

Enteric fever in and around Ambajogai, Maharashtra

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Abstract

Enteric fever is an acute communicable disease caused by *Salmonella* species and it occurs in all parts of the world. Enteric fever is a major public health problem in India. Definitive diagnosis of typhoid can be made by the isolation of *Salmonella typhi* (*S.typhi*) from blood, faeces or bone marrow. Such culture techniques are often unavailable in developing nation and widal test serves as most efficient serological diagnostic tool. In the present study, an attempt is made to find out the incidence of enteric fevers, the proportion of typhoid fever with paratyphoid fevers and to find out seasonal variation of enteric fever in rural population of Ambajogai with special emphasis on widal reaction. Incidence of enteric fever was found to be 15.99% out of 5676 febrile patients. 815 [14.35%] were diagnosed as cases of typhoid fever i.e. *Salmonella typhi* infection, 93 cases were diagnosed as paratyphoid fever out of which 82 [1.44%] had *Salmonella paratyphi A* infection and only 11 [0.19%] had *Salmonella paratyphi B* infection. The proportion of *S. typhi* to *S. paratyphi A* infection were 10:1.01, and that of *S. paratyphi B* infection was 10:0.13. Incidence of enteric fever is more i.e. 554 [61.01%] in rainy season as compared to winter and summer seasons. Due to unhygienic practices in rural population, enteric fever shows seasonal variation in terms of temporal distribution.

Keywords: Enteric fever, widal, salmonella, seroprevalence.

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INTRODUCTION

Enteric fever occurs in all parts of the world. The disease has declined a good deal in the developed countries due to improvement in sanitation and quality of life.¹ Enteric fever is an acute communicable disease caused by *Salmonella* species. Enteric fever includes typhoid and paratyphoid fever. It is usually transmitted by contaminated water and food. Although having worldwide distribution, Enteric fever is a major public health problem in India.² *Salmonella* infections are transmitted by feco oral route and ID50 for infection is around 10³ to 10⁶ bacilli. Incubation period is usually 7-14 days. Common clinical features include fever,

bradycardia and toxemia.³ Definitive diagnosis of typhoid can be made by the isolation of *Salmonella typhi* (*S.typhi*) from blood, faeces or bone marrow. Such culture techniques are often unavailable in developing nation and widal test serves as most efficient serological diagnostic tool in the diagnosis of the enteric fever.⁴ The Widal test was developed by F. Widal in 1896.⁵ In the present study, an attempt is made to find out the incidence of enteric fevers, the proportion of typhoid fever with paratyphoid fevers and to find out seasonal variation of enteric fever in rural population of Ambajogai with special emphasis on widal reaction.

MATERIAL AND METHODS

This study was carried out at S.R.T.R.G.M.C. Ambajogai, District Beed, Maharashtra. 5676 blood samples from febrile patients attending to the Out Patient department [O.P.D.] and admitted in wards of this hospital were collected for serological investigations of enteric fevers. All the blood samples were subjected to widal reaction [Cruickshank, 1975]⁶ by employing commercially available antigens. The different antigens used in this study were somatic antigen of *Salmonella typhi* [TO], flagellar antigens of *Salmonella typhi* [TH], *Salmonella paratyphi A* [PA] and *Salmonella paratyphi B* [PB].

Agglutination was observed for indicating presence of antibodies against the various antigens used.

Agglutination reactions showing positive response were considered insignificant in following cases

- Samples showing positive agglutination against TO only
- Samples showing positive agglutination against TH or PA or PB with or without against TO; with agglutination titer less than or equal to 1:60 in either or both positive agglutinations

Agglutination reactions showing positive response were considered further in this study in following cases-

- Samples showing positive agglutination against TH or PA or PB with or without against TO but with agglutination titer equal to or more than 1:120 in either or both positive agglutinations

OBSERVATIONS AND DISCUSSION

Out of 5676 samples, 1532 [26.99%] samples showed positive reaction to widal test and rest 4144 [73.01%] were found to be negative for widal reaction. Out of the 1532 positive samples only 908 samples showed significant rise in widal titer. Hence only these 908 [15.99% of total samples] were considered for the study. There were 815 [14.35%] samples with significant rise [Titer more than or equal to 1:120] against TH and TO or TH only. Depending upon this finding and clinical features, the cases were diagnosed as typhoid fever cases. In the study by R Shyamla⁷, The Widal test positivity was found to be 8.57%. This finding is somewhat lower than our finding. There were 82 [1.44%] samples which showed evidence of paratyphoid A infection which is correlated clinically [significantly raised titer of antibodies against TO and PA or PA only] It has been reported that Salmonella paratyphi A constitutes about 1.3 to 15% of enteric fevers in the study by Basu *et al* [1975].² Damle *et al*⁸ in 1985 reported this percentage to be 2% in rural population from the same region. Our findings [1.44%] are in agreement with these studies.

