FREQUENCY OF CAUSATIVE FACTORS FOR PLEURAL EFFUSION: A HOSPITAL BASED STUDY

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ABSTRACT

Objective: To determine the frequency of various causative factors of pleural effusion in adults.

Study Design: Descriptive study.

Place and Duration of Study: Study was done in the Combined Military Hospital attock and PAF Hospital Faisal Karachi from March 2006 to March 2008.

Settings: Combined Military Hospital, Attock and PAF hospital Faisal Karachi.

Patients and Methods: One hundred and fifty patients of clinical signs of pleural effusion, were selected and then, further classified in to transudative and exudative variety by carrying out pleural fluid routine testing and using Light's criteria . Later the final etiological diagnosis was made with the help of appropriate laboratory tests.

Results: Out of total 150 patients who were studied, 123 patients were found to have exudative effusions whereas 27 cases had transudative effusion. A total of five 5 patients (3.33%) were lost to follow up. Three patients were out of exudative variety and 02 were from transudative variety. Out of 120 patient of exudative pleural effusion, 70(58.2%) had tuberculosis, 28(23.2%) had malignancy, 12(10%) had pneumonia, 5(6%) were uraemic, 2(1.6%) had pulmonary embolism, and rheumatoid arthritis, Systemic lupus erythematosis and liver abscess were causative factors in 1(0.8%) each patient. Out of transudative effusions, 14(56%) had congestive cardiac failure, 5(20%) had cirrhosis liver, 4(16%) had nephrotic syndrome and 1(4%) each had cardiac tamponade and myxoedema.

Conclusion: The most common cause of pleural effusion remains tuberculosis.

Keywords: Pleural Effusion, Etiology, Tuberculous pleural effusion.

INTRODUCTION

Pleural effusion affects more than 1.3 million people annually [1]. Pleural effusion is a common diagnostic problem. It has got diverse etiologies, depending upon the age, sex, and socioeconomic background of the patient. Pleural effusion develops when the rate of production of pleural fluid exceeds the limit of absorption from lymphatics surrounding the pleura, which is mostly dependent upon capillary hydrostatic and osmotic forces [2]. Normally 150 ml fluid is produced in pleural space in 24 hours at the rate of 0.1ml/kg/hr [3]. More than 90-95% of the fluid is reabsorbed, only 10-15 ml fluid is left in pleural space. Pleural fluid has a protein concentration of 1.06 – 1.30 grams per 100 ml, with 57 -78% of albumin. The presence of albumin and immunoglobulin G has been detected by immunocytochemistry in the pleural space as well as in visceral and parietal sub endothelial structures [4].

Tuberculosis caused by Mycobacterium Tuberculosis, an acid fast bacillus, is the commonest cause of exudative pleural effusion in this region. According to a study the majority of patients with tuberculosis living in most populous countries of Asian subcontinent, accounts for nearly half the new cases that arise yearly [5]. Tuberculous pleural effusion can be diagnosed by demonstrating mycobacterium tuberculosis in pleural fluid but polymerase chain reaction (PCR) of pleural tissue has 90% sensitivity and 100% specificity, overall accuracy being similar to biopsy tissue culture. Other common etiology is malignancy. Almost half of the patients with matastatic cancer develop malignant pleural effusion. Malignant pleural effusions are caused most commonly by carcinoma of breast, lungs, gastrointestinal tract, ovary and lymphoma [6]. Malignant pleural effusion shows very poor prognosis, typically measured in months [7]. Pneumonias also causes exudative synpneumonic pleural effusion. They are commonly bacterial, most

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common being the streptococcus pneumonia, but other organisms like haemophilus influenzae and viruses also causes pneumonia. Out of transudative effusions, congestive cardiac failure is the commonest etiology as it causes high pulmonary capillary pressure and venous hypertension [8, 9]. It is the end result of most of the common cardiac conditions like ischemic heart disease, valvular heart diseases and cardiomyopathies. Next common etiology is cirrhosis liver which is most commonly caused by chronic hepatitis B & C. Pleural effusion develop in cases of cirrhosis which has gross ascities. Nephrotic syndrome is a condition in which there is heavy proteinuria along-with generalized ascities and hypoalbuminaemia. It results in transudative effusion as a part of generalized edema. This descriptive study was conducted in Combined Military Hospital Attock and PAF Hospital Faisal, Karachi from March 2006 to March 2008.

PATIENTS AND METHODS

One hundred and fifty patients who had pleural effusion on clinical examination of chest , later confirmed by chest x ray and USG chest were selected. Then these were further divided into transudative and exudative variety by using Light's criteria. Later all case were worked up for final etiological diagnosis, by using appropriate laboratory investigations and the prevalence of each etiology was calculated. Patient selection was done according to following inclusion criteria.

Patents between 15-80 years having pleural effusion unilateral or bilateral confirmed by chest x-ray ultrasound chest and thoracocentesis were included in the study.

Patients with serious co-morbid conditions which rendered them unsuitable to undergo the complete study were excluded.

Chest X-ray was carried out in all of the patients. Ultrasonography chest was done to confirm the presence of fluid. At the same time any mass or well defined parenchymal lesion of lung was also viewed.

Pleural Aspiration (Thoracocentesis) was carried out to confirm the presence of fluid in the pleural space (diagnostic tap). It was sent for routine biochemical tests. Patients were further classified into transudative and exudative varieties on pleural fluid examination keeping in view the Light's Criteria [12].

