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A Study of Pleural Effusion in Elderly

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Abstract

Introduction: Excess quantity of fluid in the pleural space, limiting the expansion of the lungs during ventilation.[1,2] is pleural effusion. Elderly patients are more prone to pleural effusion. Common diseases causing pleural effusion occur in the elderly people than in the younger. There is lack of study for various systemic diseases including pleural effusion in elderly population of Indian subcontinent.

Methods: This is a Prospective observational study done in elderly patients (age ≥60years) detected having pleural effusion attending MGM Hospital for treatment from May 2014 to Dec 2015.

Results: In this study, 66.7% were males and 33.3% were females. Cough and breathlessness were the most common clinical feature among 91.7% and 88.9% cases respectively. Carcinoma was detected in 33.3% females, 20.8%males, tuberculosis in 16.7% females, 12.5% males, heart failure in 16.7% females, 16.7 % males, pneumonia in 8.3% females, 16.7 % males. Pleural effusion was exudative in 58.33% and transudative in 41.66%. Carcinoma was (25.0%) the most common cause followed by para pneumonia effusion & empyema (19.44%) in exudate. In transudate the most common cause is congestive cardiac failure (16.66%) followed by the renal failure (5.55%). Tubercular pleural effusion was in 11.11% and non-tubercular pleural effusion in 88.88%. Malignancy (25.0%) was the most common non tubercular aetiology.

Conclusion: Incidence of pleural effusion is more among elderly males. Most common symptom for male was cough and females was breathlessness. Bilateral pleural effusion is common followed by the right sided pleural effusion. Most common aetiology of exudate was carcinoma and of transudate was heart failure.

Keywords: Exudate, Gender-wise distribution, Transudate

Introduction

The pleural space lies between the lungs & chest wall & normally contains a very thin layer of fluid, which serves as coupling system. A pleural effusion is present when there is excess quantity of fluid in the pleural space, limiting the expansion of the lungs during ventilation.[1,2] Elderly patients are more prone to pleural effusion due to reduction in the immune power along with it the muscle weakness caused at the chest wall and bone weakness. As the age progress the diaphragm gets weaken these all factors add on to the retention of the fluid in the pleural space.[2] Common diseases like tuberculosis, malignancy, congestive heart failure cause pleural effusion which mostly occur in the elderly people than in the younger ones. Geriatric population all over the world is increasing as such it is even increasing in India. There is lack of study for various systemic diseases including pleural effusion in elderly population of Indian subcontinent. The 2001 census showed that elderly population in India

consisting of 28 states and 7 union territories accounted for 77 million, where as in 1961, the elderly population was only 25 million and that is likely to increase 3-fold from 98 million in 2011 to 298 million in 2051. The proportion of elderly persons in India has risen from 5.6% in 1961 to 7.5% in 2001 and to 8.1% in 2011 and is 2 expected to reach 17% by 2050. Thus, the present study sample size is according to the demography of aging in India.[3]

Aims And Objectives:

1. To study the clinical profile of pleural effusion in elderly.

2. To study the underlying aetiologies of pleural effusion in elderly.

Materials And Methods:

Study Design: Prospective observational study

Study Population: elderly patients (age ≥60years) detected having pleural effusion (both in patient and out-patient) attending MGM Hospital for treatment from May 2014 to Dec 2015.

Setting: Department of Geriatrics, MGM Medical College Hospital, Kamothe

Methods: Detailed history will be taken from patient and meticulous examination will be done according to prepared proforma.

1. Information regarding detailed history of symptoms including fever, cough, shortness of breath, weight loss, night sweat etc. will be taken.
2. Thorough physical examination of all the systems with special emphasis on respiratory system will be done.
3. Previous hospital records and investigation done will be recorded.
4. All patients will be subjected for routine blood investigation including complete hemogram, urine analysis blood sugar, urea, creatinine sputum analysis, chest x-ray and pleural fluid analysis. USG chest HRCT chest and other special investigation will be carried out if considered necessary in particular cases. The Analysis of pleural fluid will include
5. Appearance
6. Specific gravity
7. Biochemical analysis (total protein, sugar & Adenosine Deaminase.)
8. Cytological analysis (cell count & cell type, malignant cells)
9. Bacteriological analysis (Gram stain & AFB staining)
10. Culture (bacteriological & AFB culture) as deemed necessary.

Inclusion & Exclusion Criteria:

Inclusion Criteria:

1. Patients equal to or above 60 years age of both genders.
2. Patient's willingness to participate in long term follow up program.

