

**DENGUE VIRUS-2 AND DENGUE VIRUS-3 CO-INFECTION IN THE SAME
INDIVIDUAL-THE NOTORIOUS ALLIANCE OF TODAY**¹*Dr. Rajdeep Saha MD, ²Dr. Apoorbaa Roy, ³Dr. Dipika Menon Mukherjee, ⁴Dr. Rajyasri GuhaThakurta MD.¹Assistant Professor, Department of Microbiology, Calcutta National Medical College and Hospital, Kolkata, India.^{2,3}Post Graduate Trainee, Department of Microbiology, Calcutta National Medical College and Hospital, Kolkata, India.⁴Professor and Head of the Department, Department of Microbiology, Calcutta National Medical College and Hospital, Kolkata, India.***Corresponding Author: Dr. Rajdeep Saha MD**

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ABSTRACT

Dengue is one of the most important arboviral infections prevalent in India. Dengue virus belongs to the genus *flavivirus* and family *flaviviridae*. The principle vector is *Aedes aegypti*. The disease is caused by any of the five serotypes DENV 1, DENV 2, DENV 3, DENV 4 and DENV 5. This present study has been planned to observe the co-infection of an individual with serotypes DENV 2 and DENV 3 and assess the clinical complications arising due to this co-infection. A total of 4337 blood samples were collected from patients who were grouped into: fever less than 5 days and fever more than 5 days. Serum from these samples was tested using ELISA: NS1 (for fever <5days) and MAC (for fever >5days). The samples which tested positive were further tested using PCR for identification of serotypes. Total no. of samples taken was 4337. Out of which 1401 (32.3%) samples tested positive with ELISA (NS1/MAC). On performing PCR 1050 (74.9%) samples showed infection with a single serotype and 351(25%) samples showed bands in two or more regions indicating co-infection with multiple serotypes. Out of which 237 (67.5%) showed co-infection with DENV 2(Dengue virus type 2) and DENV 3(Dengue virus type 3) and the rest i.e. 114 (32.4%) tested positive for co-infection with other serotypes. Amongst these 237 cases: 228 developed DHF (Dengue Haemorrhagic Fever) and 09 developed DSS(Dengue Shock Syndrome). Hence we see in this outbreak of dengue there is increased incidence of complication when there's a co-infection with DENV2 and DENV3.

KEYWORDS: Dengue, Dengue virus type 2(DENV 2), Dengue virus type 3(DENV 3), ELISA.**INTRODUCTION**

Dengue is one of the important arboviral infections affecting humans.^[1] They belongs to the genus *flavivirus* and family *flaviviridae*.^[2] The principle vector is *Aedes aegypti*; which is a day biting domestic mosquito and breeds in natural or artificial water. The disease is caused by any of the five serotypes DENV 1(Dengue virus type 1), DENV 2(Dengue virus type 2), DENV 3(Dengue virus type 3), DENV 4(Dengue virus type 4) and DENV 5(Dengue virus type 5).

The prevalence of this disease has grown in recent decades and is now endemic in more than 100 countries in Africa, the Americas, the Eastern Mediterranean, Southeast Asia, and the Western Pacific.^[3]

This present study has been planned to observe the co-infection of an individual with serotypes DENV 2 and DENV 3 and assess the clinical complications arising due to this co-infection.

MATERIALS AND METHOD

This test was carried out in our tertiary care hospital in collaboration with other institutes. A total of 4337 blood samples were collected from patients who showed signs and symptoms of dengue fever. These included high grade fever, headache, arthralgia, myalgia, retrobulbar pain, and asthenia.

The samples were grouped according to the duration of fever into: fever less than 5 days and fever more than 5 days. Serum from these blood samples was separated using centrifugation and all of them were tested using ELISA: NS1 (for fever <5days) and MAC (for fever >5days). The samples which tested positive were further tested using PCR (Polymerase Chain Reaction) for identification of serotypes.

RESULTS AND DISCUSSION

Total no. of samples taken=4337.

Out of which 1401 (32.3%) samples tested positive for dengue virus infection with ELISA (either NS1 or MAC).

On performing PCR 1050 (74.9%) samples showed infection with a single serotype and 351(25%) samples showed bands in two or more regions indicating co-infection with multiple serotypes.

