

ORIGINAL ARTICLE

A study of Serodiagnostic Challenges in Enteric Fever Cases Presenting as Co-infection with Dengue and Malaria

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Abstract:

*Enteric fever; Dengue and malaria still remain diseases of public health importance in the tropics. The aim of the study to see the serodiagnostic challenges in enteric fever cases presenting as co-infection with dengue and malaria. The cross sectional study was conducted in the department of Medicine and Department of Microbiology, Holy Family Red Crescent Medical College Hospital, from July 2016 to June 2017. Febrile patients attending the outpatient department or admitted to hospitals attached to Holy Family Red Crescent Medical College Hospital suspected to have signs and symptoms clinically suggestive of typhoid, malaria and/or dengue were initially enrolled. Seropositivity of typhoid-dengue it was observed that 55 (55.0%) patients had dengue IgM+typhoid, 27 (27.0%) had dengue IgG+typhoid, 10(10.0%) had dengue IgM+IgG+typhoid and 08(8.0%) were negative. Seropositivity of typhoid-malaria of the patients, it was observed that *p. falciparum*+typhoid was found in 33 (33.0%), *p. vivax*+typhoid was 22 (22.0%) and negative was 45 (45.0%). Male patients while co-infection with typhoid fever observed more than in female population. In the present study Seropositivity of typhoid-dengue fever is high of co-infections are common than typhoid-malaria, hence it should be properly diagnosed and timely medication should be provided to reduce complications and get proper treatment.*

Introduction:

Enteric fever, Dengue and malaria still remain diseases of public health importance in the tropics. Individuals residing in endemic areas are at risk of contracting these infections either concurrently or an acute infection superimposed on a chronic one.¹ Dengue and enteric typhoid fever are major public health problems in subcontinent. The febrile illness is a common clinical syndrome for dengue, typhoid,

Japanese Encephalitis, Chikungunya, Leptospirosis, Influenza A and Malaria.² Concurrent infection with two agents can result in an illness having overlapping symptoms creating a diagnostic dilemma for the treating physician. The symptoms of dengue may mimic other diseases such as leptospirosis, influenza A, Salmonella Typhi, Japanese encephalitis,

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chikungunya and malaria. There is paucity of data regarding dengue and typhoid co- infection both in the developed and developing countries.³

Methodology :

The present study was a type of cross sectional study conducted in the department of Medicine and Department of Microbiology, Holy Family Red Crescent Medical College Hospital, from July 2016 to June 2017. Febrile patients attending the outpatient department or admitted to hospitals attached to Holy Family Red Crescent Medical College Hospital suspected to have signs and symptoms clinically suggestive of typhoid, malaria and/or dengue were initially enrolled. Informed consent was taken from all patients during the study. Febrile patients with positive serological tests for either Typhoid, Malaria or Dengue were included. Febrile patients showing negative results in serological tests for Typhoid, Malaria and Dengue and/or seropositive for one of the above infections, TAB vaccinated cases and fever due to other proven causes were excluded. Using strict aseptic precautions, 5-8 mL of venous blood was collected in appropriate sterile bulbs. 2/3 of the blood was allowed to clot at room temperature for half an hour, after which the clot was dislodged to separate the serum. This was centrifuged at 3000 rpm for 2 minutes. This was used for Dengue IgM and IgG ELISA and Widal test and for detection of S.typhi IgM antibodies using immunochromatography (Enterocheck-WB). Data were process and analyses using SPSS (Statistical Package for Social Sciences) software version 23. The chi- square test and student “t” test were used to analyze the significance level of $p < 0.05$. Continuous scale data were presented as mean standard deviation and Categorical data were presented as number percentage. The summarize data were present in the table and chart.

Results:

Out of 100 cases, majority 23(23.0%) patients belonged to age 0-10 years and lowest 7(7.0%) patients belonged to age >60 years (Table I). Male was found 63.0% and female was 37.0% (Figure I). Majority 80(80.0%) patients had headache, 33 (33.0%) had rash, 31 (31.0%) had pain, 22 had arthralgia, 17(17.0%) had leucopenia, 12(12.0%) had cough, 11 (11.0%) had nausea vomiting and 8(8.0%) had jaundice (Table II). Most 55 (55.0%) of patients had TO <1:20, 44 (44.0%) patients had TH <1:20, 95 (95.0%) had AH <1:20 and 100(100.0%) had BH <1:20 (Table III). Seropositivity of typhoid-dengue it was observed that 55(55.0%) patients had dengue IgM+typhoid, 27 (27.0%) had dengue IgM+typhoid, 10 (10.0%) had dengue IgM+IgG+typhoid and 08(8.0%) were negative (Table IV). Seropositivity of typhoid-malaria of the patients, it was observed that p. falciparum+typhoid was found in 33(33.0%), p. vivax+typhoid was 22(22.0%) and negative was 45(45.0%) (Table V).

Table I: Distribution of the study patients by age (n=100)

Age (years)	Number of patients	Percentage
0-10	23	23.0
11-20	11	11.0
21-30	17	17.0
31-40	21	21.0
41-50	12	12.0
51-60	9	9.0
>60	7	7.0

Table II: Distribution of the study patients by symptoms and signs (n=100)

Symptoms and signs	Number of patients	Percentage
Headache	80	80.0
Rash	33	33.0
Pain	31	31.0
Arthralgia	22	22.0
Leukopenia	17	17.0
Cough	12	12.0
Nausea vomiting	11	11.0
Jaundice	8	8.0

Table III: Baseline Salmonella antibody titers of the patients (n=100)

