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PREVALENCE OF PULMONARY HYPERTENSION IN PATIENTS TREATED FOR PULMONARY TUBERCULOSIS IN A TERTIARY HOSPITAL

Respiratory Medicine

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ABSTRACT

Background: Pulmonary tuberculosis may lead to parenchymal destruction of the lung tissue, which may affect the vascular structure and cause vasculitis and endarteritis, subsequently leading to a reduced cross-sectional area of the pulmonary vasculature and thereby pulmonary hypertension. The World Symposium on Pulmonary Hypertension (WSPH) recommends defining PH as a mean pulmonary artery pressure (mPAP) greater than 20 mm hg. **Aim :** To assess the prevalence and risk factors for pulmonary hypertension in patients treated for pulmonary tuberculosis in a tertiary care hospital **Methods :** It is a Retrospective study conducted in Trichy SRM medical college hospital and research center from September 2021 to April 2022. 100 Patients who got treated for pulmonary tuberculosis, admitted with shortness of breath , investigated for pulmonary hypertension whose detailed medical history, including history of PTB, physical examination findings, chest X-ray, 12-lead electro-cardiogram (ECG), and 2D echo-cardiography were recorded and those reports was analyzed. **Result :** In the present study around 53% of the pulmonary tb patients had mild to moderate pulmonary hypertension. The Echo findings are associated with the spirometry changes which is statistically significant with a p value of 0.02. **Conclusion:** Pulmonary hypertension is a significant complication in treated pulmonary tuberculosis patients. This study highlights the need for early detection, treatment of pulmonary hypertension in treated pulmonary tuberculosis patients to prevent morbidity and mortality associated with pulmonary hypertension.

KEYWORDS

INTRODUCTION

Tuberculosis (TB) is among the top infectious causes of morbidity and mortality worldwide and is associated with frequent pulmonary damage despite microbiological cure. Patients with treated TB may remain lifelong sufferers of disabling structural and functional sequelae of the disease, which subsequently impair quality of life. Clinical experience suggests that post-pulmonary tuberculosis lung disease (PTLD) is an important cause of group 3 pulmonary hypertension (PH). However, TB is not listed as a cause of PH in most guidelines. (Louw) Long-term follow-up studies have revealed that many patients with treated pulmonary TB show signs of permanent impairment of their lung function. Impairment is variable in pattern and severity, ranging from none to severe, and shows restrictive, obstructive, or mixed patterns. Survivors of tuberculosis were 5.4 times more likely to have abnormal pulmonary function test results than were LTBI patients.Post-tuberculosis sequelae are associated with significant morbidity and an estimated reduction of more than 16 life-years in WHO high burden countries.

Pulmonary hypertension (PH) is a serious disorder with poor prognosis. It is defined as a mean pulmonary arterial pressure (PAP) of more than 25 mm Hg at rest. (Marjani M & 10.1016/j.bjid.)The prognosis of patients with the mean pulmonary artery pressure higher than 30 mmHg (3.33 kPa) is very bad, the median survival being about 10 months. Contrarily, a low-grade pulmonary hypertension may not, per se, provide sinister prognostic outlooks. (Marjani M & 10.1016/j.bjid.) (Vyslouzil Z & 7418569.)

PH, contributed by varied reasons, appears to be frequently encountered in our OPD practice and it was incidental to find a preceding history of pulmonary tuberculosis without any other forthcoming cause for PH. This entity of "tuberculosis-related PH," as we name it, is not well-recognized and not been given any space in all the classifications of PH. (Bhattacharyya P, 27051098, & PMCI)

Active tuberculosis by unknown mechanisms may be directly responsible for rising PAP. Moreover, PH may be related to parenchymal destruction and hypoxia in the course of the disease especially in case of delayed diagnosis and initiation of anti-TB treatment. Concomitant lung diseases such as COPD as well as myocardial involvement could be the cause of PH. (Marjani M & 10.1016/j.bjid.) (Seegert AB & 28027993.) (Muhammed)

