

Prevalence of Typhoid Fever in Healthy People: A Descriptive Study

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Abstract

Introduction: Typhoid fever, also known as enteric fever, is caused by the Gram-negative bacterium *Salmonella typhi*.

Objective: To screen pathogens which cause typhoid fever among the healthy people isolated from the blood.

Materials and Methods: Blood were collected from the 200 healthy people and transported to microbiology laboratory for performing test.

Results: A total 120 healthy people showed positive result who had typhoid fever based on clinical examination and serological test, whereas 80 showed negative results from the total 200 patients.

Conclusion: Widal test may be suitable test to detect the enteric fever after 1 week of fever when blood culture is negative.

Key words: Healthy people, Titer, Typhoid fever, Widal test

INTRODUCTION

Typhoid fever, also known as enteric fever, is caused by the Gram-negative bacterium *Salmonella typhi*. The disease is mainly associated with low socioeconomic status and poor hygiene, with human beings, the only natural host, and reservoir of infection.¹

Estimates for the year 2000 suggest that there are approximately 21.5 million infections and 2,00,000 deaths from typhoid fever globally each year.²⁻⁴

Widal is a serological diagnosis test for enteric fever was founded in 1896 by Georges Fernand Isidore Widal.⁵ It is an agglutination reaction demonstrating the presence of lipopolysaccharide somatic (O) and flagella (H) agglutinins to *S. typhi* in the serum of a patient using suspensions of O and H antigens.⁶ Commercial kits are

available for antigens of *Salmonella* paratyphi A, B, and C. The recommended method of performing the Widal test is by the tube agglutination technique were serial two-fold dilutions of the subject's serum from 1:20 to 1:1280 are tested.⁷

Isolation of *S. typhi* from the blood, feces, urine, bone marrow, or other body fluids is an important diagnostic tool. In addition, unavailability of microbiological facilities and the long waiting time for culture results have been identified as reasons for the preference for the Widal test.⁸

MATERIALS AND METHODS

Study Area and Duration

The study was conducted on *S. typhi* isolates that obtained from blood sample submitted to the department of microbiology from January 2016 to March 2016 at Hind Institute of Medical Sciences.

Study Population

Blood sample was collected from a total of 200 healthy people. All these healthy people were outpatients attending the Hind Institute of Medical Sciences.

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Blood Sample Collection

Peripheral venous blood from the all the subjects under study was drawn and allowed to coagulate at room temperature for 30-45 min, followed by centrifugation at $\times 2500$ g for 5 min.

Laboratory Investigation

The serum was subjected to semi-quantitative slide Widal test using standardized suspension of *S. enterica* serotype Typhi “O” and “H” and *Salmonella enterica* serotype Paratyphi A ‘H’ and *S. enterica* serotype paratyphi B “H” antigen test reagents.

Widal Test (Semi-quantitative Method)

Clean glass slides supplied in the kit were used for the test. About 5 μ l (corresponding to the titer of 1:320), 10 μ l (corresponding to the titer of 1:160), 20 μ l (corresponding to the titer of 1:80), 40 μ l (corresponding to the titer of 1:40), and 80 μ l (corresponding to the titer of 1:20) of undiluted serum were dispensed in respective circles using calibrated micropipette. One drop of appropriate antigen suspension was added to each circle and mixed using separate stick and rotated for one minute to take the readings.

RESULTS

A total of 120 (60%) children showed positive result who had typhoid fever based on clinical examination and serological test while 80 (40%) showed negative results from the total 200 patients [Tables 1 and 2].

DISCUSSION

Widal test, widely used diagnostic test for enteric fever in developing countries, has been an exclusive choice either due to the non-availability of blood culture or other reasons such as cost, technical demands, and time consumption.⁹ However, the majority of the normal healthy individual in the endemic region also carry detectable antibodies due to the repeated prior exposure with low inoculums of typhoid bacilli, the knowledge of baseline titer is important for using the Widal test as diagnostic tool for enteric fever in endemic area.¹⁰ Since these antibody titers vary with age and geographical area,¹¹ so the present study was aimed to determine the baseline titer of different antibodies of enteric fever.

The highest titer for O and H obtained using semi-quantitative slide Widal test were 1:640 and 1:320.

In our study, 1:320 titer for O and H in 5 and 6 of healthy people, another study by Mussa have reported titer of 1:320 for O and H in 7 (8.7%) and 11 (13.7%) of 80 healthy individuals from the endemic area of Iraq.¹² In India, one

Table 1: Personal profile and clinical details of the subjects

Characteristics	Values
N	120
Age (years)	2-9
Sex (%)	
Male	78 (65)
Female	42 (35)

Table 2: Distribution of samples with antibody titer slide Widal test against different serotypes among 120 children

Types of Widal test	1:20	1:40	1:60	1:80	1:160	1:320	1:640
Antibody titers against O antigen of <i>S. typhi</i>							
Slide test	42	12	35	20	6	5	0
Antibody titers against H antigen of <i>S. typhi</i>							
Slide test	13	23	40	12	26	6	0
Antibody titers against H antigen of <i>S. paratyphi A</i>							
Slide test	11	24	23	54	8	0	0
Antibody titers against H antigen of <i>S. paratyphi B</i>							
Slide test	23	45	23	23	6	0	0

S. typhi: *Salmonella typhi*, *S. paratyphi*: *Salmonella paratyphi*

study by Bhadur *et al.* (2013) have found that titer of 1:320 for O and H in 2 (1.86%) and 2 (1.86) of 107 apparently healthy blood donors in the region of Raichur, Karnataka.¹¹

Based on another study in north Karnataka, Madhusudhan and Manjunath, India, have found that antibody titer of 1:40 for O, 1:80 for H and 1:40 for AH antigen considered as baseline titer in this region.¹³ Further, large-scale studies using titer of more than 1:640 may be required to address the issue of cutoff titer in slide Widal test. Many studies which have used slide Widal test for evaluation of endemic titer have reported higher endemic titer compared to studies which have used the tube Widal test.¹⁴⁻¹⁶

CONCLUSION

Based on the above findings, it may be concluded that higher incidence of typhoid fever was found among the healthy people who consumed unsafe water and food from sources other than home. Widal test and typhidot test may be suitable test to detect the enteric fever after 1 week of fever when blood culture is negative.

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