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Respiratory Medicine

PREVALENCE OF PULMONARY ARTERY HYPERTENSION IN TREATED CASES OF PULMONARY TUBERCULOSIS

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ABSTRACT

BACKGROUND : India is the highest TB burden country in the world having an estimated incidence of 26.9 lakh cases in 2019 (WHO) .Bilateral and extensive tuberculosis can cause PAH due to extensive fibrosis,which causes distortion of parenchyma .The increase in pulmonary vascular resistance seems to be the basic underlying mechanism leading to pulmonary hypertension(PAH) long standing PAH leads to Cor pulmonale eventually leading to right ventricular hypertrophy and failure .

AIMS AND OBJECTIVES: To evaluate the prevalence of the pulmonary artery hypertension in treated case of pulmonary tuberculosis patients.

METHODS: This was an Cross Sectional study was conducted in the New Medical College and Hospital, Kota over a period of one year from March 2019 to Feb 2020 On 100 subjects.

RESULTS: Mean age of the patients was 51.75+_13.30 years.Most of the patients (42.6%) where found to have dyspnea grade 3 scales at the time of presentation.Out of total study subject, 38% patients had PAH , out of these 71% had mild PH , 13.2% and 15.8% patients had moderate , severe PAH respectively . Chi-square analysis was applied to find the statistical correlation between mean pulmonary artery pressure and dyspnea ($p<0.001$)I.e severity of pulmonary hypertension increase as increase in dyspnea grade.

CONCLUSION: Prevalence of PAH has a linear relationship with severity of Post tuberculosis and severe PAH is almost associated with cor-pulmonale.

KEYWORDS : PAH ,Dyspnea ,cor pulmonale ,Tuberculosis

INTRODUCTION

- India is the highest TB burden country in the world having an estimated incidence of 26.9 lakh cases in 2019 (WHO). To address this, the ability to achieve complete surveillance coverage is the prerequisite. Complete surveillance coverage would enable all levels of program management to ensure that complete and adequate diagnostic, treatment and preventive services are provisioned to all affected cases[1].
- This increase in cases was observed across all aspects of TB Notification. However, the largest proportion of increase came from the private sector. In 2019 the private sector contributed 6.79 lakh notifications, approximately 28% of total notifications. This is an increase of 25% as compared to 2018.
- Bilateral and extensive tuberculosis can cause PAH due to extensive fibrosis,which causes distortion of parenchyma. The increase in pulmonary vascular resistance seems to be the basic underlying mechanism leading to pulmonary hypertension(PAH) long standing PAH leads to Cor pulmonale eventually leading to right ventricular hypertrophy and failure[7,8].
- PAH is characterized hemodynamically by a resting mean pulmonary artery pressure (Ppa) > 20 mmHg at rest and >30mm hg during exercise.
- Cor- pulmonale-Definition according to Braunwald: Right ventricular hypertrophy and dilation secondary to pulmonary hypertension caused by diseases of the lung parenchyma and / or pulmonary vasculature, unrelated to the left side of the heart.

AIMS AND OBJECTIVES :

- To evaluate the prevalence of the pulmonary artery hypertension in treated case of pulmonary tuberculosis patients.
- To correlate this with other post tuberculosis clinico-radiological factors like total duration, radiological extent of disease.
- To correlate the ECG abnormalities in treated case of pulmonary tuberculosis patients.
- To correlate 2D-echo finding in treated case of pulmonary tuberculosis patients.

MATERIALS AND METHOD: Cross sectional study

- Number of patients-100
- **Criteria of inclusion :** All previously treated patients of pulmonary tuberculosis that are bacteriologically negative with the symptoms of pulmonary artery hypertension
- **Criteria of Exclusion:**
- Patient with associated other pulmonary diseases.
- Patient with systemic illness including systemic hypertension.
- Patient with primary cardiac diseases.
- Patient with associated Connective tissue disease, Portal hypertension ,Congenital heart disease ,Drug and toxin induced.
- **Data Collection:**

1. All the selected patients were subjected to resting two Dimension trans-thoracic Doppler echocardiography .
2. Both 2D and M-Mode studies were done.
3. Echocardiography was reviewed to assess pericardium, valvular anatomy, left and right side chamber size chamber size and cardiac functions.
4. Tricuspid regurgitate flow was identified by colour flow Doppler technique and maximum jet velocity was measured by continuous wave Doppler without the use of contrast.
5. Right ventricular systolic pressure was estimated based on modified Bernoulli equation and was considered to be equal to the SPAP (systolic pulmonary artery hypertension) in the absence of right ventricular outflow obstruction.
6. SPAP(mmHg) = right ventricular systolic pressure = Trans-tricuspid gradient + right atrial pressure(RAP).

RESULTS :

ECHO	P value	ECG	P value	Other variable	P value
RA dilation	0.315	P pulmonale	0.114	Age	0.7889
RV dilation	0.262	RAD	0.442	Smoking index	0.3982
TR	0.190	RVH	0.297	TDI	0.6402
PAH	0.022			Dyspnea severity	<0.001

TABLE 1 **TABLE 2** **TABLE 3**

TABLE 1: Significance level of ECHO findings among male and female patients

TABLE 2: Significance level of ECG findings among male and female patients

TABLE 3: Correlation of mean PAP with various parameters

DISCUSSION:

- This is cross sectional study done in the Department of Respiratory Medicine, New Medical College Hospital, Kota during period march 2019 to feb 2020.
- On the basis of history, clinical examination and various investigation of 100 previously treated patients of pulmonary tuberculosis that are bacteriologically negative with the symptoms of pulmonary artery hypertension .
- There was 74 males and 26 female Patients in study population.
- Mean age of the patients was 51.75+/_13.30 years
- The prevalence of PAH in present study population was 38.0%,
- Most of the patients 50% had duration of illness more than 5 years of post ATT.
- In male cough was more common than female and the difference was found to be statistically significant ($p<0.05$)
- Most of the patients (42.6%) where found to have dyspnea grade 3 scales at the time of presentation.
- TR was seen as most common anomaly on Echocardiography 67%.
- Out of total study subject, 38% patients had PAH , out of these 71% had mild PH , 13.2% and 15.8% patients had moderate , severe PAH respectively .
- ECG abnormalities were present in half of the patients 50%, most common ECG abnormalities were P- Pulmonale 44%, RAD 41% and RVH 35%
- Chest X ray is the basic investigation in patients with post tuberculosis as it gives information about the lungs, heart and the condition that precipitates acute infection. Most of the patients in present study had Chest X ray evidence of previous pulmonary tuberculosis infection. Chest X ray evidence of Cardiac complications of post tuberculosis – pulmonary hypertension (38%) in our study.
- In present study most common radiological abnormalities was fibrocavitatory 27%, followed by fibro bronchiectasis 18%. Ahmed et al. Reported was fibrocavitatory 50%
- Chi-square analysis was applied to find the statistical correlation between mean pulmonary artery pressure and dyspnea ($p<0.001$)I.e severity of pulmonary hypertension increase as increase in dyspnea grade.
- Significant correlation between mean pulmonary artery pressure and TR($p<0.01$) but there is no correlation with age ,smoking index ,and total duration of illness.

CONCLUSION

- Prevalence of PAH has a linear relationship with severity of Post tuberculosis and severe PAH is almost associated with cor-pulmonale.
- PAH remains an important cause of respiratory disability and a key contributor of mortality in microbiologically treated PTB patients.
- Early case finding and treatment of PTB and engaging other strategies to prevent follow-up complications such as PAH is the need of the hour.

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