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Original Research Article

Aetiopathological evaluation of pleural effusions

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ABSTRACT

Background: Pleural Effusion (PE) is a sign of disease and not a diagnosis itself. Hence an attempt was made to find out the etiological diagnosis of pleural effusion in cases.
Methods: Single center, observational, cross sectional hospital-based study. Samples were collected by systematic random sampling method; study was conducted in GSL Medical College. Patients admitted with pleural effusion in medical wards and ICU were taken. The patients >14 years age, both genders were included. All patients were interviewed to obtain detailed history and examined thoroughly as per pre-determined protocol. Chest x-ray, chest ultrasonogram, PF analysis, routine general investigations were conducted for all the participants; and pleural cytology in certain cases. PF was aspirated send for various microbiological investigations such as gram stain, culture.
Results: Out of 104 study participants, 78 were men and 26 were women and peak incidence of pleural effusion is 41-50 years. In this study, 58% cases were found to be tuberculoid, 25% malignant, 6% pyogenic.
Conclusions: Tuberculosis was found to be commonest and more prevalent cause of pleural effusion. Every case of pleural effusion should be meticulously investigated in order to arrive a diagnosis, whether tuberculous or non-tuberculous to proceed for specific therapy.

Keywords: Fluid, Pleura, Pleural effusion, Pleural fluid

INTRODUCTION

Pleural Effusion (PE) is an accumulation of fluid in the pleural space as a result of excessive transudation or exudation from the pleural space. It is a sign of disease and not a diagnosis itself. 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.[1]

Pleural Fluid (PF) accumulates when PF formation exceeds PF absorption. Normally, fluid enters the pleural space from the capillaries in the parietal pleura and is removed via the lymphatics in the parietal pleura.[2] 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 advancements in the field of medicine, the advent of newer antibiotics and various diagnostic aids like PF analysis, PF cytology, Pleural biopsy, bronchoscopy, aspiration of scalene lymph node, serological test for ANA, ADA, rheumatoid factor, PF amylase, CBNAAT; ultrasonography and CT- thorax helps the physician to arrive a correct diagnosis in the early course of the disease. Hence an attempt was made to examine and evaluate the results in cases of PEs of different origin.

METHODS

Study was conducted in the department of general medicine, GSL Medical College, Rajahmundry.

Study design was single center, observational, cross sectional, hospital-based study. Sample methods in which samples were collected by systematic random sampling method. Study period was conducted from November 2015 to April 2017.

Study subjects of patients admitted with pleural effusion in medical wards and ICU of GSL medical college during the above time period were taken into study.

Inclusion criteria

- Patients above 14 years age, both the gender were included in the study.

Exclusion criteria

- Children below 14 years age were excluded.

All patients were interviewed to obtain detailed history and examined thoroughly as per pre-determined protocol. All cases of pleural effusion aged between 13 to 85 years who were admitted in the GSL medical college and general hospital were taken up for various laboratory investigation.

All patients were interviewed to obtain detailed history and examined thoroughly as per pre-determined protocol. Chest x-ray, chest ultrasonogram, PF analysis, routine general investigations were conducted for all the participants; and pleural cytology in certain cases. PF was aspirated send for various microbiological investigations such as gram stain, culture.

Laboratory investigations such as urine examination for albumin, sugar; blood smear for TC, DC; ESR; blood urea, sugar; serum creatinine; serum proteins; sputum for AFB; pleural fluid analysis for culture and sensitivity and pleural fluid for biochemical analysis, pleural fluid cytology were done.

The initial step in assessing a pleural effusion was 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.

Statistical analysis

Statistical analyses were performed by using SPSS software version 21.0 and MS excel 2007. Categorical variables were presented as numbers and percentages.

RESULTS

In this study, total 104 patients were included. In this, 78 (75%) were men and 26(25%) were women (Table 1).

In this study, maximum (37.5%) participants were in 41-50 years age group followed by 28.8% in 51-60 years age group, 15.4% in 61-70 years age group, 10.5% in 31-40 years age group, 4.8% in 21-30 years group (Table 2).

Among the study participants, pleural fluid was found to be clear in 20 cases, 54 cases with pleural fluid were found to be straw colored, 3 cases with pleural fluid were found to be pus and 27 cases with pleural fluid were found to be hemorrhagic.

