

Frequency of Latent Tuberculosis among Diabetics and Non-Diabetics

Iffat Sultana, Mohammad Masood Savul, Lubna Meraj, Aamir Shahzad, Asim Zulfiqar

ABSTRACT

Objective: To determine the frequency of latent tuberculosis among diabetics and non-diabetics.

Study Design: A descriptive cross sectional study.

Place and Duration of Study: At Unit II, Department of Medicine, Benazir Bhutto Hospital, Rawalpindi from October 1, 2009 to March 30, 2010.

Materials and Methods: A cross sectional study was carried out in MU II, BBH Rawalpindi. All patients, male and female, both diabetic and non diabetic, above the age of 18 years, presenting in Out-Patient department for regular check up or follow up were included in the study. Mantoux test was carried out in all patients to find out the frequency of latent tuberculosis in diabetics and non diabetics.

Results: A total of 286 patients were initially inducted in the study. However by the end of study, 20 patients dropped out as they lost follow up. So 256 patients were finally included in the study. Amongst them 131 were diabetics i.e., 51.2% and 125 were non diabetics i.e., 48.8%. One hundred and seventeen were male i.e., 45.7% and 139 were female i.e., 54.3%. Mantoux test was carried out in all patients both diabetic and non diabetic. Out of 256 patients Mantoux test was positive in 33 patients i.e., 14.8%. Among diabetics Mantoux test was positive in 27 patients i.e., 10.5%. While among non diabetics Mantoux test was positive in 11 patients i.e., 4.3%, with a p value of .008. This shows that latent tuberculosis is more common in diabetics than non diabetics.

Conclusion: Latent tuberculosis is more common in diabetics than non diabetics. Treatment of latent TB in diabetics may have a beneficial impact on TB control.

Key Words: Latent Tuberculosis, Diabetics, Non-diabetics, Mantoux test.

Introduction

Globally, tuberculosis (TB) is one of the leading infectious causes of adult mortality. Regions in the world where TB is most prevalent include Pacific Rim nations, Indian subcontinent, sub-Saharan Africa, Latin America, and the former Soviet Republics.¹ Because of delayed, inadequate, or unavailable therapy, 1.8 million persons die due to TB annually.² According to WHO estimates more than a fourth of preventable deaths in developing nations are attributable to TB. The risk of developing disease after being infected depends largely on multiple factors like diabetes mellitus, smoking³ and immunosuppressive therapies.

For effective and efficient treatment of active

TB, rapid diagnosis and treatment of patients are the key points in disease control. However, the treatment of latent TB infection to prevent progression to active disease is an essential component of public health efforts to eliminate TB.⁴ Treatment of latent TB reduces the risk of developing active tuberculosis by 40%.⁵

Latent TB is diagnosed with Mantoux test. Patients with medical illnesses like diabetes are considered to have positive Mantoux test if induration is more than 10mm, while in low risk patients if it is more than 15mm the test is considered positive.⁶

Diabetes mellitus (DM) is one of the risk factors for developing TB.⁷ The world prevalence of diabetes among adults is 6.4%, affecting 285 million adults and will increase to 7.7%, and 439 million adults by 2030.⁸

Overlap between the DM and TB can adversely affect global TB control efforts.⁹ This study was planned to note frequency of latent TB among diabetics and non-

Correspondence:

Dr. Iffat Sultana
Senior Registrar
IIMC-T, Pakistan Railway hospital
Rawalpindi
Email: iffaatt@gmail.com

diabetics. Whole blood interferon-gamma assay (Quantiferon-TB gold and T-Spot-TB) is now available in developed countries for the diagnosis of latent TB.⁵ Since this test is expensive and not routinely available in developed countries, so we used conventional test i.e., Mantoux test to diagnose latent TB.

Materials and Methods

This cross sectional study was conducted Benazir Bhutto Hospital, Rawalpindi for 6 months. Sample size of 256 was calculated with 95% confidence interval, using WHO sample size calculator⁶. A person was categorized as case when fasting blood glucose ≥ 126 mg/dl and random blood glucose level was ≥ 200 mg/dl, while controls were non-diabetic. Latent TB was considered present when tuberculin reaction size was ≥ 10 mm in cases and ≥ 15 mm in controls. Exclusion criteria included; age < 18 years, active TB, previous history of TB treatment (successful, failure), malignancy, chronic kidney disease, persons taking steroids, persons positive for markers of HIV, hepatitis B and C markers, and persons receiving immunoglobulins. Detailed clinical evaluation and checking for blood sugars was done for induction of cases and controls after informed consent taking in consideration inclusion and exclusion criteria. Purposive sampling technique was used in this regard.

