

Study of prevalence of Corpulmonale in patients with pulmonary tuberculosis with reference to ECG, echocardiographic changes and radiological extent of the disease.

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I. Introduction

- Tuberculosis (TB), one of the oldest diseases known affecting humans and is likely to have existed in pre hominids, is a major cause of death worldwide.
- This disease is caused Mycobacterium tuberculosis complex and usually affects the lungs, although other organs are involved in up to one-third of cases.
- If properly treated, TB caused by drug-susceptible strains is curable in virtually all cases. If untreated, the disease may be fatal within 5 years in 50–65% of cases.
- Corpulmonale, also referred to as pulmonary heart disease, is broadly defined by altered RV structure and/or function in the context of chronic lung disease and is triggered by the presence of pulmonary hypertension.
- Virchow in nineteenth century found changes like right ventricular hypertrophy in autopsies of patients who died of pulmonary tuberculosis .
- Bilateral and extensive tuberculosis can cause pulmonary hypertension due to extensive fibrosis which causes distortion of parenchyma.
- The basic underlying pathophysiology is increase in the pulmonary vascular resistance and pulmonary hypertension.
- Clinical diagnosis depends on right ventricular dysfunction, pulmonary hypertension and evidence of primary lung disease.
- Early treatment prevents this late complication of pulmonary tuberculosis.
- Chronic cor-pulmonale is usually the end result of long standing pulmonary disease, which results from pulmonary hypertension and subsequently to right ventricular hypertrophy (RVH) and failure.
- The right ventricle (RV) may get hypertrophied without producing right heart failure. Therefore, in chronic corpulmonale the mechanism which leads to RVH ultimately results in right heart failure.
- Chronic cor-pulmonale as a cause of congestive cardiac failure (CCF) is being recognized in recent years .
- Therefore recognition of chronic cor-pulmonale is of great importance to physicians, pulmonologists and cardiologists.
- Analysis of cardiovascular epidemiology in India also reflected that chronic corpulmonale forms a significant proportion of cardiovascular cases.
- The mechanism of development of PHT in treated PTB patients is thought to result from residual pulmonary structural damage and pulmonary function abnormalities leading to gas exchange abnormalities and chronic hypoxia.
- It has also been suggested that repeated secondary respiratory tract infections, caused by residual chest x-ray abnormalities, play an important role in the pathogenesis of PHT in treated PTB patients.
- PTB Patients attending outpatient /inpatient are subjected to Chest X-ray, ECG and Echocardiographic studies.
- Patients having corpulmonale features are subjected to detailed clinical history and examination.

II. Aim and Objectives

To study the prevalence of cor pulmonale in patients with pulmonary tuberculosis with reference to -ECG,
-Echocardiographic changes and
-Radiological extent of the disease

METHOD OF STUDY Study design:

A hospital based cross sectional study.

Study subjects:

50 Patients attending the RNTCP DOTS center and those who were admitted in the medicine wards formed the study subjects.

• STUDY SETTING :

DOTS centre ,Medical wards in SRI VENKATESWARA RAMNARAYAN RUIA GOVERNMENT GENERAL HOSPITAL,TIRUPATI.

• STUDY PERIOD :

DECEMBER 2018 to JUNE 2019

METHODOLOGY

The data was collected from the patients by the detailed clinical history, clinical examination of the patients and relevant investigation in a specially designed proforma

1. Patients were assigned a case number, and their name, age, sex, occupation socio-economic status will be noted.
2. Total duration of pulmonary tuberculosis and treatment.
3. History of smoking, or tobacco in any other form was specifically noted in the personal history.
4. Family history of pulmonary tuberculosis was specifically noted.
5. Patients having clinical evidence of cor pulmonale were subjected to spirometry study to rule out COPD.

Chest x-ray findings

- The chest x-rays were analyzed by measuring the Cardiothoracic (CT) ratio, along with the widest diameter of the right descending pulmonary artery.
- Evidence of pulmonary hypertension was taken if right descending pulmonary artery width was $>16\text{mm}$.
- And also extent of parenchymal involvement of pulmonary TB is noted in the form lesions like lobar Collapse, fibrosis, cavitory lesion, bronchiectasis etc.

ECG findings

ECG was used to detect and exclude patients with Ischemic Heart Diseases (IHD).

A 12 lead ECG was recorded in all the patients.

The following ECG signs reflecting chronic cor- pulmonale were recorded:

- 1) P wave axis of $+90$ or more- right axis deviation,
- 2) P pulmonale,
- 3) right bundle branch block (RBBB),
- 4)RVH defined by one of following pattern,
R in $V1 > 7\text{mm}$, b) R/S ratio in $V1 > 1$.

INCLUSION CRITERIA :

All cases of pulmonary tuberculosis, irrespective of duration and type of treatment received will be included in the study.

