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Comparison of Occurrence of Pulmonary Hypertension in Patients with Tubercular Destroyed Lungs and Their Clinical Characterstics Compared With Patients of Pulmonary Hypertension Associate with Chronic Obstructive Pulmonary Disease

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Abstract

Background: Chronic obstructive pulmonary disease (COPD) is a leading cause of morbidity and mortality worldwide with an increasing prevalence during the past decades.One established complication of COPD is the development of pulmonary hypertension (PH). Typically pulmonary hypertension appears when airflow limitation is severe and is associated with chronic hypoxemia, the main pathophysiological cause being chronic alveolar hypoxia, although new mechanisms have emerged recently.

Methods: This study was conducted in Dept. of Respiratory Medicine Sardar Patel Medical College and, associate group of P.B.M. Hospitals, Bikaner. All Patients who satisfy the inclusion criteria attending the indoor patient of respiratory medicine dept. from January 2019 to December 2019.

Results: In group A out of 50 cases, 18 (36%) cases have PAH and 32 (64%) cases do not have PAH. In group B out of 50 cases, 24 (48%) cases have PAH and 26 (52%) cases do not have any PAH.

Conclusion: The presence of pulmonary artery hypertension in tubercular destroyed lung PAH 18(36%) patients in younger age, but in COPD, PAH 24 (48%) patients occur in older age and there is no association between lobar distribution of lung and pulmonary hypertension in tubercular destroyed lung,

but associated with severity of lung destruction.

Keywords: COPD, PAH, Tuberculosis.

Introduction

The term tuberculous-destroyed lung (TDL) is usually used to describe the destructive lung parenchymal changes due to sequelae of pulmonary tuberculosis, which occur over years and cause chronic airway obstruction as well as restrictive change, but clinical manifestations of tuberculosis-destroyed lung can be similar to those of chronic obstructive pulmonary disease (COPD) with manifestations of dyspnea due to airway obstruction. There are few predictive factors to suggest differences in the prognosis between patients with tuberculosis-destroyed lung and those with COPD when patients with dyspnea, caused by aggravation of airway obstruction. [1-2]

Chronic obstructive pulmonary disease (COPD) is a leading cause of morbidity and mortality worldwide with an increasing prevalence during the past decades.One established complication of COPD is the development of pulmonary hypertension (PH). Typically pulmonary hypertension appears when airflow limitation is severe and is associated with chronic hypoxemia, the main pathophysiological cause being chronic alveolar hypoxia, although new mechanisms have emerged recently. [3-5]

Materials and Methods

Study Design : It is a Prospective Cross Sectional Study

Source of Data : Patients were admitted in department of respiratory medicine disease hospital, S.P. Medical College, Bikaner.

Study Period: January 2019 to December 2019.

Sample Size: 100 patients were included in this study as per inclusion criteria in which 50 patients had included tubercular destroyed lung (Group A) and 50 patients had included as COPD (Group B) after obtaining informed written consent, attending Respiratory Disease Hospital, S.P. Medical Collge, Bikaner.

Inclusion criteria

a) Those who are giving informed consent.

b) Patients with destroyed lung in one or more lobes, who underwent at least one spirometry test while having a stable status and who were 18 years old.

c) Patients presenting with clinical suspicion of COPD or who are known case of COPD were included in study.

Exclusion criteria

a) Patients with active TB, non-tuberculous mycobacterial infection, lung cancer, or a history of lung resection surgery were excluded.

Method

This study was conducted in Dept. of Respiratory Medicine Sardar Patel Medical College and, associate group of P.B.M. Hospitals, Bikaner.

All Patients who satisfy the inclusion criteria attending the indoor patient of respiratory medicine dept. from January 2019 to December 2019.

The extent of Tubercular Destroyed lung was analyzed according to the lobar distribution. The upper and lower lobes and right middle lobe were Counted as one each lobe and the lingular segment was regarded as a separate lobe.

