Frequency of Latent and Smear Positive Tuberculosis in Chronic Psychotic Disorders

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Objective: Screening is one of the ways to combat Tuberculosis (TB) and should be mostly concentrated on groups showing some symptoms of the disease. Tuberculosis can be transferred from person to person in laboratories, prisons and psychiatry hospitals. The purpose of this study was to survey pulmonary TB in patients with schizophrenia in Rasht.
Methods: In this descriptive-cross sectional, Two hundred fifty seven consecutive patients with chronic psychotic disorder hospitalized in psychotic hospitals underwent purified protein derivative (PPD) test. PPD test was done with the unit 5T which was injected subcutaneously on anterior surface and at the top of left forearm. The results of the test were interpreted by the pen technique method and based on transverse diameter of induration of about 48-72 hrs. Induration size due to hypersensitivity to PPD more than 10mm was considered positive. Patients with positive PPD test underwent complementary sputum smear. Data were analyzed using chi- square and T test.
Results: The mean age of patients was 45±10 years; 75.5% were male, 74.7% were single, 10.5% married, 7.8% divorced, and 68.1% were smokers. These patients suffered from chronic psychotic disorder at the mean time of 15±7.9 years. In 74 patients (28%) positive PPD test were recorded, but active pulmonary TB was not found in complementary experiments of PPD sample. Based on data analysis, only age and gender showed a significant relationship with the results of the PPD test ($P < 0.05$).
Conclusions This study showed that patients with positive PPD test are much more than the normal population, but active pulmonary TB was not observed in our samples. Since these patients are in clinical and closed places, more programs for screening are required.

Keywords: *Tuberculosis, Chronic Psychotic disorder, purified protein derivative (PPD), Screening, Schizophrenia, latent, smear positive, Iran*

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The world health organization (WHO) has mentioned that about 9.4 million of new cases of Tuberculosis (TB) and 1.7 million deaths due to this disease have occurred worldwide in 2010. This organization also implies that TB control cost has been estimated to be 5 trillion in 2011 (1, 2). Being a neighbor to Afghanistan, Pakistan and Iraq (3) which are endemic countries of TB, has made Iran a high risk country. Mortality and morbidity rates of TB in Iran according to what WHO have estimated are 22 and 28.3 person per one thousand (4). The prevalence and incidence of tuberculosis is not uniform throughout Iran; according to the reports of tuberculosis and pulmonary diseases research center, tuberculosis is more prevalent in the border areas such as northwest of Iran (5). Furthermore, due to low level of screening and inadequate reports in many national programs, reported cases are just a part of whole patients (6) .

Screening is one of the ways to combat TB (6). Screening should be concentrated on those with TB symptoms and on high-risk groups. All patients with immunosuppressive diseases, malnutrition conditions and smokers, have a background of conducive for TB infection (7, 8). In addition to laboratories and prisons that are TB reservoirs, psychiatric hospitals are also suitable places for transferring TB (9). Mohammadi et al assessed epidemiology of psychiatric disorders according to Schedule for Affective Disorders and Schizophrenia in 2005 and showed that the prevalence of psychotic disorders was 0.89% (10) .

In clinical researches, tuberculin test (PPD) is the most convenient which can be done on infected patients. PPD will cause hypersensitivity to some particles of this bacterium. Although PPD does not have 100%

sensitivity and specificity, presently it is the best, the most cost effective and the most creditable test to screen TB infection (6). According to previous studies, the frequency of positive PPD test has a relationship with psychotic disorders; the homeless and persons with these disorders may be TB reservoirs. Prevalence of positive PPD test and hypersensitivity more than 10mm as a TB infection indicator in these societies has been reported between 17 to 37 percent (6, 11-12). The incidence of TB in chronic psychotic patients hospitalized in clinical places is more than the general population because of their aggregation in limited places (13), although another study suggested that these patients reject clinical surveys (14). In a report in Iran, PPD in patients with chronic psychotic disorders were positive in more than 28 percent (15).

Nevertheless, TB screening and active case finding in high risk groups can be an important step to control and treat TB beside other national protective efforts in the society. Due to difficult history taking in psychotic patients and also high risk of infection, we used PPD test on all of these patients to check their active pulmonary TB in Rasht education-treatment centers and psychiatry hospitals and also found out the frequency of TB infection.

Materials and Method

In this descriptive-cross sectional study, 257 patients with chronic psychotic disorders hospitalized in psychiatry hospitals whose disease has been confirmed by a psychiatrist underwent PPD test from January 2010 to January 2011 in Rasht. Chronic psychotic disorder was defined as psychotic disorders such as schizophrenia in patients who were admitted more than one time. Diagnosis of schizophrenia was based on DSM-VI-TR criteria. The study protocol was confirmed by morality committee of Guilan University of Medical Sciences. All patients with a background of PPD test in the last six months were excluded.

