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Original research article

To Assess Clinical Profile Of Oral Glucose Tolerance In Pulmonary Tuberculosis Patient

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Abstract

Introduction: Tuberculosis, sometimes known as TB, is a major cause of death around the world. It is one of the first diseases that has been shown to infect humans and is thought to have been present in pre-human primates. In most cases, the lungs are the only organ affected by this disease, which is caused by bacteria that are part of the mycobacterium tuberculosis complex. However, in as many as one-third of cases, other organs are also affected. The term diabetes mellitus, abbreviated as D.M., refers to a cluster of metabolic conditions that are quite prevalent and have the phenotype of hyperglycemia.
Keywords: oral glucose tolerance, pulmonary tuberculosis patient

Introduction

Tuberculosis, sometimes known as TB, is a major cause of death around the world. It is one of the first diseases that has been shown to infect humans and is thought to have been present in pre-human primates. In most cases, the lungs are the only organ affected by this disease, which is caused by bacteria that are part of the mycobacterium tuberculosis complex. However, in as many as one-third of cases, other organs are also affected. Nearly all cases of tuberculosis caused by drug-susceptible strains are treatable and cured if given the appropriate care. In 50–65 percent of cases, the condition will be deadly within five years if it is not treated. Transmission of tuberculosis often occurs by the dissemination of droplet nuclei through the air, which is produced by people who have infectious pulmonary tuberculosis [1].

Because healthy people's immune systems help "block off" the microorganisms that cause tuberculosis, an infection with the mycobacterium tuberculosis often does not cause any symptoms in healthy people. Active tuberculosis of the lungs is characterised by a hacking cough, which may be accompanied by blood or sputum, as well as chest pain, weakness, weight loss, fever, and night sweats.

According to the WHO Global Tuberculosis Report 2019, an estimated 10.0 million persons become ill with TB in 2018 (the range for this estimate is 9.0–11.1 million). The illness burden is extremely variable from country to country, ranging from less than five new cases per 100 000 population per year to more than 500 new cases per 100 000 population per year, with the global average being somewhere around 130. There were an estimated 1.2 million (range, 1.1–1.3 million) TB-related deaths among HIV-negative people in 2018, which is a 27% decrease from 1.7 million in 2000, and there were an additional 251 000 (range, 223 000–281 000) deaths among HIV positive people, which is a 60% decrease from 620 000 in 2000 [2]. The impact of tuberculosis can be catastrophic,

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particularly in developing nations that are coping with high rates of both tuberculosis and HIV infections simultaneously. According to the India TB report 2019 that was published by the Government of India, in 2018, India was successful in notifying a total of 21.5 lakh cases of tuberculosis, of which 25% were from the private sector. The working-age population bears the majority of the disease burden associated with tuberculosis. The age range of 15-69 years accounts for 89% of all cases of tuberculosis. Men account for around two thirds of all TB cases. The most instances of tuberculosis (TB) are found in Uttar Pradesh, which has 17% of the country's overall population but is responsible for 20% of the disease's total notifications [3].

Even though there have been significant advancements in public health and medical care, the mycobacterium TB that causes tuberculosis is still just as dangerous in the 21st century as it was when Koch discovered it as a pathogen for the first time in 1882. Tuberculosis is one of the leading causes of death and disability in every region of the world.

In recent years, substantial evidence to confirm a relationship between tuberculosis and yet another disease, diabetes mellitus, has been accumulated. This connection had been suspected for hundreds of years [4].

The term diabetes mellitus, abbreviated as D.M., refers to a cluster of metabolic conditions that are quite prevalent and have the phenotype of hyperglycemia [5]. It is a metabolic condition with diverse causes that is defined by chronic hyperglycemia and changes in the metabolism of carbohydrates, fats, and proteins [6]. These symptoms arise as a result of errors in insulin secretion, insulin action, or both. [Citation needed]

The vast majority of cases of diabetes can be classified into one of two broad categories: those who have little or no endogenous insulin secretory capacity (IDDM or type 1 DM) and those who retain endogenous insulin secretory capacity but have a combination of resistance to insulin action and an inadequate compensatory insulin secretory response (NIDDM, or type 2 DM) [6, 7].

