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Association of Co-Infection in Children with Dengue Fever

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KEYWORDS

dengue, coinfection, enteric fever, rickettsial fever, malarial fever, UTI

ABSTRACT:

Introduction: In developing countries like India Dengue, Malaria, and Typhoid are endemic and present as acute undifferentiated fever. In areas endemic for two or more infectious agents, co-infection is more common. In tropical countries, because of seasonal variation, there is a chance of coinfection of the host by dengue with another infectious disease such as rickettsia, malaria, and Enteric fever. So, our study aimed to see the association of co-infection in children with Dengue.

Methodology: This hospital-based retrospective study was conducted in Pediatric wards of NKPSIMS & LMH from 1.11.13 to 30.10.14. The case records of all cases diagnosed as Dengue & admitted to the hospital during the study period were scutinized. All patients admitted in the Pediatric ward and PICU who were NS1 positive and or IgM, IgG positive was enrolled in the study. Dengue-like illnesses but serologically negative were excluded. A total of 218 patients were included in the study

Results: During the study period total of 218 patients were admitted as serologically positive Dengue cases. Among them 126 were female and 91 were male. 191 patients were from rural and 27 were from urban areas. Of the total 218 patients, 29 patients had co-infection. Among them 17(58.62%) had Enteric fever, 8(27.58%) had malarial fever, 2(6.9%) had rickettsial fever and 2(6.9%) patients had Urinary Tract Infection (UTI). Coinfection was more in patients of dengue with warning signs and severe dengue which was statistically significant $p<0.001$. The duration of hospital stay was more in children with coinfections and mortality was more in patients of severe dengue with coinfection.

Conclusion: In patients with dengue fever co-infections with enteric fever, malaria, rickettsia, and UTI are not uncommon. Children with co-infection have a more severe presentation of dengue fever & also prolong the duration of hospital stay.

1. INTRODUCTION

In developing countries like India Dengue, Malaria and Enteric Fever are endemic and present as acute undifferentiated fever. In areas endemic for two or more infectious agents, co-infection is more common.[1] Children with coinfection may cause difficulty in diagnosis of acute febrile illness. Dengue fever, rickettsial fever, typhoid fever, malaria, UTI & respiratory tract infections are the main cause of acute febrile illness. Coinfection is the simultaneous infection of the host with multiple pathogens. Children with coinfection present with atypical or serious manifestations which delays the diagnosis and has a bad prognosis.[2]

In tropical countries, because of seasonal variation, there is a chance of coinfection of host by dengue with infectious diseases such as rickettsia, malaria, and typhoid.[3]

Dengue is the most rapidly spreading mosquito-borne viral disease in the world. Malaria is considered as the most common cause of fever . It is important to distinguish the two conditions due to clinical similarities and unexpected progress of dengue fever (DF) to severe dengue.[4] Both dengue fever and malaria can present with thrombocytopenia. Thrombocytopenia is also considered criterion of disease severity, bad prognostic factor and its presence is associated with increase probability of malaria.[4] Enteric fever remains important public health problem globally and is a major cause of morbidity in the developing world.[5]

2. AIM

To study association of co-infection in children with Dengue.

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3. OBJECTIVES

To assess duration of stay in children with dengue with co-infection. Corelate severity of illness and mortality in children with dengue fever with coinfection and assess mortality

4. METHODOLOGY

This hospital based retrospective study wad conducted in pediatric wards of NKPSIMS & LMH from 1.11.13-30.10.14. The case records of all cases diagnosed as Dengue & admitted in the hospital during the study period were scutinized.

All patients admitted in Pediatric ward and PICU who were NS1 positive and or IgM, IgG positive were enrolled in the study. Dengue like illness but serologically negative were excluded .

Total 218 patients were included in the study. Institutional ethics committee clearance was obtained.

Descriptive data was used to classify different presentations of dengue and association of co-infection. Data was analysed using Epi info software and chi-square test.

5. RESULTS

During the study period total 218 patients were admitted as serologically positive Dengue cases. Among them 126 were female and 91 were male. 191 patients were from rural and 27 were from urban area. Of the 218 patients 152 (70%) were of Dengue without warning signs, 53(24%) were of dengue with warning signs and 13(6%) were of severe dengue.Table 1

Table 1: Distribution of patients as per WHO classification of Dengue

	No. of Patients n=218
D F without Warning Signs (I)	152 (70%)
D F with Warning Signs(II)	53(24%)
Severe Dengue(III)	13(6%)
Total	218

Of the total 218 patients there were 29 patients who had co-infection.

Table 2: Co-infection profile (n=218)

Total patients of dengue	**No. of patients**
Dengue fever	189
Dengue with Coinfection	29

Table 2 Among them 17(58.62%) had Enteric fever, 8(27.58%) had malarial fever, 2(6.9%) had rickettsial fever and 2(6.9%) patients had UTI.

