

An Analysis of Cardiac Complications in Patients with Fully Treated Tuberculosis Attending a Tertiary Health Center

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Abstract:

Background and Objectives: Pulmonary TB and Heart- when we hear both these terms together, the thing which crosses our mind immediately is pulmonary fibrosis and cor pulmonale. Pulmonary TB and Cardiac dysfunctions are major causes of morbidity and mortality with overlapping symptomatology like cough, dyspnea. But whether there is any correlation between these remains largely unclear. Study aimed to assess any Cardiac dysfunction in Healed Pulmonary TB by means of 2D Echocardiography and to manage both Lungs & Heart simultaneously in a better way.

Materials and Methods: it was a cross sectional observational study. 200 Healed Pulmonary TB patients were evaluated by 2D Echocardiography for LVH, LVEF%, PASP and left ventricular functions. LVDD was determined by ratio of E/E' (standard mitral inflow maximal velocity/ mitral annular relaxation velocity) which correlates with LV filling pressures. [Systolic function was assessed by LVEF (Left Ventricular Ejection Fraction). PASP (mmHg) was measured by Tricuspid regurgitation.

Result: Significant Left Ventricular Cardiac dysfunction is seen in patients of healed Pulmonary TB.

Conclusion: We generally forget to treat the heart when treating the pulmonary TB or healed TB. This study makes us focus on heart and lungs both simultaneously in healed Pulmonary TB patients. To avoid unnecessary medications for the overlapping symptoms like cough, dyspnea and also to focus the late cardiac complications in healed TB.

Keywords: Cardiac, Complications, Cured & Healed Tuberculosis.

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Introduction

As we all know that DOTS RNTCP has very much improved the treatment and outcome of the pulmonary tuberculosis in India but it also comes into notice that after being cured from TB, Patients lungs and cardiac functions gets compromised due to extensive fibrosis in affected lung and compensatory emphysema taking place during the healing of infected TB lung which may ultimately leads to some abnormality in cardiac function [1,2]. This study was done to study the effect of healed pulmonary TB on cardiac functions. Extensive pulmonary Fibrosis and compensatory emphysema leads to tubular heart and any chronic pulmonary disorder like COPD may leads to Cor Pulmonale is very well known. Also, when heart is affected especially left side and right ventricle undergoes hypertrophy and dilatation so there is very good correlation between TB and Cardiac function. When TB heals either AFB Positive or AFB Negative but it always leaves its footprints in the form of extensive fibrosis, traction bronchiectasis, lung volume loss/collapse and cavitory lesion [3&4].

Right apical lesion of Pulmonary TB are very

common and when it heals by fibrosis it pulls the Heart and diaphragm towards the same side and also the opposite left normal healthy lung undergoes compensatory emphysematous changes which further pushes mediastinum and heart towards right side or vice versa [5]. As coronaries fills only during diastole and if diastolic functions are compromised simultaneously leads to ventricular dysfunction as if all these phenomenon taken into consideration the mainly affected organ is left ventricular [6].

Material and Method

This study was conducted at All India institute of medical sciences Patna, Bihar. Study duration is Eighteen months. A total sample of 400 population including 216 Adult males and 184 females who had completed TB treatment as per RNTCP schedule and Declared cured were included in the study.

A Baseline 2D Echo of all these patients were done at their first visit to evaluate the cardiac functions and also repeat 2D Echo was done on follow up after 6 month to compare the results with all routine investigations.

Inclusion Criteria

All the adults who were AFB positive and gets completely treated with scheduled anti TB drug regimen as per RNTCP without any default and also the the patients who were declared cured after completion of MDR TB regimen.

Both the genders of age 18 to 65 year were included.

Patients who came for follow up after 6 month.

Chronic smokers were also included among which all females nonsmokers nonalcoholic.

Among males 26 continued smoking and 190 quited smoking during TB therapy and after 6 month follow up.

Exclusion Criteria

Patients who did not completed anti TB drug regimen as per advised and who are treated as defaulter

Loss to follow up after 6 month due to any reason

Patient who did not give consent for 2 d echo.

Pericardial diseases, acute coronary syndrome, myocardial infarction, critically ill patients, HIV patients, patients on immunosuppressant.

Any past history of decompensated heart failure (left ventricular specially)

Testing and Evaluation Protocol

Study was started after taking permission of ethical committee of the institution and proper verbal, written and informed consent was obtained from the sample to participate in the study.

After taking proper detailed history, hematological studies, liver and renal function with ECG radiological imaging studies were done as per requirement.

A baseline 2D Echo was done including PASP, LVEF%, LVH, LV dysfunction.

Again on six months follow-up a repeat 2D echo was done to compare the results including PSP ejection fraction lvh and LV dysfunction (as shown in the chart)

LV dysfunction was classified from grade 0 to grade 3. as shown in chart1.

