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RESEARCH ARTICLE

STUDY OF CLINICAL PROFILE AND DIAGNOSTIC APPROACH IN PATIENTS WITH PLEURAL EFFUSION

Dr. Bhushan Laddha[1], Dr. Ekta Chandak[2] and Dr. Pradnya Gatkal[3]

1. Department of Medicine, Vedantaa Institute of Medical Sciences, Dahanu, Maharashtra University of Health Sciences.
2. Grant Medical College and Sir JJ Group of Hospitals, Mumbai.
3. Department of Medicine, Vedantaa Institute of Medical Sciences, Dahanu, Maharashtra University of Health Sciences.

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Abstract

Background: Pleural effusion is a common clinical problem with various underlying causes.
Objective: To investigate the clinical profile and diagnostic approach in patients with pleural effusion.
Methods: A retrospective study was conducted on patients diagnosed with pleural effusion at Vedantaa Institute of Medical Sciences, Dahanu.
Results: In our study, right sided pleural effusion was more common, seen in 48% of patients. In our present study, 62 % patients were with tuberculosis, 12 % with pneumonia, 10 % with CCF, 8% with malignancy, 4 % liver cirrhosis and 4 % septic shock etc. In our present study, out of 51 patients, transudate was present in 13 patients (26%), while exudate was present in 38 patients (74%). The accuracy of the Light's criteria for identifying exudates was 91% [confidence intervals (CI), 84-95%], with a sensitivity of 95.55 % (CI, 93-100%) and specificity of 69% (CI, 52-83%).
Conclusion: A systematic diagnostic approach is essential in patients with pleural effusion to determine the underlying cause and guide appropriate management.

Introduction:-

Pleural effusion is simply defined as, an excess accumulation of fluid between the two pleural layers. (1) Rather than a disease, it is a complication of pulmonary or non-pulmonary diseases and that leads to further consequences, if the things are not properly and timely managed. (2) There is huge number of causes associated with the pleural effusion.

On the Light's criteria, these can be broadly classified into two groups: Viz. exudative and transudative effusion. (2)

There is seen an excessive accumulation of the fluid in the pleural space. Worldwide congestive cardiac failure (CCF) is to be considered the most common cause of the transudate pleural effusion. (2) However in associated with the exudative pleural effusions, tuberculosis, malignancy and pneumonia are the most common causes observed in

Corresponding Author:-Dr. Bhushan Laddha
Address:-Department of Medicine, Vedantaa Institute of Medical Sciences, Dahanu, Maharashtra University of Health Sciences.

India. (2, 3)

However it is really a challenge to the doctor, to find out the exact etiology when in any case detected pleural effusion. It is easy in cases of transudative pleural effusions due to clear based history and clinical examination as well as supporting lab investigations, both leads to diagnose the exact etiology in that particular patient. But in cases of exudative pleural effusions, it is highly challenging to determine it accurately on the clinical grounds and investigations in a real way, though included biochemical, cytological as well as microbiological investigations.

In few cases, computed tomography (CT) scan of thorax, bronchoscopy, pleural biopsy, and thoracoscopy may be suggested for it.

There are various factors on which the etiological distribution are depends for the pleural effusion. These may broadly include the geographical variations, age of the patient, treatment modality, severity, patient care etc. (3,4,5)

In literature we found the most common causes of pleural effusion viz. tuberculosis, congestive heart failure, pneumonia, cancer, and pulmonary embolism etc. Pleural fluid puncture found to be a most important role in differentiation of a transudate effusion from an exudate effusion. [6, 7, 8]

For the proper management of pleural effusion, it is important to know the exact etiology. The exact etiologies can be related to the lung diseases, pleural diseases or link with any systemic disease in cases of pleural effusion. And these things make obstacle in regular patient management.

Dyspnea, predominantly dry cough, especially initially on exertion, and pleurisy chest pain are commonly observed clinical manifestations in these cases. (9)

The patients can be diagnosed with the help of Laboratory testing , chemical as well as the microbiological studies etc.

Still today there found a gap between the knowledge of the etiological diagnosis and clinical profile of the pleural effusion. We planned this research work with an aim to find the etiologies and clinical outcome in a defined population, including patients of pleural effusion admitted to our tertiary care hospital mainly from the rural community.

Material and Methods:-

The present study entitled “Clinico investigative profile of pleural effusion in patients admitted to Vedantaa Institute of Medical Sciences, Dahanu” was descriptive cross sectional study carried in the Department of Medicine, Vedantaa Institute of Medical Sciences.

