CODEN [USA]: IAJPBB ISSN : 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES
SJIF Impact Factor: 7.187
http://doi.org/10.5281/zenodo.4243589

Avalable online at: http://www.iajps.com *Research Article*

PREVALENCE OF LATENT TUBERCULOSIS INFECTION IN THE PATIENTS SUFFERING FROM HIV INFECTION

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Article Received: September 2020 **Accepted:** October 2020 **Published: November** 2020

Abstract:

Objective*: The aim of this research work was to find out the prevalence of LTBI (Latent Tuberculosis Infection) and to provide the comparison of the results of Tuberculin Skin Test (TST) to Anti TB-IgM Antibodies (ATIA) for the identification of the LTBI in the patients suffering from HIV infection.*

Methodology*: In this research work, total 62 samples having HIV infection underwent Tuberculin Skin Test in Department of Infectious Diseases of Mayo Hospital Lahore. All these patients underwent Tuberculin Skin Test with the utilization of 5.0 TU of purified protein derivative and we also measured ATIA. We used the SPSS V.21 for statistical analysis of the collected information.*

Results*: 62 patients, 54.80% (n: 34) patients were present with Tuberculin Skin Test positive results, whereas 9.70% (n: 6) patients got positive results for ATIA. There was 45.20% overall concordance between Anti TB-IgM Antibodies & Tuberculin Skin Test (Kappa= 0.370, P= 0.320). In the patients having positive test findings by either ATIA or Tuberculin Skin Test, only 4.80% patients got positive findings by both of the tests. Discordant findings were present in 54.80% patients. Positive findings for both type of tests in patients classified in 2 groups (below or above 200.0 CD4-cell/mm3) were present with no important disparity (P>0.050).*

Conclusion*: Prevalence of Latent Tuberculosis Infection among patients with HIV infection in studied region is much high as compared to other regions of world. TST is very effective test for diagnosis of Latent Tuberculosis Infection and it has preference over ATIA. Concordance between both results was very low.*

Keywords: *HIV Infection, Latent Tuberculosis Infection, Disparity, Tuberculin Skin Test.*

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Please cite this article in press Muhammad Asif Shahzad et al, ***Prevalence Of Latent Tuberculosis Infection In The Patients Suffering From Hiv Infection.,*** *Indo Am. J. P. Sci, 2020; 07(11).*

INTRODUCTION:

There is much severe impact of the HIV epidemic in many regions of the developing world. There is continuous increase in the amount of the patients of AIDS [1-3]. WHO has stated that TB (Tuberculosis) is the most vital co-infection in HIV infection with an estimation of thirteen million population in whole world with infection of both TB & HIV [4-6]. Detection of LTBI (Latent Tuberculosis infection) in the patients with HIV infection is much crucial because of a high progression rate to active tuberculosis, so treatment and diagnosis of Latent Tuberculosis Infection are much essential to control the TB [7]. Traditionally, LTBI is identified by TST (Tuberculin Skin Test), which is related with many limitations [8-10].

Some recent research works have stated alternative diagnostic methods Latent Tuberculosis Infection like IGRAs (Interferon-α Release Assays), Quanti-FERON-TB Gold assay, CPF-10 (Culture Filtrate Protein-10) and detection of antibodies against the mycobacterium antigens [11, 12]. Since, there is much limited data elaborating the alternative diagnostic methods for LTBI diagnosis in the patients with HIV infection in our region, we aimed to provide a comparison of the efficacy ATIA (Anti-TB IgM Antibodies) test with traditional TST for the detection of LTBI in the patients suffering from HIV infection.

METHODOLOGY:

A sum of 62 patients with confirm diagnosis of HIV infection were the participants of this comparative research work. This research work was carried out in Mayo Hospital Lahore from January 2019 to December 2019. We recruited the patients from Departments of addicts' treatment and Infectious diseases in this study. We performed the full physical examination of the patients. We also filled a questionnaire including questions about traits, epidemiological data, variables associated with addiction and previous history of tuberculosis. We also tested the samples of blood of all the patients for antibodies against A-60 antigen of MTB. Inclusion criteria comprised the 2 positive Elisa-HIV antibody. All the patients present with clinical TB or with complete treatment of TB or receiving anti-TB medicines were not the participants of this research work. We obtained 10 mm blood from every patient and we reserved them in 2 separate tubes (5.0 cc) 1st citrated and 2nd without citrate.

We tested the citrated samples tested by the fleocytometry for counting of CD4 positive cells. We tested the uncitrated samples for ATIA with the utilization of commercial kit named Dia-PRO diagnostic (Italian made). According to the specimen of manufacturers of kit with values higher or equal to 1.150 (OD450.0nm=1.150) were deliberated as positive. We tested all the patients for TST (Tuberculin Skin Test) with 0.10 ml 5.0TU PPD (Purified Protein Derivative). We read the tests after approximately 48 to 72 hours after obtaining samples. For every patient, maximum transverse diameter of the indurations in millimeters with the help of a ruler by pen-rolled method and record was maintained. Reactions of 5.0 mm or greater (for positive HIV) and greater than 2.0 mm (for patients of AIDS) were considered as positive ones [1, 3]. We used the SPSS V.21 for the statistical analysis of collected information. We used the Chi-square test for the comparison of proportions. We considered the differences having P value less than 0.050 as statistically significant. We evaluated the concordance between results of TST & ATIA with the use of Kappa statistics and agreement.

