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Tuberculin Skin Test among 1,424 Healthy Employees in Chaharmahal Province, Iran

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ABSTRACT

Background: *Tuberculosis is still an important problem in developing countries. The tuberculin skin test (TST) is used for the identification of latent tuberculosis (TB) infection. This study aimed to evaluate the TST results of healthy employees of different departments in chaharmahal province, Iran.*

Materials and Methods: *This study was done on 1,424 healthy employees from 49 different departments in Chaharmahal Province. The tuberculin skin test was done with Purified Protein Derivative (PPD) solution. The induration was evaluated 48-72 hours later.*

Results: *Negative PPD test was observed in 346 subjects. A 5-10 mm induration was seen in 276, a 10-15 mm in 292, a 15-20 mm in 212, a 20-25 mm in 72, and a 25-30 mm induration was observed in 14 cases. A total of 212 subjects were absent when reading the induration.*

Conclusion: *Tuberculin skin test can be used for the identification of TB infection. Prevalence of latent TB infection was low in our study. There were no significant differences in PPD test results between medical and non-medical departments.* ***(Tanaffos2011; 10(1): 37-39)***

Key words: *Tuberculosis, Tuberculin skin test, Purified Protein Derivative (PPD)*

INTRODUCTION

Tuberculosis is one of the oldest diseases known to affect humans and is caused by bacteria belonging to the *Mycobacterium tuberculosis* complex. The disease usually affects the lungs, although in up to one-third of cases other organs are involved as well (1).Tuberculosis is still an important health hazard in developing countries (2).

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The tuberculin skin test (TST) is used for the identification of latent tuberculosis (TB) infection (3). The purpose of this study was to evaluate the results of TST among employees of different departments in chaharmahal province, Iran.

MATERIALS AND METHODS

This study was conducted on 1,424 healthy employees from 49 medical and non-medical departments in Chaharmahal Province. After explaining the procedure to the subjects, tuberculin skin test (TST) was done on the anterior aspect of the

left forearm by injecting 0.1 ml of standard PPD solution with insulin syringe. The induration site was read 48-72 hours after injection. While reading the results, 212 cases were absent and excluded from the study.

RESULTS

Negative PPD test was observed in 346 subjects. A 5-10 mm induration was observed in 276 cases, a 10-15 mm induration in 292, a 15-20 mm induration in 212, a 20-25 mm induration in 72, and an induration equal to 25-30 mm was observed in 14 cases. All participants with PPD result>15 were evaluated with CXR, CBC and ESR. No abnormality was detected in CBC, ESR or CXR of evaluated subjects. Table 1 summarizes the obtained results.

Table 1. Frequency distribution of PPD test results

PPD	Number of cases (percent)
<5mm	346 (28.5)
5-10 mm	276 (22.8)
10-15 mm	292 (24.1)
15-20 mm	212 (17.5)
20-25 mm	72 (5.9)
25-30 mm	14 (1.2)

There were no significant differences in PPD test results between medical and non-medical departments.

DISCUSSION

In 1891, Robert Koch discovered components of *M. tuberculosis* in a concentrated liquid culture medium. Subsequently named "old tuberculin" (OT), this material was initially believed to be useful in the treatment of tuberculosis (although this idea was later disproved). It soon became clear that OT was capable of eliciting a skin reaction when injected subcutaneously into patients with tuberculosis. In 1932, Seibert and Munday purified this product by ammonium sulfate precipitation. The result was an active protein fraction known as tuberculin PPD. However, the complexity and diversity of the constituents of PPD rendered its standardization difficult. PPD-S, developed by Seibert and Glenn in 1941, was chosen as the international standard. Later, the WHO and UNICEF sponsored large-scale production of a master batch of PPD, termed RT23, and made it available for general use. The greatest limitation of PPD is its lack of mycobacterial species specificity, a property that is due to the large number of proteins in this product that are highly conserved in the various species of mycobacteria. Skin testing with PPD is most widely used in screening for M. tuberculosis infection. The test is of limited value in the diagnosis of active tuberculosis because of its low sensitivity and specificity (1). The tuberculin skin test (TST) is used for the identification of latent TB infection but lacks specificity in *Mycobacterium bovis* BCG-vaccinated individuals, who constitute an increasing proportion of TB patients and their contacts from regions where TB is endemic (3). The specificity of the tuberculin skin test for the diagnosis of latent tuberculosis infection is adversely affected by BCG vaccination and infection with non-tuberculous mycobacteria (4). The tuberculin skin test used to detect latent Mycobacterium tuberculosis infection has many drawbacks, and a new diagnostic test for latent tuberculosis (QuantiFERON-TB) has been introduced (5). This new diagnostic test measures the production of interferon (IFN)-gamma in whole blood upon stimulation with specific ESAT-6 and CFP-10 antigens of *Mycobacterium tuberculosis*. Since most of the mycobacteria other than tuberculosis and BCG strain do not contain these antigens, the detection of IFN-gamma levels indicates the specific T-cell response against M. tuberculosis (6). Although IFN-gamma blood assay has many advantages such as objective and

quantitative results, no interference with vaccination due to the use of specific antigens and being practical, the high cost and the need for well-equipped laboratories are among its disadvantages (6). Kang YA and Lee HW showed that IFN-gamma assay is a better indicator for evaluation of the risk of M. tuberculosis infection than TST in a BCG-vaccinated population (7). IFN-gamma assay is less affected by BCG vaccination than TST for diagnosis of latent tuberculosis (8). Porsa et al. and Cheng et al. showed that reactivity of the IFN-gamma assay is unaffected by prior BCG vaccination or serial TSTs (9). Biological tests that measure the in-vitro production of interferon gamma will replace or complement TST in the diagnosis of latent tuberculosis in the near future (10).

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