

## Widal test and its fallacy- an editorial

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Enteric Fever is a fatal multisystem illness caused by genus Salmonella. Typhoid fever is caused by Salmonella typhi and paratyphoid fever by Salmonella paratyphi A and B. Blood culture is the gold standard for diagnosis of Enteric fever, and also bone marrow or stool culture<sup>1</sup>. When facilities for culturing are not available, the Widal test is the reliable and can be of value in the diagnosis of Enteric fevers in endemic areas.

The Widal test is a serological test for diagnosis of Enteric fever. It was developed in 1896 and named after its inventor, Georges-Fernand Widal.

Widal test is an indirect agglutination test which detects the presence of serum agglutinins (O and H) in patients' serum with typhoid and paratyphoid fever. The organisms causing enteric fever possesses two major antigens namely somatic antigen (O) and a flagellar antigen (H) along with another surface antigen, Vi.

During infection with typhoid or paratyphoid bacilli, antibodies against somatic antigen of S.typhi (O), flagellar antigen of S. typhi (H), S. paratyphi A (AH), and S. paratyphi B (BH) usually become detectable in blood 6 days after the onset of infection. O antibody appears first, decline after recovery & disappears in 3-6 months. H antibody appears slightly later but persists longer and can be used to distinguish between various types of enteric fever<sup>2</sup>.

Widal test measures the antibody titre (O and H) using various dilution of Salmonella antigen suspensions by either slide method or tube method.

Baseline titre is 1:40. A single Widal test is of little clinical relevance especially in endemic areas such as Indian subcontinent, Africa and South-east Asia. This is due to recurrent exposure to the Salmonella bacteria, immunization and high chances of cross-reaction from infections, such as malaria and non typhoidal salmonella<sup>3,4</sup>.

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A 4 fold rise or a rising titer in paired samples at an interval of 7-10 days suggests the serological diagnosis of enteric fever.

High titer > 1:160 against O antigen and high titer > 1:160 against H antigen suggest typhoid fever.

**Keywords:** Widal test, enteric fever, Typhoid test

### Interpretation of Widal test

| TO     | TH     | AH     | BH     | Interpretation                        |
|--------|--------|--------|--------|---------------------------------------|
| >1:160 | >1:160 | <1:160 | <1:160 | Typhoid fever                         |
| >1:160 | <1:160 | <1:160 | <1:160 | Non – typhoidal Salmonella            |
| <1:160 | >1:160 | <1:160 | <1:160 | Anamnestic reaction or past infection |
| >1:160 | <1:160 | >1:160 | <1:160 | Paratyphoid A fever                   |
| >1:160 | <1:160 | <1:160 | >1:160 | Paratyphoid B fever                   |

### Limitations of Widal Test

- The Widal test is time consuming (to find antibody titer) because it becomes positive at least 5 days after onset of fever; so Widal test should not be done within 5 days of onset of fever.
- Often, when diagnosis is reached by Widal test; it is too late to start an antibiotic regimen.
- The Widal test should be interpreted in the light of baseline titers in a healthy local population.
- Variations also exist between laboratories in the performance and reading of Widal tests which compromise further the reliability of the test.
- The Widal test may be falsely positive in patients who have had previous vaccination or infection with *S. Typhi*.
- Repeated tests may give high titres and these should be interpreted cautiously because O antibody may persist upto 6 months and H antibody longer after recovery. Misinterpretation may lead to repeated antibiotic course.
- False positive Widal test results are also known to occur in typhus,

acute falciparum malaria, and chronic liver disease associated with raised globulin levels and disorders such as rheumatoid arthritis, myelomatosis and nephrotic syndrome.

- False negative results may be associated with early treatment, with “hidden organisms” in bone and joints, and with relapses of typhoid fever. Occasionally the infecting strains are poorly immunogenic.

The World Health Organization (WHO) has said that due to the various factors that can influence the results of a Widal test, it is best not to rely too much on this test.

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