It is uncertain if PH may evolve or improve in the post-treatment period or even develop years after the initial episode of TB. PH-postTB has been described since the 1950s13, however,much of the literature on PH-postTB predates the 1980s and was conducted even before the advent of effective chemotherapeutic agents. The development of PH in other non-TB CLD is known to be associated with a poorer prognosis2,3and it has been reported in a small study that patients with PH-post-TB have increased mortality compared to non-TB related group 3 PH and also had increased re-admission rates. (Louw)

Pulmonary hypertension remains an understudied post-tuberculosis lung sequela because of several diagnostic challenges. Pulmonary hypertension is defined by a resting mean pulmonary artery pressure of more than 20 mm Hg, which requires invasive right heart catheterisation to diagnose.

Specialised equipment is needed for this procedure, as well as trained staff for medication administration and haemodynamic monitoring, which are not readily available in resource-limited settings. The management of pulmonary hypertension is subsequently dictated by measures of cardiopulmonary haemodynamics. While the prevalence of pulmonary hypertension among tuberculosis survivors is unknown, some data from echocardiography suggest it can manifest in up to 47% of tuberculosis survivors who experience dyspnoea after tuberculosis therapy.

As the world advances towards eliminating tuberculosis, it is crucial not to forget the tuberculosis survivors who still face a significant burden of disease from chronic lung destruction, particularly in regard to the diagnosis of post-tuberculosis pulmonary hypertension. Improved, less expensive, and less invasive diagnostic methods are needed. (Vyslouzil Z & 7418569.) Globally, it is estimated that there are currently 155 million survivors of TB , however the sequela, including pulmonary hypertension post TB (PH-post TB),may contribute significantly to the unmeasured burden of disease and mortality that TB survivors experience after treatment completion. (Louw)However, with the shift towards earlier diagnosis and intervention in all forms of PH, reliable estimation and identification of post-TB PH has become essential.Thus the present study was conducted with the objective to assess the prevalence and risk factors for pulmonary hypertension in patients treated for pulmonary tuberculosis in a tertiary care hospital

METHODS AND MATERIALS

The present study is a Retrospective study conducted in tertiary

healthcare medical college hospital and research centre from September 2021 to April 2022. The study was conducted among 100 patients, the sample size calculated based on the previous study estimated using the formula 4pq/d2. The patients were recruited from the respiratory medicine department who got treated for pulmonary tuberculosis, after explaining the details of the study, prior informed written consent was obtained from the patients.

The study was presented at the institutional ethics committee and approval was obtained before the data collection. Purposive sampling was applied to select participants. The inclusion criteria for recruitment of the participants were history of tuberculosis treated and declared cured with microbiological confirmation came with symptoms and admitted with shortness of breath. Patients with severe stages of sickness, drug resistant, defaulters and those admitted in intensive care were excluded.

According to the World Symposium on Pulmonary Hypertension (WSPH) defined PH as a mean pulmonary artery pressure (mPAP) greater than 20 mm hg was taken as the operational definition. The eligible patients included in the study were investigated for pulmonary hypertension. Their detailed medical history, of diagnosis, treatment of PTB, was collected with face-to-face interviewing and medical reports, ensuring the completion of treatment. The patients underwent physical examination and findings were documented followed by which the patients were subjected to chest X□ray, 12□lead electrocardiogram (ECG), and 2D echocardiography for assessment of pulmonary hypertension. The findings were noted and compiled in MS excel for further analysis. The confidentiality of the case details and participants information was maintained throughout the study. The data collected was entered into excel sheet which was compiled and coded for evaluation.

The coded data was analyzed using SPSS version 21, the continuous data were assessed and represented as mean and standard deviation and categorical data was given as frequency and percentages. The association was assessed using chi square test categorical variables.

RESULTS

Among the 100 participants in the study majority were male ie 68 % with an overall mean age of the participants being 51.29 10.7 years. The average BMI was 23.9 3.3 among the particicpants. In the present study around 53% of the pulmonary tb patients had mild to moderate pulmonary hypertension. The Echo findings are associated with the spirometry changes which is statistically significant with a p value of 0.02.