Exclusion Criteria:

1. Patients age less than 60years even if they are suffering from pleural effusion.
2. Pleural effusion caused due to trauma

Results:

Table – 1 shows that age group and sex wise distribution of geriatric patents who are already completed 60 years and above. Overall, 36 patients are included in this study, out of these 24(66.7%) males and 12(33.3%) are females

Table-2 shows the clinical feature wise distribution among 36(100%) cases in the study group. Cough and breathlessness were the most common clinical feature among 33(91.7%) and 32(88.9%) cases in the study group respectively followed by fever in 29(80.6%) cases. Chest pain was seen in 21(58.3%) cases. Chills was seen in 19(52.8%) cases, rest were with other symptoms i.e., 7(19.4%) cases.

Table – 3 shows that pleural fluid analysis in sex wise of geriatric patients. In sex all the above parameters like TLC, P, L, E, PROTEIN, SUGAR, ADA and LDH are not statistically significant at 5% level i.e., P>0.05.

Table – 4 and shows the microbiology of the pleural fluid in the geriatric group which are grouped into male 25 and female 18 which further grouped according to the cells found i.e., mesothelial cells in females is 12(100%), malignant cells 5(41.7%) acid fast bacilli's 1(8.3%) in males out of 25, mesothelial cells were 19(79.2%) malignant cells 5(20.8%) acid fast bacilli's 1(4.2%).

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Table 5 shows that laboratory Investigation in sex wise of geriatric patients. In sex all the above parameters like BILI –Total, BILI-Direct, SGOT, SGPT, ALKOP4, TPR, ALBUMIN, GLOBULIN, Na and K are not statistically significant at 5% level i.e., P>0.05.

Table – 6 shows the total female i.e., 12 and male i.e., 24 grouped accordingly with diagnosis got are out of 12, females with carcinoma were 4(33.3%), tuberculosis 2(16.7%), Heart failure 2(16.7%), pneumonia 1(8.3%) others 3(25.0%). Out of 24, males with carcinoma were 5(20.8%), tuberculosis 3(12.5%), heart failure 4(16.7%), pneumonia 4(16.7%), others 8(33.3%).

Table –7 shows the group made as per the x ray findings got in females out of 12 are bilateral pleural effusion was in 4 (33.3%) right sided pleural effusion was in 5(41.7%) left sided pleural effusion in 3 (25%) and in males out of 24 are bilateral pleural effusion was in 11(45.8%) right sided pleural effusion in 7(29.2%) left sided pleural effusion in 6(25%).

Figures 1.1, 1.2 shows the different causes of pleural effusion in 36(100%) into exudate 21(58.33%) and transudate 15(41.66%). The exudate 21(58.33%) is further divided into carcinoma is 9(25.0%) which is the most common cause followed by para pneumonia effusion & empyema 7(19.44%), tuberculosis 4(11.11%) & others 1(2.77%). Transudate 15(41.66%) is further divided into the most common cause is congestive cardiac failure 6(16.66%) followed by the renal failure 2(5.55%) and the other different causes are 7(19.44%).

According to the Light's criteria pleural effusion is classified into 2 types i.e.

Exudate and Transudate. As per the previous studies Light's criteria was taken as 98% sensitive. In the present study of geriatric patients the total of 36(100%) patients in which 21(58.33%) patients have exudate pleural effusion and 15(41.66%) patients have transudate pleural effusion.

Table-8: shows the division of 36(100%) geriatric patients into tubercular pleural effusion 4(11.11%) and non-tubercular pleural effusion 32(88.88%). The non-tubercular pleural effusion 32(88.88%) is further divided into malignancy 9(25.0%) which is most common non tubercular aetiology followed by para pneumonia effusion & empyema 7(19.44%), congestive cardiac failure 6(16.66%), renal failure 2(5.55%) and others 8(22.22%)

Table-1: Age and Sex wise distribution of Geriatrics Patient

Age group	Sex		Total
	Male	Female	
60-64	5	5	10
65-69	3	7	10
70-74	1	5	6
75-79	2	6	8
80+	1	1	2
Total (%)	12(33.3%)	24(66.7%)	36(100%)

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Table-2: Clinical features of Geriatrics Patients

Clinical Features	No. of cases	Percentage (N=36)
Cough	33	91.70%
Breathlessness	32	88.90%
Chest Pain	21	58.30%
Fever	29	80.60%
Chills	19	52.80%
Others	7	19.40%

