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Diagnostic presentations of different pleural effusion patients to a tertiary care centre: A descriptive cross-sectional study

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Abstract--BACKGROUND-Pleural effusion is defined as collection of fluid between the two pleural covering. OBJECTIVE-To evaluate the different etiologies of pleural effusion according to laboratory report. METHODOLOGY-Data was collected in a nonprobability convenience technique with descriptive cross-sectional study in indoor patient of pulmonary medicine department of Balangir Bhima Bhoi medical college from 2017 nov to 2020 nov, 202 patients included in this technique. Diagnosis was confirmed by chest -x-Ray, and USG Chest in some cases, .Pleural fluid is aspirated from all and analysed with necessary investigation carried out ,like pleural fluid cytology, Biochemical and culture .computed tomography ,echocardiography and connective tissue profile for evaluating the underlying cause of pleural effusion. RESULT- Out of 202 patients 145 (73%) were male and 57(26)% were female Mean age was 44.8years with 19,832 SD .Among patients of pleural effusion most common cause was tuberculosis (65.3%). followed by Para pneumonic effusion/empyema (11.4%), malignancy both metastatic and primary accounted for

(15%), heart failure also showed its presence in 5% of cases. Connective tissue disorder was found to be the cause in only one case (0.5%). In one case (0.5%) pleural effusion remained undiagnosed. Conclusion: Tuberculous pleural effusion is the most common cause of pleural effusion. Less common causes include parapneumonic effusion, malignant effusion and cardiac failure. Key words: Pleural Effusion; Tubercular Pleural Effusion; Pleural Biopsy CONCLUSION- Tuberculous pleural effusion is the most common cause of pleural effusion. Others are less common.

Keywords--pleural effusion, tubercular, pleural effusion.

Introduction

There are two type of pleural effusion, Transudative and exudative, Exudative is mainly due to inflammation in pleura, having high protein, LDH, TLC count, low specific gravity etc. Transudative is due to capillary leak. The cause may be local or systemic, lungs or extrapulmonary organ ⁽²⁾., Normally 0.1 or 0.2 ml/kg fluid is present. When the production or reabsorption imbalance then pleural effusion develop. ⁽¹⁾ It may prove to be fatal if not diagnosed or treated timely, 1 to 1.5 million cases of pleural effusion are presented to physicians per annum in US while in UK the newly detected cases of pleural effusion is between 200,000 to 250,000. ⁽³⁾ Most of the cases are diagnosed by detailed history followed by clinical examination and relevant investigations. ⁽⁴⁾ . Sometimes the diagnoses become challengeable to physicians as etiology remains unknown in 15% of the cases ⁽⁷⁾. In this study it was 7 attempted to conclude an etiological diagnosis by analysing the history, detailed clinical examination and relevant cytological, bacteriological, histological, biochemical and radiological investigations

Methodology

It was a descriptive study for a period of 3 year. from Jan 2018 to Dec 2019 carried out in Department of pulmonary and Medicine of BB MCH BALANGIR. Approval for the study was obtained from research and ethical committee of the hospital. Adult 202 patients of 14 and above by age from both genders were included in study. Pleural effusion was detected on both clinical and radiological examination and was confirmed by Chest ultrasound where needed. Informed written consent was taken from the enlisted patient in the study. This consent was not only for enrolment of study but was also for diagnostic interventions. After history and was clinical examination. chest X-ray done in all cases was mostly PA view but lateral and decubitus and USG Thorax were also done where needed. This was then followed by pleural fluid aspiration and its routine examination. Exclusion criteria are Patients who were hemodynamically unstable or already diagnosed on treatment. also, patients with acute history of trauma or fire arm injury. Cytological, microbiological and biochemical examination forms are part of this routine examination. CBC, LFTs, RFTs, and blood glucose was done in all cases. In relevant cases sputum Expert MTB/RIF assay was done. Gram 'stain Z.N staining for AFB and when necessary Expert MTB/RIF assay was also carried out as directed along with routine fluid examination. Imaging of

thorax and abdomen with CT and U/G were also done where needed. In few cases image guided (CT) FNAC, Fibre optic bronchoscopy (F.O.B) biopsy were also done. ECG, and necessary Echocardiogram was performed for diagnosis of cardiac problems.

