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Original Research Article

Study on etiological profile of pleural effusion in tertiary care centre in Dakshin Kannada

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ABSTRACT

Background: Pleural effusion (PE) is a pathological state that often develops in patients with thoracic or systemic diseases and if not diagnosed and treated early, heralds a serious prognosis. Aim of the study was to determine the etiological profile of PE from exudative and transudative pleural fluid.
Methods: This cross-sectional study was conducted in participants admitted with PE in the general medicine ward of Yenepoya medical college hospital between the period of January 2021 and December 2021. The patients were analyzed for the socio-demographic characteristics; examination was done with focus on general physical examination, respiratory system, cardiovascular system and gastrointestinal system. SPSS was used for analysis.
Results: A total of 80 participants fulfilling inclusion criteria were included in the study. The mean age of participants was 50.28±15.85 years. Among the participants, 36.3% were female and 63.8% were male, with male preponderance in the study. PE, according to Light's criteria, was differentiated into exudative effusion which accounted for 63.8% and the rest 36.3% were transudative. The most common cause of PE was TB followed by malignancy. The most common malignancy causing effusion was carcinoma of the lung. All the etiologies of PE showed a male preponderance and it was statistically significant ($p<0.05$).
Conclusions: In males, PE was more frequently observed. The main causes of PE were TB and cancer. One of the Clinical indicators including pallor demonstrated a strong correlation with malignant and tuberculous effusions. Malignancy and empyema were substantially correlated with clubbing.

Keywords: Pleural fluid, Transudative PE, Exudate, TB, Dyspnoea

INTRODUCTION

Pleural effusion (PE) is defined as abnormal accumulation of fluid in the pleural space. A PE is always abnormal and its presence indicates an underlying disease. It has been found that PE is one of the most common respiratory symptoms for which patients are admitted and evaluated. The normal pleural space contains 7 to 14 ml fluid. An increased amount of fluid accumulates in the pleural space when the rate of formation exceeds the rate of removal.[1,2]

The clinical presentation of PE depends upon the amount of fluid present and the underlying cause. Many patients have no symptoms at the time a PE is discovered. Possible symptoms include pleuritic chest pain, dyspnoea and a dry, unproductive cough.[3] The chest pain associated with PE is caused by the pleural inflammation of the parietal pleura resulting from the movement related friction between the two surfaces.[4] Pleuritic chest pain may be local or referred. The pain eases with strapping of the chest or on accumulation of fluid. Because dyspnoea and chest pain are non-specific symtoms, a careful history and physical examination are important in narrowing down the differential diagnoses.

History provides information about the possible etiology of PE and guidelines for the necessary investigations. A history of fever suggests a parapneumonic effusion, either

complicated or uncomplicated. Older age, weight loss and a history of smoking points towards diagnosis of malignant PE. A history of cardiac, renal or hepatic impairment indicates a transudative PE.[5] Recent swelling or deep vein thrombosis may cause effusion related to pulmonary embolism. Physical examination findings like ascites may indicate cirrhosis or Meigh's syndrome cardiac injury syndrome may be considered in cases of fever, dyspnoea and pleuritic chest pain up to 3 weeks post cardiac surgery.[6] History findings suggestive of connective tissue disease and certain long-term medications like amiodarone methotrexate, phenytoin, Nitrofurantoin and Isoniazid suggests that as a possible etiology.

METHODS

This cross-sectional study was conducted in participants admitted with PE in the general medicine ward of Yenepoya medical college hospital between the period of January 2021 and December 2021. Yenepoya medical college hospital (YMCH) is a 900 bedded tertiary care teaching hospital situated at Deralakatte, a suburban locality of Mangaluru, Dakshin Kannada. It provides general and specialist healthcare to the coastal and central parts of Karnataka and northern part of Kerala. The patients were analyzed for the socio-demographic characteristics; examination was done with focus on general physical examination, respiratory system, cardiovascular system and gastrointestinal system. The data on previous admissions indicate that were about 79 participants diagnosed with PE was admitted in the department of general medicine from Jan 2019 to Jan 2020. At 5% level of significance and anticipated proportion 83% based on the article submitted by Majhi et al with 10% margin of error, the recommended sample size of the present study to be, n=54.[8]

Inclusion criteria

Participants with age more than/ equal to 17 years, giving consent and participants with PE proven with chest X-ray/ ultrasound of thethorax were included in study.

