Diagnostic Evaluation Of 120 Cases Of Pleural Effusion In A Tertiary Care Center In Ahmedabad, India

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ABSTRACT:

Aim:

A pleural effusion is a buildup of fluid between the layers of tissue that line the lungs and chest cavity. In this study an attempt has been made to arrive at the etiological diagnosis of pleural effusion by analysis of history, clinical presentation, biochemical, radiological, cytological and bacteriological methods.

Methods:

This study was carried out in the Department of Pulmonary Medicine, Sheth VS General and Sheth C.M. hospital , Smt. NHL Municipal Medical College, Ahmedabad, Gujarat, , India. In this study total 120 indoor patients of adult age and either sex were taken. Patients with pleural effusion as determined by clinical and or radiological means, thoracocentesis on who yield a minimum amount of fluid enough to carry out routine test were included in the study. Patients with pleural effusion with non aspirable fluid quantity decided clinically or radiologically, were excluded.

Results:

Most of the patients were between the age group of 31-40 years and males (56.8%). Most of the patients of tuberculous effusion were from younger age group between 21-50 years. Most common symptom was chest pain (68%) followed by fever (61%). Most of cases were tuberculous (63.3%) followed by malignant (18.3%). There were 19 patients with undiagnosed pleural effusion, in which, thoracoscopic pleural biopsy was done, among them 12 patients had malignancy and 7 patients had tuberculous pleural effusion.

Conclusions:

Most of etiologies for pleural effusion were tuberculosis among young and malignancy in older age. Right sided pleural effusion was more common in exudative effusion while bilateral pleural effusion was more common in patients with transudative. Thoracocentesis followed by pleural fluid analysis is the best method to diagnose the underlying etiology. Thoracoscopic pleural biopsy also has good role in undiagnosed pleural effusions.

Keywords: Pleural effusion, Pleura, Thoracoscopy, Tuberculosis

Diagnostic evaluation of 120 cases of Pleural Effusion in a Tertiary care center in Ahmedabad, India.

INTRODUCTION:

A pleural effusion is a buildup of fluid between the layers of tissue that line the lungs and chest cavity. The body produces pleural fluid in small amounts to lubricate the surfaces of the pleura. This is the thin tissue that lines the chest cavity and surrounds the lungs.[1] Collection of fluid in pleural cavity has varied etiological factors.[2] Because of the various etiologies that can cause pleural effusion, it often presents a diagnostic problem, even after extensive investigations. The initial step is the distinction

between transudates and exudates as this gives an indication of pathophysiological mechanisms, differential diagnosis and the need for further investigation. There are many criteria to differentiate exudates but none has 100% sensitivity and specificity. The diagnosis of cause of pleural effusion is usually done by clinical, radiological, histological and laboratory findings.

In this study an attempt has been made to arrive at the etiological diagnosis by analysis of history, clinical presentation, biochemical, radiological, cytological and bacteriological methods. The aims and objectives behind the study are as following:

(1) To study the clinical profileof pleural effusion;

(2) To study the radiological manifestation of pleural effusion;

(3) To study the laboratory diagnostic findings in pleural effusion;

(4) To study the etiological factors of pleural effusion and

(5) To study efficacy of pleuroscopy in undiagnosed pleural effusion.

METHODS:

The present study was carried out in the Department of Pulmonary Medicine, Sheth VS General and Sheth C.M. hospital , Smt. NHL Municipal Medical College, Ahmedabad, Gujarat, , India. In this study total 120 indoor patients having pleural effusion of adult age and either sex were taken.

A. **Inclusion criteria**

Adult patient with pleural effusion as determined by clinical and or radiological means, thoracocentesis on who yield a minimum amount of fluid enough to carry out routine test were included in the study.

B. **Exclusion criteria**

Patients with pleural effusion with non aspirable fluid quantity decided clinically or radiologically, were excluded.

All patients underwent detailed clinical examination and routine laboratory examination like blood test for hemoglobin, total WBC count, differential WBC count, erythrocyte sedimentation rate, random blood sugar, RFTS, serum proteins, urine examination, sputum examination and tuberculin test will be carried out in all patients. A plain chest X ray postero-anterior view taken prior to thoracocentesis and another was taken after thoracocentesis to rule out complications. Additional films and ultrasound, computed tomography scan was done whenever indicated. Pleural fluid analysis was done for protein, sugar, total cell count, differential cell count, gram's stain, ZN stain, culture and sensitivity and adenosine deaminase (ADA) level. Pleural fluid cytology was done in suspected malignant pleural effusion. Additional investigations like ANA screening, ANA profile, CECT thorax and 2D-Echo was done. In undiagnosed pleural effusion thoracoscopy guided pleural biopsy was taken. Diagnosis was made on clinical examination, radiological examination and analysis of laboratory data.

RESULTS:

The most common symptom was chest pain (70%) followed by fever (61%), breathlessness (58%) and cough (59%).

Most of the patients were between the age group of 31-40 and 41-50 and they constituted the 36.7% and 24.2% of total cases respectively and pleural effusion was more common in males (65%) as compared to females (35%).

