Original Research Article

Study on Etiology and Clinical profile of Pleural Effusion

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Abstract

Background: The etiological classification of pleural effusions in different series depends on the geographical area, the age of the patient and the progress of the diagnostic and therapeutic methods of the cause. The purpose of this study was to evaluate etiology characteristics and clinical manifestations of pleural effusion. **Material and Methods:**The present observation-cross sectional hospital based study was conducted in the Department of General Medicine, ARMCH&RC, Kumbhari during two year of study. All patients were interviewed for a detailed background and were thoroughly examined in accordance with a pre-determined protocol. **Result:** In the present study, Pleural effusion was commonly seen in male (73%). The incidence of pleural effusion was maximum in the age group 41-50 years (39%). Most common cause pleural effusion was tuberculosis (59%), followed by malignancy (25%), pyogenic (6%), and transudative effusion ie. cardiac failure (10%). **Conclusion:** Every case of pleural effusion should be meticulously investigated in order to arrive a diagnosis and to proceed for specific therapy/treatment may be started earliest.

Keywords: Etiology, Pleural effusion, Transudation, Exudation.

Introduction

Pleural fluid accumulation occurs when pathological processes cause an imbalance of the hydrogen pressure gradient, capillary membrane permeability, and lymphatic capacity leading to poor protein metabolism or inflammatory exudates [1].

The pleural space is located between the lungs and the chest wall and usually contains a thin fluid that acts as a coupling system. Pleural effusion is said to be an excess of fluid in the pleural space.

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Pleural Effusion is an accumulation of fluid in the pleural space as a result of excessive transudation or exudation from the pleural space [2]. Whenever an adjacent organ is infected, the sympathetic pleura sheds its tear/ fluid into the pleural space, the accumulation which is encountered by the clinician frequently as a serious manifestation of thoracic disease, pulmonary or cardiac and occasionally as the first evidence of some other profound systemic disease. Pleural fluid accumulates when pleural fluid formation exceeds pleural fluid absorption. Normally, fluid enters the pleural space from the capillaries in the parietal pleura and is removed via the lymphatics in the parietal pleura.Fluid can also enter the pleural space from the interstitial spaces of the lung via the visceral pleura or from the peritoneal cavity via small holes in the diaphragm. The lymphatics have the capacity to absorb 20 times more fluid than is formed normally. Accordingly, a pleural effusion may develop when

there is excess pleural fluid formation or when there is decreased fluid removal by the lymphatics. Congestive cardiac failure (CCF) is the most common cause of transudative pleural effusion worldwide [3].Patients suspected of having a pleural effusion should undergo chest imaging to diagnose its extent. Chest ultrasound has replaced the lateral decubitus x-ray in the evaluation of suspected pleural effusions and as a guide to thoracentesis. When a patient is found to have a pleural effusion, an effort should be made to determine the cause. Initial evaluation of patients with pleural effusion should include ultrasound-guided thoracocentesis to classify effusion as transudate or an exudates [1]. A transudative pleural effusion occurs when systemic factors that influence the formation and absorption of pleural fluid are altered. An exudative pleural effusion occurs when local factors that influence the formation and absorption of pleural fluid are altered. The leading causes of exudative pleural effusions are bacterial pneumonia, malignancy, viral infection and pulmonary embolism. The primary reason for making this differentiation is that additional diagnostic procedures are indicated with exudative effusions to define the cause of the local disease.

The etiological classification of pleural effusions in different series depends on the geographical area, the age of the patient and the progress of the diagnostic and therapeutic methods of the cause. There is still a gap in knowledge of etiological diagnosis and therapeutic forms of pleural effusion due to limited research in different geographical locations. The purpose of this study was to evaluate etiology characteristics and clinical manifestations of pleural effusion.

Material and Method

Study Design: Observation-Cross sectional hospital based study

Study setting: Study was conducted in the Department of General Medicine, ARMCH&RC, Kumbhari.

Study duration: Two year

Sampling method: Random sampling technique

Sample size: All the patients who satisfied the inclusion and exclusion criteria during the study period were included in the study.

Selection criteria

Inclusion criteria

Patients of both sexes who underwent clinical and radiotherapy with pleural effusion and ultimately confirmed by pleurocentesis presented.