Table -3: Pleural Fluid Analysis of Geriatrics Patients

Pleural Fluid	Sex	N	Mean	Std dev	T -test	P-value	Significant
TLC	Female	12	1893.3333	1486.9085	0.739	0.465	NOT
	Male	24	1473.7500	1660.9029			
P	Female	12	39.4167	30.8558	1.472	0.150	NOT
	Male	24	55.3750	30.5867			
L	Female	12	60.5000	30.9472	1.443	0.158	NOT
	Male	24	44.8750	30.4578			
E	Female	12	8.333E-02	.2887	0.429	0.670	NOT
	Male	24	.1667	.6370			
PROTEIN	Female	12	3.8008	1.6237	0.541	0.592	NOT
	Male	24	3.4742	1.7469			
SUGAR	Female	12	127.7083	53.9836	0.511	0.613	NOT
	Male	24	138.1500	59.5862			
ADA	Female	12	24.3500	21.9253	0.968	0.340	NOT
	Male	23	42.5696	62.8431			

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LDH	Female	4	295.2500	308.1183	0.696	0.497	NOT
	Male	13	978.2308	1913.6228			

Table-4: Pleural Fluid of Geriatrics Patients

Pleural Fluid	Sex				Total	
	Female		Male			
	N	%	N	%	N	%
ME. CELLS	12	100.0	19	79.2	33	91.7
MALIGNANT CELLS	5	41.7	5	20.8	10	27.8
AFB	1	8.3	1	4.2	2	5.6

Table-5: Laboratory Investigation Analysis of Geriatrics Patients

Laboratory Investigation	Sex	N	Mean	Stdev	T -test	Pvalue	Significant
LIVER FUNCTION TEST							
BILI-T	Female	12	1.0892	.6142	0.366	0.717	NOT
	Male	24	1.1742	.6773			
BILI-D	Female	12	.6475	.4246	1.261	0.216	NOT
	Male	24	.8596	.4980			
SGOT	Female	12	40.4500	52.9843	0.010	0.992	NOT
	Male	24	40.6250	49.9076			
SGPT	Female	12	25.8833	18.6990	0.548	0.587	NOT

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	Male	24	29.9125	21.7110			
ALKPO4	Female	12	162.1667	27.3856	0.497	0.623	NOT
	Male	24	157.7917	23.6349			
TPR	Female	12	7.3092	.6065	0.920	0.364	NOT
	Male	24	7.5217	.6748			
ALBUMIN	Female	12	3.8300	.5775	0.790	0.435	NOT
	Male	24	3.9829	.5330			
GLOBULIN	Female	12	3.1058	.5720	0.315	0.755	NOT
	Male	24	3.1617	.4643			
ELECTROLYTES							
Na	Female	12	131.2500	5.8640	0.381	0.706	NOT
	Male	24	131.8750	3.9266			
K	Female	12	3.3000	.4328	1.868	0.070	NOT
	Male	24	3.7042	.6811			

Table 6: Diagnosis of Geriatrics Patients

DIAGNOSIS	SEX				**Total**	
	Female		Male			
	N	%	N	%	N	%
Carcinoma	4	33.3	5	20.8	9	25.0
TB	2	16.7	3	12.5	5	13.9
Heart Failure	2	16.7	4	16.7	6	16.7
Pneumonia	1	8.3	4	16.7	5	13.9
Others	3	25.0	8	33.3	11	30.5
TOTAL	12	100.0	24	100.0	36	100.0

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Table 7: Chest X-ray of Geriatrics Patients

CHEST X-RAY	SEX				Total	
	F		M			
	N	%	N	%	N	%
B/L Pleural effusion	4	33.3	11	45.8	15	41.7
Right sided pleural effusion	5	41.7	7	29.2	12	33.3
Left sided pleural effusion	3	25.0	6	25.0	9	25.0
TOTAL	**12**	100.0	**24**	100.0	**36**	100.0

