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Emerging co-infections in dengue: A study at tertiary care Govt. general hospital

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Abstract--Background: Infection with two agents might cause overlapping symptoms, confusing the treating physician. This study aims to determine the current coinfections rates in dengue patients in a tertiary care Govt. General Hospital, Anathapuramu. Method: From July 2021 to November 2021, an observational study was conducted at the Government Medical College & Hospital in Ananthapuramu. A total of 100 clinically suspected Dengue patients were included in this research. Blood samples from 100 patients who visited the General Medicine and Pediatrics OPD were taken and sent to the lab for the diagnosis of Dengue and other co-infections. Result: In our study, Out of 100 samples, 32 samples tested positive for Dengue by RTPCR. Out of 32 samples tested positive by RTPCR, two samples were positive for DENV-1, 26 samples were positive for DENV-2, and four samples were positive for DENV-3, according to RTPCR results. Dengue with co-infection was detected in 21 individuals, with 1 (3.125%) being MP-ICT positive, 2 (6.25%) being salmonella WIDAL positive, 1 (3.125%) being Scrub typhus IgM reactive, 4 (12.5%) being chikungunya IgM positive, 9 (28.125%) being UTI positive, and 4 (12.5%) having Blood

Stream Infections. Conclusion: When dealing with instances of dengue fever, it is important to keep in mind the possibility of co-infection. This study provides information on the prevalence of dengue and co-infections.

Keywords---Coinfections, Dengue, malaria, salmonella, Scrub Typhus, chikungunya.

Introduction

A sickness caused by concurrent infection with two agents might have symptoms that are similar to each other, posing a diagnostic difficulty for the treating physician. Acute febrile illness (AFI) is a clinical phenomenon that affects a large number of individuals seeking medical treatment in India. Dengue fever is one such disease that often manifests as symptoms of a flu-like sickness, including high-grade fever, broad body discomfort, nausea, vomiting, and maculopapular rashes, among other symptoms. Dengue fever is an emergent mosquito-borne viral illness of humanity of public health significance, with a 30-fold rise in worldwide occurrence over the previous five decades. Dengue is the most common mosquito-borne viral disease in the world.

It is possible that the symptoms of dengue will be confused with those of other diseases such as leptospirosis, influenza A, Salmonella Typhi, Japanese encephalitis, chikungunya, and malaria, all of which are common in places where dengue is endemic [1,2]. Approximately 50–100 million new dengue infections are thought to occur yearly in more than 100 endemic countries, with the number of countries reporting the illness steadily increasing [3,] according to estimates from the World Health Organization (WHO). Because of the similarities in symptoms and differential diagnoses between these infections, they frequently resemble those of dengue, making accurate clinical diagnosis and therapy difficult without laboratory confirmation [4].

Potential dengue fever is often associated with all febrile diseases occurring during the monsoon season (September to November) in India, unless and until the presence of dengue fever is verified via laboratory testing. Patients with fever are often advised to contact a healthcare institution only if their symptoms continue after two to three days of non-specific self-medication. (1,4-6). Multiple studies have been conducted in different regions of the world to investigate the relationship between dengue and other arboviral illnesses[7]. The purpose of this study is to determine the present coinfection rates in Dengue patients at a tertiary care hospital in Ananthapuramu,

Materials & Methods:

An observational study was done at Government Medical College & Hospital, Ananthapuramu from July 2021 to November 2021. Institutional ethical committee approval was taken prior to start of the study and informed written consent was taken from all the participants.

Inclusion criteria:

Patients of all age groups, patients with less than 4 days of fever, clinical symptoms, and signs of acute dengue-like illness, and whom serological diagnosis requested for dengue infection.

Exclusion criteria:

Already diagnosed cases of dengue (referred or admitted with dengue positive report) and Fever after 4 days.

Patients presented with a clinical history of Dengue were selected to do this study. Primary details (age, sex, complaints, medical history) were noted in the proforma. Blood samples of 100 patients who have come to General Medicine & Pediatrics OPD were collected and sent to the Microbiology laboratory for the diagnosis of Dengue and other co-infections.

Hi-Media Dengue Serotyping(1-4) Kit Real-Time Probe-Based PCR: The serotyping of all the samples was carried out using commercially available Hi-Media Dengue Serotyping(1-4) Kit Real-Time Probe-Based PCR.