Table 1: Age and sex wise distribution of pleural effusion

Age Group (in years)	Number of Patients			Percentage (%)
	Male	Female	Total	
11-20	5	2	7	5.8
21-30	10	4	14	11.7
31-40	25	19	44	36.7
41-50	21	8	29	24.2
51-60	11	6	17	14.2
>60	6	3	9	7.4
Total	78	42	120	100

Table 1 suggests that out of 120 cases maximum numbers of cases of pleural effusion were tuberculous (63.3%). Out of 76 patients of tuberculous effusion, 8 patients were positive for HIV, patients were diabetic, 2 patients were hypertensive and 3 patients had ischemic heart disease. Among 76 patients of tuberculous effusion only 6 patients had past history of tuberculosis. 3 patients with congestive cardiac failure were having ischemic heart disease in the past and 2 patients had hypertension. Out of 11 patients with parapneumonic effusion 2 patients were diabetic. Out of 22 patients of malignant pleural effusion 4 patients were hypertensive. Majority of patients had right sided effusion. Right sided effusions were also more common in tuberculous and malignant effusions.

Table 2: Etiology of pleural effusion

Diagnosis	Right	Left	Bilateral	Male	Female	Total
Tuberculous	50	26	0	49	27	76
Malignant	13	9	0	14	8	22
Parapneumonic	9	2	0	7	4	11
Congestive Cardiac Failure	0	1	5	4	2	6
Hypoproteinemia	0	0	1	1	0	1
Other causes	1	2	1	3	1	4
Total	73	40	7	78	42	120

95.72% of patients of tuberculous effusion, 94.5% patients of malignant effusion and 88.4% patients of parapneumonic effusion had pleural fluid protein value

>3gm% and had pleural fluid protein to serum protein ratio >0.5. 57 (89.47%) patient with tuberculous effusion had pleural fluid ADA levels more than 40. In etiologies like congestive cardiac failure and hypoproteinemia all (100%) patients had pleural fluid protein <3 gm%. Pleural fluid cytology was positive for malignant cells in 10 patients of malignancy out of 22 patients, confirmed by biopsy. Total 90.8% patients had exudative pleural effusion (Table 2).

There were 16 patients with undiagnosed pleural effusion were gone through Thoracoscopy guided pleural biopsy which gave 100% yield in diagnosis. Out of 16, biopsy suggests 10 patients with malignancy, 4 patients with tuberculosis and 2 patients with parapneumonic pleural effusion. Bronchoscopy was not performed in any patient in this study.

DISCUSSION:

In the present study pleural effusions were more common in 31-40 years of age group which is comparable with the study of Shah H. In study done by Burgers it was among 41-50 years of age group. In present study more common etiology was tuberculosis as India is prevalent country for it so it is common among young age group. In the present study group male to female ratio was 1:86:1, which is comparable with the studies of Maldhure (2.13:1), Amethiya P (2.34:1) and Hirsch (2.53:1).[3-5]

Table 3: Transudates and exudates

Study	Transudate	Exudative
Valdes	25.69%	74.31%
Rm KN	32.5%	67.5%
Amethiya	6%	94%
Present Study	8%	92%

This suggests that exudative effusions are more common.

Most of the patients in present study had right sided pleural effusion (60.8%) which is comparable with the study of Ambethiya P (right side pleural effusion-60%) and Dambal A (right side pleural effusion-58.2%).[4,6] Tuberculous pleural effusion more commonly occurs in right side because it involves right lung more than left lung.

In the present study incidence of exudative effusion was 91% which was comparable with the study of Amethiya P (94%). In various other studies the incidence of exudative effusion was low which can be explained by the fact that tuberculousis is more prevalent in India having exudative etiology.

In the present study incidence of tuberculous pleural effusion was 63.3% which was comparable to the studies of Thiruvengadam (64%), Damlal A (65.5%) and Amethiya P (68%) which were done in India while in various other studies incidence of tuberculous pleural effusion was low, which can be explained by the fact that TB is more prevalent in india.[4,6,7] Incidence of malignant pleural effusion was 18.3% which was comparable with the Indian studies of Amethiya P (18%), Damlal A (18.2%), Thiruvengadam (21%) and Valdes (22.9%).[4,6-8]

Table 4: Pleural Fluid ADA levels in various pleural effusions

ADA level (U/L)	<40	41-55	>55
Tuberculous	8	31	37
Malignant	19	0	3
Parapneumonic	9	2	0
Congestive Cardiac Failure	6	0	0
Hypoproteinemia	1	0	0
Other causes	2	0	2
Total	45	33	42

Table 4 suggests that most of the tuberculous pleural effusions had elevated levels of pleural fluid ADA. Some of the malignant and parapneumonic pleural effusions also had raised pleural fluid ADA. So it is advisable not to rely only on this investigation for diagnosing tuberculous pleural effusion.

Table 5: Thoracoscopy in undiagnosed pleural effusion

Study	No. of patients diagnosed
Tscheikuma et al	95%
Kendall et al	83%
Mootha VK et al	74.3%
Present Study	100%

100% success rate in diagnosis was found in thoracoscopy guided pleural biopsy in undiagnosed pleural effusion which is comparable with various previous studies (Table 5).

CONCLUSION:

Pleural effusion is a common problem in the developing countries like India. Tuberculous pleural effusion is most common etiology followed by malignancy. Thoracocentesis followed by pleural fluid analysis is the best method to diagnose the underlying etiology. Undiagnosed pleural effusions can be best diagnosed by thoracoscopic pleural biopsy and histopathologic analysis.

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