**Original Research Paper**  **Medicine**

## CORRELATION OF DENGUE SCORE WITH THE SEVERITY OF DENGUE

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**ABSTRACT** **Background:** Dengue is one of the most prevalent vector borne diseases worldwide. Dengue fever presents with wide clinical spectrum ranging from self limiting infection to severe dengue. Aim: Present study is done to correlate a novel indicator 'Dengue Score'with the severity of dengue. **Methods:** A 2 year cross-sectional study was conducted among patients presenting with Dengue fever at BMCRI, Bangalore. **Results:** A total of 55 patients were included in the study. Mean age in the study was 42 years. Out of 55 patients, 33(60%) were males and 22(40%) were females. 36 had dengue fever without warning signs, 13 had Dengue fever with warning signs and 6 had severe dengue. Dengue score of 2 was associated with Hemoconcentration and severe thrombocytopenia. Dengue score of 3 or more was associated with Severe Dengue. **Conclusion:** Present study showed that Higher Dengue Score is associated with increased risk of plasma leakage and Severe Dengue. It is a simple scoring system, which uses laboratory parameters that are routinely measured in clinical practice.

**KEYWORDS :**

## INTRODUCTION

Dengue fever is a viral infection transmitted by Aedes aegypti mosquitoes that has recently re-emerged globally as the most important viral disease. Aedes aegypti, primary vector for dengue fever is well adapted to breeding in human made breeding sites in urban and peri urban environments. Dengue is now endemic in over 100 countries with dramatic increase in geographical range recorded in recent years. The World Health Organization (WHO) guidelines defined plasma leakage with the occurrence of hemoconcentration and/or hypoalbuminemia and/or serous effusion. However, there are several limitations in diagnosing plasma leakage using these criteria. In clinical practice, clinicians often detect pleural effusion and/or ascites in patients with elevated hematocrit values of less than 20 %, a cut off used to define hemoconcentration as recommended by WHO.

Dengue fever presents with wide clinical spectrum ranging from self limiting infection to severe dengue, which occurs in approximately 5% cases and characterised by plasma leakage and bleeding manifestations.This is a novel dengue scoring system to predict pleural effusion and/or ascites using laboratory parameters, such as the degree of hemoconcentration, lowest albumin concentration at the critical phase, degree of hypoal buminemia, lowest platelet count, elevated ratio of aspartate aminotransferase (AST), alanine amino transferase (ALT), and sodium concentration at critical phase. This Dengue Score can be used to identify pleural effusions and/or ascites, which are better indicators of plasma leakage, to stratify dengue-infected patients at risk of developing severe dengue. Dengue score, consisting of Hematocrit, Albumin concentration, Aspartate Aminotransferase and platelet count, is used to predict plasma leakage, which is the hallmark of Severe Dengue.

$$\text{Hemoconcentration (\%)} = \frac{\text{peak hematocrit} - \text{minimum hematocrit}}{\text{minimum hematocrit}} \times 100$$

$$\text{Albuminemia (\%)} = \frac{\text{peak albumin level} - \text{minimum albumin}}{\text{peak albumin level}} \times 100$$

$$\text{AST} = \frac{\text{peak AST in critical phase}}{\text{upper AST reference limit}}$$

$$\text{ALT} = \frac{\text{peak ALT in critical phase}}{\text{upper ALT reference limit}}$$

### Table 1 – Components of Dengue score

| Parameter | Value | Score |
|---|---|---|
| Hematocrit concentration | >15.1% | 1 |
| Albumin concentration | <3.5mg/dl | 1 |
| Platelet count | <49500/cumm | 1 |
| AST ratio | >2.5 | 1 |

## MATERIALS AND METHODS

**Study design:**

Cross sectional study. All consecutive patients presenting in the OPD or emergency department of the hospital with dengue fever during the study period were considered eligible for participation in the study.

**Study period:** December 2020 to May 2022

**Place of study:** Study was conducted in Hospitals attached to Bangalore Medical College and Research Institute.

**Sample size:** 55

**Study Procedure**

Patients attending the OPD or emergency department with dengue fever were initially evaluated and resuscitated for maintaining airway, breathing, and circulation. Informed consent was obtained from eligible patients. Patient was clinically examined and routine investigations were done.

**Statistical Analysis**

Data collected were analyzed in computer by using the Statistical Package for Social Sciences (SPSS) program version 10. Data analysis was done by usingdescriptive and inferential statistical methods: frequency,percentage, means.

## RESULTS

The study included 55 patients, with a mean age of 42 years. Out of the 55 patients, Males were 33(60%) and females were 22(40%).

Out of 55 patients, 36 patients had Dengue Fever without warning signs, 13 had dengue with warning signs and 6 had severe Dengue.

**Table 2- Dengue score components analysis**

| Parameter | Total | Percentage |
|---|---|---|
| Hemoconcentration | 8 | 14.5% |
| Hypoalbuminemia | 7 | 12.7% |
| Platelet count <49500 | 20 | 36% |
| AST ratio >2.5 | 4 | 7.2% |

**Table 3- Dengue score frequency**

| Dengue Score | Total | Percentage |
|---|---|---|
| 0 | 35 | 63% |
| 1 | 4 | 7.2% |
| 2 | 10 | 18.1% |
| >2 | 6 | 10.9% |

Dengue score of 2 was associated with Hemoconcentration and severe thrombocytopenia. Dengue score of 3 or more was associated with Severe Dengue.

## DISCUSSION

Michels et al. and Balasubramanian et al. showed that pleural effusion and/or ascites detection by USG is superior to clinical and laboratory parameters for diagnosing plasma leakage. USG is not routinely available in all healthcare facilities. Hematocrit, albumin, hepatic transaminases, platelet count, and sodium concentrations are laboratory parameters that are routinely checked in the management of dengue patients as recommended by the WHO. Therefore, the scoring system to predict the plasma leakage that was represented in this study by the detection of pleural effusion and/or ascites would be highly applicable in various healthcare settings where USG is not available.

In this study, the Dengue Score was compared with the severity of dengue. Identifying plasma leakages in patients with dengue, which was known as dengue hemorrhagic fever (DHF), is essential for determining which patients are at high risk for developing severe dengue. The laboratory parameters, i.e., levels of AST, serum albumin and Complete Hemogram were assessed in the critical phase. The degree of hemoconcentration and the lowest platelet count were determined based on daily complete blood count measurement.

An elevated AST level, a lower albumin concentration, the hematocrit peak, a low platelet count were found in the critical phase or 1–2 days after defervescence. Dengue score of 2 or more was associated with plasma leakage and Severe Dengue.

## CONCLUSION

Higher Dengue Score is associated with increased risk of plasma leakage and Severe Dengue. It is a simple scoring system, which uses laboratory parameters that are routinely measured in clinical practice. Dengue score may help clinicians identify patients with plasma leakage associated with severe dengue.

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