Patients who had given willingness to include in the study .

Exclusion criteria

The patient does not want to give proper consent.

Hemodynamically unstable patients

Patient already undergone pleurocentesis and on treatment

Data collection procedure

All patients were interviewed for a detailed background and were thoroughly examined in accordance with a pre-determined protocol. All patients underwent X-rays of chest, chest radiographs, pleural fluid analysis, and routine general examination.

A total of 100 cases had been included in the study. All of them were subjected to physical examination and detail history were recorded in a predesigned proforma. The initial step in assessing a pleural effusion is to ascertain whether it is a transudate or exudate. The biochemical analysis of pleural fluid is considered later Clinical assessment alone is often capable of identifying transudative effusions. After observing the physical appearance of the fluid it was sent for cytological (including detection of malignant cell), microbiological (Gram staining, acid-fast bacilli [AFB] staining, and culture in selected cases) and biochemical tests including estimation of adenosine deaminase (ADA), whereas physical appearance of the fluid not seems to be of transudate. In selected cases, pleural biopsy (for histopathology and mycobacterial culture) was done. Examination of sputum for AFB staining was done in all cases but the mycobacterial culture in selected cases. Sputum examination for Gram stain and pyogenic culture was performed in selective relevant cases. FNAC/biopsy of lymph node/swelling was done wherever these were detected in a few cases. Estimation of serum/pleural fluid amylase and lipase was performed in selected cases. CT scan and ultrasonography of thorax/abdomen had been done in a number of cases where necessary. In some cases to reach etiological diagnosis, image-guided (CT) FNAC, fiber optic bronchoscopy (FOB), and biopsy were done. Light's criteria are applied to differentiate accurately exudates from Transudates. The pleural fluid is an exudate if one or more of the following criteria are met: Pleural fluid protein divided by serum protein >0.5, Pleural fluid LDH divided by serum LDH >0.6, Pleural fluid LDH more than two-thirds the upper limits of normalserum LDH. All the patients were studied in a every possible way and an appropriate etiological diagnosis was made out in a systematic way.

Result

Table 1 : Incidence of Pleural Effusion according to age group

Age group	Number	Percentage
21-30	4	4
31-40	10	10
41-50	39	39
51-60	30	30
61-70	15	15
> 70	2	2

In the present study, maximum incidence of pleural effusion was found in the age group 41-50 years (39%) followed by 51-60 years (30%).

Table 2 : Incidence of Pleural Effusion according to Sex

Sex	Number	Percentage
Male	73	73
Female	27	27

In the present study**,** it was observed that, male (73%) is predominance than female (27%)

Table 3 : Distribution of cases according to etiology

Etiology	Number	Percentage
Exudative		
Tuberculosis	59	59
Malignancy	25	25
Pyogenic	6	6
Transudative		
Cardiac failure	10	10

In the present study, out of 100 cases, 90 cases were exudates and 10 cases were transudates. The most common etiology of pleural effusion was tuberculosis (59%) and cardiac failure (10%).

Discussion

In the present study, the incidence of pleural effusion was maximum in the age group 41-50 years (39%). In another study reported that, majority of their cases (29.6%) below 20 years of age.[4]

Pleural effusion was commonly seen in male (73%). Cases of pleural effusion have been studied earlier and there male outnumbered the female [4]. Similar observation also made by Sharma et al [5]. Most common cause pleural effusion was tuberculosis (59%), followed by malignancy (25%), pyogenic (6%), and. cardiac failure (10%).

Bintcliffe et al. conducted study at Bristol (UK) of 327 patients with non-malignant effusions referred to a tertiary pleural service for further investigation over a 5-year period. Data demonstrates the distribution of possible aetiologies after effusions caused by malignancy or trauma have been excluded, such as pleural infection in 131 patients (40%), congestive cardiac failure in 81 patients (34.8%), idiopathic pleuritis/undiagnosed in 41 patients(12.5%), benign asbestosis pleural effusion in 27(8.3%) patients, liver cirrhosis in 13(4%) patients, renal failure in 10 patients(3.1%), pulmonary embolism in 6 (1.8%) patients, post CABG in 4(1.2%) patients [6].