Results

Out of total 400 samples tested the results of cardiac functions on 2D echocardiography are as follows

Table 1 Among females:--Results of 2decho before and after 6month followup .

2DEho (females)	Before	After 6month follow-up	2dcho (males)	Before	After 6month follow up
PASP	13 -62 (avg 32.78)	7-25 (avg. 39.538)	PASP	20-70 (avg 32.833)	25-70 (avg 41.32)
EF%	4-75% (avg 63.13%)	49-76 (avg 62.59)	EF%	45-73. (avg 62.37)	49-76 (avg 62.05)
LVH	0.94	0.98	LVH	1.19	1.67
LVDD			LVDD		
Grade 0	45	0	Grade 0	38	0
Grade 1	100	15	Grade1	60	03
Grade 2	30	102	Grade 2	70	124
Grade 3	09	67	Grade 3	03	79

Comparison of Results Among Females

(total females=184)

- A) At beginning total 45 females were already in grade 0 After 6 month follow up who remained in grade 0 is nil, progresses from grade 0 to grade 1 is 15 from grade 0 to grade 2 is 28 from grade 0 to grade 3 is 2.

Making it total females remained in grade 0 is Nil.

- B) At beginning total 100 females were already in grade 1 After 6 month follow progress from grade 0 to grade 1 is 15 and those who are remained in grade 1 is Nil those who were progress from grade 1 to Grade 2 is 74 and from grade 1 to grade 3 is 26.

Making it total 15 females remained in grade 1

- C) At the beginning of study total 36 females were already in grade 2

After 6-month followup adding 28 females from grade 0 to Grade 2 and 74 females progress from grade 1 to Grade 2. making it total 102 females remained in grade 2

- D) At the beginning of study total 9 females were in grade 03

After 6 month follow up those who were progressive from grade 0 to grade 3 is to and from grade 1 to grade 3 is 26 and from Grade 2 to grade 3 is 30 and remained in grade 3 to grade 3 is 9.

Making it total 67 females in grade 3

Results Among Males (total males=216):- 2decho before and after 6 months follow up:

Comparison of results among males (216)

- A) At the beginning of study total 83 males were in grade 0. After 6 month follow up out of 83 Males, who Remained from grade 0 to 0 is Nil, And those who were progress from grade 0 to grade 1 is 13,

from grade 0 to 2 is 51, from grade 0 to grade 3 is 19. Making it total Remained in grade 0 is Nil.

B.) At the beginning Total 63 males were in grade 1. After six months follow-up those who progress from grade 0 to grade 1 is 3 and remained in grade 1 to grade 1 is nil and progressed from grade 1 to 2 is 60 and from grade 1 to grade 3 is Nil.

Making it total remain in grade 1 is 3.

C.) At the beginning 70 males were in grade 2.

After 6 month follow up those who were progress from grade 0 to Grade 2 is 51, progress from grade 1 to Grade 2 is 60, remained from grade 2 to 2 is 13 and progress from Grade 2 to grade 3 is 57.

Making it total males remained in Grade 2 is 124.

D) At beginning 03 Males were in grade 3.

After 6 month follow up those who are progress from grade 0 to grade 3 is 19, from grade 1 to grade 3 is 0, from Grade 2 to grade 3 is 0. Algorithm for diagnosing diastolic dysfunction with Doppler echocardiography from grade 1 to grade 3

Discussion

As we all know that pulmonary TB leads to cavitory Lesions, consolidations, tubercular nodules leads to volume loss of the affected lung [7].

Extensive lung Fibrosis during healing process of the TB occurs which causes further pulling of the mediastinum and heart on the fibrosed side of lung and also the diaphragm upwards [8&9].

Compensatory emphysema of normal lung causes further pushing of the mediastinum and heart toward the affected side of lung [10].

All these pulling and pushing phenomenon occurring during the healing process may lead restriction of the ventricular dilation of the heart during diastole [11].

Conclusion

As it is well established that RNTCP Program has improved the treatment and outcome of the TB and is very well appreciated worldwide.

Patient may get AFB negative but we also need to focus on its pulmonary and cardiac complications simultaneously. Despite having highest TB incidence, India has no targeted approach of follow up to for cardiac dysfunction in TB patients so cardiac follow up should be considered to prevent cardiac morbidity and mortality

And patients do not get treated unnecessarily

with antibiotics, bronchodilators for acute exacerbations of COPD so need to follow up for both pulmonary and cardiac functions simultaneously

The extensive fibrosis in healed TB should be taken care so there is less Loss of lung volume and also need of cardio-pulmonary interventions to release pressure effects due to cavitory and extensive fibrosis on heart to improve cardiac functions should also be taken care of to prevent cardiac dysfunction.

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