Study Design:
Descriptive cross sectional study

Study period:
12 months duration starting from March 2022 to March 2023

Study population:
The study was conducted in Vedantaa Institute of Medical Sciences Dahanu, a tertiary care teaching hospital located in the rural area of the Palghar district. In patients with clinical and biochemical evidence of pleural effusion

Sample Size:
A total of 51 samples were included in this study. This included all patients of pleural effusion aged ≥14 years admitted in medicine wards of Vedantaa Hospital.

Inclusion Criteria:
- Patient age more than 12 years, male or female
- Patients with tappable pleural effusion
- Patients willing to give consent for the study, and parental consent for patients less than 15 years

Exclusion Criteria:
1. Patients with loculated, non-tapable pleural effusion
2. Patients with coagulopathies or bleeding tendencies
3. Patients with any other contraindications to pleural tapping
4. Non-consenting patients

Data Collection:
Demographic and clinical information, laboratory results, and imaging studies

Statistical Analysis:
SPSS software version 23, descriptive statistics, chi-squared tests, and Fisher's exact tests

Ethical Issues
The study was conducted following Helsinki declaration and after it was approved by the Institutional Ethical Committee and Research Cell of Institute. A written informed consent was taken from all the patients and only those who consented were studied.

Results:-

Table 1:- Age wise distribution of patients.

Age range (Years)	Number of patients	Percentage
18 -30	15	29.4
31-50	9	17.64
51-60	5	9.80
61	22	43.14
Totalpatients	51	100

In present study mean age of patients was 50.21 years, while maximum patients were above 61 years of age.

Table 2:- Gender wise distribution of patients.

Gender wise distribution	Number of patients	Percentage
Male	31	60.78
Female	20	39.21
Total number of patients	51	100

In present study maximum patients were male (60.78%) while female patients were 39.21%.

Table 3:- Etiology of pleural effusion – distribution of patients.

Etiology of pleural effusion	**Number of patients**	**Percentage**
Tubercular pleural effusion	32	62.74

Synpneumonic	6	11.76
CCF	5	9.80
Malignancy	4	7.84
Liver cirrhosis	2	3.92
Septic shock	2	3.92

In present study, 62.74 % patients were with tuberculosis, 11.76 % with synpneumonic, 9.80% with CCF , 7.84% with malignancy , 3.92 % with liver cirrhosis and 3.92 % with septic shock.

Table 4:- Distribution of radiological features :

Radiological X ray features	**Number of patients**	**Percentage**
Right sided pleural effusion	28	54.90
Left sided pleural effusion	14	27.45
B/L Pleural effusion	5	9.80
Neoplastic mass with pleural effusion	4	7.84

In present study , in 28 patients (54.90 %) was observed right side pleural effusion ,in 14 patients (27.45%) was observed left side pleural effusion..

Table 5:- Distribution of patients according to presenting complaints:

Clinical features	**Number of patients**	**Percentage**
Breathlessness	43	84.31
Cough with expectoration	42	82.35
Fever	36	70.58
Weight loss	21	41.18
Chest pain	18	35.29
Lower limb swelling	11	21.57
Dry cough	9	17.64
Abdominal distension	8	15.68
Loss of appetite	7	13.72
Giddiness	5	9.80

In present study, 43 patients (84.31 %) with breathlessness , in 42 patients (82.35%) were with cough with expectoration etc.

Table 6:- TLC Count – pleural fluid - examination in patients.

