Original Research Paper

To Study Etiology and Clinico-Radiological Profile of Patients presenting with Pleural Effusion

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Article History

Received Nov 30, 2018 (Received in revised form Dec 11, 2018)

Accepted on Dec 12 , 2018

Abstract: Pleural effusion is the abnormal accumulation of fluid in the pleural space. Pleural effusions are either transudates or exudates based on the biochemical characteristics of the fluid, which usually reflect the physiologic mechanism of its formation. This prospective study was carried out to access the etiology and to know the clinico-radiological profileof 130 patients presenting with pleural effusions over a period of one yearin the Department of Pulmonary Medicine, GMC, Patiala, India. In our study, out of 6 patients of transudative pleural effusions, 83.33% were males and 16.67% were females, whereas out of 124 patients of exudative pleural effusions, 74.19% were males and 25.81% were females. Tuberculosis (70.16%) was the most common condition associated with exudative effusions followed by para-pneumonic effusions (15.32%) and malignant pleural effusions (12.10%), whereas transudative effusions were associated with either congestive heart failure (50%) or renal disease (50%).Commonest clinical symptom was cough (73.85%), followed by chest pain (60.77%) or fever (55.38%). Thus patients presenting with these complaints should always be evaluated for the presence of pleural effusion for early diagnosis.

Key Words: Exudative, Parapneumonic, Transudative, Tuberculosis.

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Introduction:

Pleural effusion is a condition characterized by the abnormal accumulation of fluid in the pleural space [1].Pleural effusions are either transudates or exudates based on the biochemical characteristics of the fluid, which usually reflect the physiologic mechanism of its formation. Transudative pleuraleffusions are caused by a limited number of clinical conditions such as congestive heart failure (CHF), cirrhosis, nephrotic syndrome, urinothorax, peritoneal dialysis, glomerulonephritis, myxedema, cerebrospinal fluid leaks to pleura, hypoal buminemia, atelectasis and sarcoidosis [2].On the other hand, an exudative pleural effusion is principally caused by a local pleuro-pulmonary disease process like infection, malignancy, pulmonary thromboembolism, local trauma etc. Tuberculosis is the single most frequent cause of death by an infectious agent, worldwide [3].In many areas of the world, including India, tuberculosis remains the most important cause of pleural effusion in the absence of demonstrable pulmonary disease [4-6].In clinical practice, exudative effusions can be separated effectively from transudative effusions using Light's criteria [7].

Material and Methods:

This prospective study was carried out on the patients presenting with pleural effusions from January, 2015 to December, 2015in the Department of Pulmonary Medicine, Government Medical College, Patiala, India and was approved by the Ethical Committee of this institution. A total of 130 patients were included and subjected to detailed history and thorough clinical examination. They were then subjected to detailed investigations which included routine haemogram, urine examination, chest X-Rays, mantoux test, TSP/DSP and pleural fluid

analysis.Pleural fluid was analyzed for Cytology, C/S, Gram stain, Zn stain, proteins, total and differential cell counts. Collagen profile, Ultrasound chest and CT chest were done in selected cases. Pleural effusions were classified as mild, moderate and massive on the basis of chest X-Ray [8]. Thoracentesis was done by using standard technique. The procedure was carefully explained to the patient in layman language, and a signed written informed consent was obtained. The pleural fluids were differentiated into transudates and exudates using Light's criteria (i.e. the ratio of pleural fluid protein to serum protein should be greater than 0.5) [7].

Results:

Out of 130 patients in the present study, there were 97 (74.62%) males and 33 (25.38%) females with a male preponderance. Mean age of the patients was 42.57 ± 18.76 years. The minimum age was 11 years while the maximum was 85 years. Table 1 shows that out of 6 patients of transudative pleural effusions, 5 were males and only 1 was female. All the patients of transudative pleural effusions were in the age group of 41-50, 51-60, 61-70 years with each group comprising of 3, 1 and 2 patients respectively. Out of 124 patients of exudative pleural effusions, 92 were males and 32 were females. Most of the patients of exudative pleural effusions were in the age group of 21-30 years. Table 2 shows that majority of the patients (73.85%) were complaining of cough while 60.77% of patients were having chest pain, 55.38% were having fever, 53.85% were havingloss of appetite, 48.46% were having breathlessness, 31.54% were having loss of weight and 2.31% were complaining of hemoptysis also. In our study, most common cause of pleural effusion is tuberculosis (87 cases) followed by parapneumonic effusion (19 cases) and right sided effusion is predominant in tubercular (55.17%) and parapneumonic effusions (63.16%), whereas bilateral effusion is predominant in patients of renal disease

Table 1: Age and sex distribution

Type of Pleural Effusion	Gender		Age (Years)								Total
	Male	Female	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	
Transudative	5	1	0	0	0	3	1	2	0	0	6
Exudative	92	32	18	28	15	25	19	12	5	2	124
Total	97	33	18	28	15	28	20	14	5	2	130