Majority of the patients had fibrosis of lungs in x-ray findings, about 50%, whereas 24% had fibrosis with cavitation. In 12% x-ray findings showed bronchihectasis.

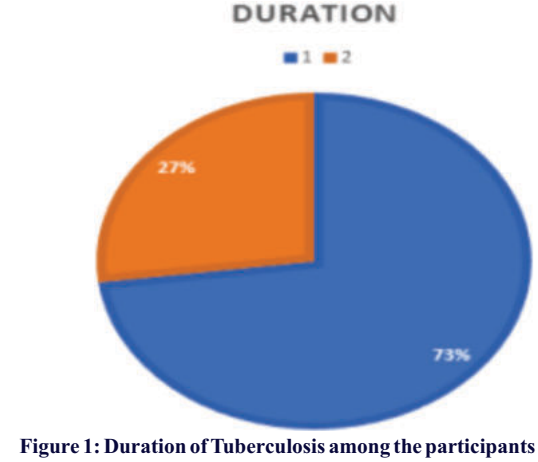

Figure 1: Duration of Tuberculosis among the participants

Table 1: Sociodemographical details of the particicpants

Factors	Frequency	Mean values
Age 30-40 41-50 51-60 >60	 26 16 29 29	51.29 10.7 years
Gender Male Female	 68 32	
Height 140-150 151-160 161-170 >170	 04 64 24 8	160.39.5 cm
Weight 40-60 61-80 >80	 46 50 04	61.511.8 kg
BMI <20 21-25 26-30 >30	 16 42 38 04	23.9 3.3

Table 2: Xray Findings Among The Participants

Features	Frequency	Percentage
	1	1.0
Bronchiectasis	12	12.0
Calcification	13	13.0
Fibrosis	50	50.0
Fibrosis with cavitation	24	24.0
Total	100	100.0

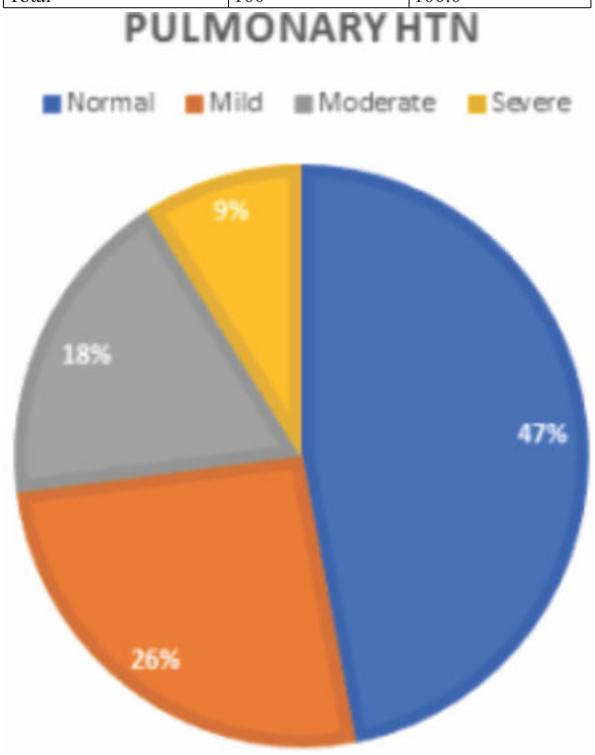

Figure 2: Echo findings

Prevalence Of Pulmonary Hypertension

In the present study around 53% of the pulmonary tb patients had mild to moderate pulmonary hypertension. About 26% had mild pulmonary hypertension with significant spirometry changes. The Echo findings were associated with the spirometry changes with statistically significant p value of 0.02.

