudative pleural effusion in the present study.

Similar to Light et al,[16] Antony Seaton[1] showed glucose level < 60mg% in synpneumonic, empyema, tubercular and malignancy and >60mg% in transudates.

Similar to study conducted by Bowen,[17] in the present study malignancy is the cause of massive pleural effusion and synpneumonic effusion and empyema are the common cause for minimal pleural effusion.

In the present study, out of 34 cases tubercular pleural effusion, in 9 (26.46%) cases sputum for acid fast bacilli was positive. Out of 34 TB cases, 19 had associated pulmonary lesions. The results are similar to study conducted by Subhakar K et al, where sputum positivity percentage was 11%.[7]

CONCLUSION: Pleural effusion is a commonly encountered in medical practice. The commonest cause is tuberculosis, as evidenced from the present study. The initial step in evaluating case of pleural effusion which is done by a detailed history, clinical examination and investigations like a chest radiography and pleural fluid analysis.

Even in the advanced diagnostic approaches, still detailed clinical history and examination of the patient is important to make a clinical diagnosis. All suspected cases of pleural effusion undergo sonography of the thorax along with routine chest x-ray. Fluid cytology should be done to confirm tuberculosis or to rule out malignancy, which guides Pulmonologist for further evaluation of the patient if required.

In the differential diagnosis of pleural effusions simultaneous determination of serum-pleural fluid protein ratio, ADA and LDH are to be included along with the routine analysis of pleural fluid glucose and total protein which helps to differentiate between exudates and transudates. It also helps to differentiate between tubercular and non-tubercular effusion.

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