

DETERMINATION OF BASELINE WIDAL TITRE AMONG HEALTHY POPULATION

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ABSTRACT

Objective: To determine the baseline Widal titre in apparently healthy adult population of Hubli-Dharwad (North Karnataka region), which is an endemic area for enteric fever.

Methods: Two hundred healthy volunteers involving women attending ANC clinics, students, doctors and health care personnel were screened for Salmonella agglutinins using Widal test. Widal titres were estimated by tube agglutination method & slide semi quantitative method.

Results: A total of 154(77%) individuals revealed antibody titre to common O antigen. One hundred and seventy two (86%) had anti H titre & 68(34%) had anti AH titre of *S. enterica*. subsp. *enterica*. ser. *Typhi* & *Paratyphi A* respectively. Geometric mean of the observed readings were 38.58 for O, 60.37 for H & 40.02 for AH antibody. Result of slide semiquantitative & tube agglutination test were in agreement with each other. No significant difference was observed in the baseline titre among general population and health care providers.

Conclusion: Based on these findings antibody titre of 1:40 for O, 1:80 for H & 1:40 for AH antigen considered as baseline titre in this region. Updated data on the basal antibody titres in various regions is essential to decide the cut off level for interpretation of the Widal test and proper diagnosis of Enteric fever.

Keywords: Baseline titre, Widal, Enteric fever, Endemic

1. Introduction

Enteric fever is an important major public health problem in India. Though fraught with many problems still Widal test is used widely for the serodiagnosis of enteric fever in many peripheral centres, as it is the most economical test available for the diagnosis of enteric fever. ¹ In endemic areas, sera of a proportion of healthy individuals contain a variable titre of antibody against *Salmonella* antigen due to previous stimuli. ² Knowledge of prevalent endemic titre in a region needs to be periodically updated to interpret the significance of the titre as to patient is indeed suffering from enteric fever or not. The present study has been undertaken to evaluate the baseline antibody titre for O, H antigens of *S. enterica*. subsp. *enterica*. ser. *Typhi* and AH antigen of *S. enterica* subsp. *enterica* ser. *Paratyphi A* among normal healthy adult population.

2. Materials and methods

Study design was cross sectional study. Subjects were normal healthy adults who have been living in the Hubli-Dharwad (North Karnataka) region for atleast 5 years, with no history of fever in the last 6 months period & not vaccinated against enteric fever. A total of 200 subjects including 62 Students, 55 pregnant ladies attending antenatal clinic, 32 doctors & 51 health care personnel were enrolled into the study. Serum samples from all were subjected to widal tube agglutination, rapid slide screen & Semiquantitative slide

agglutination test using commercially available antigens containing Typhi O, H antigen & Paratyphi AH, BH antigen (span diagnostics private limited).

3. Result:

The titre of O, H & AH agglutinins in the normal healthy population is presented in Table 1. A total of 172(86 %) individuals revealed the presence of agglutinin titre to either O, H & AH antigens. No demonstrable titre was seen against BH antigen. Majority tested 60 (30%) had anti O titre of 1:40 & 66 (33%) had anti H titre of 1:40. Only 34(17%) individuals had anti AH titre of 1:20. Highest level of titre observed was 1:320 for all, that i.e. O, H & AH antigens. Twenty four (12%) individuals were negative for O, H & AH agglutination reaction.

Geometric mean of the observed readings were 38.58 for O, 60.37 for H & 40.02 for AH antibody. Since these values were closer to the following dilution values, cut off value of 1:40 for O, 1:80 for H & 1:40 for AH was interpreted as baseline titre. Results of slide semiquantitative and tube agglutination tests were in agreement with each other. No significant difference was observed in the baseline titre among general population and health care providers.

4. Discussion:

In countries like India, the endemicity is so high that enteric fever is the prime suspect cause of

febrile illness. The isolation of Salmonella species is a gold standard for the diagnosis but the isolation rates, even in the best laboratories, may not exceed 50 per cent. The initiation of improper or empirical antibiotic therapy before the diagnosis is made could be one of the main reasons for the poor isolation rates. Further, the cost and lack of facilities limits the use of diagnosis through culture method only to a few larger hospitals in the developing countries. As a result, the diagnosis largely relies upon the clinical features and serological tests like Widal.³ Controversies over the diagnostic utility of Widal could be due to several factors like high endemicity, antigenic cross reactivity with other agents, non-availability of paired sera for the documentation of rising titres, diverse methods and criteria of interpretation etc.¹ In areas where fever due to infectious causes is a common occurrence, the possibility exists that false positive reactions may occur as a result of nontyphoidal fever. The purpose of the present study was to reappraise the diagnostic value of the Widal test by evaluating the basal antibody levels in the adult healthy population. Though the classical Widal test is the tube agglutination method in most part of India rapid slide agglutination method is used. In peripheral centres many a times report is issued based on single Rapid slide screen test which may be a pseudopositive result. In our study 54% individuals revealed antibody titre to *S. enterica* subsp *enterica* ser *Typhi* alone, 1%-individuals to *S. enterica* subsp *enterica* ser *Paratyphi* A alone, 33%-individuals to both *S. enterica* subsp *enterica* ser. *Typhi* and *S. enterica* subsp *enterica* ser. *Paratyphi* A. Only 1 to 8.5% of individuals had high titre upto 1:320 to different antigens. Majority had antibody titre upto 1:40 for O, 1:40 for H & 1:20 for AH antigen. Based on the geometric mean of the observed readings antibody titre of 1:40 for O, 1:80 for H & 1:40 for AH antigen considered as baseline titre. Any titer above these would be significant & indicative of enteric fever.³ Therefore in this region titre of 1:80 for O, 1:160 for H & 1:80 for AH antigen is diagnostic titre for enteric fever. Our findings are in agreement with study carried out at Indore, Vellore, Lucknow & Gujarat^{3, 4, 5, 6}. The levels of titre detectable in healthy population of different area vary considerably. Frequency of antibodies in normal population reported by various workers from different parts of India ranges from 1:20 to 1:160.^{1, 2, 3, 6}

This variation depends on the degree to which the enteric fever is endemic in each area a fact which

may change over time, so needs to be updated with time.⁷ It is also probable that in endemic areas where the population is permanently "immunologically sensitized" due to constant exposure, the response to infection is more rapid, reaching higher levels & is less likely to be affected by antibiotic use when compared to nonendemic areas.¹

5. Conclusion:

Antibody titre of 1:40 for O, 1:80 for H, & 1:40 for AH antigen considered as baseline titre in Hubli-Dharwad(north Karnataka) region. Results of slide semiquantitative and tube agglutination tests were in agreement with each other. Knowledge of endemic titre and proper interpretation of Widal test are necessary for accurate diagnosis of enteric fever to avoid misuse of antibiotics, thereby preventing the occurrence of drug resistance.

References

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Table 1: Distribution of antibody titres in healthy population

Titres	O antibody N(%)	H antibody N(%)	AH antibody N(%)
0	46 (23.0%)	28 (14.0%)	132 (66%)
1:20	57 (28.5%)	27 (13.5%)	34 (17%)
1:40	60 (30.0%)	66 (33.0%)	11 (5.5%)
1:80	29 (14.5%)	45 (22.5%)	16 (8.0%)
1:160	6 (3.0%)	17 (8.5%)	3 (1.5%)
1:320	2 (1%)	17 (8.5%)	4 (2.0%)