

Original research article

Study of impaired glucose tolerance test in pulmonary tuberculosis

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Abstract

Patients who have been diagnosed with tuberculosis have a higher risk of developing diabetes mellitus, according to research. The reciprocal worsening of the two processes by each other; Malnutrition and low BMI; Pancreatic Tuberculosis in rare cases; stress-induced Diabetes mellitus due to Tuberculosis and pituitary and adrenocortical hyper-reactivity; and vitamin D deficiency are all possible causes of the higher prevalence of Diabetes mellitus in tuberculosis. The purpose of our research is to determine the age and gender distribution of patients with pulmonary tuberculosis who have an impaired Glucose Tolerance Test (GTT), as well as to investigate the correlation between an impaired GTT and sputum positivity and radiological extent of disease.

Keywords: Impaired, glucose, tolerance, pulmonary, TB

Introduction

Since ancient times, medical professionals have suspected a connection between diabetes and tuberculosis. In recent years, tuberculosis has become a major public health issue once again. There is mounting evidence suggesting that having diabetes together with tuberculosis may alter how the disease manifests and how it is treated. In addition to this, tuberculosis has been shown to have an effect on glucose intolerance and the ability of diabetics to maintain good glycemic control. About 9 million people are afflicted with tuberculosis every year, and approximately 2 million lose their lives to the disease each year. (CDC, 2007) ^[1]. Co-infection with both tuberculosis and diabetes Mellitus is on the rise as a direct result of the epidemics of both diseases converging at the same time. The observational study was carried out with a total of one hundred participants. Patients diagnosed with pulmonary tuberculosis who had either positive or negative sputum cultures and radiographic lesions were admitted to the medicine wards of our hospital between the years 2009 and 2011. The purpose of our research is to determine the age and gender distribution of patients with pulmonary tuberculosis who have an impaired Glucose Tolerance Test (GTT), as well as to investigate the correlation between an impaired GTT and sputum positivity and radiological extent of disease. In addition, we hope to determine the prevalence of GTT in patients with pulmonary tuberculosis. Oral GTT was performed on the patients, and the findings were analysed in accordance with the WHO standards. Statistical analysis was performed to establish the P value and significance using the Chi-square test.

Aims and Objectives

To study the impaired glucose tolerance test in pulmonary tuberculosis.

Materials and Methods

The patients who participated in the study were individuals who had been diagnosed with pulmonary tuberculosis and were receiving treatment at our hospital's outdoor patients department or medicine ward during the years of 2012 and 2015. Patients with pulmonary tuberculosis who had either a positive or negative sputum smear for acid-fast bacilli and had clinical or radiological signs of tuberculosis made up the study group, which included one hundred individuals in total. The oral glucose tolerance test was performed on each and every patient, and the findings were analysed in accordance with the criteria established by the WHO for diabetes.

Patients who participated in our research had to be at least 18 years old, have either positive or negative sputum cultures for acid-fast bacteria (AFB), and have either clinical or radiological signs of pulmonary tuberculosis. Patients who were less than 18 years old, those who had diabetes mellitus, women who were pregnant, patients who were critically ill, and HIV positive patients were not eligible.

All of the patients had an oral glucose tolerance test, also known as an OGTT, and the findings were analysed and interpreted in accordance with WHO recommendations.

The Ziehl-Neelsen stain method was utilised for the examination of the patients' sputum in order to

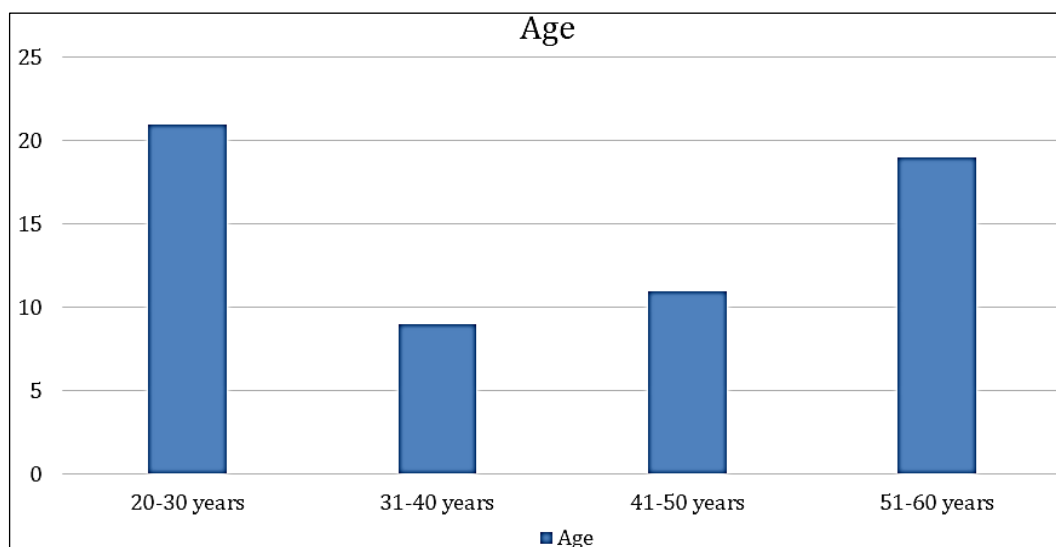
visualise acid-fast bacilli (such as Mycobacterium TB and Mycobacterium leprae, for example). Three sputum specimens, preferably taken first thing in the morning, were collected to be examined by an AFB smear and a mycobacterium culture.