Each case and control underwent Mantoux testing in standard way. This included injecting purified protein derivative intradermally on the volar surface and reading reaction as transverse diameter of induration in millimeters (mm) after 48-72 hours on second visit. A tuberculin reaction size of 10 mm or more was considered indicator for latent TB in cases, and 15 mm in controls. Data regarding age, gender, Mantoux test results was collected on a

specifically designed proforma. Frequency and percentages were calculated for gender and Mantoux results, while mean \pm SD were calculated for age. Association of Mantoux test positivity (latent TB) was sought between cases and controls employing Chi square test.

Results

Of the 286 cases and controls, 20 dropped out due to follow up lost patients. Thus the study comprised 256 persons which included 131 (51.2%) cases and 125 (48.8%) controls. 117 (45.7%) of the study participants were males and 139 (54.3%) were females. Mean age of study participants was 49.1 ± 15.49 years. Mantoux test was positive in 38 (14.8%) of all study participants, 27 (10.5%) cases, and 11 (4.3%) controls, p value 0.008.

Table I: Frequency of latent tuberculosis in study population (n= 256)

Patient Group	Number of Patients	Latent TB	Percent
Diabetics	131	27	10.5%
Non diabetics	125	11	4.3%
Total no of patients	256	38	14.8%

Discussion

Among infectious diseases tuberculosis is a leading cause of death, ranks second only to human immunodeficiency syndrome (HIV/AIDS).¹⁰ In 2006, there were 9.2 million new cases of tuberculosis and 1.7 million deaths, with the burden of the disease occurring predominantly in the immunodeficiency virus and acquired imploding world.¹¹ It is estimated that currently one in three people of world's population is infected with latent

Mycobacterium tuberculosis, acting as reservoir for future disease.¹²

There is a strong link between diabetes mellitus and tuberculosis. In recent decades, tuberculosis incidence has declined in high-income countries, but incidence remains high in countries that have high rates of infection with HIV, high prevalence of malnutrition and crowded living conditions, or poor tuberculosis control infrastructure. At the same time, diabetes mellitus prevalence is increasing globally, which has impact on prevalence of tuberculosis and latent tuberculosis.¹³ It is estimated that about 10% of people with latent TB will go on to develop active TB, which is infectious. In our study we tried to compare the frequency of latent tuberculosis among diabetics and non diabetics. In our study 256 patients were screened for latent tuberculosis. Amongst them 131 were diabetics i.e. 51.2% and 125 were non diabetics i.e. 48.8%. Out of them 117 were male i.e. 45.7% and 139 were female i.e. 54.3%. Mantoux test was carried out in all patients both diabetic and non diabetic. Out of 256 patients Mantoux test was positive in 33 patients i.e. 14.8%. Among diabetics Mantoux test was positive in 27 patients i.e. 10.5%. While among non diabetics, Mantoux test was positive in 11 patients i.e. 4.3%, with a p value of 0.008. This shows that latent tuberculosis is more common in diabetics than non diabetics.

ADRIANA PÉREZ and others did a study to find association between tuberculosis and diabetes. A case control analysis of the hospital discharge data set from the Texas Health Care Information Council was performed for the years 1999-2001. Risk factors associated with tuberculosis were identified by logistic regression. Diabetes patients were almost twice as likely to have tuberculosis after adjusting by sex, age, and race/ethnicity.¹⁴

Alfredo Ponce-de-Leon carried out a study

to determine the impact of diabetes on the rates of tuberculosis in a region where both diseases are prevalent. The estimated prevalence of diabetes in the study area was 5.3%. The estimated rates of tuberculosis for the study area were greater for patients with diabetes than for non-diabetic individuals (209.5 vs. 30.7 per 100,000 person-years, $P < 0.0001$). So the rate of tuberculosis was increased 6.8-fold ($P < 0.0001$) in patients with diabetes.¹⁵

Recently Muhammad Atif Shiraz and Abdullah Khan assessed the prevalence of latent pulmonary tuberculosis (TB) in young adult males. The study was carried out at Combined Military Hospital Kohat from January 2004 to August 2005. Sample size was 4000. 7.45% had strongly positive Mantoux test and were labeled as latent pulmonary TB. It was concluded that there is a high prevalence of latent pulmonary TB in our asymptomatic adult population.¹⁶

Similarly Qayyum A and others conducted a study to find the prevalence of Pulmonary Tuberculosis among diabetics. In this study the calculated prevalence of pulmonary tuberculosis among diabetic patients was 9.5% compared to non-diabetic patients who had prevalence of 2.08% ($P\text{-Value} < 0.002$) indicating 7.5% higher risk in diabetic patients.¹⁷

Conclusion

Latent tuberculosis is more common in diabetics than non diabetics. Treatment of latent TB in diabetics may have a beneficial impact on TB control.

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