Then some relevant investigations were done accordingly to find out co-infections. NIV (National Institute of Virology) Pune Kit (IgM) ELISA for chikungunya, Rapid Diagnostic Kits Supplied by NVBDCP_Med Source Ozone Biomedical Pvt.Ltd for Malaria, Widal test for Typhoid Diagnosis through EnSure Company Kits, Rapid Diagnostic kits for Scrub Typhus fever through J Mitra & Co Pvt Ltd, Hepatitis B surface Antigen(HBsAg) Elisa test for Hepatitis B infection, RTPCR Meril kits for COVID-19, Himedia Cultures for UTI diagnosis, IgM/IgG Rapid Diagnostic Test for Leptospirosis, and Microxpress Blood culture bottles for Blood Stream Infections were used for testing and Results noted.

Results

Out of 100 samples received in the laboratory, 51 samples belong to females & 49 samples belong to males. Table 1

Table 1
Gender distribution

Gender	Frequency (n)	Percentage (%)
Male	49	49
Female	51	51

Out of a total of 100 samples, 32 (32%) samples were tested positive by the RTPCR test. out of 32 positive samples, 2 samples were positive for DENV-1, 26 samples were positive for DENV-2, and 4 samples were positive were DENV-3. Table 2

Table 2
RTPCR TEST for Dengue

Total number of samples tested	Number of positives	Number of negatives
100	DENV-1 = 02	68
	DENV-2 = 26	
	DENV-3 = 04	
	TOTAL POSITIVES = 32	

Dengue with co-infection was found in 21 patients and dengue without co-infection was found in 11 patients. Table 3

Table 3
Co-infection in dengue patients

	Number (%)
Dengue with co-infection	21 (66%)
Dengue without co-infection	11 (34%)

Out of 32 dengue patients, 21 (66 %) patients had coinfections. In which 1 (3.125%) patient was MP-ICT positive, 2 (6.25%) were salmonella WIDAL positive, 1 (3.125%) Scrub typhus IgM reactive, 4 (12.5%) were chikungunya IgM positive, 9 (28.125%) were UTI positive, 4 (12.5%) were having Blood Stream Infections. Table 4.

Table 4
Showing the pattern of co-infection with dengue fever (N=32)

Diagnosis	Number (%)
Chikungunya	04 (12.5%)
Malaria	01 (3.125%)
Typhoid	02 (6.25%)
Scrub typhus	01 (3.125%)
UTI	09 (28.125%)
Bloodstream infections	04 (12.5%)
Covid-19	0
Hepatitis B	0
Leptospirosis	0

Discussion

In the last few decades, dengue co-infections, whether true or due to serological cross-reactivity, have been emerging as a separate entity as far as presentation and morbidity are concerned [8]. In this study, co-infection was found in 21 (66%) cases of dengue fever. In our study, 9 patients had urinary tract infections with dengue fever. Dengue and concurrent urinary tract infection were also reported by Wiwinitkit S et al. in their study.[9]. In our study, 4 patients with Dengue had

Chikungunya. Chikungunya co-infection has also been described in the previous studies.[10-12].

Typhoid infections were found in two of the individuals in our investigation. Aside from that, R. Bansal et al. reported two confirmed instances of typhoid associated with dengue as a co-infection. [13]. One of the patients in our research had a scrub typhous infection. The co-infection of dengue and scrub typhus was also found during a study abroad experience in which scrub typhus was positive. [14] One of the patients in our research was infected with malaria. A study conducted in Karnataka, India, found two youngsters who had both dengue fever and vivax malaria at the same time. [15].

Conclusion

According to the findings of the study, dengue sufferers are at an increased risk of contracting other diseases. The increasing occurrence of co-infections in dengue fever highlights the need for understanding coinfections now, more than ever, and this study provides information on the prevalence of dengue and co-infections. Dengue and co-infections have the potential to cause multi-organ involvement as well as other undesirable effects; thus, early detection of coinfections in dengue is critical for improved clinical outcomes in this disease. Delegated responsibility for monitoring and treatment of dengue patients who are also suffering from co-infections is a good practice.

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