All of the patients were given a chest x-ray as part of the radiological examination, and the image was analysed to determine whether there was an infiltrate or consolidation, as well as any cavitary lesion, pleural effusion, hilar or mediastinal lymphadenopathy, and infiltration of either side of the lungs or both sides. (CDC guideline 2009).

Results

Table 1: Sex Distribution

Male	Female
48	12



Graph 1: Age Distribution

Table 3: GTT

Normal GTT	Abnormal GTT	Sig
39	61	Sig

Table 4: Right vs. Left Lung Pathology

Left	Right	Sig
17	22	Not Sig

Discussion

The resurgence of tuberculosis as a serious public health problem is very recent. The global burden of diabetes mellitus is likely to climb from an estimated 180 million prevalent cases at the present time to a forecast 366 million by the year 2030, with the developing world expected to see the biggest increase in prevalence. (WHO, 2006) [2]. Co-infection with both tuberculosis and diabetes mellitus is on the rise as a direct result of the epidemics of both diseases converging at the same time. (Stevenson CR *et al.*, 2007) [3]. There is a high prevalence of impaired glucose tolerance test in patients with tuberculosis, with rates ranging from 2% to 41%, according to studies that were carried out after the introduction of the glucose tolerance test in the year 1950. There have been reports of a significant incidence of diabetes in cases of tuberculosis, ranging from 4 to 20 percent, and the rates are even higher for impaired glucose tolerance test, which ranges from 16 to 29 percent (Mboussa J *et al.*, 2003) [4]. Fasting with impairments Glucose and impaired glucose tolerance refer to the metabolic state that lies between normal glucose homeostasis and the glucose homeostasis that occurs in diabetics. It is believed that either one or both of these illnesses may be the beginning stages of diabetes mellitus; however, the process by which these conditions develop into the full-blown disease is not well known. The risk of both macrovascular and microvascular problems grows across a wide range of blood glucose concentrations, considerably below the level that defines diabetes in its classic form. Mellitus and is connected with post challenge hyperglycemia more strongly than it is associated with fasting glucose level. Diabetes has been linked to an increased risk of tuberculosis treatment failure or relapse (Morsy AM *et al.*, 2003) [5], as well as decreased culture conversion rates at 2 months and 6 months (Guler M *et al.*, 2007).

Diabetes mellitus has been linked to an increased risk of mortality from all causes in tuberculosis patients and more particularly death related to pulmonary tuberculosis, according to research from Wang CS *et al.* (2009)^[6]. Diabetes mellitus is also associated with an increased risk of tuberculosis^[7].

Patients who have been diagnosed with tuberculosis have a higher risk of developing diabetes mellitus, according to research. The reciprocal worsening of the two processes by each other; Malnutrition and low BMI; Pancreatic Tuberculosis in rare cases; stress-induced Diabetes mellitus due to Tuberculosis and pituitary and adrenocortical hyper-reactivity; and vitamin D deficiency are all possible causes of the higher prevalence of Diabetes mellitus in tuberculosis (Banerjee S JIMA 2005)^[8]. The study of sputum is extremely helpful in both obtaining a diagnosis of pulmonary tuberculosis and determining how well a patient is responding to therapy for the disease. In more severe stages of the disease, the sputum smear examination will typically be positive, but it is possible for it to be negative in less advanced stages. In the two investigations that were conducted and reported, the sensitivity of the sputum smear examination was approximately 50%, while its specificity was better than 99%, and its positive predictive value ranged from 91-98.5%. The prevalence of abnormal GTT results was 18. (16.98%) out of 106 patients in the study that was done by M. K. Jain *et al.* This result was statistically significant and compares to the results found in the studies by Kishore *et al.* (1973), 20.9%, Singh *et al.* (1978), 22.0%, Mugusi *et al.* (1990), 19%, and Yamagishi *et al.* (2000), 14.1%. Other research came to the following conclusions: Khanna (1968), 14.6%; Zack *et al.* (1973), 15.41%; Roychaudhary *et al.* (1980), 16.27.25%; Marais, (1980), 2.1%; Oluboyo and Erasmus (1980), 3.7%; Fernandez *et al.* (1997) 19.3%; Basuglu *et al.* (1999), 20.19% and Firsova *et al.* According to the findings of a study that was carried out by M. K. Jain and colleagues (2006)^[9], the prevalence of IGT rises with increasing age while the number of tuberculosis patients falls. According to the findings of our research, the incidence of impaired glucose tolerance is most common in those who are between the ages of 51 and 60. The higher prevalence of IGT in senior people was also noted by Kishore *et al.* (1973)^[10], who discovered that the prevalence of IGT was higher in patients aged 40 years or older. This was another study that demonstrated the higher prevalence of IGT in elderly people. Yamagishi *et al.* (2000)^[13] and Roychaudhary and Sen (1980)^[16] both came to comparable conclusions with their research. In some additional research carried out by Basuglo *et al.* (1999) and Lin *et al.* (1998)^[20], researchers observed that the elderly had a greater prevalence of IGT. According to this particular research, the incidence of IGT was found to be more common in males than in females. In a study that was carried out by Fernandez *et al.* (1997), the prevalence was determined to be 6.2% in males and 3% in females. According to M.K. Jain *et al.* (2006)^[14], out of 18 individuals diagnosed with IGT were male, making up 77.78 percent of the total.

Conclusion

In conclusion, a significant proportion of individuals suffer from reduced glucose tolerance the higher risk of pulmonary tuberculosis that was identified in this study most likely reflects an enhanced link between TB as well as DM.

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