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EVALUATION OF UTILITY OF SINGLE WIDAL TEST IN DIAGNOSIS OF TYPHOID FEVER IN INDIA

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Abstract:

The utility of single widal test in the diagnosis of typhoid fever was assessed. The test was performed on 110 pediatric age group cases 70 cases were of suspected Typhoid fever of 5-7 days duration and 40 cases were of non typhoidal fever. In suspected typhoid cases initial O and H agglutinin titer was less than 1:80 but after a week there was rise in level of titer more than or equal to 1:160.

In non typhoidal 40 fever cases initial level of O and H agglutinin titer was ranging between 10% to 40 % and did not rise ever after 1 week of fever. On the basis of the interpretation of O and H agglutinin titers of two groups titers of more than or equal to 1:160 were indicative of typhoid fever.

Keywords: Titer, Widal test, Typhoid fever

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Introduction

Typhoid is major public health problem in India. It is endemic in most of the areas of India, where unhygienic conditions prevail and safe drinking water is not available especially in low socio economic areas. The definitive diagnosis of typhoid requires isolation of Salmonella Typhi from the blood, body fluid or faeces. The gold standard for diagnosis of typhoid fever is culture positivity. But in developing country like India, definitive diagnostic test like typhidot, blood culture, stool culture, urine culture, Bone morrow culture etc are not available routinely in most of the laboratories and smaller hospitals , and diagnosis relies upon the clinical features and the detection of the agglutinating antibodies to S. Typhi by the Widal test.

Various studies[1-4] have been conducted but however the available data of these studies reflects doubts on value of widal test. Classically fourfold rise of antibody in paired sera is considered diagnostic of typhoid fever.[5] However it is difficult to obtain paired sera and on basis of single Widal test specific chemotherapy has to be started. Demonstration of rising titer of antibodies in paired sera is not seen in some situations because the acute phase sample was obtained late in natural history of the disease, because of high levels of background antibodies in a region of endemicity or because in some individuals the antibody response is blunted by the early administration of antibiotics.[6] Further more patient management cannot be delayed for results obtained with a convalescent phase sample. For practical purposes a treatment decision must be made on the basis of the results obtained with a single acute phase sample.

This study was conducted to reassess the utility of single widal test in the diagnosis of typhoid fever.

Material and Methods

This study was conducted at K.D. Medical

College Hospital & Research center, Mathura (U.P) catering the rural population. 110 cases of pediatrics age group ranging from 2 years to 18 years were encompassed in the study. Patients were divided in two groups, having following inclusion & exclusion criteria.

1. Typhoidal Group

Inclusion criteria: Fever duration 5 or more days.

Exclusion criteria: The cases had any other clinical features suggestive of any system involvement like exanthemotous illness, respiratory tract infection, urinary tract infection, lymphreticular involvement.

2. Non Typhoidal Group

Inclusion criteria: Fever duration 5 or more days.
Exclusion criteria: Splemomegaly
Widal test and blood culture was done is all the cases but not a single test of blood culture was found positive.

The Widal tube agglutination test was performed on all sera by the conventional agglutination method. 0.4 ml of two fold serially diluted patient sera (dilution from 1:20 to 1:320) in 0.9 % normal Saline were tested by adding equal volume of antigen. A negative saline control was included for comparison.

Table 1 'O' Agglutination in Typhoid & Non–typhoid fever cases

Group	No. of cases	<1:20	1:20	1:40	1:80	1:160	1:320
Typhoid fever (Suspected)	70	0 (0)	2 (2-8)	8 (11-5)	5 (7-1)	20 (28-6)	35 (50)
Non typhoidal Fever	40	23 (57-5)	7 (17-5)	5 (12-5)	3 (7-5)	2 (5)	0 (0)

