

## STUDY OF ETIOLOGICAL AND CLINICAL PROFILE OF PLEURAL EFFUSION IN A TERTIARY CARE HOSPITAL IN KOSI REGION OF BIHAR

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**ABSTRACT:** Pleural effusion can cause significant symptoms and diminished quality of life, but more importantly, is associated with increased risk of respiratory failure and mortality. This hospital based study was carried out on 80 patients to find the etiological profile and clinical presentation of patients with pleural effusion in Kosi region of Bihar. Results of this study revealed that Tubercular effusion, par pneumonic effusion, malignant effusion, Congestive cardiac failure, Liver disease, Renal disease are major important disease factors with various presenting feature of patients with pleural effusion, mainly shortness of breath, fever, cough, chest pain, oedema, haemoptysis and weight loss. This study would help in early diagnosis and possible intervention and prompt treatment of patients with pleural effusion.

**KEYWORDS:** Diagnosis, effusion, pleural, profile, treatment.

**HOW TO CITE THIS ARTICLE:** Md. Jamaluddin, Rakesh Kumar, Mehre Darakhshan Mehdi, Md. Faiyaz Alam. "Study of Etiological and Clinical Profile of Pleural Effusion in a Tertiary Care Hospital in Kosi Region of Bihar". Journal of Evidence based Medicine and Healthcare; Volume 2, Issue 47, November 12, 2015; Page: 8330-8334, DOI: 10.18410/jebmh/2015/1129

**INTRODUCTION:** Pleural effusion is an abnormal collection of fluid in the pleural space. The etiological spectrum of pleural effusion depends on the geographical region and the local incidence of different diseases that cause pleural effusions. In the developed countries the common causes of pleural effusion in adult are cardiac failure, malignancy and pneumonia.<sup>1,2</sup> Whereas in developing countries tuberculosis and par pneumonic effusions are more prevalent.<sup>3,4</sup>

The pleural space normally contains 0.1–0.2ml/kg body weight of fluid, filtered from systemic capillaries down a small pressure gradient. Fluid drains into the systemic circulation via a delicate network of lymphatic's and eventually enters the mediastina lymph nodes. Fluid may accumulate in the pleural space by a number of mechanisms: increased pulmonary capillary pressure, decreased (more negative) intrapleural pressure (e.g. Atelectasis), decreased plasma oncotic pressure (e.g. hypoalbuminaemia), increased pleural membrane permeability and obstructed lymphatic flow (e.g. pleural malignancy or infection).<sup>5</sup> When local factors are altered, the fluid is rich in protein and lactate dehydrogenase (LDH) and is called an exudate. Local factors include leaky capillaries and pleural inflammation due to infection, infarction, or tumor. When systemic factors are altered producing a pleural effusion, the fluid has low protein and lactate dehydrogenase levels and is called a transudate. This can be caused by an elevated pulmonary capillary

pressure with heart failure, excess ascites with cirrhosis or low oncotic pressure with the nephritic syndrome.<sup>6</sup>

A systemic approach to the investigations is needed because of the extensive differential diagnosis. Pleural effusions can be transudative or exudative.<sup>7,8</sup> In cases with transudative pleural effusion the diagnosis is usually made without much difficulties but exudative pleural effusion requires careful differential diagnosis that includes par pneumonic effusion, tuberculosis, and metastatic cancers which are found to be the cases in large number of patients.<sup>9,10</sup>

Criteria known as Light's criteria define the exudative and transudative effusion. An exudative effusion will have a ratio of pleural fluid protein to serum protein greater than 0.5, a ratio of pleural fluid lactate dehydrogenase to serum lactate dehydrogenase greater than 0.6 or a pleural fluid lactate dehydrogenase greater than two thirds the upper limit of normal for serum lactate dehydrogenase.