In the present study, 78 (75%) cases are having non malignant pleural effusion, such as pleural infection in 68 patients (65%), congestive cardiac failure in 10 patients(10%).

Bintcliffe et al. study reveals that, pleural infections and congestive cardiac failure constitutes 74.8% of causes of pleural effusion, whereas in the present study reveals that, pleural infections and congestive cardiac failure constitutes 75% .

In present study, pleural infections constitute the major cause for pleural infection (65%), whereas, in Bintcliffe et al. study, pleural infections(40%) and congestive cardiac failure (34.8%) toghther constitutes major causes of pleural effusion [6]. In present study, pleural infections constitute major cause for pleural infection, because Tuberculosis is the commonest and more prevalent communicable disease in India.

Walker et al stated, Pleural effusions secondary to a non malignant aetiology can represent significant morbidity and mortality. These non malignant pleural effusions (NMPE) are common, with congestive heart failure (CHF) representing the leading cause. Despite

this, there is limited data on mortality risk and the factors which influence them [7].Walker et al studied on 782 patients, 356(46%) were diagnosed with a NMPE. These patients had a mean age of 68(SD17) with 69% of patients male. This is the largest prospectively collected series in patients with NMPE, demonstrating that those secondary to organ dysfunction have an extremely high 1-year mortality. In addition, the presence of bilateral and transudative effusions are an indicator of increased mortality. In present study, the major causes of Non malignant pleural effusions are pleural infections which accounts for 65%, and congestive cardiac failure which accounts for 10%., In walker et al study, the majority of NMPE were exudative (73%), unilateral (88%) with pleural infection being the commonest aetiology (40.6 %) [7].

In Shimon Izhakian et al study, (73.7%) were diagnosed with exudative effusion, and 44 (18%) were diagnosed with transudative effusion, whereas in present study, exudates are 90% , and 10% cases were transudates [8]. In the present study, the major cause for exudative pleural effusion is tuberculosis 59% , whereas in Shimon Izhakian et al study, the major cause for exudative pleural effusion is malignant effusion 53.1% [8].Nick Maskell et al study is the first to establish the prevalence of more than one identifiable cause for a unilateral pleural effusion. Out of 130 study subjects, 38 (30%) had multiple causes for an effusion. The identification of multiple pathologies underlying an accumulation of fluid in the pleural space may be important in determining optimum treatment and improving patients' symptoms [9]. But, in present study all 100 cases had a single cause for their pleural effusion. Hence, present study did'nt establish the prevalence of more than one identifiable cause for a unilateral pleural effusion.Yuanyuan Liu et al stated that, the differential diagnosis of tuberculous pleural effusion (TPE) and malignant pleural effusion (MPE) remains difficult despite the availability of numerous diagnostic tools [10]. In present study, 59% of patients are having tuberculous pleural effusion, whereas in YuanyuanLiu et al study, 68.4% of patients are having tuberculous pleural effusion [10]. In both studies, major cause of pleural effusion is Tuberculosis, and second most common cause is malignancy. Our study result is concordant with results observed by Jindal,[11] Valdés.[12]The definitive diagnosis of pleural malignancy depends upon histological proof obtained via pleural biopsy. SPB (standard pleural biopsy), US-CNB (ultrasound (US)-guided cutting-needle biopsy) and thoracoscopy are techniques commonly utilised for the acquisition of pleural tissue [13-17].

In study done by Jinlin Wang on 172 patients, reported that, Malignant pleural effusions are 90 (52.3%) patients while non-malignant pleural effusions are 82 (47.7%) patients. Whereas in present study, malignant pleural effusions are 25%, non malignant pleural effusions are of 75% [18].In Jinlin Wang et al study, malignancy is the major cause of pleural effusion, whereas in present study, pleural infections i.e; tuberculosis is the major cause of pleural effusion [18]. In Jinlin Wang et al study, Pleural tuberculosis is the second most common cause of pleural effusion, whereas in present study, malignancy is the second most common cause of pleural effusion [18].

Conclusion

Every case of pleural effusion should be meticulously investigated in order to arrive a diagnosis and to proceed for specific therapy, specific treatment may be started earliest.

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