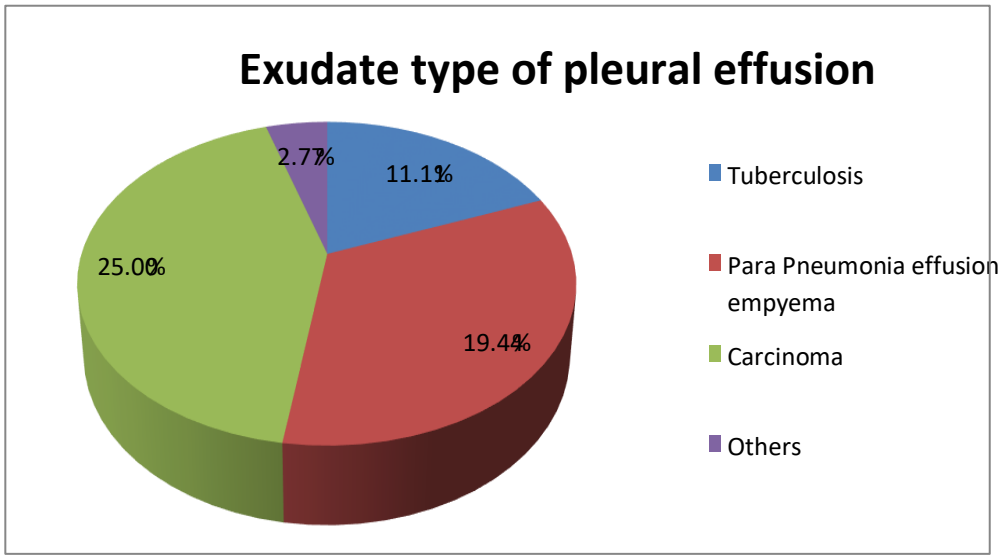

Figure 1.1

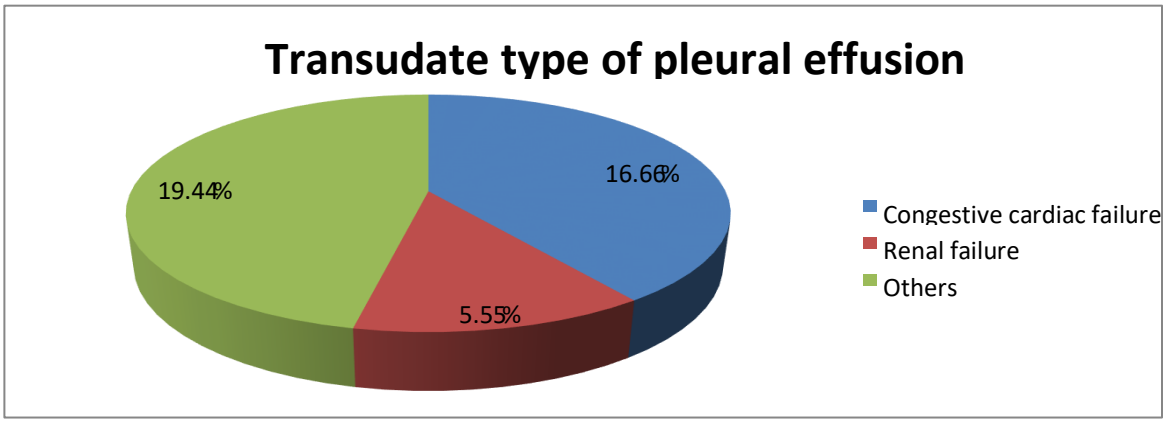

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Figure 1.2

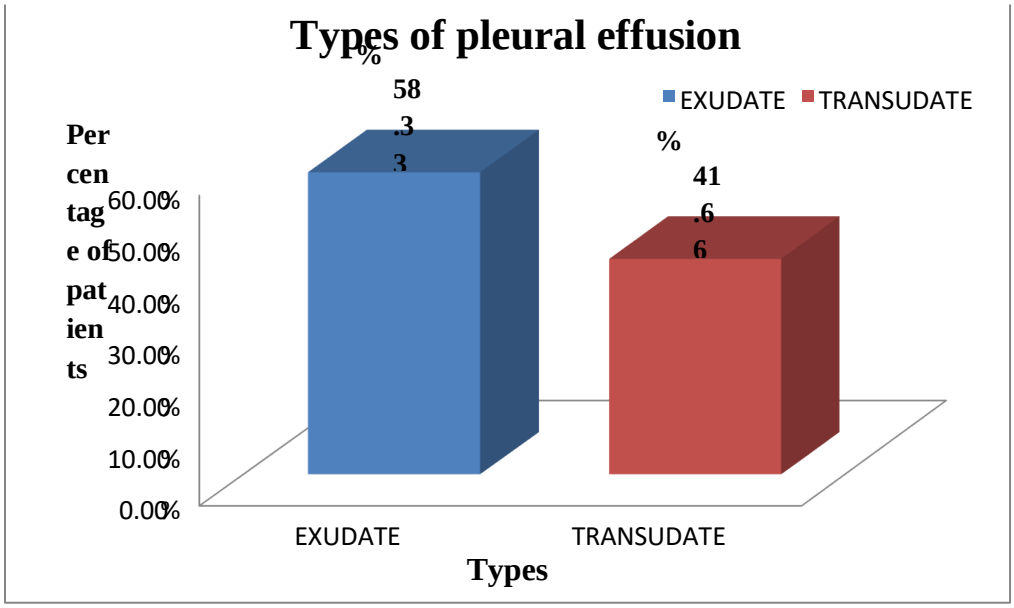

Table-8: Etiological diagnosis of pleural effusion

Group code	Diagnosis	No. of cases	Percentage
A	Tubercular pleural effusion	4	11.11%
B	Non-Tubercular pleural effusion	32	88.88%
	a) Malignancy	9	25.0%
	b) Para Pneumonia effusion & empyema	7	19.44%
	c) Congestive cardiac failure	6	16.66%
	d) Renal failure	2	5.55%
	e) Others	8	22.22%
	Total	36	100%

Discussion:

The present study is an observational study of clinical profile and underlying aetiology in elderly (≥60yrs) patients with pleural effusion. The study is specifically done in elderly as the geriatric population all over the world as well in India is increasing. There is lack of studies in elderly population especially in Indian Subcontinent, for various systemic diseases including pleural effusion. Elderly patients present with clinical features milder than in young, due to the age-related degenerative changes in all the systems. Thus, this study might help to know the proper

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presentation of pleural effusion, its underlying aetiology, to respond quickly, to start the treatment & future management. The study was conducted with 36 elderly patients presented with clinical and radiological features suggestive of pleural effusion. Among the 36 cases in the study group majority of them were males (66.7%) compared to females (33.3%). Among age distribution majority of cases were in age group of 60 to 70 years (Table no-1). In the clinical presentation cough (91.7%) was the most common followed by breathlessness (88.9%) and fever (80.6%), chest pain (58.3%), chills (52.8%), although, with the younger patients' fever is more common. (Table No-2)

The pleural fluid is analysed and co-related for finding the underlying aetiology of pleural effusion by all the parameters like TLC, P, L, E, PROTEIN, SUGAR, ADA and LDH. The microbiological examination of the pleural fluid showed the mesothelial cells as the major cells in both the sex followed by the malignant cells which were more in females compared to the male and the very less was the acid-fast bacilli. Bhavsar Kaushal M et al. showed majority of the patients with tuberculous pleural had yellowish and turbid fluid, while malignant pleural effusion had haemorrhagic fluid.