



INCIDENCE OF SALMONELLA TYPHI AND SALMONELLA PARATYPHI A & B BY WIDAL TEST IN PATIENTS COMING TO MICROBIOLOGY DEPARTMENT OF PATNA MEDICAL COLLEGE AND HOSPITAL, PATNA

Medical Microbiology

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ABSTRACT

INTRODUCTION One of the sources of human salmonella spread is human salmonella carrier itself. Most important source of infection of salmonella is water, which is used for drinking and cleaning from various source like river, pond, stream and wells. Bacterium enterica serovar Typhi, salmonella enterica serovar paratyphi A & B causes typhoid fever and paratyphoid fever. Paratyphoid fever has benign nature of illness, while both typhoid & paratyphoid fever shows similar clinical features. Children and young adults are more common sufferer of enteric fever. Highest burden of salmonella infection is shared by developing nations due to more population, rapid urbanization, poor health system and contaminated drinking water sources. **MATERIAL AND METHODS** A total of 200 samples were collected from febrile patients from OPD and indoor with symptoms clinically similar to enteric fever and chosen only those samples which has given their blood sample in microbiology department only. **OBSERVATION AND RESULTS** A total 200 patients, 122 was male and 78 was female patients. Males were more commonly affected than females. Salmonella Typhi and paratyphi A were highest in school going children and adolescents. Salmonella Typhi was most common pathogen followed by salmonella paratyphi A & B. **DISCUSSION** Incidence of Salmonella typhi and paratyphi A is increasing, it may be due to increased drug resistance and improved diagnostic technique. School going children and adolescents in our study had more incidence of typhoid fever. These group of people need education regarding prophylaxis measures of typhoid fever. A descriptive study was done by Sudeepa KM et al also had Salmonella Typhi as the most important pathogen of typhoid fever which was similar to present study.

KEYWORDS

Typhoid fever, Salmonella Typhi, Salmonella paratyphi A & B, Widal tube agglutination test, Faeco-oral rout.

INTRODUCTION

There is various source of human salmonella spread, human carrier is one of them. Disease is spread by faeco-oral route and the primary source of infection are faeces and urine of case and carrier. Human carrier spread the disease by contamination of water and food. Salmonella infection is food borne as well as water borne. Water from contaminated river, pond well and stream which is used for drinking purpose is important source of infection. The mode of transmission of salmonella infection is by oral transmission via sewage contaminated water, via food handled by carrier. The risk of infection is high in middle income countries due to rapid urbanization, poor sanitation, restricted safe water. Typhoid fever is multisystem illness caused by bacterium Salmonella enterica seovar Typhi, Salmonella enterica seovar paratyphi A & B causes paratyphoid fever.

Typhoid and paratyphoid fever is collectively known as enteric fever. Enteric fever is endemic in tropics and subtropic countries. Enteric fever is more common in children and young adults in developing countries while traveller are more common sufferers in the developed countries. Reservoir host of enteric fever is only human beings. The severity of infection in enteric fever varies from mild to fatal. Common clinical presentation of enteric fever is fever with step ladder pattern, chills, headache, anorexia, malaise, vomiting, constipation, diarrhoea and relative bradycardia. The widal test detects agglutinating antibodies against the O and H antigen of salmonella Typhi. The widal test has been widely used for over a century for diagnosis of typhoid fever.

MATERIAL AND METHOD

A total of 200 samples collected from febrile patterns from out patient department (OPD) and ward (inpatients) of Patna medical college and hospital, Patna. Patients should have symptoms clinically similar to enteric fever and who were prescribed widal tube agglutination test and whose sample were sent to microbiology laboratory were included in the study.

Blood sample was collected with the help of sterile syringe and needle, about 2-3ml of blood was collected from those patients as they arrived the microbiology laboratory.

Inclusion Criteria

- 1) Febrile patients who are willing to participate in the study by giving informed consent.
- 2) Those who did not take antibiotic treatment for the enteric fever or

for any other bacterial infection.

- 3) Those who had fever for 2 or more days before visiting Patna medical college and hospital accompanied by other clinical symptoms of enteric fever will be included in the study.

Exclusion Criteria

- 1) Those febrile patients who have received antibiotics treatment within 2 weeks before coming to the hospital.
- 2) Those who are diagnosed for other known febrile illness will be excluded from the study.

Serological Test

Widal tube agglutination test was done using S. Typhi O & H, S. paratyphi AH & BH antigens according to the instructions of the manufacturer. The antigen suspension commercially available in 5 ml volume from TYDAL reagent was used.

Standard Tube Test Method

In widal test two types of tubes was used:

- 1) Dreyer's tube (narrow tube conical bottom) for H agglutination and
- 2) Felix tube (short rounded bottomed tube) for O agglutination
- 3) 0.5ml Kahn tubes was used for both types of agglutination.