Pneumonia is associated with an exudative pleural effusion in up to 57% of cases and is the most common cause of pleural effusion in young patients. The majority resolves with antibiotic treatment, but a certain number will progress to an infected pleural space. The mortality of empyema is as high as 15% and up to 40% of these patients require surgery because medical treatment has failed.<sup>11</sup>

Malignancy is the most common cause of exudative pleural effusions in patients aged >60 years. The majority are the result of metastases to the pleura from primaries in the lung (38%), breast (17%), lymphoma (12%) and genitourinary tract (9%). 37 the primary is unknown in 7–15% of cases.<sup>12</sup>

Mesothelioma is a malignant tumor of the pleura and peritoneum, usually caused by previous asbestos exposure. There is a lag time of 15–40 years between exposure and disease presentation. The incidence has been increasing

Submission 17-10-2015, Peer Review 19-10-2015,

Acceptance 20-10-2015, Published 11-11-2015.

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DOI: 10.18410/jebmh/2015/1129

since the 1960s and is projected to reach a peak of more than 3000 cases per year in the UK in 2020.<sup>13</sup>

Pleural effusion due to tuberculosis develops from a delayed hypersensitivity reaction to mycobacteria in the pleural space following rupture of a sub pleural caseous focus, and is common in areas of tuberculosis endemicity. Tuberculosis pleurisy may occur during primary infection, when it tends to affect younger individuals in areas with a high prevalence of tuberculosis, or it may be recognized as a manifestation of disease reactivation, particularly affecting older patients.<sup>14-16</sup> Although pleural effusion is a common clinical problem confronting physicians in India, there has never been a systematic study of the diseases causing pleural effusion in this country especially in kosi region of Bihar. This prompted us to conduct this study to define the etiology of pleural effusions in this region of Bihar, and to evaluate the roles of pleural fluid analysis in the diagnosis of malignant and tuberculous effusions.

**MATERIAL & METHODS:** The observational hospital based study was carried out in the department of medicine Katihar Medical College and Hospital, Katihar, which was preapproved by the Ethical Committee of this institution review board. This is a retrospective where data from all the cases diagnosed with pleural effusion in the medicine department of KMCH from July 2013 to July 2014 were included. Data was taken from medical record section. Altogether 80 cases diagnosed with pleural effusion by chest x-ray (poster-anterior, anterioposterior and lateral view), and ultra-sonogram were taken. Patients with diagnosis other than tubercular effusion, par pneumonic effusion, and malignant effusion, congestive heart failure, due to liver disease and due to renal disease were mentioned as others. Patient's demographics were enlisted alphabetically to avoid inclusion of same patient more than once. Any patients with confusion were deleted from the study.

This study involved all adult patients (>15 years) with pleural effusions who were admitted to Katihar medical college. Patients underwent thoracentesis in the first 24 hours after Ultrasonography under aseptic conditions, a 16-gauge needle was used, and 100 mL samples of pleural fluid were collected and immediately sent to the biochemical, cytological and microbiological laboratories for analysis. At the same time, blood samples were taken for simultaneous pleural fluid and blood determination of the levels of total protein, albumin, lactate dehydrogenase and glucose.

**OBSERVATION:** Observations are represented below in tables.

**RESULTS:** Table 1 shows, Out of 80 patients of Pleural effusion studied, majority of patients were aged between 61-70 years (28.75%) and were males 46.25% (Table-2). Commonest cause of pleural effusion is tuberculosis 29(36.25%), Second commonest cause of pleural effusion is par pneumonic effusion in 15 patients 18.75% (Table-3).

Commonest symptom of pleural effusion is shortness of breath in 65 patients (81.25%), weight loss occurs in only 11 patients (13.75%) (Table-4). 22 patients of tubercular effusion out of 29 patients of tubercular effusion (75.86%) presented with shortness of breath, 13 patients out of 15 patients of parpneumonic effusion presented with shortness of breath, only 4 patients out of 6 patients (66.66%) of liver disease presented with shortness of breath (Table-5). 23 patients of tubercular effusion out of 29 patients (79.31%) presented with cough, No any patients of pleural effusion due to renal disease presented with cough (Table-6). 25 patients of tubercular effusion out of 29 patients (86.20%) presented with fever, 14 patients of par pneumonic effusion out of 15 patients presented with fever, only 2 patients of pleural effusion due to renal disease (33.33%) presented with fever (Table-7).

**DISCUSSION:** Out of 80 patients of pleural effusion studied, majority of patients were age group of 51 to 70 year 47.50% (Table-1) this finding is consistent with poor and developing countries studies<sup>3-4</sup> but differ from some western studies<sup>1-2</sup> due to low prevalence of infectious disease in their population.