Table 2: Chief Complaints

Chief Complaints	Frequency	Percentage
Cough	96	73.85%
Chest Pain	79	60.77%
Fever	72	55.38%
Loss of Appetite	70	53.85%
Breathlessness	63	48.46%
Loss of Weight	41	31.54%
Hemoptysis	3	2.31%

Table 3: Shows Fluid Distribution in different Etiological conditions based on Chest X-Ray (CXR)

Etiology	Right	Left	Bilateral	Total
Tubercular effusion	48 (55.17%)	34 (39.08%)	5 (5.75%)	87
Parapneumonic effusion	12 (63.16%)	7 (36.84%)	0 (0%)	19
Malignant effusion	6 (40%)	7 (46.67%)	2 (13.33%)	15
Congestive Heart failure	0 (0%)	0 (0%)	3 (100%)	3
Renal disease	1 (33.33%)	0 (0%)	2 (66.67%)	3
Others	0 (0%)	1 (33.33%)	2 (66.67%)	3
Total	67 (51.54%)	49 (37.69%)	14 (10.77%)	130

Discussion:

Pleural effusion is a very common clinical condition seen in a variety of diseases. A number of studies have been conducted in the past to correlate the clinical and radiological aspects of these patients with the underlying etiological conditions.

Out of the total130 patients enrolled in this study, 124 (95.38%) were having exudative pleural effusions and 6 (4.62%) were having transudative pleural effusions. These findings are comparable to Romero et al[9] who analyzed 297 patients of pleural effusion, of which 44 (15%) were transudates and 253 (85%) were exudates. Out of 6 patients of transudative pleural effusions, 83.33% were males and 16.67% were females, whereas out of 124 patients of exudative pleural effusions, 74.19% were males and 25.81% were females. All the patients of transudative pleural effusions were more than 40 years. Majority of the patients of exudative pleural effusions belonged to the age group of 21-30 years. These findings are comparable to studies by Romero et al[9] and Hirsch et al[11]. In his

study, Hirsch et al has reported 64.1% involvement of males and 35.9% females with the average age of 53 years.

In this study tuberculosis was the most common etiology in exudative effusions followed by pneumonia and malignancy, whereas transudative effusions were associated with either congestive heart failure (50%) or renal disease (50%). The above findings are in accordance with Dhital KRet al[12]who concluded that most common cause of pleural effusion was tubercular effusion followed by parapneumonic effusion and most cases of the tubercular and parapneumonic effusions belong to younger age group (21-30 years).

We observed that most of the patients complained of either cough, chest pain or fever followed by other symptoms like loss of appetite, dyspnea, and weight loss. Bhadada et al[13]found that the most common symptoms in cases of pleural effusion were fever (76.6%), dyspnea (73%), cough (70%) and chest pain (60%).

Majority of the patients were having moderate pleural effusion in both right (40.3%) and left sides (51.02%), whereas mild and massive effusions were present in 34.33% and 25.37% cases on right side and 22.45% and 26.53% cases on left side respectively. Right sided effusion was present in 55.17%, 63.16%, 40% cases of tubercular, parapneumonic and malignant effusions respectively, whereas bilateral effusion was present in 66.67% cases of renal disease and all cases of congestive heart failure. BasuA et al [14]in 44 patients of tubercular pleural effusion in whom they reported that mild, moderate and massive effusions were present in 10.5%, 21.1%, 21.1% cases on right side and 5.3%, 23.7%, 18.4 % on left side respectively and moderate effusions were most commonly present both on right as well as on left side.Dhital KR et al [12] concluded that right sided effusion was seen in most cases of tubercular, parapneumonic and malignant effusion whereas bilateral effusion was seen in 87.5% of the patient having congestive heart failure and all cases of renal disease.

Gross appearance of the pleural fluid shows that majority of the patients (67.69%) were having straw colored fluid followed by hemorrhagic fluid in 26.15%, thick fluid in 4.62% and turbid in 1.54%. Majority of the patients with congestive heart failure and renal disease showed WBC count less than 1000/mm^3 with lymphocytic predominance, whereas majority of the patients of tubercular (86.21%), parapneumonic (89.47) and malignant effusions (53.33%) showed WBC count more than 1000 cells/mm^3. Both tubercular and malignant effusions showed lymphocytic predominance, whereas parapneumonic effusions showed polymorph predominance. These findings are in accordance with findings of Light et al [10]who also reported lymphocytic predominance in cases of TB and malignancy whereas polymorph predominance in parapneumonic effusions.ADA was >70 IU/L in 74.71% cases and > 40 IU/L in 93.10% cases of tubercular effusions which is comparable to Patel A et al [15] who reported ADA >40 IU/L in 96.67% cases.

Conclusion:

We have observed that the most common presenting features of pleural effusion are cough, chest pain and fever. Thus patients presenting with these complaints should always be evaluated for the presence of pleural effusion.Transudative pleural effusion should be considered the first in patients of age group of >40 years and having bilateral effusions. Though tuberculosis is the commonest cause of pleural effusion in our country still the treatment should not be started merely on the basis of X-Ray.

Conflict of Interest: None

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