Data Analysis

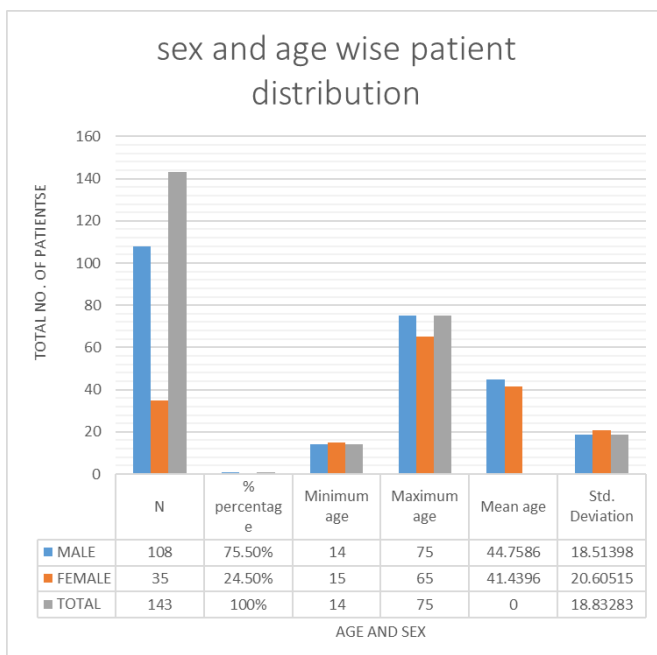
All information was recorded and was analysed statistically. Statistical analysis was performed by using SPSS version 20.0. Frequencies / Percentages were calculated for qualitative variables, while Mean \pm standard deviation was calculated for quantitative variables. Results were documented as tables.

Result

The study of the two-department showing 75.5% male and 24.5% female patients. Patient age varies between 14 and 75 years with mean age for male 44.75+18.513 SD and female 41.43+20.605 SD respectively (Table 1)

Table 4.1
Sex and age wise distribution of patients

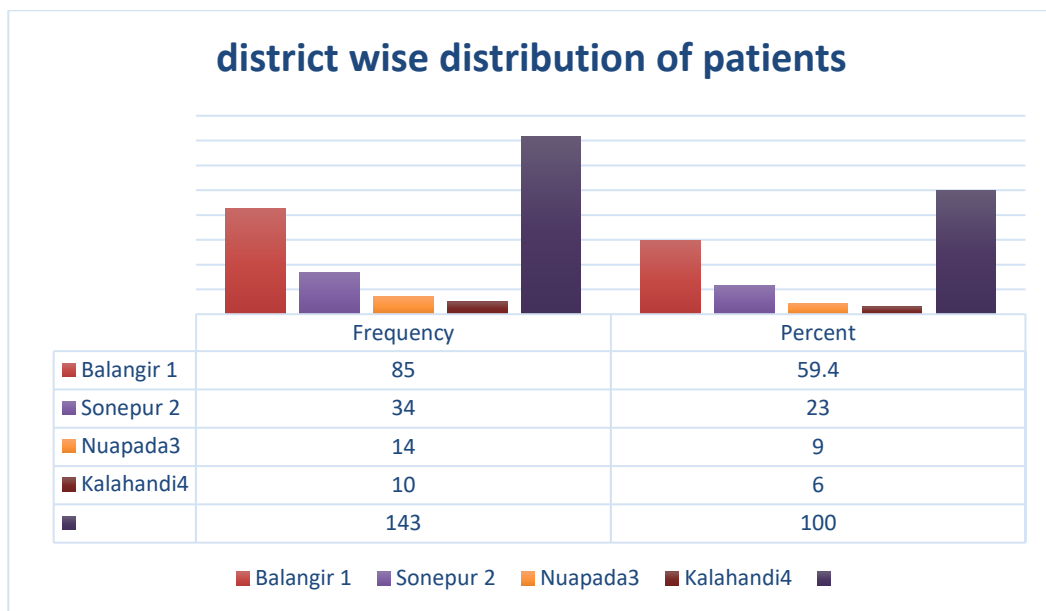
SEX	N	% percentage	Minimum age	Maximum age	Mean age	Std. Deviation
MALE	108	75.5%	14	75	44.7586	18.51398
FEMALE	35	24.5%	15	65	41.4396	20.60515
TOTAL	143	100%	14	75	44.8218	18.83283



Most of the patients included in study were from BALANGIR district,as well as other nearer district.