These 351 cases which showed co-infection were further tabulated to find out the percentage load of co-infection with DENV2 and DENV3 serotypes.

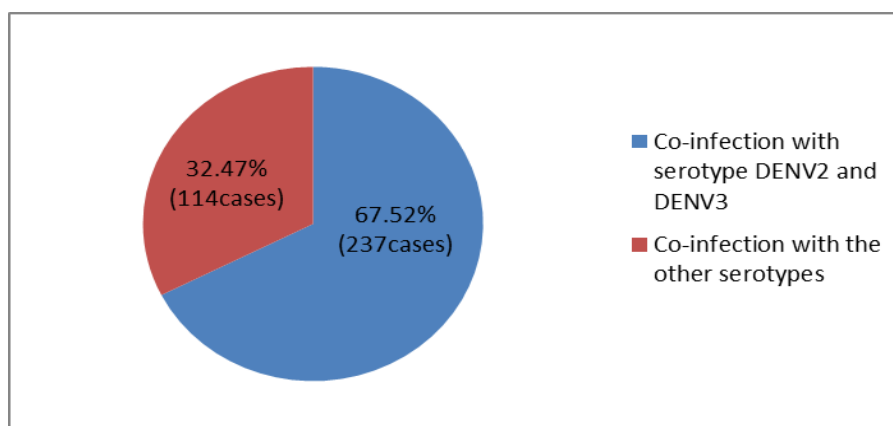


Diagram 1. Pie chart showing the distribution of cases of co-infection with different serotypes of Dengue virus.

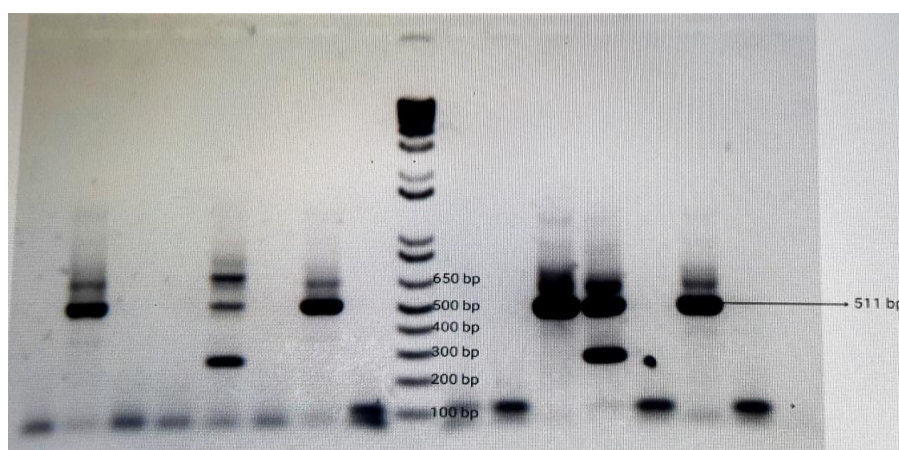


Diagram 2. PCR (Polymerase Chain Reaction) showing DENV 2 and DENV3 co-infection

Amongst these 237 cases after following up with the patients we found that 228 patients (i.e. 96.2%) developed DHF (Dengue Haemorrhagic Fever) and 09 patients (i.e. 3.8%) developed DSS (Dengue Shock Syndrome).

The above statistics observed in brings light to the surge in the incidence of complications in cases of co-infection with DENV 2 and DENV 3.

CONCLUSION

With the changes in global epidemiology of dengue during last 50 years,^[2] not only the number of countries reporting dengue has increased but also the number of severe disease in the form of DHF/DSS is being increasingly reported.^[4]

It has been postulated that the concurrent infections by multiple dengue virus serotypes may influence the clinical expression of the disease. This is considered as a single major factor for the emergence of DHF.^[5]

Similarly our study reveals the domination of severe dengue in cases of co-infection with DENV 2 and DENV 3 serotypes.

The key to control both dengue and severe dengue is the control of *Aedes aegypti*.^[6] It is possible to assume that mosquitoes infected with DENV 2 and DENV 3 may transmit them both in areas where two or more serotypes of the virus exists, together with a high prevalence of the vector.^[7]

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