

ORIGINAL RESEARCH

A clinic pathological study of pleural effusion- A cross sectional study

Dr. Priyanka Sharma¹, Consultant Pathologist, Bhagwan Mahavir Hospital, Sumerpur, Rajasthan, India

Dr Govind Sharma², Consultant Anaesthetist- Intensivist

Corresponding author

Dr. Priyanka Sharma

Consultant Pathologist, Bhagwan Mahavir Hospital, Sumerpur, Rajasthan, India

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Abstract

Background: Pleural effusion has varied aetiological factors. It constitutes one of the major causes of morbidity in India as well in other parts of world. Because of the various aetiologies that can cause pleural effusion, it often present a diagnostic problem, even after extensive investigations.

Objective: In this study, we aimed to identify the common aetiologies causing pleural effusion and their clinical profile in a tertiary care hospital.

Materials and Methods: A hospital based cross-sectional study is conducted over a period of one year in Bhagwan Mahavir Hospital, Sumerpur. 40 patients of pleural effusion above 10 yrs of age were studied.

Results: Among all cases (n –40) the exudative type was far more common than transudative one (90% vs. 10%). Tuberculosis was the primary aetiology in more than half of the total cases (57.5%) whereas infection was the next most prevalent cause accounting for 8 cases (20%). These two were followed by malignancy (7.5%), congestive cardiac failure (2%). One case of cirrhosis of liver and one had hypoproteinemia diagnosed.

Conclusion: The present study highlights tuberculosis as the common causative factor for pleural effusion.

Introduction

Pleural effusion is an excess fluid that accumulates between the two pleural layers [1]. The aetiologic spectrum of pleural effusion depends on the geographical region and the local incidence of different diseases that cause pleural effusions. In developed countries the common causes of pleural effusions in adults are cardiac failure, malignancy and pneumonia [2, 3], whereas in developing countries tuberculosis and parapneumonic effusions (PPE) are more prevalent [4-7]. Malignant pleural effusion is one of the most challenging pleural disorders to manage, given the paucity of high-quality evidence and the heterogeneity of practice worldwide [8, 9]. Between 30% and 50% of all patients with metastatic malignancies will have pleural involvement at autopsy, and approximately half of these will have pleural effusions, which range from insignificant to massive [10]. There remains still a gap in the knowledge and understanding of aetiological causes and clinical profile of pleural effusion as

there is limited studies in different geographical location. We aimed this study to explore the aetiology and clinical profile of patients with pleural effusion with emphasis on tubercular aetiology attending our Hospital.

Objectives

The objective of this study was to explore the aetio-pathology of pleural effusion in the patients who were admitted to a tertiary care hospital. The objectives of this present work is to study the distribution of aetiology of pleural effusion, alteration of blood and pleural fluid parameters in patients with pleural effusion, the imaging findings in patients admitted with pleural effusion and the etiological causes of malignant pleural effusion.

Materials and Methods

Study type: Cross sectional hospital based observational study.

Study design: Prospective cohort study.

Study setting/area, population and period: The study was performed in patients attending in Bhagwan Mahavir Hospital, Sumerpur during the period from 1st

July 2021 to 30th June 2022 (One year).

INCLUSION CRITERIA- Patients of both gender of more than 10 year of age with clinical and radiological features of pleural effusion and ultimately confirmed by pleurocentesis presented to OPD and IPD.

Sampling

Selection of patients with pleural effusion: A total of 40 patients were selected.

Detailed clinico-radiological examination and routine laboratory examination done like haemoglobin, total and differential WBC count, erythrocyte sedimentation rate (ESR), random blood sugar, serum proteins, urine and sputum examination and tuberculin test are carried out in all patients. A plain chest X ray PA view was taken prior to pleural fluid aspiration to rule out complications. Additional films, ultrasonography and CT scan (Figure 1A) were done whenever needed. Pleural fluid analysis were done for protein, sugar, total cell count and cell type, Gram's stain, ZN stain, culture and sensitivity and adenosine deaminase (ADA).

The conventional smear technique: The 20 ml sample was centrifuged at 1500 rpm for 20 minutes. A minimum of 2 thin smears were prepared from the sediment. One smear was prepared after air drying and it was stained with the May-Grünwald-Giemsa stain. The other smear was immediately fixed in 95% alcohol and it was stained with the Papanicolaou stain and Hematoxylin & Eosin (H&E) stain.

Data analysis: All data collected were tabulated on a grand chart and analysed using chart, diagram by a statistical software SPSS version 22.

Statistical methods: Percentage, prevalence were calculated using SPSS version 22 software

Result

A total of 40 cases of diagnosed pleural effusion was taken in the present study maintaining the inclusion and exclusion criteria. Among all cases (n =40) the exudative type was far more common than transudative one (90% vs. 10%).