- Demographic findings, comorbid conditions, chest X-ray findings with or without chest computed tomography(CT), lung function and cardiac function as assessed by two dimensional Doppler transthorasic echocardiography(2D Echo) were collected.
- We were identified patients with COPD who had

echocardiographic data during the same study period as those for patients with tuberculosis-destroyed lung.

- Patients with tuberculosis-destroyed lung and PAH (PAH Group) and without PAH(non PAH group) were compared.
- Additionally the PAH with TDL group was compared with patients of PAH associate with COPD (COPD group).

The chi-square test was used to compare categorical variables and Student t-test were applied for continuous variables.

We were perform univariate and multivariate logistic regression analyses using Firth's penalized likelihood approach to compensate for the small sample size after adjusting for confounders, for occurrence of pulmonary arterial hypertension.

Radiographic finding and the involved lung lobes allowed multiple responses.

Pearson's correlation analysis was applied to identify the relationship between pulmonary arterial pressure and mortality from the national statistical office, we was analyzed inter group differences in clinical outcomes including mortality, using Kaplan-Meir methods.

- **P-value 0.05 was considered significant.**

Results

Table 1:Distribution of cases of Group A (TDL) and Group B (COPD) according to "Age Group"

Age Group (In Years)	Male		Female	
	Group A	Group B	Group A	Group B
≤ 40	10	1	6	1
41-50	6	4	3	2
51-60	10	13	4	3
61-70	5	15	3	0
>70	4	11	0	0
Total	35	44	15	6

In Group A (TDL), 10 cases male and 6 cases female in age group of ≤40, 6 cases male and 3 cases female in age group of 41-50, 10 cases male and 4 cases female in age group of 51-60, 5 cases male and 3 cases female in age group of 61-70, 4 cases male and 0 cases female in age group of >70. As shown in above table, In Group B (COPD), 1 cases male and 1 cases female in age group of ≤40, 4 cases male and 2 cases female in age group of 41-50, 13 cases male and 3 cases female in age group of 51-60, 15 cases male and 0 cases female in age group of 61-70, 11 cases male and 0 cases female in age group of >70.

Table 2: Distribution of cases of Group A (TDL) and Group B (COPD) according to presence of "Pulmonary Arterial Hypertension"

Age Group (In Years)	Group A PAH				Group B PAH			
	Present		Absent		Present		Absent	
	Male	Female	Male	Female	Male	Female	Male	Female
≤ 40	4	2	6	4	0	1	1	0
41-50	1	2	5	1	2	2	2	0
51-60	4	2	6	2	9	1	4	2
61-70	1	1	4	1	3	0	12	0
>70	1	0	3	0	6	0	5	0
Total	11	7	24	8	20	4	24	2

In Group A (TDL), 4 male and 2 female have PAH and 6 male and 4 female Non PAH in age group of ≤40, 1 male 2 females PAH and 5 male and 1 female Non PAH in age group of 41-50, 4 male 2 females PAH and 6 male and 2 female Non PAH in age group of 51-60, 1 male 1 females PAH and 4 male and 1 female Non PAH in age group of 61-70, 1 male no females PAH and 3 male and no female Non PAH in age group of >70.

As shown in above table, In Group B (COPD), no male and 1 female have PAH and 1 male and no female Non PAH in age group of ≤40, 2 male 2 females PAH and 2 male and no female Non PAH in age group of 41-50, 9 male 1 females PAH and 4 male and 2 female Non PAH in age group of 51-60, 3 male no females PAH and 12 male and no female Non PAH in age group of 61-70, 6 male no females PAH and 5 male and no female Non PAH in age group of >70.