Titers	Number of patients	Percentage
TO		
<1:20	55	55.0
1:20	13	13.0
1:40	25	25.0
1:80	01	1.0
1:160	04	4.0
1:320	02	2.0
TH		
<1:20	44	44.0
1:20	19	19.0
1:40	28	28.0
1:80	05	5.0
1:160	03	3.0
1:320	01	1.0
AH		
<1:20	95	95.0
1:20	00	0.0
1:40	00	0.0
1:80	0.0	0.0
1:160	03	2.0
1:320	02	2.0
BH		
<1:20	100	100.0

Table IV : Seropositivity of typhoid-dengue (n=100)

Seropositivity of typhoid-dengue	Number of patients	Percentage
Dengue IgM + typhoid	55	55.0
Dengue IgG + typhoid	27	27.0
Dengue IgM + IgG + typhoid	10	10.0
Negative	08	8.0

Table V : Seropositivity of typhoid malaria (n=100)

Seropositivity of typhoid- malaria	Number of patients	Percentage
P. falciparum+typhoid	33	33.0
P. vivax+typhoid	22	22.0
Negative	45	45.0

Discussion:

In present study maximum 23 (23.0%) patients belonged to age 0-10 years and lowest 7 (7.0%) patients belonged to age >60 years, Similar observation was found Sharma et al.³ study they showed maximum number of dengue positive cases was seen in age group 0- 10 years.

In current study observed that female was found 63.0% and male was 37.0%, Sharma et al.³ study also found 91 (64.5%) were females and 50(35.5%) males that is similar to our observation. In this study observed that majority 80 (80.0%) patients had headache, 33(33.0%) had rash, 31 (31.0%) had pain, 22 (22.0%) had arthralgia, 17 (17.0%) had leukopenia, 12 (12.0%) had cough, 11 (11.0%) had nausea vomiting and 8(8.0%) had jaundice. In study of Rajgopal and Kousalya⁴ were found the commonest presentations were fever, myalgia, headache, jaundice, nausea and vomiting.

Uneke⁵ study showed the signs and symptoms of malaria and typhoid fever do overlap, it was observed in Pakistan that subjects with dual infection had significantly higher rates of nausea, vomiting, abdominal pain, and diarrhoea, all common presenting features of enteric fever.⁶ Furthermore, it was noted that unlike the intermittent fever pattern generally seen with malaria, patients with dual infection tended to exhibit a continuous fever more typical of enteric fever.⁶

In this study majority 55 (55.0%) patients had TO <1:20, 44 (44.0%) patients had TH <1:20, 95 (95.0%) had AH <1:20 and 100 (100.0%) had BH <1:20. Ramya et al.⁷ study observed that among the 100 blood samples collected from healthy blood donors, a significant portion (58) had anti-O antibody titers <1:20. 48 donors had anti-H antibody titer <1:20 against serotype S. enterica serotype Typhi. Among the 42 samples demonstrating anti – O titers of \geq 1:20 to S. enterica serotype typhi, 22 had a titer of 1:40 and 6 had a titer of \geq 1:80. Similarly among the 52 samples demonstrating anti – H titers of > 1:20 to S. enterica serotype typhi, 24 had a titer of 1:40 and 11 had \geq 1:80. For S. enterica serotypes Paratyphi A, anti-H titers of >1:20 were found only in 3 samples. For S. enterica serotypes Paratyphi B all (100%) had anti-H titres <1:20. The results are comparable with the study conducted by Shukla et al.⁸ (13.83% and 8%), Sneha et al.⁹ (2.2% and 4.4%) and Peshattiwar¹⁰ (4.1% and 9.52%). Slightly higher value for H antibodies (29.0%) was recorded by Pokhrel et al.¹¹ in Nepal. In yet another study in Lagos, Nigeria, which investigated Widal agglutinin in malaria-infected individuals, it was found that 85% of patients with a negative S. typhi culture but positive malaria smear had Widal titers of 1:40, 12% had titers of 1:80, and 3% had titers of 1:160; in contrast, 45% of patients with both S. typhi cultures and malaria smears negative had Widal titers of 1:40, 15% had titers of 1:80, and 10% had titers of 1:160¹².

In present study seropositivity of typhoid-dengue it

was observed that 55 (55.0%) patients had dengue IgM+typhoid, 27 (27.0%) had dengue IgM+typhoid, 10 (10.0%) had dengue IgM+IgG+typhoid and 08 (8.0%) were negative. Ramya et al.⁷ study observed that 81 cases were seropositive for dengue and typhoid accounting for 9.83%. Among these, 46 (56.79%) showed Dengue IgM antibodies, 26 (32.09%) showed Dengue IgG antibodies and 09 (11.11%) showed both IgM and IgG antibodies.

In this study seropositivity of typhoid-malaria of the patients, it was observed that p. falciparum+typhoid was found in 33 (33.0%), p. vivax+typhoid was 22 (22.0%) and negative was 45 (45.0%). Ramya et al.⁷ study observed that 55 cases were seropositive for Malaria- Typhoid accounting for 6.67%. Out of these, 34 (61.82%) were positive for P.falciparum and 21 (38.18%) were positive for P.vivax. They noted 49 cases showing seropositivity for both Dengue and Malaria accounting for 5.94%. A total of 55 patients showed co seropositivity for typhoid and malaria accounting for 6.67%. This is slightly lower compared to the findings of Mbuh et al.¹³ (10.1%), Olopoenia et al.¹² (12%), Jhaveri et al.¹⁴ (14.58%) and Samal and Sahu¹⁵ (15.4%). A slightly higher percentage was observed by Igharo et al.¹⁶ in Nigeria.

Conclusion:

Male patients while co-infection with typhoid fever observed than in female population. In the present study Seropositivity of typhoid-dengue fever is high of co-infections are common than typhoid-malaria, hence it should be properly diagnosed and timely medication should be provided to reduce complications and get proper treatment.

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