Exclusion criteria

Participants with malabsorption syndrome, participants with venous thromboembolism and PE and participants previously diagnosed and already on treatment were excluded.

Statistical analysis

The statistical analysis was performed using SPSS for windows version 22.0 software (Mac, and Linux). The findings were present in number and percentage analyzed by frequency, percent, and Chi-square test. Chi-square test was used to find the association among variables. The critical value of p indicating the probability of significant difference was taken as <0.05 for comparison.

RESULTS

Table 1: Mean age of patients.

Age (Years)				
N	**Min**	**Max**	**Mean**	**SD**
80	17	86	50.28	15.853

As per Table 1 in present study, a total of 80 participants fulfilling inclusion criteria were included. Mean age of participants was 50.28±15.85 years.

Table 2: Gender distribution of patients.

Gender	N	Percent (%)
Female	29	36.3
Male	51	63.8
Total	80	100

Among the participants, 36.3% were female and 63.8% were male, with malepreponderance in the study.

Table 3: Classification of type of pleural fluid based on Light's criteria.

Type of pleural fluid (L)	N	Percent (%)
Exudative	51	63.8
Transudative	29	36.3
Total	80	100

Light's criteria revealed 63.8% of exudative effusion and 36.3% were transudative type inthe study.

Table 4: Comparison of parameters based on Light's criteria.

Variables	Type of pleural fluid (L)				P value
	Exudative		Transudative		
	Mean	SD	Mean	SD	
Pleural fluid protein	4.0	1.4	2.8	1.2	0.01
Serum protein	6.8	1.2	6.8	1.1	0.654
P. protein/ S. protein	0.596	0.215	0.404	0.132	0.01
Pleural fluid LDH	766	4194	112	57	0.01
Serum LDH	372	324	276	171	0.655
P.LDH/ S.LDH	7.666	24.509	.451	.151	0.01
2/3 ULN S. LDH	245.624	213.531	182.433	112.974	0.01

The study showed a statistically significant (p=0.01) in the pleural-serum ratio of both LDH and protein which helped in differentiating exudative from transudative effusion.

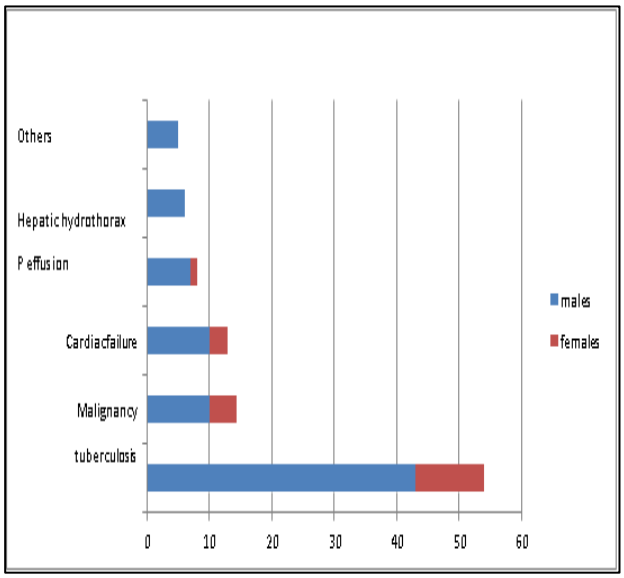

Figure 1: Etiologies of PE

As per Figure 1 the most common cause of PE was TB followed by malignancy. The most common malignancy causing effusion was carcinoma of the lung. All the etiologies of PE showed a male preponderance and it was statistically significant (p<0.05).