Table 3: Distribution of cases of Group A (TDL) and Group B (COPD) according to "MMRC Grade"

MMRC Grade	PAH		Non-PAH	
	Group A	Group B	Group A	Group B
Grade I	0	0	2	1
Grade II	8	4	17	6
Grade III	8	16	13	16
Grade IV	2	4	0	3
Total	18	24	32	26

As shown in above table Group A (TDL), no cases PAH and 2 cases had Non PAH in Grade I of MMRC, 8 cases PAH and 17 cases had Non PAH in Grade II of MMRC, 8 cases PAH and 13 cases had Non PAH in Grade III of MMRC, 2 cases PAH and no cases had Non PAH in Grade IV of MMRC.

In Group B (COPD), no cases PAH and 1 cases had Non PAH in Grade I of MMRC, 4 cases PAH and 6 cases had Non PAH in Grade II of MMRC, 16 cases PAH and 16 cases had Non PAH in Grade III of MMRC, 4 cases PAH and 3 cases had Non PAH in Grade IV of MMRC.

Table 4: Distribution of cases of Group A (TDL) and Group B (COPD) according to Measurement of pulmonary hypertension by calculating SPAP (Systolic Pulmonary Arterial Pressure) (2D-Echo)

SPAP (Systolic Pulmonary Arterial Pressure)	Group A (TDL)	Group B (COPD)
Normal	32	26
Mild	4	7
Moderate	11	7
Severe	2	10
Total	50	50

As shown in above table, 32 cases in Group A and 26 cases in Group B have normal SPAP, 4 cases in Group A and 7 cases in Group B have Mild SPAP, 11 cases in Group A and 7 cases in Group B have Moderate SPAP, 2 cases in Group A and 10 cases in Group B have Severe SPAP.

Table 5: Distribution of cases of Group A and Group B according to "PAH"

PAH	Group A (TDL)	Group B (COPD)
Yes	18	24
No	32	26
Total	50	50

As shown in above table, in group A out of 50 cases , 18 (36%) cases have PAH and 32 (64%) cases do not have PAH.

In group B out of 50 cases,24 (48%) cases have PAH and 26 (52%) cases do not have any PAH.

Discussion

We analyzed the occurrence of pulmonary artery hypertension in tubercular destroyed lung and comparing with COPD groups. The clinical implications of PAH in patients with tuberculosis-

destroyed lung and mortality were elucidated.

This prospective cross sectional hospital based study was conducted in department of respiratory medicine in S.P. Medical College, Bikaner, Rajasthan, India.

In the study by Babets et al examined 29 men with severe course of COPD in stable phase of pathological process (average age - 65.4 ± 2.6 years). In relation to smoking, patients were distributed as follows: 28 (96.6%).

Kessler et al[6] showed that PAH develops in 25% of patients with moderate COPD. Supporting this hypothesis, one study reported that tuberculosis-destroyed lung is a progressive rather than a stable disease by showing a pattern of decline in FEV1 during follow-up similar to that of COPD.4–7 Overall mortality was 32.31% (63 of 195) in this study and tended to be higher in the PAH group than in the non PAH group.

In our study in group A, 18 (36%) cases have PAH and 32 (64%) cases do not have PAH. In group B among 50 cases, 24 (48%) cases have PAH and 26 (52%) cases do not have PAH.

In the study by Suk Jo et al examined 195 patients with tuberculosis-destroyed lung, echocardiographic data were available in 53 patients. The PAH group (n=37) had a smaller lung volume and more extensively destroyed lungs than those in the non-PAH group (n=16). Multivariate analyses did not reveal any significant risk factors contributing to PAH in patients with tuberculosis-destroyed lung. Compared to COPD patients with PAH, tuberculosis-destroyed lung patients with PAH have smaller lung volume but a less severe airflow limitation.

Conclusion

The presence of pulmonary artery hypertension in tubercular destroyed lung PAH 18(36%) patients in younger age, but in COPD, PAH 24 (48%) patients occur in older age and there is no association between lobar distribution of lung and pulmonary hypertension in tubercular destroyed lung, but associated with severity of lung destruction.

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