Table 4. 2
District wise distribution of patients

District	Frequency	Percent
Balangir	85	59.4
Sonepur	34	23
Nuapada	14	9
Kalahandi	10	6
	143	100.0



Tuberculosis is the common cause of pleural effusion in our study next disease is parapneumonic effusion (PPE) and malignancy. Only eight patients (5%) presented with pleural effusion due to CCF. Right sided effusion was found in 85 cases which makes 59.4% of the total and left sided effusion was present in 51 patients making 35.6% of the total patients, while bilateral effusion was detected in 2 cases making 4.0%. of the total (Table 3).

Table 4.3
Side versus Diagnosis of effusion

Diagnoses	Side of effusion			Total
	Right side effusion	Left side effusion	Bilateral Effusion	
Tuberculosis	49	30	2	81
Parapneumonic effusion/Pleural	10	11	2	23

empyema				
Malignant pleural effusion	12	3	0	15
Malignant pleural mesothelioma	9	1	0	10
Congestive cardiac failure	4	2	2	8
Hemothorax	1	3	0	4
Connective tissue disorder	0	1	0	1
Undiagnosed	0	0	1	1
Total	85	51	7	143

Right sided effusion was found in 85 cases which makes 59.4% of the total and left sided effusion was present in 51 patients making 35.1% of the total patients, while bilateral effusion was detected in 7 cases making 4.0% of the total (Table 4). 49 patients with TB presented with right sided effusion while 30 patients presented with left sided effusion and bilateral effusions were present in only 2 cases. Bilateral effusion was not detected in malignancy. Majority of the patients with CCF presented with right sided effusion though patients with left side and bilateral effusion were also found in CCF (Table 4).

Table 4.4
Mean age distribution of different patients with diseases

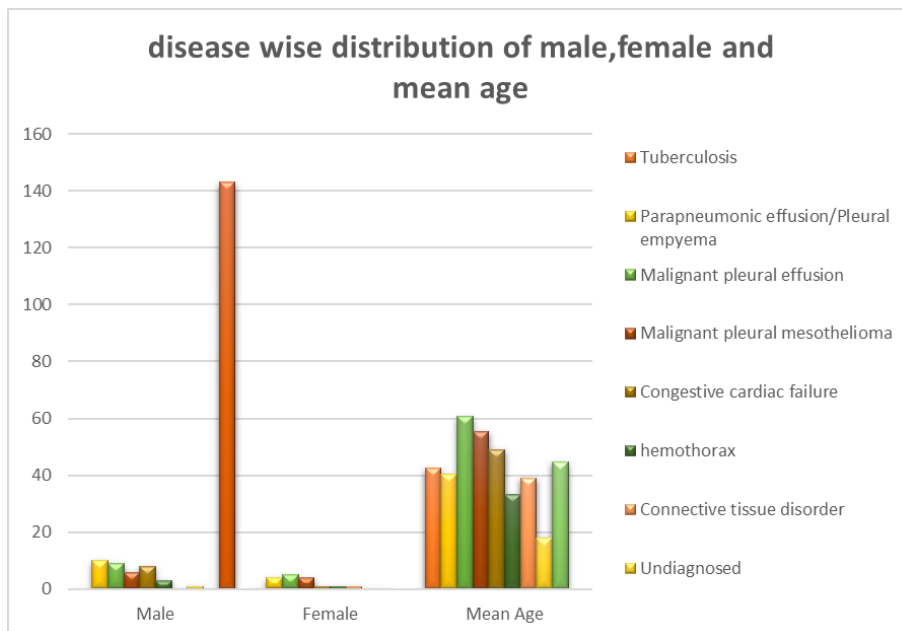
Diagnoses	No of cases	percentage	Mean Age
Tuberculosis	81	56.6%	42.40
Parapneumonic effusion/Pleural empyema	23	16%	40.34
Malignant pleural effusion	15	10%	60.68
Malignant pleural mesothelioma	10	6%	55.40
Congestive cardiac failure	8	5%	49.10
hemothorax	4	2%	33.25
Connective tissue disorder	1	0.6%	39.00
Undiagnosed	1	0.6%	18
Total	143		44.75

Tuberculosis is found to be more common in younger age group with mean age of 42.4 while malignancy (metastatic) was common in old age with mean age of 60.68. Mean age for malignant pleural mesothelioma was 55.4 and for PPE was found to be 48.34. Single patient with connective tissue disorder was female and a teenager versus diagnosis of effusion. Tubercular effusion was found to be more in males than females (38% males and 18.1% females). Likewise all other causes

of pleural effusions were more in males than in females but pleural effusion due to connective tissue disorders was only found in females.

