

## C- Reactive Protein Levels in Patients Diagnosed with Dengue Fever at a Tertiary Care Hospital, Mahabubnagar

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### Abstract

Dengue, an arboviral infection is a notifiable disease in India and is endemic in many regions of the country. CRP levels help in knowing the severity of the disease. Patients with signs and symptoms of Dengue were included in the study. Their demographic data was noted. Serum was tested for NS1 ELISA, IgM ELISA. Positive samples were tested for CRP levels. Platelet count and Blood transfusion data was noted. Dengue positivity was 21%, with male predominance (55.6%), common in young children and teens. CRP level of 12 mg/L was seen in 28.40% of patients. Patients with CRP of 48mg/L required multiple platelet transfusion. Our study has correlated dengue positive patient's platelets, CRP levels and need for blood transfusion.

**Keywords:** Dengue, CRP, blood transfusion, Mahabubnagar, NS1 ELISA, IgM ELISA.

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## INTRODUCTION

Dengue virus is endemic in many countries of the world. In India, it is the commonest Arboviral disease [1-2]. The vector transmitting the infection is *Aedes aegypti*, and *Aedes albopictus*. The clinical classification given by WHO in 2009 is followed worldwide. The stages are divided based on severity of the infection into i-Dengue with or without warning signs, ii-Severe Dengue [1]. However clinical presentation varies with age and secondary infection [2]. It varies from simple self limiting disease to severe dengue shock. In India, it is endemic in all the states. In Mahabubnagar district of Telangana seroprevalence during the year 2017 was 7% [3].

C - reactive protein (CRP) is commonly used biomarker in the prognosis of infective diseases & inflammatory conditions [4]. In early period of Dengue infection, CRP helps in differentiating DF from severe DF. C - reactive protein is a biomarker which can be easily detected by simple latex agglutination test.

This study was conducted to compare the platelets values and CRP levels in dengue positive patients and assess the severity and prognosis of disease.

## MATERIAL & METHODS

The prospective study was conducted at a tertiary care hospital at Mahabubnagar over a period of 3 months (July-Sep-2019). Blood samples were collected from 2768 patients based on clinical signs & symptoms of dengue.

### Patient Inclusion and Exclusion Criteria

Patients suffering from 2-20 days fever with or without rash, decreased platelets, retro orbital pain, arthralgia, head ache, myalgia, and malaise were included in the study. Patients of Immune compromised status were excluded.

### Sample Collection & Processing

2-3 ml of blood was collected under aseptic conditions according to standard sample collection protocol. Serum was separated and laboratory tests were performed.

Serum samples collected from patients suffering from fever of less than 5 days were subjected to antigen detection. Pan bio dengue ELISA kit was used (dengue NS1 capture ELISA). Serum samples of patients suffering from fever of more than 5 days were subjected to dengue IgM antibody detection. NIV dengue IgM capture ELISA kit (sandwich ELISA) was used. Tests were done according to the manufacturer

guidelines. Results were recorded based on OD values of the sample.

For positive dengue cases, CPR latex agglutination test was done using arkray kit. If test was positive, the result was reported in dilutions. Based on the platelets levels and patients clinical condition, platelet transfusion (SDP & RDP) was done according to the institution protocols. Platelet count, blood transfusion and recovery data was collected from the blood bank, patient record and medical record section.

**RESULT**

A total of 2768 samples were tested for dengue infection during 3 months (July-Sep-2019), out of which 595(21%) samples were positive for dengue infection. Among them NS1 ELISA positives were 137 cases (23.02%) and 458 cases (76.9%) were positive for IgM ELISA (Chart-1). Out of 595 patients, males were predominant (55.6%) (Chart-2). The positive cases were seen in majority of children below 10 years (35.46%) and adolescent group (29.07%) (Chart-3).

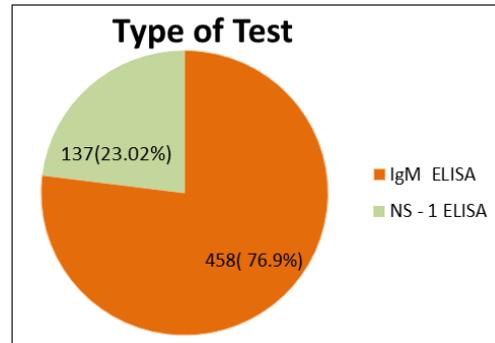


Chart-1: Tests done for dengue

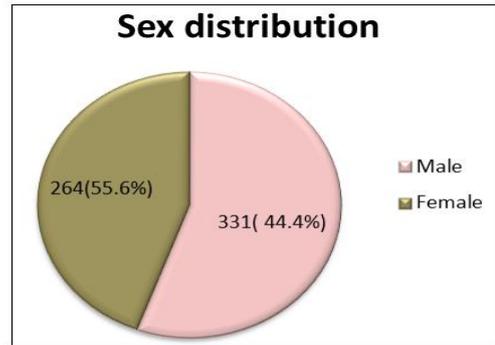


Chart-2: Sex Distribution

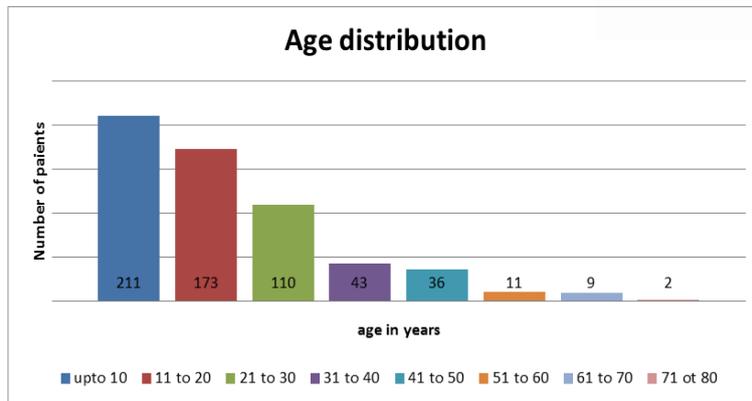


Chart-3: Age Distribution

Among 595 positive dengue cases, 362 were negative for CRP and 233 cases showed positive CRP,

out of which 1 in 2 dilutions (12) were seen majority of the cases (Chart-4).