The International Diabetes Federation estimates that 463 million persons aged 20–79 years now have diabetes and are living with the condition. This accounts for 9.3% of the total population of people in this age range around the globe. It is anticipated that the whole number would increase to 578 million (10.2%) by the year 2030 and to 700 million (10.9%) by the year 2045 [8]. The number of people living with diabetes and the complications it can cause for their health have increased at a rate that is higher than in any other part of the world [9].

According to a multicentric survey conducted by the Indian Council of Medical Research (ICMR) [10] conducted approximately 30 years ago, the prevalence of diabetes in India was approximately two percent in urban India and one percent in rural India. These prevalence rates among adults over the age of 20 have skyrocketed in just three decades, jumping from three to eight percent in rural India to three to eight percent in urban India. These increases have occurred in urban India. In point of fact, the term "Diabetic Capital of the World" is now commonly used to refer to India. In addition, diabetes is linked to a number of different problems.

There have been a number of recent publications that have described the connection between diabetes and tuberculosis (TB), specifically the higher prevalence of active TB among patients who have diabetes and the worse treatment outcomes in these patients when compared to those who do not have diabetes [11, 12]. In the next years, the connection between these two diseases may become much more significant, as it is anticipated that the prevalence of obesity and diabetes will climb rapidly in the resource-poor areas where TB thrives [13].

It is common knowledge that diabetic patients have a higher risk of getting pulmonary tuberculosis than patients who do not have diabetes. As opposed to persons with diabetes who get tuberculosis, in which case the disease typically spreads to both of the patient's lungs. The fact that the symptoms of the aggravating disease are obscured by the symptoms of the co-existing condition [14] is what makes it so difficult to diagnose the combo of diseases.

Aims and Objective

To assess clinical profile of oral glucose tolerance in pulmonary tuberculosis patients

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Materials and Methods

In this study 150 newly diagnosed cases of pulmonary tuberculosis patients were evaluated. A cross section of both male and female diagnosed case of pulmonary tuberculosis attending the outdoor and indoor of various departments were taken into study.

Inclusion criteria

- Patients with positive sputum smear for acid fast bacilli
- Patients with chest x ray features suggestive of pulmonary tuberculosis
- Patient aged between 30 and 65 years

Exclusion criteria

- Type 1 diabetes mellitus
- Patient with diabetes mellitus
- Previously diagnosed and treated patients of pulmonary tuberculosis

A detailed history, clinical examinations and relevant investigations was performed as follows

1. **History**

- Age, sex duration of illness like fever, cough with sputum or blood, chest pain, weakness, weight loss and night sweats.
- Past history and family history of pulmonary tuberculosis and diabetes
- Personal medical history

B. Sputum for acid fast bacilli

Sputum smears for AFB was done and graded according to RNCTP GUIDELINES as per 0 with AFB per 100 oil immersion fields, scanty with 1-9 AFB per 100 oil immersion fields, grade + with 10-99 AFB per 100 oil immersion fields, grade ++ with 1-10 AFB per field (examine 50 fields), grade +++ is more than 10 AFB per field (examine 20 fields)

C. Chest X-ray

Infiltration, cavitation, fibrosis, fibrocavitory lesions, military mottling along with different zones involved

D. Oral glucose tolerance test

Samples of blood were taken according to the WHO guidelines after the patient fasted overnight for atleast 12 hours, then at 1 and 2 hours following 75 grams glucose ingestion. Based on these results, patients with impaired glucose tolerance will be subjected to fasting and post prandial blood sugar levels to confirm the diabetes status.

