

PREVALENCE STUDY OF DENGUE AND MALARIA COINFECTION IN TERTIARY CARE REFERRAL HOSPITAL IN THANE

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ABSTRACT

BACKGROUND

There are many mosquito-borne infections in the tropical countries including India. Dengue and malaria being the commonest. Despite this, coinfection with dengue fever are scarcely reported in literature and more so in children. Malaria and dengue are rampant illnesses with overlapping presentation. Both have high morbidity and mortality. Coinfection of dengue and malaria are seldom reported, especially in children. Authors wish to quantify the prevalence of this coinfection in this article.

MATERIALS AND METHODS

Retrospective descriptive design was adopted and ethical committee approval was taken. Indoor record papers of paediatric patients admitted with suspected dengue fever in paediatric ward of RGMC between January to December 2016 were studied.

RESULTS

Out of 71 confirmed dengue cases, 18 were also positive for malaria (25.35%). Of these confirmed 18 malaria cases, 15 were *P. vivax* (83.33%) and 3 were *P. falciparum* (16.6%). The high number of coinfection cases that we got 25.35% suggests that the prevalence of coinfection of dengue and malaria is reasonably high.

CONCLUSION

Our study highlights the importance of need of awareness on the part of treating paediatricians of dengue coinfection in endemic areas. High index of suspicion should be maintained especially when one infection is found to proactively look for second infection.

KEYWORDS

Children, Coinfection, Dengue, Malaria.

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BACKGROUND

Coinfection is defined as "a concurrent infection of cell or organism by 2 organisms."¹ Coinfections were first described in US Army as typhomalarial fever.² WHO statistics show 2.7 billion people are at risk of developing dengue, and in South East Asia, 2.3 million people were affected in 2010. According to WHO, malaria affected 207 million people and caused 62,500 deaths.³ Deaths due to malaria are 2.4 per 1 lakh population in India.

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Mosquito is considered to be an important vector that can cause several diseases to human beings. Mosquito-borne infections is an important medical topic in tropical countries. Dengue and malaria are two common mosquito-borne infections with high morbidity and mortality in the world. Coinfection with dengue and malaria, however, is scarcely reported especially in children. There are very few published reports of coinfections and that too only from a few countries.⁴⁻⁹ More interestingly, some areas with high prevalence of both malaria and dengue such as South East Asian countries have never reported coinfection with dengue and malaria.

With these observations in literature and sparsely published reports of coinfections in children, we decided to conduct this study of prevalence of dengue and malaria.

The clinical presentation and manifestations of concurrent dengue and malaria include high fever and myalgia. Characteristics of malaria and dengue are shown in Table 1.

Characteristics	Malaria Infection	Dengue Infection	Concurrent Infection
Mode of transmission	Mosquito borne (Anopheles)	Mosquito borne (Aedes)	Mosquito borne (Anopheles + Aedes)
Fever	Acute febrile illness (chronic in some cases)	Acute febrile illness	Acute febrile illness
Myalgia	Detectable	Common	Common
Shock	Possible	Possible	Possible
Blood parasite	Positive	Negative	Positive
Atypical lymphocytosis	Usually negative	Usually positive	Usually positive
Haemoconcentration	Usually negative	Usually positive	Usually positive
Thrombocytopenia	Usually negative	Usually positive	Usually positive
Bleeding	Rare	Possible	Possible
Haemolysis	Possible	Rare	Rare
Tourniquet test	Usually negative	Usually positive	Usually positive
Treatment	Antimalarial drug	Fluid therapy	Antimalarial drug with fluid therapy

Table 1. Characteristics of Malaria and Dengue

Aims and Objectives

1. To study prevalence of coexisting dengue and malarial fever.
2. Describe epidemiological correlates of patients with coinfection.

MATERIALS AND METHODS

Retrospective descriptive design was adopted and ethical committee approval was taken. Indoor record papers of paediatric patients admitted with suspected dengue fever in paediatric ward of RGMC between January to December 2016 were studied.

Effort has been made to identify true coinfections based on relevant lab investigations.

NS1 antigen, dengue IgG and IgM were taken as positive results for dengue and peripheral smear and/or malarial antigen test as confirmation for malaria.

RESULTS

Total of 71 confirmed cases of dengue were found, out of which, 39 (54.93%) were boys and 32 (45.07%) were girls. The youngest was 2-month-old infant. Only 9 patients were below 3 years of age. Table 2 shows age and sex wise distribution of dengue-positive patients.

Dengue	Female	%	Male	%	Total	%
<1 year	1	1.41	6	8.45	7	9.86
1-5 years	6	8.45	7	9.86	13	18.31
5-10 years	18	25.35	17	23.94	35	49.30
>10 years	7	9.86	9	12.68	16	22.54
Total	32	45.07	39	54.93	71	100

Table 2. Age and Sex Wise Distribution of Dengue-Positive Patients

Out of 71 confirmed dengue cases, 18 were also positive for malaria (25.35%). Of these confirmed 18 malaria cases, 15 were P. vivax (83.33%) and 3 were P. falciparum (16.6%). Table 3 shows age wise and species wise distribution among coinfection with malaria.

Coinfection	Falciparum	Percentage	Vivax	Percentage	Total	Percentage
<1 year	2	11.11	4	22.22	6	33.33
1-5 years	1	5.56	2	11.11	3	16.67
5-10 years	0	0	6	33.33	6	33.33
>10 years	0	0	3	16.67	3	16.67
Total	3	16.67	15	83.33	18	100

Table 3. Age Wise and Species Wise Distribution among Coinfection with Malaria

In 18 patients with coinfection, 4 (22.22%) were females and 14 (77.78%) were males, which shows predominance of coinfection in males. Table 4 shows sex wise analysis of patients with coinfection.

	Number of Patients	Percentage
Male	14	77.78
Female	4	22.22
Total	18	100

Table 4. Sex Wise Analysis of Patients with Coinfection

DISCUSSION

According to the reports by Carme et al in French Guiana, the specific coinfection rate of dengue and malaria from overall febrile patients was 0.99%⁶ and Hati AK et al 1.5%¹⁰ in India.

There is no reported increase in mortality and morbidity or severity in coinfections.⁴⁻⁹ There also is no recommendation for any specific required treatment for coinfections.

The combination of separate therapeutic protocol for each infection at the same time can be successful.⁴⁻⁹

Any species of malaria can coinfect with dengue.

One question, which baffles is that why coinfection is uncommon or scarcely reported.

Possible explanation includes-

1. Both vector mosquitoes have different habitats and different movement patterns.
2. Immunity to each infection is probable; this may prevent infection.
3. Overlapping or similar clinical presentations of illnesses may make the clinician not look for second infection when one infection is detected.
4. Both illnesses in absence of complications are self-limiting, dengue recovery and malaria carrier state can be expected in some cases.

The high number of coinfection cases that we got 25.35% suggests that the prevalence of coinfection of

dengue and malaria is reasonably high. The probable reason for this maybe endemicity of both infection's mosquitoes and their respective habitat being available in today's cities and the reason why very few published reports are available can be because of common and overlapping clinical picture where the treating paediatrician does not feel the need to search for second infection when one infection is detected.

CONCLUSION

In conclusion, our study highlights the importance of need of awareness on the part of treating paediatricians of dengue coinfection in endemic areas. High index of suspicion should be maintained especially when one infection is found to proactively look for second infection. This will facilitate curative treatment of both infections and decreased chances of complications and increase in morbidity and mortality.

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