

Evaluation Of tuberculin skin test and booster effect in hemodialysis patients

Masomeh Alimaghham, Saied Aminiafshar, Latif Gachkar, Kamran Sharafim, Mohammad Farahbakhsh

Infectious Diseases and Tropical Medicine Research Center, Shaheed Beheshti University of Medical Sciences, Tehran, Iran

ABSTRACT

Background: Tuberculosis is an endemic disease in Iran which may occur more frequently among hemodialysis patients. We have evaluated tuberculin skin test (TST) in hemodialysis patients in a university hospital in 2003-2004.

Materials and methods: Sixty-seven hemodialysis patients were enrolled for tuberculin skin tests. Indurations were measured 48-72 hours after the injection and then on the 7th day. Those with indurations less than 5mm in TST1 were introduced for TST2.

Results: Of 67 patients, 18(26.9%) had indurations of less than 5mm in TST1 and were introduced for TST2 among whom 7 (39%) had an induration measured less than 5mm. Of 18 cases, 11 (61%) were revealed to have booster effect that represent a ratio of 16% of all studied hemodialysis patients in our study.

Conclusion: It seems that the second TST is a better indicator of infectivity in hemodialysis patients, especially for patients who require repeated or annual estimation for M. tuberculosis infection.

Keywords: Hemodialysis, Booster effect, Tuberculosis, Tuberculin skin test.

(Iranian Journal of Clinical Infectious Diseases 2006;1(1):35-37).

INTRODUCTION

The oldest documents about tuberculosis (TB) are related to the Neolithic period (1). One third of human populations are infected with Mycobacterium tuberculosis, and about three million people lost their lives due to tuberculosis (2). CDC warned that tuberculosis can be stamped out by year 2010, based on declining prototype of TB between 1950-1985 (3). But after the AIDS pandemic, TB has increased worldwide (2).

Hemodialysis patients are explicit group (longevity length of disease and immunosuppression) who are at increased risk for TB infection; however, prophylaxis may be required for this high risk group (4). Patients with chronic renal failure or those under hemodialysis may develop TB 16 times more frequently than the general population (5). Approximately, 8000 hemodialysis patients are living in Iran (6).

TST is a delayed hypersensitivity reaction, happening 2-10 weeks following the infection (7). Although TST cannot sensitize an uninfected person, it can re-stimulate remote hypersensitivity that was deteriorated. This booster effect (a positive test after the negative one) develops within

Received: 29 May 2005 Accepted: 21 September 2005

Reprint or Correspondence: Masomeh Alimaghham, MD, Department of Infectious Diseases and Tropical Medicine, Shaheed Beheshti University of Medical Sciences.

E-mail: masomehalimaghham@yahoo.com

36 Tuberculin skin test in hemodialysis

several days following the first injection and may be persistent. This causes interpretative problems because a negative test result followed by a positive test result approximately 10 weeks later may be a product of either a recent infection or booster effect. This problem is circumvented by retesting non-reactors one week later. If the second test result is positive, these indicate boosting rather than recent tuberculosis conversion. Tuberculin positivity only after boosting is more common in older subjects, in persons infected with non-tuberculosis mycobacterium and in those individuals who had received BCG vaccine (2,8). In a study conducted by Mitwally on 25 hemodialysis patients, 28% had TB without any specific complaint, 71.4% had extrapulmonary TB and 40% had positive TST (9).

PATIENTS and METHODS

This descriptive study was performed in the Hemodialysis ward of Labafi Nejad Hospital (affiliated to Shaheed Beheshti University of Medical Science) in 2003-2004. We included the hemodialysis CRF cases who had at least two sessions of hemodialysis per week during the recent 2 months. Meanwhile, the following exclusion criteria were set at baseline: transient hemodialysis for acute problems, hemodialysis for less than two months.

All patients were requested to complete an informed consent. Then, a thorough history and physical examination were achieved. During the first visit, TST1 was carried out in forearm of the fistulae free hand (0.1ml of Razi PPD solution, Lotno-16-6-8, by Mantoux technique). TST indurations measured 48-72 hours later and also on 7th day by trained staff, with mean measurement of "Ball Point" in two dimensions span, length and width. Following the first measurement, the second TST (TST2) was injected for those who had an induration less than 5mm after one week of TST1. Site of TST2 was at least 10 cm far away TST1.

