
Value of Widal Test in Diagnosis of Typhoid Fever

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Abstract:

The diagnostic value of an acute -phase Widal test for suspected typhoid fever was evaluated with 328 Patients admitted to Ibn Al- Kateeb hospital between (1-4-2004 and 30-9-2004) from this number 258 patients was widal test positive and from this number 27 patients was blood culture positive (19patients for S. typhi, 2 patients for S. paratyphi A, and 6: patients for S. paratyphi B). Most infections were between age groups (11-20) and (21-30) years.

Conclusions: The signs and symptoms of typhoid fever are non-specific, and an accurate diagnosis on clinical grounds alone is difficult although a definitive diagnosis can be made by isolation of salmonella typhi or salmonella paratyphi A, B from blood. The resulting Widal result may lack sensitivity and specificity, particularly in a community with endemic typhoid fever.

Keywords: Widal test, typhoid fever, blood culture.

Introduction:-

T yphoid is a common problem in developing countries Infection acquired by the ingestion of pathogens, could remain localized in the gastrointestinal tract or could disseminate to other organs and body systems^[1,2].

S typhi and S. paratyphoid A,B that cause enteric fever, these species of salmonella are restricted to humans and do not have a reservoir in animals. Therefore, spread of the infection is from person to person, usually through contaminated food or water. After infection, the salmonellae that survive the antibacterial defenses of the stomach and small intestine penetrate the gut mucosa through the Peyer's patches then reach the intestinal lymph nodes, where they survive and multiply within macrophages then transported to mesenteric lymph nodes and to thoracic duct and then eventually discharged in to blood stream^[3,4]. Disseminated to many organs like spleen, bone marrow, liver and Peyer's patches (reticulo endothelial system) from this system the bacteria reinvade the blood to reach other organs like kidney and gall bladder and then enters the intestine for a second time in much larger numbers causes a strong inflammatory response.

Patients & Methods:

Three-hundred febrile patients admitted to Ibn-ALKateeb hospital. They were with signs symptoms suspected of typhoid fever^[5].

Control group include 100 persons.

Serological Methods:-

For detection of antibody titer in patients with unknown illness, serum agglutinins rise sharply during the second and third week of salmonella infection. At least 2 serum specimens should be

obtained at intervals of 7-10 days to prove rise in titer.

The tube dilution agglutination test (Widal test).

Serial (2-fold) dilutions of unknown serum are tested against antigens from representative salmonellae. The results are interpreted as follows^[6, 7, 8]:-

- a- High titer of "o" (1: 160 or more) suggests that active infection is present.
- b- High titer of "H" (1: 160 or more) suggests past Vaccination or past infection.
- c- High or rising titer of "Vi" occurs in some carriers.

Bacteriological Methods for isolation of salmonellae:

* Specimens blood, serum Media:-

* Enrichment cultures: use tetrathionate broth after incubation for (1-2) days, plated on.

* Selective Media like salmonella-shigella (SS) agar or on deoxycholate-citrate agar which favors growth of salmonellae and shigella over coliform organisms

* And Differential media like MacConkey's agar or deoxycholate medium permits rapid detection of lactose non-fermenters.

Gram-positive organisms are somewhat inhibited.

* Bismuth sulfite medium permits rapid detection of S. typhi which forms black colonies because of H₂S production.

* Final identification:-

Suspected colonies from solid media are identified by biochemical tests like TSI (Triple sugar iron) a gase test urea's test, motility test^[9].

Results & Discussion:-

The results of patients with suspected typhoid fever to 258 patients shows in table (1). From blood culture positive the bacterial isolates shows in table (2).

Most positive Widal test has titer more 1:320 positive shows table (3, & 4).

Table (1): The numbers and percentage of cases with suspected typhoid fever

Results	No.	%
Widal test positive	258	78.65%
Blood culture positive & Widal test positive	27	8.23%
Control Patients	100	30.48%
Total	328	

Control persons: Widal test (- ve)

Blood culture (- ve)

From blood culture positive the bacterial isolates shows in table (2).

Most positive Widal test has titer more 1:320 positive shows table (3).

Table 2: Type of bacterial isolates from blood culture for 228 patients (Widal test positive)

Type of bacteria	No.	Percentage %
S. typhi	19	8.33%
S. paratyphi B	6	2.63%
S. paratyphi A	2	0.87%

Table (3): the numbers and Percentage of Antibodies titers (1:320)

Type of bacteria	Type of antibody	No. of cases	Percentage %
S. typhi	O	68	30%
S. typhi	H	40	20%
S. paratyphi: A	O	19	11%
S. paratyphi: A	H	17	10%
S. paratyphi: B	O	35	18%
S. paratyphi: B	H	19	10%
Total no. of Widal test positive 258 patients			

Table 4:- Widal test results for patients suspected with typhoid fever (Febrile Patients).fokau patients blood culture -ve)

Organisms No.	Salmonella typhi antigen	No. of Organisms for which the titer was as follows:			
		1/80	1/160	1/320	1/640
Escherichia coli (61)	O	37	18	1	
	H	43	5		
Klebsiella spp. (20)	O	4	1		
	H	5	2	1	
Proteus mirabilis (19)	O	1			
	H	1			
Pseudomonas aerations (20)	O	3			
	H	2			
Salmonella spp. (25)	O	10	9	1	
	H	13	10	3	
Staphylococcus aureus (22)	O	12	5	3	
	H	19	7		
Streptococci (29)	O	18	9		
	H	22	4		
Acinetobacter spp. (5)	O	2			
	H	1			
Control persons (30)	O	2	1		
	H	1			
Total No.		231 patients			

The other titers have very small percentage from the total Widal test positive cases.

The most age group infected between (11-20) years and (21-30) years and less in other age group as shown in table (5).

Table (5): age group of patients with suspected typhoid fever (Widal test positive)

Age groups	No. of patients	Percentage %
1-10	18	8%
11-20	45	20%
21-30	68	30%
31-40	34	15%
41-50	27	12%
51-60	18	8%
61-70	15	7%
Total no.	228	100%

False-positive Widal test results have been reported for patients with non-enteric fever salmonellae infections, malaria, typhus, meningitis, immunological disorders and chronic liver disease [10,11,12].

In this study, elevated levels of agglutinins were found in patients with a variety of other bacteremic illnesses, including those caused by other salmonella spp. E. coli, Klebsiella spp., and staphylococcus aureus.

In general, the level of O antibodies in these patients was higher than that of H antibodies.

The elevated levels may have been due to cross-reacting antigens or an anamnestic response. There are more 40 cross-reacting antigens between S. typhi and other Enterobacteriaceae [13].

So this test needs to be evaluated using bacterial isolation as gold standard [14], and a definitive diagnosis can be made by isolation of salmonella typhi and S. paratyphi A,B from blood [15].

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