EXCLUSION CRITERIA :

- 1. Primary lung pathologies
- 2. All primary cardiac diseases
- 3. Occupational lung diseases
- 4. Malignant lung diseases
- 5. Less than 18yrs

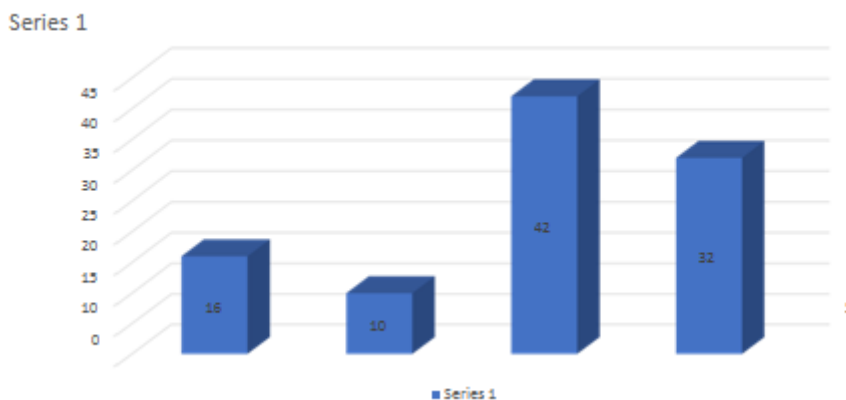
III. Results And Statistical Analysis

AGE WISE DISTRIBUTION

Age group	Frequency	Percent
18-25 yrs	2	4.0
26-45 yrs	29	58.0
46-65 yrs	18	36.0
>65 yrs	1	2.0
Total	50	100.0
Mean +- SD	43.06+-11.07	

- The age group ranged between from 18 to 72 years in the study group.
- Maximum number of patients was between the age group of 26-45 years.
- The mean of age distribution in the study group is 43.06 years
- Radiological features have been classified in to fibrosis, fibrocavitary, fibro thorax and others.
- 16% of patients had shown cardiomegaly, 10% had fibro thorax and 42% of the patients had fibrocavitary lesion.

RADIOLOGICAL FINDINGS



ECHO FINDINGS

- Among 50 patients 16% of patients had right ventricular hypertrophy, 18% had RA/RV dilated. 12% of the patients had RVSP >40mmHg and also had paradoxical movement of IVS. 10% of the patients had TAPSE < 16mm which signifies RV dysfunction.

ECG FINDINGS

ECG Findings	Frequency	Percentage
P PULMONALE		
ABSENT	39	78.0
PRESENT	11	22.0
TOTAL	50	100.0
RBBB		
ABSENT	43	86.0
PRESENT	7	14.0
LOW VOLTAGE		
ABSENT	44	88.0
PRESENT	6	12.0

Proportion Of Corpulmonale Based On Criteria

CRITERIA	FREQUENCY	PERCENTAGE
Presence of P Pulmonale	11	22.0
Presence of RVH	7	14.0
Presence of RA/RV dilatation	9	18.0
RVSP > 40 mmHg	6	12.0
Paradoxical IVS motion	6	12.0
TAPSE < 16 mm	5	10.0

IV. Discussion

- The present study concludes that prevalence of corpulmonale in patients with pulmonary tuberculosis is 12%.
- Patients with corpulmonale may present with RVH, asymptomatic RV dysfunction or RV failure.
- Evidence of congestive heart failure was seen in majority of the cases as evident by raised jugular venous pressure, enlarged tender liver and lower limb oedema.
- Majority of patients had pulmonary hypertension as evidenced by epigastric pulsation (90%), loud P (72%) and palpable P (51%) .
- Minority of them had evidence of right ventricular hypertrophy with a parasternal heave (41%).
- Hence clinical diagnosis is usually possible only when patients develop right ventricular failure.

- In the present study out of 50 cases of pulmonary tuberculosis 6 cases (12%) had clinical evidence of corpulmonale in the form of right heart involvement as compared to a study by P K Jain et al where out of 125 cases, 11 cases (8.8%) had a clinical evidence of corpulmonale .
- Generally the peak incidence of corpulmonale occur in 4th,5th,6th decade of life according to Shanker et al and K Vishwanathan studies, but another study showed incidence of corpulmonale in less than 40 years old patients with pulmonary tuberculosis . In the present study also out of those cases with corpulmonale ,45% cases had less than 40 years old.
- A study had reported a series of 60 cases of CorPulmonale in which the majority had tuberculosis as the primary pathology .
- In a study, reporting an autopsy series, considered tuberculosis as the most important cause of CorPulmonale, having contributed no less than 60% of their cases .
- Their material, of course, was biased in that tuberculous individuals formed a disproportionately large number of their autopsies, but significance must be attached to the incidence of 51 % CorPulmonale in tuberculous patients autopsied by them.

V. Conclusions

- According to the present study prevalence of corpulmonale in PTB cases is 12%

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