Table- 2 'H' Agglutination in Typhoidal & Non Typhoidal fever cases

Group	No. of cases	<1:20	1:20	1:40	1:80	1:160	1:320
Typhoid fever (Suspected)	70	7 (10)	9 (12-8)	13 (18-6)	20 (28-8)	7 (10)	14 (20)
Non typhoidal Fever	40	8 (20)	7 (17.5)	16 (40)	8 (20)	0 (0)	1 (2.5)

Table- 3 'O' & 'H' Agglutination in Typhoidal & Non Typhoidal fever cases

Group	No. of cases	Significant O or H _> 1:160	Non-Significant O or H (<1:160)
Typhoid fever	70	58 (82.9)	12 (17.1)
Non – Typhoidal Fever	40	4 (10)	36 (90)
(Figure in parentheses indicate percentages)			

Results

O and H agglutination liter levels were assessed in 110 cases consisting of 70 children of suspected typhoid fever and 40 cases of non typhoidal fever.

It is seen from the Table 1 that 55 (78.5 %) out of 70 typhoid fever cases had an 'O' agglutinin titer level of more than or equal to 1:160 as compared to only 2 (5 %) among non-typhoidal fever cases. This difference was significant.

Similarly it was also observed that 21 (30 %) out of 70 typhoidal fever cases had an 'H' agglutinin titer level of more than or equal to 1:160 compared to only 1 (2.5%) among non typhoidal cases (Table 2).

On observing 'O' and 'H' agglutinins in isolation, a titer of more than or equal to 1:160 was present in a significant number of typhoid cases as compared to non- typhoidal cases.

Therefore the significance table was prepared (Table-3) after clubbing 'O' and 'H' titers together and taking as significant either 'O' or 'H' titer of more than or equal to 1:160. It is self evident that only 4(10%) of the non – typhoidal cases showed significant titers as compared to 58(82.9) of cases with typhoid.

On the basis of above interpretation an 'O' titer in isolation, an 'H' titer when considered together of greater than or equal to 1:160 were indicative of typhoid fever.

Discussion

The specific objective of this study was to reassess the utility and authenticity of the Widal test after interpretation

of results. There are various difficulties associated with an evaluation of the Widal test. First, the levels of agglutinins detectable in the non- infected populations of different areas vary considerably.[7-9] This variation depends on the degree to which the disease is endemic in each area, fact which may change over the time. It also depends on the level of infection due to other salmonellae with cross reacting antigens. A second issue is the choice of a satisfactory gold standard test for diagnosis and selection of adequate control group.

In this study blood culture was negative in all the cases. It can be difficult to choose patients who are blood culture negative and who definitely do not have typhoid fever. The level of agglutinin was correlated with age, with a higher level of agglutinins in children than in adults as other have observed.[7] A negative result would have a good predictive value for the absence of disease, but a positive result would have a very low predictive value for typhoid fever. The test should be restricted to those who have a reasonable probability of having typhoid fever. Bone morrow cultures are said to retain a high sensitively (90 %) despite prier antibiotic therapy but the obvious constraints are that the test is invasive and more applicable to hospital setting. Culture of intestinal secretions can be positive despite a negative bone marrow culture.[10] It would be interesting to extrapolate this to endoscopically obtained duodenal secretions in the centers where endoscopy is available. Numerous studies have produced data which throws doubts on the value of Widal test in diagnosis of typhoid fever several factors have contributed to uncertainty. These include poorly standardized antigens, the sharing of antigenic determinants with antibiotics and previous immunization with TAB vaccine. Another major problem relates to the difficulty of interpreting Widal test result in areas where S. typhoid is endemic and where the antibody titers of the normal population are often not known.

The Present study reveals that a single Widal test has utility for diagnosis of typhoid fever. An 'O' titer in isolation, an 'H' titer in isolation and an 'O' or 'H' titer when considered together are more than or equal 1:160 with relevant clinical findings was found to be highly suggestive of typhoid fever. This is similar to the observations made by other.[9,11]

Conclusion of the present study is that despite the availability of other gold standard test for diagnosis of typhoid fever, the Widal test remains one of the best, easily available, cheap and simple method for the diagnosis of typhoid fever.

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