Second measurement was recorded 48-72 hours later, like TST1.

RESULTS

The study population included 36 females and 31 males with the mean age of 46.9 years (range, 18-74 years). Of 67 patients, 18 (26.9%), including 14 females and 4 males, had an induration of less than 5mm during the TST1 test. These cases were introduced for TST2. First TST induration was directly correlated with hemodialysis duration ($r>0$, $p<0.05$). The TST1 indurations have been changed within the first week follow up in hemodialysis patients so that it was decreased in 81.4% but increased in 18.6%.

Table 1 outlines the results of TST2 after 48-72 hours. As shown, 7 (39%) patients had an induration measured less than 5mm, while 9 (50%) had 5-9mm indurations, and 2 (11%) ≥ 10 mm indurations. Of 18 cases, 11 (61%) were revealed to have booster effect that represent a ratio of 16% of all studied hemodialysis patients in our study.

Table 1. Results of indurations in the TST2 after one week from the TST 1

	Induration (mm)				Total
	0-4	5-9	10-14	≥ 15	
Number of cases	7	9	1	1	18
Percentage	39	50	5.5	5.5	100

DISCUSSION

Diagnosis and treatment of the tuberculosis is a worldwide health concern. Diagnosis could be established by past medical history, physical examination, chest x-ray, sputum smear and culture and, of course, finally by means of tuberculin skin test (TST). Nevertheless, TST measurement is just a warning sign for infection with Mycobacterium tuberculosis in hemodialysis patients (2). TST is a rapid simple technique that can be employed even

in outpatient setting. Prior investigators have explained the advantages of this technique (3,4); however, more justified and careful interpretations should be applied for subjects with an underlying disease and immunosuppressive conditions such as hemodialysis patients (7).

TST1 can be planned for all subjects; however, TST2 will be employed for those have an induration of less than 5mm in TST1. Indurations of ≥ 5 mm provide suitable indication for INH prophylaxis. In our study, 64% of the patients had positive TST1 that is in accordance to the study of Mitwalli (9).

The TST1 indurations have been changed within the first week follow up in hemodialysis patients. Therefore, follow up measurement during the first week is strongly recommended (2).

Totally, booster effect was revealed in 16% of our studied subjects. Of 18 negative-TST1 patients, 11 (61%) were shown to have positive TST2 results. To our knowledge, booster effect has not been previously investigated among hemodialysis patients, however, in a study in Canada, Menzies have reported booster effect in 5.2% of young healthy adults (10).

We recommend measurement of TST size to be followed for at least one week while the utmost range ought to be recorded and any alteration should be noted down. Furthermore, patients who have indurations of < 5 mm in TST1, should have TST2 after one week to assess the delayed hypersensitivity reaction.

REFERENCES

1. Ziazarifi A, editor. History of TB from past to today. Tehran, Alfa Publications, 1982; p: 15.
2. Hass DW, Mycobacterial diseases, In: Mendel GL, Bennett JE, Dolin R, editors. Principles and practice of infectious diseases. 5th edition. Churchill Livingstone; USA, 2000; p: 2576-83.
3. CDC. Treatment of tuberculosis. MMWR Morb Mortal Wkly Rep 2003;52 (RR-11):1-88.
4. Raviglione MC, O'Brein RJ. Tuberculosis, In: Braunwald E, Fauci AS, Kasper DL, et al., editors. Harrison's principal of internal medicine. 15th edition. New York, McGraw Hill, 2001; p: 1024-35.
5. Sosaki S, Akiba T. Ten years survey of dialysis associated tuberculosis. Nephron 1979;24(3):141-45.
6. Velayati AA, editor. Tuberculosis disease. 1st edition. Tehran, Center of University Publications, 1982; p: 701-5.
7. Haynes BF, Fauci AS. Introduction to immune system, In: Braunwald E, Fauci AS, Kasper DL, et al., editors. Harrison's principal of internal medicine. 15th edition. New York, McGraw Hill, 2001; p: 1827-28.
8. Belcon MC. Tuberculosis in dialysis patients. Clin Nephrol 1982;17(1):14-18.
9. Mitwalli A. Tuberculosis in patients on maintenance dialysis. Am J Kidney Dis 1991;18(5): 579-82.
10. Menzies R. The booster effect in two step tuberculin skin testing. Ann Intern Med 1994;120:190-98.