

Malaria in Dengue Patients

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ABSTRACT

Objective: To determine frequency of malaria in dengue patients

Study Design: Cross sectional study

Place and Duration of Study: The study was carried out in the Department of Medicine, Civil Hospital Karachi from June 2008 to December 2008.

Materials and Methods: 274 dengue patients with Ig M antibody positive results were included in the study after informed consent Malaria parasite peripheral film and malarial ICT (immunochromatography) test of all these dengue patients were performed in order to detect the presence of co-infection with malaria. Age and sex of the patients were also noted.

Results: In the study, out of 274 dengue patients, 189 (69%) were males and 85 (31%) were females. Mean age was 31.01 ± 14.83 years. 41 (15%) dengue patients had concomitant malarial infection. Out of these 41 dengue-malaria co-infected patients, 29 (10.6%) had plasmodium vivax; 8 (2.9%) had plasmodium falciparum and 4 (1.5%) had both falciparum + vivax.

Conclusion: Patients with dengue fever are predisposed to have concomitant malarial infection. Hence, these must be investigated for malaria as undiagnosed and untreated malaria can increase the morbidity and mortality of the dengue patients.

Key Words: Dengue, Malaria, Thrombocytopenia

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INTRODUCTION

Malaria parasite and dengue virus are two different organisms, transmitted by two different types of mosquitoes i.e. female anopheles and aedes aegypti respectively. Despite the difference in causative organisms and the causative vector species, dengue-malaria co-infection is not uncommon worldwide¹⁻⁵.

It remains unclear whether the dual malarial and viral infections⁶⁻¹² are independent of each other or the immunodeficiency state caused by the viral infections leads to the reactivation of the dormant malarial hypnozoites in the liver, resulting in relapse of malaria.

Dengue is the most common flaviviral disease transmitted globally. Dengue virus has four distinct serotypes (DEN 1, DEN 2, DEN 3 and DEN 4). It is transmitted by Aedes aegypti mosquito.¹³

Dengue cases can be divided into probable and suspected cases. Probable case of dengue includes patients having fever, nausea, vomiting, petechial rash, bone and joint pains, hemorrhagic manifestations, leucopenia and thrombocytopenia. Confirmed case of dengue fever requires isolation of dengue virus or dengue antibodies from serum, cerebrospinal fluid or autopsy tissues of the affected patients.¹³

In our country, diagnosis of dengue fever is mostly confirmed by demonstration of anti dengue IgM or IgG

antibodies in the serum of the affected patients by ICT (immunochromatography).

Malaria is a parasitic infection caused by four species of genus plasmodium: falciparum, vivax, ovale and malariae. Malaria is transmitted by the female anopheles mosquito.¹⁴

Life cycle of malaria parasite has different stages of development including sporozoites, merozoites, hypnozoites, trophozoites and schizonts. Malarial parasites, especially plasmodium vivax and ovale remain dormant in the liver in the form of hypnozoites and these hypnozoites may reactivate any time even after years to cause relapse of malaria.¹⁴

Diagnosis of malaria is mostly done by thick and thin film microscopy for malaria parasite. The well recognized limitations of malarial peripheral film include poor quality of microscopy, particularly at the peripheral level. The accuracy of malarial microscopy is absolutely dependent on the microscopist reading malarial peripheral film. He may be a Professor involved in teaching and research or simply an inadequately trained technician involved in malaria microscopy. To overcome such limitations and for counter checking results of malarial microscopy, malarial immunochromatography (ICT) test is done.⁸

Apart from dengue virus, co-infection of malaria is also seen with other viruses like Human immunodeficiency virus⁶, hepatitis A, B, C, D, E virus⁷⁻⁸, Epstein Barr virus,⁹ parvo virus B19,¹⁰ and herpes virus¹¹⁻¹² etc.

It remains unclear whether the dual malarial and viral infection is independent of each other or the immunodeficiency state caused by the viral infection

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leads to the reactivation of the dormant malarial hypnozoites in the liver, resulting in relapse of malaria. A previous study was conducted in a tertiary care hospital in Karachi which showed 26 (23.1%) patients out of 78 were concomitantly positive for malaria and diagnosis was based on malarial thin and thick films only.¹

While, this study has done malarial thin and thick film microscopy along with malarial ICT for more accurate diagnosis of malaria and included 274 patients which is a good number as compared to the previous study.