[4] All blood investigation like complete blood count, liver function test, renal function test, serum electrolytes etc is done to find out and co-relate the systemic diseases effecting the formation of pleural fluid. According to the diagnostic co-relation done as per the Das DK et al malignancy was the most common cause of the pleural effusion in elderly followed by heart failure and tuberculosis compared with the Qarat study where tuberculosis is said to the most common aetiology for pleural effusion.[5,6] The chest x-ray findings were also correlated with the diagnosis for the type of or side of pleural fluid accumulation. Bilateral pleural effusion was the most common followed by the right sided pleural effusion. Our study even showed right sided pleural effusion was more common in malignancy, tuberculous, and parapneumonic effusion while bilateral pleural effusion was more common in patients with CCF and hypoproteinaemia. Majority of the patients with malignant pleural effusion had large effusion, while tuberculous pleural effusion had moderate effusion shown in Bhavsar Kaushal M et al.[4] The pleural fluid is classified into exudate and transudate based on Light's criteria. The previous studies showed the sensitivity of the Light's criteria was taken as 98% & sensitivity for proteins in pleural fluid in one of the studies by Calikoglu et al. was 92%. The study done by Girish K Shanthaveeranna et al. In the present study the exudate effusion is more common than the transudate. The exudate further showed the malignant effusion more common followed by the pneumonia and empyema. The transudative pleural effusion that are most common aetiology is heart failure.[7] The etiological classification of pleural fluid in the present study was done by comparing with the similar study done by Bhavsar Kaushal M et al. which as concluded that tuberculosis effusion was more common in younger age group (below 40 years) while malignant effusion was more common in older age group (above 60 years).[4]

Conclusion:

Incidence of pleural effusion is more among males and most of them are in the age group of 60-70 years. Cough, breathlessness, fever, and chest pain are common symptoms seen in the elderly patients. Almost all males have cough as the common symptom, whereas females have breathlessness as the most common symptom. According to x ray findings bilateral pleural effusion is common followed by the right sided pleural effusion. Right sided pleural effusion is in common in malignancy. Carcinoma is major etiology of the exudate type of pleural effusion in elderly. Heart failure is the most common aetiology of transudate pleural effusion in elderly. In overall i.e., both exudate and transudate pleural fluid, carcinoma is the most common aetiology of pleural effusion in elderly

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