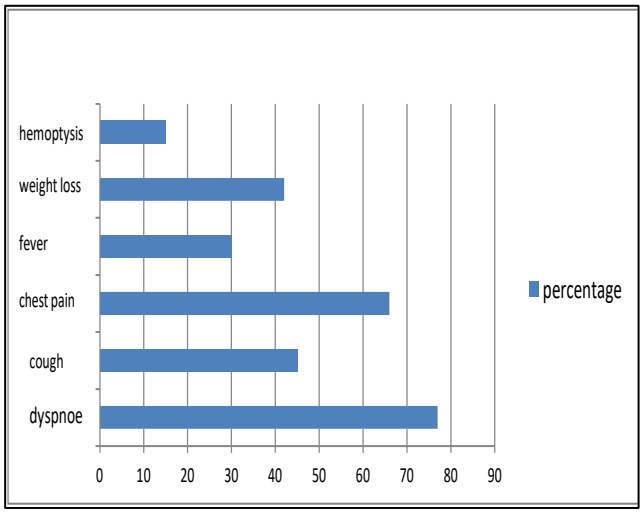

Figure 2: Symptoms in PE.

As per Figure 2 the most common symptom was dyspnoea (77%), followed by pleuritic chest pain (66%). Pallor was present in 24 cases of tuberculous effusion (p=0.000) and all 14 cases of malignant effusion (p=0.001). Clubbing had a significant association with malignant effusions (p=0.0) and empyema (p=0.012). Five out of 14 patients with malignant effusion had significant lymphadenopathy (p=0.0). 86 % of the subjects had ESR > 80 mm fall in the first hour.

DISCUSSION

This cross-sectional study aimed to assess diagnostic value of pleural fluid cholesterolas an additional lab parameter to differentiate transudative and exudative PE.In our study, a total of 80 participants fulfilling inclusion criteria were included. Mean age of patients was 50.28±15.85 year. Among the participants, 36.3 percent were female and 63.8% were male, with male preponderance in the study. PE, according to Light's criteria, was differentiated into exudative effusion which accounted for 63.8% and rest 36.3% were transudative.

When compared to the results of our study few studies find out of the 100 patients, 66 had right sided effusion, 28 had left sided and 6 had bilateral effusion, 52 of the 100 patients had mild PE, clinically and radiologically. 49 out of 54 tuberculous effusions had straw coloured effusion and 12 out of 14 malignant effusions were blood stained (p=0.000), 94.4% of the tuberculous effusions had a pleural fluid lymphocyte of 80-100% (p=0.0).[9-11] The 87.5% of the parapneumonic effusions had pleural fluid polymorphs between 80-100% (p=0.0), 44.4% of tuberculous effusions had pleural fluid protein >5 gm% (p=0.00).[12]

Pleural fluid ADA was >40 IU/ml in all cases of TB effusion (p=0.0). Most of the malignant effusions had a ADA level of <30. Pleural fluid cytology was positive in 1 out of 14 cases of malignant effusion (p=0.015) Tuberculin skin test was positive in 61.10% cases of tuberculous effusion (p=0.0). Sputum was negative for acid fast bacilli in 88.9 % of TB PEs (p=0.0).[13,14]

CONCLUSION

In males, PE was more frequently observed. The main causes of PE were TB and cancer. One of the clinical indicators including pallor demonstrated a strong correlation with malignant and tuberculous effusions. Malignancy and empyema were substantially correlated with clubbing. Malignant effusion was associated with lymphadenopathy. The majority of PE patients reported elevated ESRs. Malignant effusions were far more often blood stained than tuberculous effusions, which were typically straw colored. A substantial correlation exists between lymphocyte predominance and tuberculous effusion in pleural fluid. The ADA was quite cautious when excluding tuberculous effusion.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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