Figure 3: DENGUE WITH CO-INFECTION PROFILE (n=29)

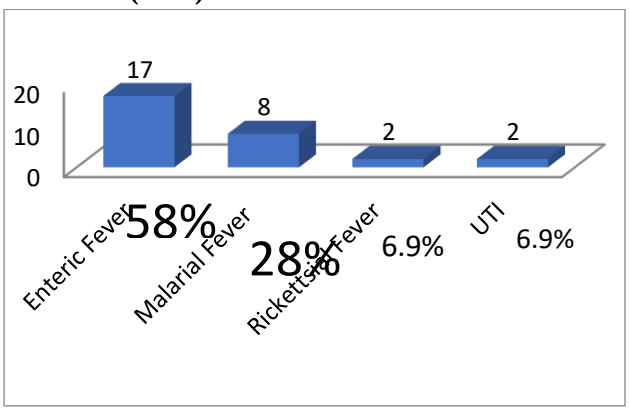

Figure 3 Of the total 218 patients of dengue, 152 patients were of dengue fever & in this category only 1 patient had coinfection, 53 patients were of dengue with warning signs of which 17 patients (32.07%) were with coinfection. Of the 13 patients of severe dengue 11 (84.61%) .

Table 4: Co-relation of Dengue with coinfection as per category of Dengue

Dengue fever (189)	**Dengue Fever (152)**	**Dengue with warning signs (53)**	**Severe Dengue (13)**
	151	**36**	**2**
Dengue with coinfection (29)	**1**	**17**	**11**

Υ^2=69.6 P<0.001

Table 5: Co-relation of Dengue with co-infection

	Dengue fever & dengue with warning signs (152+ 53= 205)	**Severe dengue n=13**	**p value**
Dengue with coinfection	**18**	**11**	**p> 0.01 significant**
Dengue without coinfection	**160**	**2**	**Not significant**

So coinfection was more in patients of dengue with warning signs and severe dengue which was statistically significant p<0.001 Table 4 & 5.

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Table 6: Duration of hospital stay and outcome

Dengue fever	Dengue fever(152)	Dengue with warning signs(53)	Severe Dengue(13)
	4.5 days	6.4	8.8
Mortality	0	0	1
Dengue with coinfection	6	8.7	10.7
Mortality	0	0	3

The average duration of hospital stay was 4.5 days & 6 days in patients of dengue fever and dengue fever with coinfection respectively & no deaths. In patients of dengue with warning signs the average duration of stay was 6.4 days and inpatients with coinfectio it was 8.7 days and no mortality in this group. In patients of severe dengue the average duration of stay was 8.8 days with 1 death and in severe dengue with coinfection it was 10.7 days and 3 deaths. So the duration of hospital stay was more in children with coinfections and mortality was more in patients of severe dengue. Table 6

6. DISCUSSION

In our study there were total 218 patients who were admiited as serologically positive dengue cases. Of the total 218 patients 152 (70%) were of Dengue without warning signs, 53(24%) were of dengue with warning signs and 13(6%) were of severe dengue. Of the total 218 patients 29 had coinfection. Among them 17(58.62%) had Enteric fever, 8(27.58%) had malarial fever, 2(6.9%) had rickettsial fever and 2(6.9%) patients had UTI.

Retrospective study conducted by S Meena et al was on prevalence of concurrent infections among tropical fevers in pediatric population . Total 70 patients were of Dengue , among them 26(37.14%) were with coinfection. Of these 26 patients , 3(11%) were of dengue with enteric fever, 2(8%) were of dengue with scrub typhus, 3(11%) were of dengue with malaria & 1(3.8%) was of dengue with malaria and scrub typhus.[6]

These results are comparable to other studies from India & SE Asian countries with some difference in incidence.[7-11]

Study by Bhakri et al compared clinical & hematological parameters in 2 groupa- malaria coinfection vs dengue monoinfection. They found 20 children (3.3%) to be coinfected with malaria.[12]

Study by Hasnat et al on concomitant infection of typhoid and rickettsia with dengue fever in acute febrile patient, among 244 patients of acute febrile illness, dengue monoinfection was was 44.26% and coinfection was present in 18.03% (dengue with typhoid was 7.37% and dengue with rickettsia was 10.66%).[13]

Study by Ghosh et al of the total 175 dengue patients, dengue without co-infection were 152 (86.9%) and dengue with co-infection were 23(13.1%) Among the patients of dengue with co-infection ; typhoid fever 9(39.1%), typhus/ rickettsial fever 3(13%), urinary tract infection 1(4.3%)[14] whereas in our study only 2 patients (6.9%) were with UTI.

Dengue and concurrent urinary tract infection was also reported by Wiwinitkit S et al. in their study.[15]

In our study number of children with coinfection were more in childern of dengue with warning signs and severe dengue and they had prolong duration of hospital stay. Mortality was more in children with severe presentation of dengue with coinfections. Study by Bhakri et al also observed severe clinical course & longer duration of hospitalization among children with coinfection with malaria without significant difference in mortality.[12] These findings are similar to that reported from Orrisa & Gujrat, India.[16,17]

In study by Meena et al average duration of hospital stay was 13 days (8-21 days).. However two (2) patients, one (1) with concurrent infection of Dengue with Malaria and another with Dengue and Scrub typhus succumbed to the infections.[6]

7. CONCLUSION

In patients with dengue fever co-infections with enteric fever, malaria, rickettsia, UTI are not uncommon. Possibility of coinfection with one or more organisms should be borne in mind when treating patients of acute febrile illness. Children with co-infection have more severe presentation of dengue fever & also prolong duration of hospital stay.