PPD test (Span, India) was done with the unit 5T (0.1mm of one per thousand solutions) which was injected subcutaneously on anterior surface and at the top of left forearm. The results of the test were interpreted by the pen technique method and based on transverse diameter of induration of about 48-72 hrs. After the injection induration size was measured with a ruler.

Induration size due to hypersensitivity to PPD more than 10mm was considered positive and most of the patients with active TB showed induration more than 10mm with 10 units of Tuberculin. Then, patients with positive PPD test result underwent complementary sputum smear. Acid-fast sputum smear tests were provided from infected patients by a related expert three times before breakfast in the morning.

Demographic information of patients, characteristics related to their disease, duration of morbidity and hospitalization and results of patients' PPD and sputum smear tests were recorded in form of applications. Statistical analyses were done by SPSS software (version 18, USA). Collected data were presented as frequency, mean ± standard deviation. Data were analyzed with chi- square and T test.

Results

Two hundred fifty seven patients with chronic psychotic disorder including 63 women (24.5%) and 194 men (75.5%) were studied. The mean age of the patients was 44.51±10.54 years (ranged from 19 to 76 years old). The mean age in PPD positive group and PPD negative group were 47.37± 10.24 and 43.13±10.44, respectively. One hundred ninety two patients (74.7%) were single, 27 (10.5%) married and 20 (7.8%) were divorced; 14% of patients were illiterate, 60.7% were high school drop outs, and 25.3% had a high school diploma or a higher academic degree; of the patients, 68.1% were smokers. The patients have suffered from chronic psychotic disorders (more often schizophrenia) for the mean time of 17.71±7.9 (2.1% less than 5 years; 7.7% between 5 to 10 years; and 90.1% more than 10 years). The results revealed that their disorder became chronic. The mean duration of their hospitalization was 61.98±39.61 months with 22.2% less than 24 months, 11.7% between 24 to 48 months and 66.1% more than 48 months. All of the 257 patients underwent PPD tests; the results were negative in 174 patients (67.7%), and 83 patients (32.3%) had an induration of more than 10 millimeter.

Table-1: Relationship between variables and results of the purified protein derivative (PPD) test

Variables	Positive PPD	PPD Negative	P Value
Age	47.37± 10.24	43.13±10.44	0.03
Gender			
male	75 (38.7%)	119 (61.3%)	0.001
Female	8 (12.7%)	55 (87.3%)	0.001
Duration of being disease	19.31± 7.57	16.87±8.02	NS
Duration of hospital stay	65.45 ±41.39	60.33± 38.74	NS

The mean size of PPD test was considered as 4±7.7 millimeter. Then, 83 patients with positive PPD test underwent complementary sputum smear and active pulmonary TB was not found in the subjects.

Based on the data analysis, only age and gender showed a significant relationship with the results of the PPD test ($P < 0.05$). Other variables such as age, duration of the disease and duration of the hospitalization did not show a significant relationship with the results of the PPD test (table-1). Furthermore, education and marriage did not reveal a significant relationship with the results of the PPD test.

Discussion

This study revealed that patients with positive PPD test are much more than the general population but we did not observe any active pulmonary TB in these patients. This result is observed in similar studies. In a study in 2005 in the United States, 20.2% of 655 patients hospitalized in psychiatric hospitals showed positive PPD test (16). Mac Quiston and colleagues also studied the prevalence of TB infection in 71 patients with severe psychotic disorder with the mean age of 32 years using PPD test. In their study, 17% of the cases had positive PPD test, but in our study it was 32.3% (11).

In a study by Zenrich and colleagues, 39 cases out of 720 (often with schizophrenia just like our study) were suffering from active TB. They used PPD test, chest X-Ray and sputum smear to check TB in the patients (17). In another study by Hashemi and colleagues in The Hamedan province of Iran, all of the patients with chronic psychotic disorders hospitalized in Sina hospital and Abolfazl Care Center in 2005-2006 underwent PPD test. Then, complementary tests were done on patients with positive PPD. Among 215 patients with the age range of 18 to 85 years, 62 (28.8%) had positive PPD. Test positivity was significantly associated with age and disease duration (15). However, in our study, we did not observe any significant relationship between duration of morbidity and positive PPD test.

Borzenko and colleagues considered the chest X-ray as the main way of TB diagnosis in patients with psychotic disorders. However, in our study due to high costs and loss of positive sputum smear, we did not perform this complementary test in any of the cases with positive PPD test (18). In another study, Fisher and colleagues tested 113 patients with severe Psychotic disorder for TB using immunoassay enzyme (19).

Considering the fact that TB is more prevalent in patients with chronic psychotic disorder than in the general population, one of the ways to solve this problem is active screening. Moreover, as these patients are hospitalized in limited clinical places, the collection of accurate TB case finding programs requires information on prevalence of active TB (20).

Conclusion

This study revealed that patients with positive PPD test are much more than the normal population, but active pulmonary TB was not observed in our samples. Since these patients are in clinical and closed places, more programs for screening are required.

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