Other Investigations were carried out according to the provisional diagnosis. Sputum samples were examined by ZN staining and PCR was carried out on samples for detecting Mycobecterium tuberculosis.

Pleural biopsy was carried out in all the cases in which malignancy or tuberculosis was the most probable clinical diagnosis.

CT scan was not required for the initial diagnosis in any of the patients under study. But it was carried out in few patients as further work up, and in which associated pulmonary pathology like tumor of lung or of any structure of the mediastinum is to be viewed.

There is a long list of other investigations, which were carried out on these patients, to reach the final etiology of pleural effusion. Because the etiology of pleural effusion is quite diverse, hence the further work up was diverted towards the most likely etiology suspected clinically.

Statistical methods used in calculations of incidence of various etiologies:

The data obtained was analyzed by the help of statistical software SPSS version 10.0. Descriptive statistics were obtained by frequencies and percentages.

RESULTS

Out of 150 patients who were studied, by using Light's criteria, 120 patients were found to have exudative effusions while 27 cases had of transudative effusion.

Out of 120 patients of exudative effusions, the data analysis showed 102 males (84.9%) and 18 females (15.9%). The age ranged from 23-67 years with a mean of 38.47+11.32 years. On complete work up of patients having exudative effusion, 70(58.2%) were found the have tuberculosis, 28(23.2%) had malignancy. Pneumonia was found as a cause in 12 patients (10%), uremia in 5 Patients (6%), pulmonary embolism in 2 patients, and liver abscess, rheumatoid arthritis and systemic lupus

erythematosis in one patient each (0.8%) (Table-1).

Out of 25 transudative effusion patients data analysis showed 18 males (72%) and 7 females (28%). The age ranged from 35 to 75 years with a mean of 40.1 +12.08 years. After carrying out the necessary further investigations on transudative effusion, 14(56%) patients were found to have congestive cardiac failure, 5(20%) had cirrhosis liver with ascities, 4(16%) were suffering from nephrotic syndrome, 1(4%) each had cardiac tamponade and myxoedema (Table-2).

Table-1: Frequency of etiological factors of exudative pleural effusion

Disease& no of cases	Frequency
Tuberculosis(70)	58.2%
Malignancy(28)	23.2%
Pneumonia(12)	10%
Uremia(5)	4.6%
Pulmonary Embolism(2)	1.6%
Liver Abscess(1)	0.8
Rhumatoid Arthritis(1)	0.8%
SLE (1)	0.8%

Table-2: Frequency of Etiological Factors of Transudative Effusion

Disease & No. of Cases	Frequency
CCF (14)	56%
Cirrhosis Liver (5)	20%
Nephrotic Syndrome (4)	16%
Cardiac Tamponade (1)	4%
Myxoedema (1)	4%

DISCUSSION

Pleural effusion is one of the commonly seen problem in our part of the world. It is suspected clinically on finding, reduced vocal fremitus & vocal resonance along with stony dull percussion note on chest examination. Then on chest x-ray it shows homogenous opacity (decubitous view is more sensitive as it can diagnose very small amount of fluid, which a PA view can easily miss) [10]. Further, ultrasonography of chest confirms the presence of fluid in the pleural cavity. It also helps by demonstrating the fibrin bands of various lengths, delicate septations, encysted pleural effusions, pleural thickening and occasionally pleural nodules [11].

Pleural effusion has got a list of diverse etiologies. Many studies are conducted in other populations for frequency of different causes but in our population, the pattern of etiologies of pleural effusion (especially the exudative effusion) is different from developed countries mainly because of very high prevalence of tuberculosis in our part of the world. This study was carried out at Combined Military Hospital, Attock and PAF Hospital Faisal, Karachi to determine the pattern of different etiologies in our population.

According to a Malaysian study carried out by Liam et al, in this region most common cause of exudative pleural effusion is tuberculosis followed by malignancy [14], followed by pneumonias [15]. The results of this study are comparable with our study.

In another study on exudative effusions, Tiukhtin and stugova [16] found that tuberculous pleurisy was the cause in (87.7%) patients, parapneumonic pleurisy in 10.01% cases and 1.1% patients had traumatic pleurisy.

In our study, out of transudative variety, congestive cardiac failure is the commonest etiology followed by cirrhosis liver with ascities and nephrotic syndrome. Rarely pulmonary embolism can cause transudative effusion. These results are comparable with Western figures [17], because in them congestive cardiac failure with left ventricular failure is the commonest etiology of transudative pleural effusion.

A similar local study was carried out [18] in which causes of pleural effusion were ascertained in 150 patients of age group 16-80 years and of either sex using various investigative procedures. The result showed 67 patients (44.6%) of tuberculosis, 36 (24%) of malignancy and 47 (31.33%) had chronic non specific pleuritis.

In this era of advanced technology, there continues to be scientific rationale of use of cost effective diagnostic techniques but for a sound clinician, it is important to know about the prevalence of each of the diverse etiologies of pleural effusion for early and effective diagnosis and treatment.

It is required that more studies are to be conducted in Pakistani population. This study, thus, is a step towards probing the pattern of etiologies of pleural exudates and transudates in Pakistan.

CONCLUSION

It is concluded from this study that exudative effusions are more common than transudative effusions and most common cause of pleural effusion remains tuberculosis which is also the commonest cause of exudative effusion. The commonest cause of transudative effusion and third commonest cause of pleural effusion, over all was congestive cardiac failure.

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