Our study concludes that the tubercular effusion is the commonest cause of unilateral pleural effusion followed by par pneumonic effusion and congestive heart failure is the commonest cause of pleural effusion (Table-3). But in developed countries as shown in study by Storey and coworkers<sup>9</sup> reported that malignancy accounted for nearly 50% of patients with pleural effusion. Tubercular effusion is the common cause of exudative pleural effusion in many areas of the world<sup>17-18</sup> which is consistent with our study which shows that 29 patients were having tubercular effusion out of 80 patients. Tubercular effusion and par pneumonic effusion predominantly in younger patients but pleural effusion due to malignancy and congestive cardiac failure is common in old patients. Shortness of breath, fever and cough are the commonest mode of clinical presentation.

This study also shows that in par pneumonic effusion mean total neutrophil is 72% which shows that par pneumonic effusion is an acute process affecting pleura whereas predominance of mononuclear cells indicates a chronic process. A preponderance of small lymphocytes indicates that the patient most likely has cancer or tuberculous pleuritis.<sup>19-20</sup>

This study is just the retrospective cross-sectional study, with small sample size, the findings should be interpreted with caution. However our study collaborates well with the other study and shows the various mode of clinical presentation, importance of sputum profile and pleural fluid analysis in patient presenting with pleural effusion. Further study would be required to determine the complete clinical profile patient presenting with pleural effusion in this region.

**CONCLUSION:** We have observed various presenting features for pleural effusion are short ness of breath, cough, fever, chest pain etc.; sand important disease factors for the occurrence of pleural effusion such as tubercular effusion, par pneumonic effusion, malignant effusion, congestive heart failure etc. This study would help in early diagnosis and prompt treatment of patients with pleural effusion especially in remote areas which remains a challenging problem. More detailed epidemiologic studies are required to improve understanding of the burden of pleural effusion with its potential risk factors in this region.

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Age in years	No. of patients	Percentage (%)
16-20	9	11.25
21-30	7	8.75
31-40	8	10.00
41-50	11	13.75
51-60	15	18.75
61-70	22	28.75
71-80	7	8.75

**Table 1: Age wise distribution of patients**

Sex	Male	Female
No. of patients	37	46.25
Percentage (%)	43	53.75

**Table 2: Gender wise distribution of patients**

Diagnosis	No. of patients	Percentage (%)
Tubercular effusion	29	36.25
Par pneumonic effusion	15	18.75
Malignant effusion	11	13.75

Congestive Heart failure	9	11.25
Liver disease	6	7.50
Renal disease	4	5.00
Other	6	7.50
<b>Table 3: Distribution of pleural effusion patients based on diagnosis</b>		

Sign and symptoms	No. of patients	Percentage (%)
Shortness of breath	65	81.25
Cough	53	66.25
Fever	46	57.50
Chest pain	27	33.75
Odema	24	30.00
Haemoptysis	19	23.75
Weight loss	11	13.75
<b>Table 4: Clinical presentation of patients</b>		

Diagnosis	No. of patients presented with Shortness of breath	Percentage (%)
Tubercular effusion	22	75.86
Par pneumonic effusion	13	86.66
Malignant effusion	10	90.90
Congestive Heart failure	8	88.88
Liver disease	4	66.66
Renal disease	3	75.00
Other	5	83.33
<b>Table 5: Pleural effusion Patients presented with Shortness of breath with different etiology</b>		

Diagnosis	No. of patients presented with Cough	Percentage (%)
Tubercular effusion	23	79.31
Par pneumonic effusion	13	86.66
Malignant effusion	8	72.72
Congestive Heart failure	5	55.55
Liver disease	2	33.33
Renal disease	0	00.00
Other	2	33.33
<b>Table 6: Pleural effusion Patients presented with Cough with different etiology</b>		

<b>Diagnosis</b>	<b>No. of patients presented with Cough</b>	<b>Percentage (%)</b>
Tubercular effusion	25	86.20
Par pneumonic effusion	14	93.33
Malignant effusion	4	36.36
Congestive Heart failure	1	11.11
Liver disease	2	50.00
Renal disease	2	33.33
Other	1	16.66
<b><i>Table 7: Pleural effusion Patients presented with Fever with different etiology</i></b>		