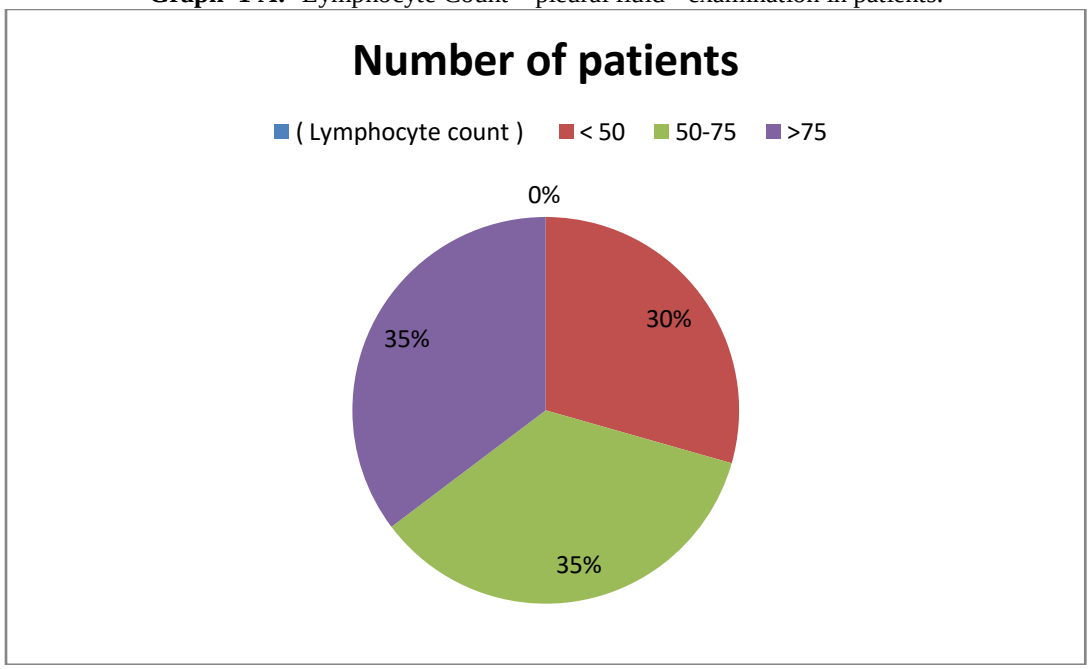
TLC Count	Number of patients	Percentage
< 100	22	43.13
101-1000	18	35.29
>1000	11	21.56

In present study , TLC count was less than 100 in 22(43.13%) patients , more than than 1000 in 11(21.56%) patients while it was in range 101-1000 in 18 patients

DLC – pleural fluid - examination in patients :

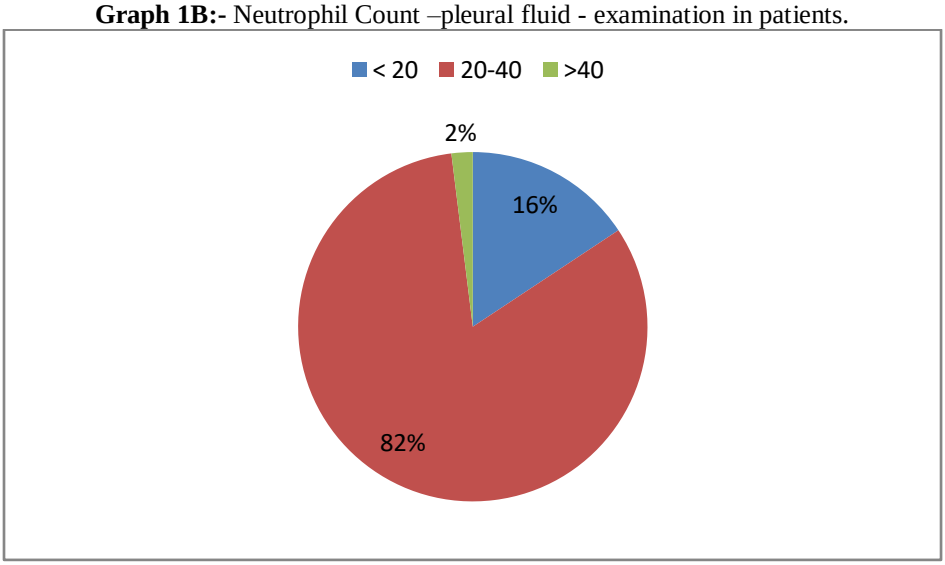
1. In present study , Lymphocyte count was less than 50 in 15 (29.4%) patients , more than than 75 in 18(35.29%) patients while it was in range 50 -75in 18 patients(35.29%).
2. In present study , Neutrophil Count was less than 20 in 8 patients(15.68%) , more than than 40 in 1(1.96%)patients while it was in range 20 -40 in 42 patients(82.35%).

Graph 1 A:- Lymphocyte Count – pleural fluid - examination in patients.



In present study , Lymphocyte count was less than 50 in 15 (29.4%) patients,more than than 75 in 18(35.29%) patients while it was in range 50 -75in 18 patients(35.29%).

Graph 1B:- Neutrophil Count –pleural fluid - examination in patients.