MATERIALS AND METHODS

This is a cross sectional study conducted in department of Medicine Civil Hospital Karachi after ethical permission from June 2008 to Dec 2008 for a period of six months. Patient of more than 08 years of age of either sex having seropositive (Dengue IgM and ICT method) status for dengue were selected by non probability purposive sampling, while probable or suspected cases of dengue fever (not serologically confirmed by the presence of IgM antibodies) were excluded from the study.

Sample size was calculated from a previous study using open EPI website and the data was analysed through SPSS v.16. The frequency and percentage were computed for gender and malarial infection in dengue patients. Mean and standard deviation were estimated for age. Stratification was done to control effect modifier like age and gender to observe the effect on the outcome variable through chi-square test. $p < 0.05$ was taken as significant.

Operational Definition

Dengue: Patients with dengue IgM antibody positive results are considered to have dengue infection.

Malaria: Patients with malarial peripheral film or malarial ICT positive results are considered to have malarial infection.

RESULTS

In our study (Table 1), out of 274 dengue patients, 189 (69%) were males and 85 (31%) were females. Mean age was 31.01 ± 14.83 years. 41 (15%) dengue patients had concomitant malarial infection. Out of these 41 dengue-malaria co-infected patients, 29 (10.6%) had plasmodium vivax; 8 (2.9%) had plasmodium falciparum and 4 (1.5%) had both falciparum + vivax.

Table No.1: Type of infections and age-descriptive analysis

Type of infection	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Only Dengue	233	30.62	14.191	.930	28.79	32.45	12	74
Falciparum	8	30.00	16.562	5.855	16.15	43.85	18	50
Vivax	29	32.93	18.908	3.511	25.74	40.12	8	55
Falciparim+Vivax	4	42.00	16.000	8.000	16.54	67.46	18	50
Total	274	31.01	14.831	.896	29.25	32.77	8	74

DISCUSSION

This study included 274 dengue IgM antibody positive patients which were tested for concomitant malarial infection by both MP peripheral film and MP ICT methods.

In this study, out of 274 dengue patients, 189 (69%) were males and 85 (31%) were females. Mean age was 31.01 ± 14.83 years. 41 (15%) dengue patients had concomitant malarial infection. Out of these 41 dengue-malaria co-infected patients, 29 (10.6%) had plasmodium vivax; 8 (2.9%) had plasmodium falciparum and 4 (1.5%) had both falciparum + vivax.

Malarial parasite and dengue virus are two different organisms, transmitted by two different types of mosquitoes i.e. female anopheles and aedes aegypti respectively. Despite the difference in causative

organisms and the causative vector species, dengue malaria co-infection is not uncommon worldwide¹⁻⁵.

In 2009, a previous study titled as 'clinical features, diagnostic techniques and management of dual dengue and malaria infection' was conducted in a tertiary care hospital in Karachi and it showed that out of 78 dengue positive patients, 26 patients (23.21%) were concomitantly infected with malaria and the diagnosis of malaria was based on MP peripheral film only.¹

However, this study utilizes malarial thin and thick film microscopy along with malarial ICT method for more accurate diagnosis of malaria. Moreover, the sample size of this study is 3.5 times the previous study.

Currently, diagnosis of dengue fever by ICT or ELISA costs around one thousand Pakistani rupees from majority of the private labs. Moreover, dengue is a self-limiting infection that requires only symptomatic treatment in majority (but not all) of the patients.

This study gives the frequency of malaria in dengue patients but many patients presenting to the physicians with low platelet count and lab proven malaria are just treated with antimalarials without investigating for the presence of underlying dengue infection even during dengue epidemics. This is mainly to decrease the burden of the cost of the investigations. This situation creates a limitation for our study as the patients diagnosed and treated as 'malaria only' might actually have the concomitant dengue infection.

Dual dengue-malaria infection increases the risk of morbidity and mortality among the patients. Hence, treating physicians must not miss the presence of malaria in dengue patients and vice versa.

CONCLUSION

Patients with dengue fever are predisposed to have concomitant malarial infection. Hence, these must be investigated for malaria as undiagnosed and untreated malaria can increase the morbidity and mortality of the dengue patients.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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