1. Take 4 sets of 8 Kahn tubes / test tubes and label them 1 to 8 for O, H, AH, & BH antibody detection.
2. Pipette into the tube No.1 of all sets 1.9 ml of isotonic saline.
3. To each of the remaining tubes (2 to 8) add 1.0ml of isotonic saline.
4. To the tube no. 1 tube in each row add 0.1ml of serum sample will be tested and mix well.
5. Transfer 1.0ml of the diluted sample from tube no.1 to tube no. 2 and mix well.
6. Transfer 1.0ml of the diluted sample from tube no.2 to tube no.3 and mix well. Continue this serial dilution till tube no. 7 in each set.
7. Discard 1.0ml of the diluted serum from tube no. 7 of each set.
8. Tube no. 8 in all the sets, serves as a saline control. Now the dilution of the serum sample achieved in each set is as follows: tube no. 1, 2, 3, 4, 5, 6, 7, 8 (control) dilution 1:20, 1:40, 1:80, 1:160, 1:320, 1:640, 1:1280.
9. To all the tubes (1 to 8) of each set add drop of the respective WIDAL TEST antigen suspension (O, H, AH & BH) from reagent vials And mix well.

10. Cover the tubes and incubate at 37C overnight (approximately 18hrs).
11. Dislodge the sediment button gently and observe for agglutination.
12. Titer: The highest dilution of sera, at which agglutination occurs, is taken as the antibody titer.

Significant titer taken in this study was:
for O agglutination titer more than 80.
for H agglutination titer more than 80.

OBSERVATION AND RESULT

The present study entitled "Incidence of salmonella Typhi and salmonella paratyphi A & B by widal test in patients coming to microbiology department of Patna medical college, Patna" was undertaken with a view toward better understanding of the risk of the disease on variable, such as age, sex, patient coming from OPD and Indoor.

Total number of patients during 1 year study duration was 482 from them I have chosen 200 patients for my study by simple random sampling method and tube agglutination was done on it.

Table -01: Isolates Salmonella Species

S. N	Organism	No. Of Isolates
1	Salmonella Typhi	36
2	Salmonella Paratyphi A	04
3	Salmonella Paratyphi B	00

In this study period, a total of 200 widal tube agglutination test was performed, out of which 40 isolates of salmonella, 36 were positive for salmonella Typhi and 4 isolates were positive for salmonella paratyphi A. In this study no isolates were positive for salmonella paratyphi B.

Table No – 02: Age And Sex Wise Distribution And Frequency Of Typhoid Fever

Sex	Male		Female		Total	
Age Group (Years)	No. Of Study Subject	No. Of Widal Positive Cases	No. Of Study Subject	No. Of Widal Positive Cases	Total No. Of Study Subject	Total No. Of Widal Positive Cases
0 - 10	21	03	15	02	36	05
>10 - 20	23	12	16	06	39	18
>20 - 30	25	05	18	02	43	07
>30 - 40	21	03	15	02	36	05
>40 - 50	17	02	09	01	26	03
>50 - 60	15	01	05	01	20	02
Total	122	26	78	14	200	40

Age wise, more positive isolates were detected in adolescent group (> 10- 20yrs) followed by (> 20-30yrs) in both sexes. In adolescent age group (> 10- 20yrs), Out of 39 cases, 18(46.15%) were positive.

Table No-03 : Rural – Urban Distribution

	Rural		Urban	
Organism	S. Typhi	S. Paratyphi	S. Typhi	S. Paratyphi
Positivity Rate	25	03	11	01

In the present study, number of cases belonging to rural area, (28) cases (25) cases were positive for salmonella Typhi and (3) were positive for salmonella paratyphi A. from urban area out of (12) cases, (11) cases were positive for salmonella typhi and (1) were for salmonella paratyphi A.

DISCUSSION

The present study was conducted to evaluate incidence of salmonella Typhi and salmonella paratyphi A & B by widal test at Patna medical college, Patna. Salmonella Typhi and salmonella paratyphi A are major agent of enteric fever. In this study out of total salmonella species 200 isolates the majority (18%) were salmonella Typhi and 2% were salmonella paratyphi A Patil et al, Mishra et al, Khadaka et al found this type of result.

In gender wise infection rate was 21.31% in males and 17.91% in females. Males are more vulnerable than female for typhoid fever due to our cultural background, where male is more likely to report to hospital and more outdoor activity. S C Sood, P N Taneja and S N Khosla et al also found this type of study.

Majority of cases (46.15%) were in age group between > 10-20 yrs. Because these age group had more mobility and consumption of unhygienic food water in school and college.

Majority of case 20.89% of salmonella were isolated from the rural patient, probably due to poor faeco-oral hygienic and water sanitization of these areas.

REFERENCES

- 1) Kanungo S, Dutta S, Sur D Epidemiology of typhoid and paratyphoid fever in India J infect Dev Ctries 2008;24:54-60
- 2) Mogasale V, Maskery B, Ochiai RL, Lee JS, Mogasale VV, Ramani E, et al. Burden of typhoid fever in low-income and middle-income countries: A systematic, literature-based update with risk factor adjustment Lancet Glob Health 2014;2:e570-80
- 3) Andualem A, Abebe T, Kebede N, Gebre-selase S, Mihret A, Alemayehu H. A comparative study of widal test with blood culture in the diagnosis of typhoid fever in febrile patients. BMC Res Notes 2014;6:53.
- 4) Enabulele O, Awunor SN. Typhoid fever in a tertiary hospital in Nigeria: another look at the widal agglutination test as a preferred option for diagnosis. J infect Dis. 2016;57(3):145-9.
- 5) Khadaka P, Thapaliya J, Thapa S Susceptibility pattern of Salmonella enterica against commonly prescribed antibiotic, to febrile -pediatric cases, in low-income countries BMC Pediatr 2021;21:38.