In present study , Neutrophil Count was less than 20 in 8 patients(15.68%) , more than than 40 in 1(1.96%)patients while it was in range 20 -40 in 42 patients(82.35%).

Table 7:- Distribution of patients according to mean pleural fluid LDH levels.

Etiology	Number of patients (N= 51)	MEAN (gm/dl)	Standard Deviation (SD)
TB	32	582.84	410.19
Synpneumonic	6	557.10	61.20
CCF	5	89.4	48.09
Malignancy	4	555.5	119.33
Cirrhosis	2	69.50	31.29
Septic shock	2	138.12	82.90

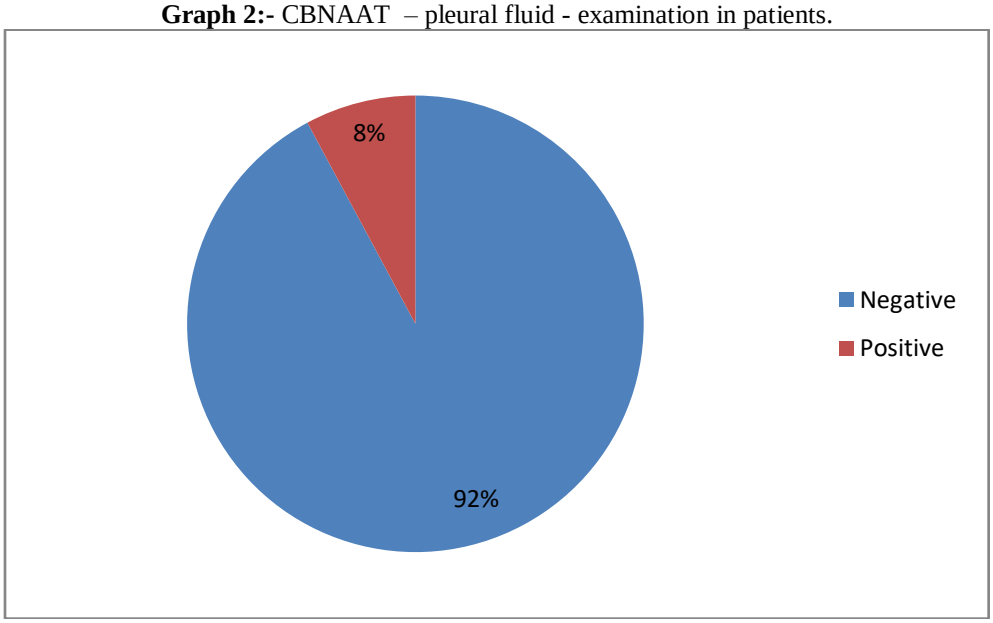
In present study,highest LDH levels were seen in TB patients.

Table 8:- Malignant cells – pleural fluid - examination in patients.

Malignant cells	Number of patients	Percentage
Negative	47	92.15
Positive	4	7.84

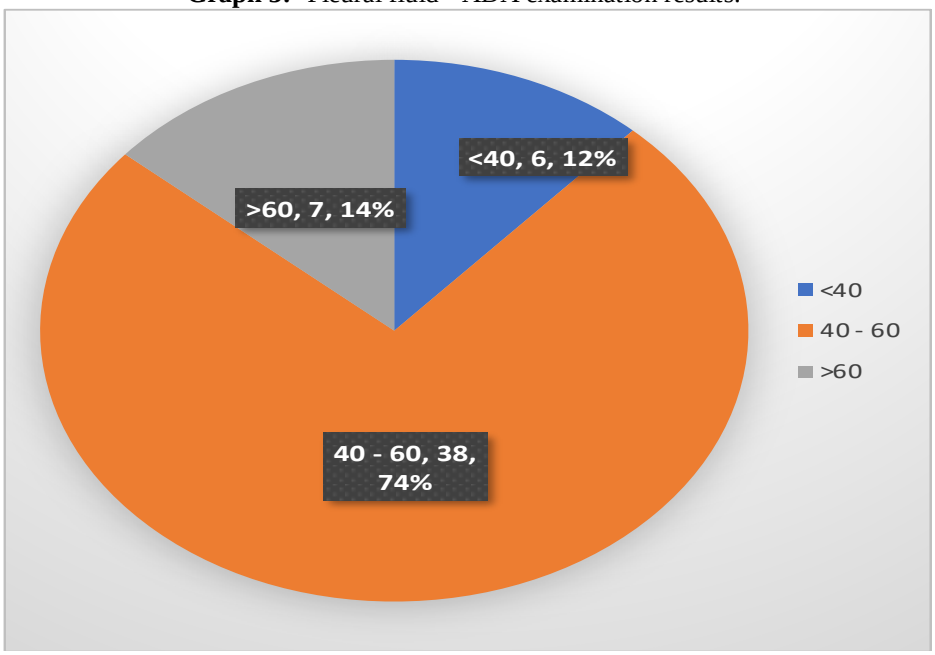
In present study, Malignant cells was seen in 4 patients (7.84 %)