In all the 12 transudative effusions, the pleural fluid protein is found to be less than 0.5 gm/dl. In 92 exudative effusions, the pleural fluid protein is found to be more than 3.5 gm/dl, in all the 12 transudative effusions, the pleural fluid protein/serum protein is found to be less than 0.5 and in the 92 exudative effusions, the pleural fluid proteins/serum protein is found to be more than 0.5.

In this study, 60(58%) cases were diagnosed to be tuberculoid, 26(25%) cases were diagnosed as malignant and 6(5.7%) pyogenic (Table 3). In the 60 tuberculoid cases, 44 patients had right side PE, left PE in 14 cases and bilateral in 2 patients. In this 19 were found to be smear positive for acid fast bacilli. In 26 malignant cases, 7 were diagnosed to be squamous cell carcinoma and 19 cases were adenocarcinoma of lung.

Table 1: Gender distribution of the study participants.

Total cases	Male	Female
104	78(75%)	26(25%)

Table 2: Age wise distribution of the study participants.

Age	Male	Female	Total
21-30	5	0	5(4.8%)
31-40	10	1	11(10.5%)
41-50	26	13	39(37.5%)
51-60	23	7	30(28.8%)
61-70	11	5	16(15.4%)
71-80	1	1	2(1.9%)
>80 yrs.	1	0	1(0.9%)

Table 3: Comparison of exudative causes of pleural effusion of present study.

Cause	No. of cases	Percentage
Tuberculosis	60	57.7%
Malignancy	26	25%
Pyogenic	6	5.7%

DISCUSSION

PE is present when there is an excess quantity of fluid in the pleural space. PF accumulates when PF formation exceeds PF absorption. Once the presence of a PE is established, in most instances a diagnostic thoracentesis should be performed to assess the characteristics and cause of the pleural fluid. If the fluid is free following and at least of moderate size, the physical examination can safely guide thoracentesis. If uncertainty exists, ultrasound-guided thoracentesis should be carried out, which will increase the safety of the procedure.[3]

However, a grossly bloody effusion narrows the differential diagnosis to malignancy, Benign Asbestos Pleural Effusion (BAPE), Post-Cardiac Injury Syndrome (PCIS), pulmonary infarction and trauma.[4]

Out of 104 cases in this study, 78(75%) cases are having nonmalignant PE, such as pleural infection in 66 patients (63.5%), congestive cardiac failure in 12 patients (11.5%). It was reported that pleural infection in 131 patients (40%), congestive cardiac failure in 81 patients (34.8%), idiopathic pleuritis/undiagnosed in 41 patients (12.5%), benign asbestosis PE 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.[5] In present study, pleural infections constitute major cause for pleural infection, because Tuberculosis is the commonest and more prevalent communicable disease in India. Smears for acid fast bacilli are only positive in 10-20% of tuberculosis effusions and are only 25-50% positive on PF culture.[6,7] The addition of pleural biopsy histology and culture improves the diagnostic rate to about 90%.[8]

Relative to many other areas of respiratory medicine, it is often said there is a lack of research in pleural disease and this is particularly evident in non-malignant pleural disease which currently suffers from a lack of high-quality data to guide management and future research should address this unmet need.[9]

Mentioned in the literature that 46% with nonmalignant PEs (NMPE); the investigators also stated that PEs secondary to a nonmalignant etiology can represent significant morbidity and mortality.[10] These 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. In this study, NMPE are pleural infections, accounted for 63.5%, and congestive cardiac failure which accounts for 11.5%.

PF CRP levels can be used to discriminate between parapneumonic effusions and other types of exudative effusions, which may help distinguish between exudative and transudative effusions. A CRP level >1.38 mg/dL indicates the strong possibility of a parapneumonic effusion, whereas a level <0.64 mg/dL indicates a heart failure PE. This study highlights the need for prospective studies to demonstrate the prognostic effect of pleural CRP as an effective diagnostic biomarker. Present study did not used, PF CRP level for diagnosis of para pneumonic effusions, due to limitation of resources and facilities.

CONCLUSION

In this study, tuberculosis is found to be commonest and more prevalent cause of PE. Every case of PE should be meticulously investigated in order to arrive a diagnosis, whether tuberculous or non-tuberculous to proceed for specific therapy.

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