RESULTS:

Among 62 patients, 95.20% (n: 59) patients were males with an average age of 30.470 ± 6.060 years and 4.80% (n: 3) patients were females with an average age of 34.30 ± 6.65 years. Total 54.80% (n: 34) patients were present with positive results for TST (Table-1).

Table-I: The Results for Two Studied Tests in HIV Infected Individuals

	ATIA positive N (percent)	ATIA negative N (percent)	Total
TST positive	3(4.8)	31(50)	34(54.8)
TST negative	3(4.8)	25(40.4)	28(45.2)
Total	6(9.6)	56(90.4)	62(100)

TST; tuberculin skin test, ATI A; anti TB-IgM anti bodies, HIV; human immune deficiency virus

The patients with count of CD4+ cells greater than 200 cells/mm3, 56.0% (28 of 50) patients were present with positive results for TST (Table-2), in comparison with 50.0% (6 of 12) with count of CD4+ cells of lower than 200 cells/mm3 (P = 0.70). TST distribution in different age groups displayed an important difference between negative & positive results age-group from 15 to 25 year (21.0% vs.7.50%, P<0.050) whereas, we found no difference in the age-group having 26 to 35 (22.50% vs 27.50%, P>0.050) and in age-group of greater than 35 years of age (11.50% vs 7.50%, P>0.050.

Table-II: Tuberculin Skin Test Results According to CD4+ T Lymphocyte Count in HIV Positive Individuals

CD4+ count	TST + N (percent)	TST- N (percent)	Total
More than 200	28(45.1)	22(35.5)	50(80.6)
Lower than 200	6(9.7)	6(9.7)	12(19.4)
Total	34(54.8)	28(45.2)	62(100)

TST; tuberculin skin test, CD4+; CD4 positive T lymphocyte count (cell/mm^3), HIV; human immune deficiency virus

There were positive results of ATIA testing in 9.60% (6 of 62) patients, negative findings in 90.40% (56 of 62) patients (Table-1). Among those with a count of CD4+ cells lower than 200 cells/mm3, 8.30% (1 of 12) had positive results for ATIA (Table-3), in comparison with 10.0% (5 of 50) patients with a count of CD4+ cells greater than 200 cells/mm3 (P = 0.80). Among these, 40.40% (n: 25) patients were concordant in non-positive results and 4.80% (n: 3) patients were concordant in positive test results, for overall concordance of 45.20% (Kappa= 0.370, P= 0.320). TST+/ATIA "discordant findings were discovered in 50.0% (31 of 62) patients and TST"/ATIA+ findings in 4.80% (3 of 62) patients.

Table-III: Anti TB-IgM Anti Bodies Results According to CD4+ T Lymphocyte Count in HIV Positive Individuals

CD4+ count	ATIA+ N (percent)	ATIA- N (percent)	Total
More than 200	5(8.0)	45(72.6)	50(80.6)
Lower than 200	1(1.6)	11(17.8)	12(19.4)
Total	6(9.7)	56(90.3)	62(100)

ATIA; anti TB- IgM anti bodies, CD4+; CD4 positive T lymphocyte count (cell/mm^3), HIV; human immune deficiency virus

DISCUSSION:

The findings of this current research work showed the high incidence of LTBI in the patients present with HIV infection in this particular region of world with a rate of prevalence of 59.70% that is much higher as compared to rate of prevalence in other regions of world. The range of its prevalence rate is from 16.80% in the countries which are developed to 30.0% in the non-developed regions [13-17]. Mohraz stated 29.0% rate of prevalence of LTBI in the patients with HIV positive results in Pakistan [18]. The main causes behind these differences are not clear. Residency in the regions with high prevalence of TB (like India) may be considered as a cause of this disparity but the incidence rate of 43.0% in India [13], is much lower than the particular region of current research work makes it much unreasonable. Drug use with intravenous injections (which is most common cause of spread of HIV infection in our region) and imprisonment [15, 18, and 19] may be considered for this difference of our results with the other research works conducted in different regions.

In this current research work, there was no effect of age and sex on LTBI. This result is in contrast with the data available in this particular field and other research works [18]. We can consider the HIV epidemiological pattern in our region as acceptable cause for this particular disparity. This research work showed that there was failure of ATIA in diagnosis of LTBI (with 8.80% sensitivity & 11.0% specificity), so TST regardless of its limitation is an effective tool for diagnosis of LTBI in our particular region. This finding is much consistent with the findings of research works conducted by Imeran in 2008 and Song in 2007 [19]. They stated that serological tests are not much effective for the diagnosis of LTBI. Our result is in contrast with some other research works like study of Fugita conducted in 2005 and research work of Genarro in 2007. They recommended the serological tests for the diagnosis of LTBI. The causes for these differences are not clear but may be depending upon some other factors as size of sample, type of utilized antigen or calculated immunoglobulin (IgM vs. IgG),

variation in the epidemiological pattern of AIDS and tuberculosis in different parts.

CONCLUSION:

The incidence of LTBI in the patients suffering from the infection of HIV in this particular region was much high as compared to other regions of whole world. TST method is very useful for the detection of LTBI with a preference over ATIA. Concordance between both test results was much low.

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