Graph 2:- CBNAAT – pleural fluid - examination in patients.



In present study, CBNAAT was negative in 47 patients. (92.15%) while positive in 4 (7.84%) patients.

Graph 3:- Pleural fluid - ADA examination results:



Inpresent study, Pleural fluid - ADA was < 40 in 6 patients (11.76%) while it was in range 40-60 in 38 patients(74.05%). >60 in 7 patients (13.72%)

Inpresent study, Transudate waspresent in 13 patients(25.49%) while, exudate was present in 38 patients (74.50%).

Discussion:-

1. In present study mean age of patients was 50.21 years, while maximum patients were above 61 years of age. In study of Porcel JM et al[34] mean age was 58 .02 years,In Biswas B et al [36]study the mean age was 51 years.
2. In present study 60.74% patients were male while female patients were 39.21%. Similar results were seen in studies of Porcel JM et al and Biswas B et al (34,36) where they found male patients to be 64% and 66%, respectively.

3. In present study, 62.74 % patients were due to tuberculosis, 11.76 % had synpneumonic. Similar results were obtained byMaikapMK et al they concluded, the most common cause of pleural effusion in his study was tuberculosis (68.8%), followed by malignancy (14%)
4. In present studypresenting clinical features were, 43 patients (84.31 %) with breathlessness followed by 42 patients (82.35%) with cough with expectoration. In study of Biswas B et al, the most common presenting symptom was shortness of breath (95.4%), followed by chest pain (89.4%).
5. In our study right sided pleural effusion (54.90%) was more common.Similarly, Poongavanam Paranthaman[48] study also right sided pleural effusion was common (56%).
6. Pleural fluid TLC count was less than 100/cumm in 22(43.13%) patients, more than than 1000/cumm in 11(21.56%) patients. Similar results were noted by Biswas B et al,Porcel JM et al., Khamar N D et al and Dhital KR (36,34,27, 50) who found that TLC count was respectively less than 100/cumm in 38 %
7. In the presentstudy,Mean pleural fluid LDH levels for etiology of tuberculosis was 582.84 IU/L, pneumonia 557.10 IU/L etc.
8. 758 .33 IU/L in Porcel JM et al study, 561.09 IU/L in Khamar et al study
9. In the present study, CBNAAT was negative in 47 patients (92.15%) while positive in 4 (7.84%) patients. In Porcel JM et al study CBNAT was positive in 4% patients (34).2% in PoongavanamParanthaman et al study
10. In present study, Pleural fluid - ADA was < 40 IU/L in 6 patients (11.76%) while it was in range 40-60 IU/L in 38 patients (74.05%). While comparing with Biswas B et al study (36) , Out of 36 cases of malignancy, 34 cases (94.4%) had ADA value <40 IU/L.

Conclusion:-

1. Dry cough (17.64%), abdominal distension (15.68%). The most common presenting complaint was breathlessness (84.31%), followed by cough with expectoration (82.35%),fever (70.58%), weight loss (41.18%), chest pain (35.29%), lower limb swelling (21.57appetite (13.72%) and giddiness (9.80%).
2. Based on clinical examination and chest X-ray findings 54.90% patients had right sided pleural effusion, 27.45% patients had left sided pleural effusion, 9.80 % had bilateral pleural effusion and 7.84% had malignant pleural effusion.
3. The lights criteria was used to dignose exudative and transudative pleural effusion by simultaneous determination of pleural fluid to serum protein ratio and pleural fluid to serum LDH ratio. Exudative pleural effusion was present in 74.50% and transudative pleural effusion was present in 25.49%.
4. The commonest cause of pleural effusion was tuberculosis (62.74%), followed by synpneumonic pleural effusion (11.76%), CCF (9.80%), malignancy (7.84%),liver cirrhosis (3.92%) & septic shock (3.92%).

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