Table 1: Incidence of enteric fever [Total number of cases is 5676]

Infection	Number of cases showing titer more than or equal to 1:120	Percentage
Salmonella typhi	815	14.35
Salmonella paratyphi A	82	1.44
Salmonella paratyphi B	11	0.19
Total	908	15.99

According to Ananthanarayan and Paniker¹, proportion of Salmonella typhi and Salmonella paratyphi A infection is 10:1. Damle *et al*⁸ [1985] in their study found this proportion to be 10:1.1. This proportion in our study

came out to be 10:1.01. In our study, there were just 11 [0.19%] sera with significantly raised against PB and TO or PB only. Raised antibodies against paratyphoid B along with clinical profile led to the diagnosis of paratyphoid B fever. Salmonella paratyphi B infection is very rare in India as reported by Ananthanarayan and Paniker as well as Sen *et al* [1968]⁹. This rarity has also been confirmed. Proportion of S. typhi to S. paratyphi B was shown as 10:0.3 by Damle *et al*.⁸ In the present study this proportion came out to be 10:0.13. We conclude that in our area, as the rest of India, among enteric fever cases, typhoid fever is the most common followed by paratyphoid A. Paratyphoid B infection trails the list. The proportion and rates of infection of paratyphoid fevers are also same as found in rest of India. An attempt was made to find out seasonal association with enteric fever in rural population of Ambajogai. In and around rural areas of Ambajogai, Marathwada region, summer season ranges from February to May and rainy season from June to September while winter season ranges from October to January.

Table 2: Seasonal distribution of enteric fever [Total number of suspected cases is 5676, Diagnosed cases of enteric fever are 908]

Sr. No.	Season	Number of cases	Percentage
1	Summer [Feb- May]	227	25.00
2.	Rainy [Jun- Sept]	554	61.01
3	Winter [Oct- Jan]	127	13.98
Total		908	100.00

It was found that out of 908 positive cases, maximum i.e. 554 [61.01%] cases occurred in rainy season, 227 [25.00%] cases occurred in summer while 127 [13.98%] cases in winter season. This finding can be correlated with that of Damle *et al*⁸ [1985] who reported similar finding in same region. Mangal *et al* [1967]¹⁰ also reported similar observation. The high co-incidence of enteric fever cases in rainy season and increase in house fly population in the affected regions shows poor sanitation and problems in supply of safe drinking water in those regions. Besides, open air defecation, poor personal hygiene, health ignorance and illiteracy all together contribute for increased transmission of infections. All these factors are responsible for high endemicity of enteric fever in India [Park JE 1991]¹¹. Unless social factors are remedied, hazardous effects of salmonella infections cannot be reduced.

SUMMARY AND CONCLUSION

Cases of enteric fevers were diagnosed depending on clinical features and diagnostic rise in antibodies. Incidence of enteric fever was found to be 15.99% [908

out of 5676 samples] Out of 5676 febrile patients, 815 [14.35%] were diagnosed as cases of typhoid fever i.e. *Salmonella typhi* infection, 93 cases were diagnosed as paratyphoid fever out of which 82 [1.44%] had *Salmonella paratyphi A* infection and only 11 [0.19%] had *Salmonella paratyphi B* infection. The proportion of *S. typhi* to *S. paratyphi A* infection were 10:1.01, and that of *S. paratyphi B* infection was 10:0.13. Incidence of enteric fever is more i.e. 554 [61.01%] in rainy season as compared to winter and summer seasons. Due to unhygienic practices in rural population, enteric fever shows seasonal variation in terms of temporal distribution.

REFERENCES

1. Ananthanarayan R and Paniker CK, Textbook of Microbiology, 9th Edition, University press, Hyderabad
2. Basu S et al, Bull W.H.O, 52:332, 1975, Quoted by Park and Park, 1930
3. Hemangi Walke and Shrikant Palekar, Endemic titer of Widal test in Kolhapur, India, Int.J.Curr.Microbiol.App.Sci (2014) 3(11) 708-710
4. Seema Mittal, Kiran Bala, Rajvir Singh, Sonia Sharma, Uma chaudhary and P.K.Shegal, Baseline titer for Widal test in Haryana, India, Int.J.Curr.Microbiol.App.Sci (2014) 3(10) 93-96
5. Prashant Peshattiwari, Study of the Baseline Widal Titre Amongst Healthy Individuals in Amlapuram, India, JCDR/2012/3888:2067
6. Cruickshank R, Duguid JP, Marmion BP, Swan RHA, Medical Microbiology, Vol.2, 12th Ed., Churchill Livingstone, Edinburgh, P.417, 1975
7. Shyamala R, Prevalence of Widal positivity in a tertiary care hospital in South India, Der Pharmacia Lettre, 2012, 4 (5):1486-1489
8. Damle AS et al, Incidence of paratyphoid fevers in Ambajogai, Mah. Mad. Journal, Vol. XXXII, No.2, pp 43-44, May 1985
9. Sen R et al, Jr. Medical association, 50:297, quoted by Park and park 1991
10. Mangal HN et al, Ind. J. Med. Research, 55, 219, 1967
Park JE and Park K, Textbook of Preventive and Social Medicine, Messer's Banarsidas Bhanot Publication, Jabalpur, pp. 389.

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