DISCUSSION

Pulmonary tuberculosis may lead to parenchymal destruction of the lung tissue, which may affect the vascular structure and cause vasculitis and endarteritis, subsequently leading to a reduced cross-sectional area of the pulmonary vasculature and thereby pulmonary hypertension. Previous studies have quoted different findings of pulmonary hypertension among the post tuberculosis patients. Radiologically, the patients of PH with a history of tuberculosis have shown an overall direct but weak co-relationship to the total radiological abnormalities, and a poor but negative co-relationship with the degree of fibrosis. The present study has reported 53% prevalence of pulmonary hypertension, which is similar to the study by Kathleen et al which reports 47%. Another study by Parthasarathi et al

has reported that approximately 15% of the Pulmonary hypertension patients having a preceding history of pulmonary tuberculosis. Supporting the same finding Louw et al has documented as PH after TB was a common finding in their community-based population. Majjid et al has represented a significant association between mortality and presence of pulmonary hypertension and drug abuse among new cases of pulmonary tuberculosis.In a meta-analysis, One cohort study found a significantly higher prevalence of hypertension among TB patients compared to controls. Cross-sectional studies reported a prevalence of hypertension in TB patients ranging from 0.7% to 38.3%.

The fibrosis of lungs were the major findings in Xray posing as the risk factors among the participants with pulmonary hypertension. Also, majority had obstructive pulmonary function testing followed by restrictive and few with mixed spirometry findings which proved to be significant factor in contributing to development of pulmonary hypertension among the post TB patients.

The overall findings of our study corroborate the results of previous studies concerning the relevance of PH in TB patients, but our study was conducted in post TB cases and did not evaluate long-term outcomes. Although the current study has some strong points such as participants undergoing ECHO, x-ray and spirometry tests along with clinical examination there are some important limitations such as predominance of male, patients not followed up and other pathologies of lung parenchymal were not considered .

CONCLUSION

The mean survival in patients with pulmonary hypertension from respiratory causes is only 4 years. Because right heart catheterisation is a technically demanding diagnostic procedure, millions of tuberculosis survivors at risk of pulmonary hypertension will likely never be identified. As a result, many will not be treated, exacerbating tuberculosis-related morbidity. Despite the severity TB is not listed as a cause of PH in most guidelines. No studies were designed to assess whether hypertension is a risk factor for developing active TB. Thus the association of tuberculosis and PH needs further elaboration and investigation and essential in the elimination process of tuberculosis.

REFERENCES

1. Louw, E., Baines, N., Maarman, G., Osman, M., Sigwadhi, L., Irusen, E., Koegelenberg, C., Doubell, A., Nathan, S., Channick, R. and Allwood, B. (2023), The prevalence of pulmonary hypertension after successful tuberculosis treatment in a community sample
2. Seegert AB, Rudolf F, Wejse C, Neupane D. Tuberculosis and hypertension-a systematic review of the literature. Int J Infect Dis. 2017 Mar; 28027993., 56:54-61. doi: 10.1016/j.ijid.2016.12.016. Epub 2016 Dec 24.
3. Bhattacharyya P, Saha D, Bhattacherjee PD, Das SK, Bhattacharyya PP, Dey R. Tuberculosis associated pulmonary hypertension: The revelation of a clinical observation. Lung India. 2016 Mar-Apr; 27051098, 33(2):135-9. doi: 10.4103/0970-2113.177433.
4. Marjani M, Baghaei P, Malekmohammad M, Tabarsi P, Sharif-Kashani B, Behzadnia N, Mansouri D, Masjedi MR, Velayati AA. Effect of pulmonary hypertension on outcome of pulmonary tuberculosis. Braz J Infect Dis. 2014 Sep-Oct; 10.1016/j.bjid., 18(5):487-90.
5. Vyslouzil Z, Polák J, Widimský J, Suková M. Pathogenesis of pulmonary hypertension in tuberculosis. Czech Med. 1980; 7418569., 3(2):123-31.
6. Muhammed, & Al, Waheeb & Al.Obaidy, Muhammed & Ficms, Resp & Medicine, & Al, Adnan & Jubouri, & Mrcp, Frcp & Marwa, Bassam & Eidan, & Ch, M. (2018). Pulmonary hypertension in active pulmonary tuberculosis patients.