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ORIGINAL ARTICLE

Etiological basis of pleural effusion in a teaching hospital

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Abstract

Background: *A pleural effusion represents the disruption of the normal mechanisms of formation and drainage of fluid from the pleural space. Pleural effusions are associated with diseases of varied etiologies and often carry a grave prognosis.*

Objective: *To evaluate the common cause of pleural effusion in developing country and also to compare to that of developed countries.*

Methods: *This is a prospective observational study. Fifty four patients, diagnosed with pleural effusion on admission were randomly selected from I April 2016 to 30 September 2016 in Medicine ward of Khulna medical college hospital. Etiologic diagnosis was established by sequential clinical history and findings on physical examination, laboratory tests, chest radiograph, CT Scan of chest and pleural fluid analysis. Patients who remained undiagnosed were subjected to fibre-optic bronchoscopy, thoracoscopic pleural biopsy, and histopathology.*

Results *: Etiologic diagnosis of pleural effusion was established in 50 (92.59%); tuberculosis 25 (46.29%), parapneumonia 10 (18.52%) malignancy 7 (12.96%) nephrotic syndrome 3 (5.55%),cirrhosis of liver disease 2 (3.71%) congestive cardiac failure 2 (3.71%), systemic lupus erythematosus I (1.85%). 4 patients (7.41%) remain undiagnosed. Among subjects, exudative pleural effusion was 43 (79.63%) and transudative 11 (21 57%). Among exudative pleural effusion sputum for AFB positive 15 (34.88%), FNAC 10 (23%), fibre-optic bronchoscopy was positive 2 (4.6%), gene expart test for tuberculosis positive in 5 (11.62%).*

Conclusions: *Most of the pleural effusion cases are diagnosed as tuberculosis, Early and adequate treatment results in complete recovery of the patient.*

Keywords: *Pleural effusion, Etiology, Tuberculosis.*

Introduction

Pleural effusion is common in the respiratory intensive care unit (RICU) patients, suggests a serious local or systemic disease and calls for urgent investigations to determine its cause. The pathophysiologic mechanisms underlying the accumulation of fluid in the normally pleural space include an increased pulmonary capillary pressure, decreased plasma oncotic pressure, increased permeability of pleural membrane, mediastinal involvement with reduced pleural lymphatic drainage, bronchial obstruction with high negative intrapleural pressure, and imbalance between formation and absorption of fluid.[1]

The effusion occurring through pressure filtration without capillary injury is termed as transudate. Common examples are congestive cardiac failure (CCF), renal failure, superior vena cava obstruction, constrictive pericarditis, liver cirrhosis, fluid overload, and hypoalbuminaemia Meig's syndrome. On the other hand, "inflammatory" fluid leaking between cells due to locat factors is termed an exudate, as in bacterial pneumonia, viral infections, tuberculosis, malignancy, sub phrenic pathology, and Dressler's syndrome. It may be noted that a malignant disease and pulmonary embolism may produce either a transudative or an exudative effusion Exudates and transudates are best differentiated

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by Light's three criteria: (i) Ratio of pleural fluid protein to serum protein >0.5; (ii) ratio of pleural fluid to the serum lactate dehydrogenase (LDH) >0.6; (iii) absolute value of pleural fluid LDH >two thirds of the upper normal limit for serum.2 While exudates meet one or more of the three criteria, transudates meet none.

Ninety percent cases of pleural effusion in the western countries are reported to result from only five diseases: CCF, pneumonia, nalignancy, pulmonary embolism and viral infections. Twenty to forty percent of hospitalized patients with bacterial pneumonia develop pleural effusion. In Bangladesh, unlike the western countries, tuberculous pleural effusion is more common Out of 54 pleural effusion 25 (46.29%) cases were diagnosed as tuberculosis.

Pleural effusion is a significant respiratory problem that needs hospitalization. To evaluate the common cause of pleural effusion in developing country and also to compare that of developed countries.

Materials and methods

This was a prospective observational study, conducted in medicine ward of Khulna Medical College Hospital, Khulna over a period of six months from I April 2016 to 30 September 2016.

During this period 54 patients were admitted in medicine ward and diagnosed as pleural eflusion based on comprehensive clinical history, complete physical examination, a chest x ray & diagnostic ultrasonography. Patients of either sex i.e. both male and female were randomly selected and patients above 20 years of age were included in this study. Exclusion criteria was patient refusal and age of the patient below 20 years.

Complete Blood Count (CBC) with ESR, pleural fluid study for biochemical, cytological, gram staining and malignant cells, serum protein and sputum examinations by smear for acid fast bacillus (AFB) done in DOTS corner in KMCH laboratory, and chest radiograph were done in all cases. Transudative pleural eflusion were evaluated by 24 hour total urinary protein, color Doppler echocardiogram, USG of whole abdomen, albumin globulin ratio and serological test (ANA test).

Thoracocentesis was done in all cases for pleural fluid analysis. The fluid was examined for AFB by smear and for pyogenic organisms by culture and sensitivity tests.