8. LIMITATIONS OF STUDY

Retrospective nature of study design as data was collected from case records of patients. Small sample size limited the scope of conclusion.

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10. CONFLICT OF INTEREST- The authors declare that they need no conflict of interest.

REFERENCES:

1. Rajnish Joshi et al Nonmalarial Acute Undifferentiated Fever in a Rural Hospital in Central India: Diagnostic Uncertainty and Overtreatment with Antimalarial Agents, Am J Trop Med Hyg 2008; 78 (3): 393-39dbook of clinical management of dengue, WHO 2012.
2. Uzzal KG, Azmeri S, Nobo KG, Kazi I, Morsheda K, Madhabi B Pattern of co-infection with dengue fever: An observational study. Bangladesh J Child Health 2020;44:157-60.
3. Kamath V, Ganguly S, Avinash BL. A comparative study of concurrent infections of rickettsial infection, malaria, typhoid, and chikungunya with dengue. APIK J Int Med 2019;7:120-6.
4. Co-existence of Dengue Fever & Malaria in Thrombocytopenic Patients Presented with Acute Febrile Illness. Shazia Yasir1, Muhammad Owais, Rashid2, Faisal Moin3, Komal Owais Department of Emergency Medicine, Ziauddin University and Hospitals
5. Geoffrey C. Buckle, Christa L. Fischer Walker, Robert E. Black, Typhoid fever and paratyphoid fever:Systematic review to estimate global morbidity and mortality for 2010 Journal of Global Health 2012;
6. **Shyam S. Meena, Monika Matlani, Deepika Meeena, and Vinita Dogra** Prevalence of Concurrent Infections among Tropical Fevers in Pediatric Population-A Hospital Based Study Annals of Pediatrics & Child Health
7. Raina S, Raina RK, Agarwala N, Raina SK, Sharma R. Coinfections as an aetiology of acute undifferentiated febrile illness among adult patients in the sub-Himalayan region of north India. J Vector Borne Dis. 2018; 55: 130-136.
8. Singhi S, Rungta N, Nallasamy K. Tropical Fevers in Indian Intensive Care Units: A Prospective Multicenter Study. Indian J Crit Care Med. 2017; 21: 811-818.
9. Abrahamsen SK, Haugen CN, Rupali P, Mathai D, Langeland N, Eide GE, et al. Fever in the tropics: Aetiology and case-fatality - A prospective observational study in a tertiary care hospital in South India. BMC Infect Dis. 2013; 13: 355.
10. Chrispal A, Boorugu H, Gopinath KG, Chandy S, Prakash JA, Thomas EM, et al. Acute undifferentiated febrile illness in adult hospitalized patients: The disease spectrum and diagnostic predictors – An experience from a tertiary care hospital in South India. Trop Doct. 2010; 40: 230-234.
11. Ellis RD, Fukuda MM, McDaniel P, Welch K, Nisalak A, Murray CK, et al. Causes of fever in adults on the Thai-Myanmar border. Am J Trop Med Hyg. 2006; 74: 108-113.
12. Bhanu Kiran Bhakhri, Dharmendra Kumar Singh, Nupur Singh, and Ruchi Rai,Does Malaria Co-Infection Alter the Clinical Course in Children Infected with Dengue?Analysis from 623 Indian Children Admitted with Dengue InfectionJournal of Tropical Pediatrics, 2021, 00, 1–6 doi: 10.1093/tropej/fmab006
13. Ferdousi Hasnat, Farahnaz Shoma, Syeda Mehnaj, Shamima Farzana, Mohammed Nurullah, Rifat T. Anne Concomitant Infection of Typhoid and Rickettsia with Dengue Fever in Acute Febrile Patient Paediatr Nephrol J Bangladesh 2022;7:63-6.
14. Uzzal Kumar Ghosh, Azmeri Sultana, Nobo Krishna Ghosh, Kazi Iman, Morsheda Khanam, Madhabi Baidya Pattern of Co-infection with Dengue Fever: An Observational Study Bangladesh J Child Health 2020; Vol 44 (3) : 157-160
15. Wiwanitkit S, Wiwanitkit V. Dengue, and concurrent urinary tract infection. Asian Pac J Trop Dis. 2013; 3: 323.
16. Mohapatra MK, Patra P, Agrawala R. Manifestation and outcome concurrent malaria and dengue infection. J Vector Borne Dis 2012;49:262–5.
17. Shah PD, Mehta TK. Evaluation of concurrent malaria and dengue infections among febrile patients. Indian J Med Microbiol 2017;35:402–405.