Table-1: Distribution of cases according to aetiology.

Aetiology	Number	Percentage
EXUDATIVE	36	90%
Tuberculosis	23	57.5%
Infective/pneumonia/parapeumonic	8	20%
Malignancy	3	7.5%
Pancreatitis	2	5%
TRANSUDATIVE	4	10%
CHF	2	5%
Ascitis/Cirrhosis	1	2.5%
Hypoproteinemia	1	2.5%

Among 40 patients, 36 had exudative effusion and 4 had transudate. Tuberculosis was the primary aetiology in more than half of the total cases (57.5%) whereas infection was the next most prevalent cause accounting for 8 cases (20%). These two were followed by malignancy (7.5%), congestive cardiac failure (2%). One case of cirrhosis of liver and one had hypoproteinemia diagnosed.

Table-2: Age and sex wise distribution of pleural effusion.

Age group(in years)	Male	Female	Total
11-20	1	1	2
21-30	1	3	4
31-40	9	4	13
41-50	2	2	4
51-60	4	1	5
61-70	4	1	5
>70	5	2	7
Total	26(65%)	14(35%)	40

As shown in table 2, it is clearly evident that male patients outnumbered female patients by 30% (male 65% vs. female 35%). Majority of patients were in age group of 31 to 40 years (13 patients, 32.5% of study population) out of which male were 69.1% and rest were female patients. The second most common age group was >70 years comprising of 17.5% (7 cases) of study population.

Table-3: The site of pleural effusion.

Site	Number	Percentage
Right	28	70%
Left	12	30%

Table no. 3 shows that the most common site of pleural effusion was right i.e. 70% cases and 30% had left site effusion.

Table 4-Cell count and cell type in exudative pleural effusion

	0-200	200-1000	1000-5000	>5000	Predominant cell type
Tuberculosis	2	7	10	4	Lymphocytes

					(70% to 90%)
Infective	0	2	4	2	Polymorph
Malignant	2	0	1	0	Lymphocytes and atypical cells
Pancreatitis	0	1	1	0	Polymorphs

Above table shows that in tuberculosis major cell type is lymphocytes and in majority of cases i.e. 10 out of 23 had count from 1000-5000, followed by 200-1000. In infective exudates predominant cell type was polymorph, while in malignant exudates predominant cell type is Lymphocytes and atypical cells.

Discussion

Tuberculosis was the primary aetiology in more than half of the total cases (57.5%) whereas infection was the next most prevalent cause accounting for 8 cases (20%). These two were followed by malignancy (7.5%), congestive cardiac failure (2%). One case of cirrhosis of liver and one had hypoproteinemia diagnosed. This epidemiological result corroborates closely with the findings of Jindal [11] Valdés [12]. Tuberculosis was also the leading cause of pleural effusion in a study conducted by Maikap MK [13], while world wide CCF is the most common cause of pleural effusion [14]. But a study conducted in respiratory intensive care set up by Chinchkar N J and co workers found malignancy to be the most frequent cause of pleural effusion [15].

Majority of cases of pleural effusion were males as compared to females in the present study (65% vs. 35%) with male: female ratio 1.8:1. The male preponderance is similar among tuberculosis and Malignant Pleural Effusion group also. Sharma SK et al [16] and Maikap M K et al [13] also found similar male majority in their previous studies. In the present study, the patients with pleural effusion were found in all age groups ranging from 14 years boy as the youngest subject and 93 years aged male was the eldest and patients aged between 31 and 40 represent the largest group (29.34%). This finding was in concordance with the study of Parikh P and co-researchers [17]. One previous study found majority of their cases between 21 and 40 year of age [18] another study found majority of their cases (29.6%) below 20 years of age [19]. In the present study revealed that pleural effusions were predominantly observed in the right side (61.33%) which corroborates with a few previous studies [13, 17, 20].

Majority of the cases in this study had predominantly right side lung involvement which was quite similar to different research articles published previously like F Y Khan et al (15.55%) [23], Maikap et al (14%) [13] and Chinchkar NJ (24%) [15].

Conclusion

From this hospital based cross-sectional study; it can be concluded that, most common cause of pleural effusion in a tertiary hospital setting is tuberculosis, followed by infection and parapneumonic effusion. So in a community set up, implementation of strategies to decrease the burden of tuberculosis is required, which would in turn lead to decrease in tubercular pleural effusion.

The study was conducted in a tertiary care hospital with limited resources. Thus authors formulated a convenient protocol to reach at an aetiological diagnosis of cases of pleural effusion in centres with a handful of resources.

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