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Pulmonary Medicine

BIDIRECTIONAL SCREENING FOR TUBERCULOSIS AND DIABETES MELLITUS IN A TERTIARY CARE HOSPITAL IN SOUTH INDIA

Dr Arun Babu.V*	Assistant Professor, Dept Of Respiratory Medicine, Institute Of Thoracic Medicine, Madras Medical College, Chennai. *Corresponding Author
Dr Deepak Kanna.K	Assistant Professor, Dept Of Respiratory Medicine, Omandurar Medical College, Chennai.

ABSTRACT Screening for Tuberculosis in people with Diabetes and screening for Diabetes in people with Tuberculosis will allow earlier detection of co-morbidities, leading to better health outcomes. This study carried out in a tertiary care hospital in South India consisted of 500 Diabetic patients and 250 patients of Tuberculosis. In 250 Tuberculosis patients screened for DM, the overall prevalence of DM in TB patients was 24.8%,out of which 17.2 % already had Diabetes and 7.6% was the additional yield during screening. About 500 Diabetes cases screened for tuberculosis, 7.6% had symptoms suggestive of tuberculosis. On further evaluation of these subjects none of them revealed evidence for tuberculosis. There exists a bidirectional relationship between TB and diabetes, and they both impact the presentation of each other. This study highlights the need of routine screening for dysglycemia for all TB patients, especially at the time of diagnosis, similar to HIV screening.

INTRODUCTION

India is a country with population of about 1.2 billions (17.5% of the world's population) and is undergoing rapid development and urbanisation. As a consequence of this social and economic development, which is associated with increasing physical inactivity, an unhealthy diet and obesity, there has been an escalating epidemic of Diabetes mellitus. In 2013the prevalence of DM in India is about 8.5%and prevalence of pre-diabetics is 2.8%.[1]In terms of absolute numbers and given the size of the population, this makes India one of the highest DM burden countries in the world.[2,3,4]

As India is the home to the largest number of Tuberculosis and Diabetic patients, there is growing amount of evidence of one disease fueling the other. Available reports suggest that 95% of patients with TB live in the low and middle-income countries and more than 70% of patients with DM also live in the same countries, especially in South East Asia. Diabetes Mellitus is a risk factor for development of active Tuberculosis increasing the risk by 2 to 3 times compared to people without Diabetes. It makes a substantial contribution to the burden of tuberculosis.

The link between Tuberculosis and Diabetes requires interventions that address both diseases.Screening for Tuberculosis in people with Diabetes and screening for Diabetes in people with Tuberculosis will allow earlier detection of co-morbidities, leading to better health outcomes as well as less risk of TB transmissions within health facilities. So this study is planned to perform bidirectional screening of Tuberculosis and Diabetes.

MATERIALS AND METHODS

The study was conducted at Department of Respiratory Medicine, in a tertiary care centre in South India. It is a prospective observational study approved by research committee and ethical committee. 500 Diabetic patients and 250 patients of Tuberculosis (Pulmonary and Extra Pulmonary) were included in the study.

The Diagnosis of Tuberculosis was based on detailed history, clinical examination, sputum examination for acid fast bacilli, chest radiography, biochemical analysis and histopathological examination as and when applicable. The investigations will be individualized according to the patient.

Group A – Tuberculosis patient screened for Diabetes mellitus

Inclusion criteria:
1. Subjects within age group 20 - 70 years
2. Subjects diagnosed as anew case of Tuberculosis (smear positive, smear negative and extra pulmonary tuberculosis)

Exclusion criteria
1. Seropositive subject(HIV/AIDS)
2. Chronic alcoholic
3. Chronic liver/renal failure
4. Chronic steroid/immunosuppressive therapy
5. Connective tissue disorders
6. Malignancies
7. Pregnancy

Group B – Diabetes patients screened for Tuberculosis
Inclusion criteria:
1. Subject within age group 20 - 70 years
2. Subject diagnosed to have Diabetes

Exclusion criteria
1. Seropositive subject
2. Chronic alcoholic
3. Chronic liver/renal failure
4. Chronic steroid/immunosuppressive therapy
5. Malignancies
6. Patients with any other risk factors of Tuberculosis
7. Pregnancy
8. Connective tissue disorders

Study patients were divided into two groups- **Groups A** (Tuberculosis group) and **Group B** (Diabetes group).

Group A– Patients with Tuberculosis were screened for Diabetes mellitusas per the National guidelines [5] [Table1]

Table 1 : According to National guideline diagnosis of DM is based on RBG and FBG

"At first visit: time of registration or close to starting TB treatment

Screen first with a random blood glucose (RBG) .
• If the RBG is less than 110 mg/dl, then no further action is needed
• If the RBG is 110 mg/dl or greater, then do a second screen at next visit

Next visit:

Screen second with a fasting blood glucose (FBG).
- If FBG is less than 110 mg/dl, then this is normal
- If FBG is 110 – 125 mg/dl, then this indicates impaired glucose tolerance
- If FBG is 126 mg/dl or higher, then this indicates Diabetes mellitus''

Group B– Patients with Diabetes mellitus were subjected to Tuberculosis screening clinically, radiologically and with relevant Laboratory investigations

All the questionnaires were manually checked for completeness and were then coded for computer entry. The collected data was entered in Excel and analyzed using SPSS software (IBM Corp. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.). Descriptive statistics were be used to describe findings.