Result

Table 1: X- Ray findings

X-Ray findings	Percent
Normal	22.67
Infiltration	49.33

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Cavitatory lesion	13.33
Fibrotic changes	14.67
Total	100.00

Almost half (49.33%) of patients had infiltration, 14.67%

Glucose Tolerance (mg/dl)	**Percent**
Normal	82.67
Impaired	17.33
Total	100.00

In the present study overall incidence of impaired glucose tolerance was 17.33% (including three cases of confirmed diabetes mellitus)

Table 2: Glucose tolerance test

Glucose tolerance (mg/dl)	**Percent**
Normal	80.00
Impaired fasting glycaemia	0.00
Impaired glucose tolerance	16.00
Diabetes mellitus	4.00
Total	100.00

80.00% patients OGTT was normal (fasting <110 mg /dl and 2 hours < 140 mg/dl). In 16.00% of patients impaired glucose tolerance (fasting <126mg/dl and 2 hours>140mg/dl) was recorded and among 4% patients diabetes mellitus (fasting >126 mg/dl and 2 hours >200 mg/dl) was diagnosed. However, no patient had impaired fasting glycaemia.

Table 3: Final diagnosis of DM based on FBS and PPBS

Diagnosis	**FBS>110mg/dl (n=3)**		**PPBS >200 mg/dl (n=3)**	
Confirmed	3	100.00	3	100.00
Non Confirmed	0	0.00	0	0.00
Total	3	100.00	3	100.00

Table 4: Association of impaired glucose tolerance with x-ray findings

X-ray findings	**Impaired GT (n=15)**		**Normal (n=60)**		**Total**	
	No	Percent	No	Percent	No	Percent
Normal	1	5.88	16	94.12	17	100.00
Infiltration	11	29.73	26	70.27	37	100.00
Cavitatory lesion	0	0.00	10	100.00	10	100.00
Fibrotic changes	3	27.27	8	72.73	11	100.00

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Discussion

It is not well documented that pulmonary tuberculosis is related to the development of altered OGT, and very few research have reported the incidence of diabetes mellitus in individuals who have pulmonary tuberculosis. In patients who were diagnosed with pulmonary tuberculosis, the purpose of this study was to determine the frequency of OGT as well as its clinical characteristics.

According to the findings, the vast majority of patients were males (84%) and the ratio of males to females was 5.25:1.

The age range of 51 to 60 years was the most prevalent, accounting for 33.33 percent of the total, followed by the age range of 41 to 50 years, which made up 29.33 percent.

Fever was the most prevalent symptom of pulmonary tuberculosis (69.33%), followed by cough and sputum (68.00% each), while diabetic indications appeared in 8% of patients each. Polyuria and polydipsia were the most common diabetic symptoms. The results of the AFB test showed a positive result in 73.33% of patients on sample 1, and 76.00% of patients on sample 2. On chest x-ray, over half of the patients (49.33%) had infiltration.

According to the findings of this research involving 75 cases, the total incidence of impaired glucose tolerance in patients with pulmonary tuberculosis was 17.33%. The GTT results were normal for 82.67 percent of patients (Fasting 110 mg/dl and 2 hours 140 mg/dl). In 16.00% of patients, impaired glucose tolerance was documented (fasting 126 mg/dl and 2 hours > 140 mg/dl), and in 4% of patients, diabetes mellitus was diagnosed (fasting > 126mg/dl and 2hours >200 mg/dl). Both of these conditions are associated with a higher risk of developing type 2 diabetes. Patients diagnosed with pulmonary tuberculosis and diabetes mellitus were not found to have any statistically significant associations between gender, age, or the findings of chest x-rays.

Conclusion

In the current investigation of 75 cases, the researchers found that the overall incidence of impaired glucose tolerance in patients with pulmonary tuberculosis was 17.33%. However, the GTT results of 82.67% of these patients were normal (Fasting 110 mg/dL and 2 hours 140 mg/dL). In 16.00% of patients, impaired glucose tolerance was documented (Fasting 126 mg/dL and 2 hours > 140 mg/dL), while in 4% of patients, diabetes mellitus was identified (Fasting > 126 mg/dL and 2 hours > 200 mg/dL). Both of these conditions are considered to be metabolic syndromes. There was not a single patient who exhibited impaired fasting glycemia. Patients who had pulmonary tuberculosis and diabetes mellitus were included in this study, and the researchers found that there was no statistically significant association between sex, age, and chest X-ray findings.

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