Table 4.5
Gender versus diagnosis of effusion

Diagnoses	Male	Female	Mean Age
Tuberculosis	55(38%)	26(18%)	42.40
Parapneumonic effusion/Pleural empyema	10	4	40.34
Malignant pleural effusion	9	5	60.68
Malignant mesothelioma	6	4	55.40
Congestive cardiac failure	8	1	49.10
hemothorax	3	1	33.25
Connective tissue disorder	0	1	39.00
Undiagnosed	1	0	18
	92(64%)	45(31%)	44.75
total	143		



Discussion

In our study common cause for pleural effusion was pulmonary tuberculosis (56.6%), followed by parapneumonic effusion/empyema (16. %), metastatic lung

(10.%) and malignant mesothelioma (6.%). We found that transudative effusion was mainly due to CCF and was found only in 5% of cases. Tubercular effusion was found in younger age group while malignant effusion was common in patients of age group 55 and above. Right sided effusion was found in 59.4% while left sided was found in 35.1%, while in 4% of cases it was bilateral. CCF is the common cause of pleural effusion worldwide and in developing countries like, India, Bangladesh, Malaysia tuberculosis leads the race. Our 7 results were similar to the observations made by Abbas et al and in India in Pakistan. Tuberculosis was also found to be common cause of pleural effusion by Jindal and Valdes. As this study was conducted in medical unit of 11 teaching hospital, where cases of CCF were studied in cardiology department. This may also be the reason for a smaller number of reported transudative effusion as have got referral to their respective units. In our study pleural effusion due to all causes was more common in males (64%) than in females (31%) and male: female ratio was 2.04:1, similar ratio of gender was found to be present in tubercular effusion as well. Earlier studies also showed that pleural effusion was found more in males. This was also finding by Sharma et al.

The slightly higher male ratio reported in our study as compared to other international studies may be due to difference in number of patients. Social, cultural norms and male dominant society may also contribute to this fact as female are less likely to get health facilities as compared to male. In our study tubercular effusion was more common in younger age group with a mean age of 41 years. A study conducted in the past also highlighted that common age group was between 21 and 40 years. The cause of TB in this age group is most likely due to primary pleural infection at an early age rather than reactivation of previous lung parenchymal tuberculosis. Patients with Tubercular effusion presented to us mainly with complaints of fever, cough and chest pain while those with malignant effusion also have got similar complaints but dyspnea and weight loss was more pronounced in them. However, fever was an uncommon feature of malignant effusions. Berger and Megia also concluded that patients with Tubercular effusion presented with pleuritic chest, non-productive cough and fever. Cher now et al also found in their study that 13 dyspnea and weight loss were the presenting symptoms in patients with malignant effusion. Fever was more 14 common in benign effusion (tubercular) as compared to malignant, it was also observed by an observer in the past.¹⁵ In our study right sided effusion (57%) was more common than left sided effusion (38%).

A study done in the past also showed that right sided effusion was more common than left.¹⁶ Regarding physical appearance, cardiac effusion was clear, turbid effusion was found in PPE while tubercular and malignant effusions were straw colour and haemorrhagic respectively however. Similar findings have been reported in work done by Light RW. In Tubercular 17 effusion lymphocyte count was more than 50%, this is what already explained by Light RW. Polymorphs were 18 found in excess in PPE and this again was in accordance to the finding of Light RW, Ball CW, et al. Atypical cells 18 were present in malignant effusion in 48% of cases which was again according to the findings of Light RW. In 18,19 developing countries like Pakistan simple pleural fluid analysis is the initial tool to guide further work up in reaching the final diagnosis. Blind pleural biopsy coupled 6 with immune histochemical staining of biopsy material has revived this old

procedure in establishing the diagnosis. Complicated effusion and undiagnosed 20 cases may need further workup like, computed tomography scans, bronchoscopy and thoracoscopic pleural biopsy under vision. Conclusion It was concluded that after many decades Tuberculosis still remains the common cause of pleural effusion in Pakistan. This is followed by Para Pneumonic effusion. In developing countries simple pleural fluid analysis and blind pleural biopsy coupled with immune histochemical staining still remains the best tools in diagnosing pleural effusion though complicated and undiagnosed cases, may need further workup like CT scans, bronchoscopy and thoracoscopic pleural biopsy.

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