RESULTS
The data obtained from screening of 250 Tuberculosis patients for presence of Diabetes (Group A) and 500 diabetic patients for the presence of Tuberculosis (Group B) were analysed.

Screening for Diabetes mellitus among Tuberculosis group[Group A]
Out of 250 Tuberculosis patients screened for DM, the overall prevalence of DM in TB patients was 24.8%. Of which 17.2 % already had Diabetes and 7.6% was the additional yield during screening. (Table 2)

Table 2: Screening for Diabetes mellitus among Tuberculosis group[Group A]

Parameters	Number	Percentage
No of TB patient screened	250	100
Males	161	64.4
Females	89	35.5
Current smokers	87	34.8
No with Known Diabetes	43	17.2
No of patient whose Diabetes status unknown	207	82.8
No of patient screened for RBS	207	82.8
No with RBS >110mg/dl	71	28.4
No screened with FBS	71	28.4
No with FBS >126 mg/dl (currently diagnosed with Diabetes)	19	7.6
No with known and Currently diagnosed Diabetes	62	24.8

Screening patients with Diabetes mellitus for Tuberculosis [Group B]
Out of 500 Diabetes cases screened for tuberculosis, 7.6% had symptoms suggestive of tuberculosis. On further evaluation of these subjects none of them revealed evidence for tuberculosis. (Table 3)

Table 3: Screening patients with Diabetes mellitus for Tuberculosis

Parameters	Number	Percentage
No of DM patient screened	500	100
Males	312	62.4
Females	188	37.6
No of DM patient with positive TB symptoms	38	7.6
No of DM patient investigated for TB	38	7.6
No of DM patient diagnosed as TB	0	0

DISCUSSION
Screening for DM in TB patients
Out of 250 Tuberculosis patients screened for DM, the overall prevalence of DM in TB patients was 24.8%. Of which 17.2 %were known case of Diabetes and 7.6% was the additional yield during screening.

Similar prevalence of DM in TB patients has also been reported in studies from South India and abroad. In Tamil Nadu , Vijay Viswanathan et al reported a DM prevalence of 25.3% among TB cases .[6]In Kerala, Shibu Balakrishnan et al reported a Diabetes prevalence of 44% among 552 TB cases.[5]In Pondicherry Raghuraman S et al reported a Diabetes prevalence of 29 % among tuberculosis patients.In Madhya Pradesh, Bhupendra Kumar Ratre et al observed a DM Prevalence of 35 % among TB patients.[7]

Similar observation also noted in various international studies. A Study done by Jimenez- corona et al in south Mexico reported a Diabetes prevalence of 29.63% in tuberculosis patients .[8]In Iran, Golsha et al. found a DM prevalence of 23 % in tuberculosis patients.[9] Christie Y. Jeon et al did a systemic review of screening TB with DM and reported prevalence of DM ranging from 1.9% to 35%.[10] A retrospective analysis of 2 years data on TB subjects from Saudi Arabia in 1998 revealed that 27% had DM. Another study from Taiwan reported 16.9% DM among TB patients.

Screening for Tuberculosis in Diabetes Mellitus
In this study out of 500 Diabetic cases screened for tuberculosis, 7.6%patients reported symptoms consistent with suggestion of tuberculosis. These subjectswere investigatedwith sputum AFB and chest x ray but no evidence for tuberculosis was found in any of the screened patients. Further prospective large scale studies may be required to establish the usefulness of screening for tuberculosis in diabetes.

In 2012 a large-scale study done by Kumar et al in India, reported prevalence of Tuberculosis at 0.8% among 31,146 DM cases.[11]In 2013 a Study done by Mallikarjun V. Jali et al, in Karnataka observed a TB prevalence of 2.7% among DM.[12]

CONCLUSION
In the light of above discussion, it can be concluded that there exists a bidirectional relationship between TB and diabetes, and they both impact the presentation of each other. Diabetes is being increasingly recognized as a risk factor for TB and may affect its presentation, similarly TB may worsen glycemic control or lead to IGT among TB patients. This study highlights the need of routine screening for dysglycemia for all TB patients, especially at the time of diagnosis, similar to HIV screening.

Even though the other direction of screening i.e presence of TB in all diabetic cases has not yielded any additional benefit in this study we suggest multicentric large scale prospective studies in some selected group of diabetic patients example: presence of elderly age and uncontrolled diabetes.

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