The patients, in whom the etiologic diagnosis could not be established after above investigations, were subjected to do the following investigations:

Two patients were investigated by fiber optic bronchoscopy and broncho alveolar lavage (BAL) fluid examination at NICDH, Mohakhali, Dhaka. FNAC of 10 patients were done at private laboratory of Khulna, gene expert test of 5 patients were done in chest disease hospital, Khulna.

The following investigation were not possible due to lack of laboratory facility in this hospital- Pleural biopsy, AFB culture, Pleural fluid for ADA.

Result

In this study 54 patients were included, among them male was 41, rest 13 was female. Most of the patients (36, 66.66%) were in age group within 20 49 years (Table 1).

Table I

Age and sex distribution of patients with pleural effusion.

Age in year	Male	Female	Total (%)
20-29	9	5	14(25.92)
30-39	10	2	12(22)
40-49	9	1	10(18.51)
50-59	5	2	7(12.96)
6-70	8	3	11(20.37)
Total	41	13	54(100)

The causes of pleural effusion were tuberculosis 25 (46.29%), pneumonia 10 (18.52%), malignancy 7 (12.96%) and nephrotic syndrome 3 (5.55%).

Table II

Etiology of pleural effusion

Cause of pleural effusion	Number of patient	Percentage
Tuberculosis	25	46.29
Pneumonia	10	18.52
Malignancy	7	12.96
Nephrotic syndrome	3	5.55
Cirrhosis of liver disease	2	3.71
Congestive cardiac failure	2	3.71
Systemic lupus erythematosis	1	1.85
Undiagnosed	4	7.41
Total	54	100

Among 54 cases 7 patients of malignant pleural eff usion was confirmed by FNAC of lymphnode, lung biopsy, fiberoptic broncoscopy for broncoalveolar

lavage examination and bronchial tissue biopsy for histopathological examination reveals adenocarcinoma, of lung 5 (five); rest of 2 (two) were squamous cell carcinoma.

Table III

Findings of pleural fluid study.

Physical colour	Number of patient	Predominant cell count
Straw colour	37	Lymphocyte
Turbid	10	Neutrophil
Haemorrhagic	7	Lymphocyte
Total	54	

Among 54 patients exudative pleural effitsion was 43 (79.63%) and transudative was 11 (21.57%). Among exudative pleural effusion sputum for AFB was positive in 15 (34.88%) cases, FNAC 10 (23%), fiber optic bronchoscopy positive was 2 (4.6%) and rest of 5 (11.62%) cases were gene expert for tuberculosis positive.

Discussion

This prospective observational study was conducted among 54 patients of pleural effusion with aim to determine the etiology. In our study, tuberculosis, malignancy. pneumonia, nephrotic syndrome, cirrhosis of liver disease, congestive cardiac failure were the common conditions producing pleural effusion.

Out of 54 patients 41 (75.92%) were males, whereas 13 (24.07%) were females with a male female ratio of 3.15: 1. In a study of developed country, cause of pleural effusion were malignancy (24%), para pneumonia. (22%), tuberculosis (14%), hemothorax (4%), liver cirrhosis (2%) indicating malignancy is the common cause of pleural efflusion in developed country but in our study common cause of pleural effiision is tuberculosis which does not correlate.1 In another study us Hyderabad, Pakistan, common cause of pleural effusion was tuberculosis (66%) which support our studyt.2 Different study shows that tuberculosis is the major cause of pleural effusion in developing country and our study correlate with other study. Out of 54 pleural effusion cases; right sided pleural effusion 31 (57.41%), left sided pleural effusion 17 (31.48%) and both sided pleural effusion 6 (11.11%). Among the patients exudative cause of pleural effusion 43 (79.63%) and transudative 11 (21.57%). Study of exudative pleural effusion reveals sputum for AFB positive 15 (34.88%), FNAC 10 (23%), fiber optic bronchoscopy positive 2 (4.6%), gene expert for tuberculosis positive in 5 (11.62%). In this study transudative causes of pleural effusion were 11, but 4 cases were undiagnosed. In our study causes of pleural effusions were undiagnosed in 4 (7.41%), cases in a study of developed country the cause of 15% to 20% of all pleural efflisions remained unknown despite intensive diagnostic efforts.12

Our study correlate with other studies that right sided pleural effusion is more than left sided pleural effusion. Major causes of exudative pleural effusions are tuberculosis, pneumonia, malignancy which is almost similar with cases of other studies in developing countries. But in developed country scenario is different where malignancy is in 1st position then parapneumonic effusion, systemic lupus erythematosus and other exudative causes but tuberculosis is almost nil. In case of transudative causes of pleural effusion are nephrotic syndrome then cirrhosis of lives disease and congestive cardiac failure.

Conclusion

In Bangladesh the common cause of pleural effuslon is tuberculosis due to poverty, over crowding and inadequate treatment. Early and adequate treatment results in complete recovery of the patient.

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