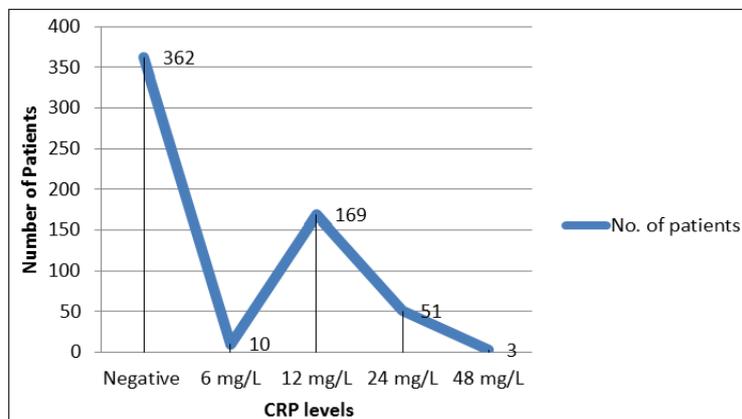


Chart-4: CRP levels

Up to 10,000/ $\mu$ L platelet level was seen in 3.36% of the patients. 11,000-50,000/ $\mu$ L was seen in 29.91% patients. 51,000 to 1, 00,000 / $\mu$ L was seen in 14.95% patients, 51.76% have more than 1,00,000/ $\mu$ L. For 198 patients, platelet transfusion was done. Single Donor Platelet (SDP) was transfused for 20 patients (Table-1), among these, 2 patients had CRP level 1 in 8 dilution (48mg/L), 4 patients had 1 in 4 dilution (24 mg/L), 12 patients had 1 in 2 dilution (12 mg/L), 2 patients had negative CRP. Random Donor Platelets (RDP) was transfused for 178 patients (Table-2), among these, 1 patient had CRP level 1 in 8 dilution (48 mg/L), 34 patients had 1 in 4 dilution (24 mg/L), 124 patients had 1 in 2 dilution (12 mg/L), 7 patients had 1 in 1 dilution (6 mg/L) and 12 patients had negative CRP. Remaining 397 patients had no transfusions (Table-3), among them 5 patients had CRP levels 1 in 4 dilution (24 mg/L), 41 patients had 1 in 2 dilution (12 mg/L), 3 patients had CRP 1 in 1 dilution (6 mg/L) and 348 patients had negative CRP. There was zero mortality seen in patients due to dengue infection.

**Table-1: CRP levels of patients in whom platelet count was less than 20,000 / $\mu$ L**

CRP level	Number of patients
Negative	2
6 mg/L	0
12 mg/L	4
24 mg/L	12
48 mg/L	2

**Table-2: CRP levels of patients from whom platelet count was 20,000-50,000 / $\mu$ L**

CRP level	Number of patients
Negative	12
6 mg/L	7
12 mg/L	124
24 mg/L	34
48 mg/L	1

**Table-3: CRP levels of patients from whom platelet count was 50,000/ $\mu$ L and above**

CRP level	Number of patients
Negative	348
6 mg/L	3
12 mg/L	41
24 mg/L	5
48 mg/L	0

## DISCUSSION

Dengue fever is a major global public health problem, especially in the tropical and subtropical countries. The burden of the disease is particularly seen in countries like India, where, during the dengue "season," the health care system is overwhelmed by patients with dengue fever [5]. The dengue disease is widely distributed in almost 35 states/UTs in India [6, 7]. In India, dengue is a notifiable disease. The seroprevalence of dengue in Mahabubnagar district in

the year 2017 was 7% and maximum numbers of cases were seen during the month of September [3]. This study was conducted at the same center and time period was taken as 3 months around the peak season.

The positivity during of the study was 21%. The positives were detected more by IgM ELISA test as majority of the patients presented after 5 days of duration of fever. 35.46% of the cases were seen in children less than 10 years of age. Shubhankar Mishra *et al.*, [8] conducted study on children up to 14 years of age. This correlated with the study of Udayasri *et al.*, [3], Chakravarthi *et al.*, [9], Gupta *et al.*, [10], Pandya *et al.*, [11]. Male predominance (55.65%) was seen in the present study and this correlates with majority of studies [2-10].

CRP levels are of significant importance in prognosis of many diseases. In this study, patients having CRP levels of 48mg/L and 24mg/L, all required platelet transfusion either SDP or RDP. These patients also were transfused multiple times. Whereas patients with CRP 12 mg/L rarely required platelet transfusion (RDP). And patients with negative CRP recovered well and didn't require any transfusion. The transfusion of SDP or RDP was decided on platelet count of the patient. Chien-Chih Chen *et al.*, [12] conducted a study to determine the utility of CRP in different stages of Dengue infection and concluded "single measurement of CRP as a potential useful and simple biomarker to identify patients who are at risk for developing a more severe dengue illness and to help triage patients requiring hospital care."

In conclusion, CRP as a biomarker helps clinician in estimating the patient condition, severity of the disease and guides them for further plan of treatment for the patient and decrease their hospital stay. Especially, this is important at a government setup where resources are limited.

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