

## Evaluation of Hypoalbuminemia in Dengue Patients and its Relation to Severity of Disease at a Tertiary Care Hospital

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### Article History

Received: 07 May 2015

Revised: 03 June 2015

Accepted: 22 June 2015

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### ABSTRACT

**Background:** Dengue infections predominantly present without symptoms. For those exhibiting clinical manifestations, the symptoms can be categorized into three distinct patterns according to their severity: undifferentiated fever, dengue fever (DF), and dengue hemorrhagic fever (DHF). Hence; the present study was conducted to evaluate the occurrence of hypoalbuminemia in dengue and its relation to severity of disease.

**Materials & Methods:** A total of 100 patients with the presence of dengue were enrolled. Dengue infection is classified into three distinct severity categories: dengue fever (DF), dengue hemorrhagic fever (DHF), and dengue shock syndrome (DSS). Blood samples were obtained, and albumin levels were recorded. Severity assessment of dengue fever was done in relation of hypoalbuminemia. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

**Results:** Mean age of the patients was 51.3 years. 69 percent of the patients belonged to the age group of more than 45 years. 71 percent of the patients were males while the remaining were females. While classifying dengue fever patients in terms of severity, it was found that 33 percent, 39 percent, and 38 percent of the patients were of DF, DHF and DSS respectively. Hypoalbuminemia was seen in 35 percent of the patients. While correlating the severity of dengue fever with the occurrence of Hypoalbuminemia, it was seen that incidence of hypoalbuminemia was significantly higher among patients with higher severity of dengue fever.

**Conclusion:** Hypoalbuminemia can be used as a predictor for assessing severity of disease in dengue fever patients.

**KEYWORDS:** Dengue Fever (DF); Dengue Hemorrhagic Fever (DHF), Dengue Shock Syndrome (DSS); Hypoalbuminemia.

### INTRODUCTION

Dengue fever (DF) has emerged as one of the world's major infectious diseases. Dengue infections predominantly present without symptoms. For those exhibiting clinical manifestations, the symptoms can be categorized into three distinct patterns according to their severity: undifferentiated fever, dengue fever (DF), and dengue hemorrhagic fever (DHF). When DHF is accompanied by shock, it is referred to as dengue shock syndrome (DSS). In clinical settings, the diagnosis and treatment are primarily guided by clinical observations and initial laboratory test abnormalities. Additional

laboratory assessments may be conducted to confirm cases, particularly in research contexts. However, these tests typically require several days to weeks for results and are not employed in standard clinical practice, being primarily utilized for epidemiological studies. The primary causes of mortality associated with dengue infection include prolonged shock, significant hemorrhage, and fluid overload. A critical issue contributing to poor outcomes or fatalities is the failure to diagnose patients presenting in severe conditions upon arrival at healthcare facilities.<sup>1-3</sup>

Clinical risks and laboratory assessments have been examined to predict the severity of infections. Factors considered in this analysis include gender, younger age, the presence of hepatomegaly, abdominal discomfort, lethargy, cold extremities, episodes of abnormal bleeding, obesity or overweight status in children, malnutrition, type 2 dengue infection, secondary infections, ascites, pleural effusion, leukopenia, thrombocytopenia, hemoconcentration, elevated SGOT and/or SGPT levels, prolonged activated partial thromboplastin time (PTT), prolonged prothrombin time (PT), positive D-dimer test results, and gallbladder wall thickening as assessed by ultrasound. It is evident that many of the aforementioned parameters are not routinely utilized in general hospital settings. Additionally, several of these tests necessitate days to weeks for conclusive results, and some studies are based on limited sample sizes, often presenting descriptive data or case series.<sup>4-6</sup> Hence; the present study was conducted to evaluate the occurrence of hypoalbuminemia in dengue and its relation to severity of disease.

**MATERIALS & METHODS**

The present study was conducted to evaluate the occurrence of hypoalbuminemia in dengue and its relation to severity of disease. A total of 100 patients with the presence of dengue were enrolled. Complete demographic and clinical details of all the patients were obtained. Dengue infection is classified into three distinct severity categories: dengue fever (DF), dengue hemorrhagic fever (DHF), and dengue shock syndrome (DSS). In the context of ordinal regression analysis, the

coefficients of significant predictors associated with disease severity were converted into item scores. These total scores facilitated the classification of patients into the aforementioned severity categories. Key clinical predictors of dengue infection severity included age greater than six years, the presence of hepatomegaly, hematocrit levels of 40% or higher, systolic blood pressure below 90 mmHg, white blood cell counts exceeding 5000/ $\mu$ L, and platelet counts at or below 50,000/ $\mu$ L. The total scores, which varied from 0 to 18, enabled the categorization of patients into three severity levels: DF for scores below 2.5, DHF for scores ranging from 2.5 to 11.5, and DSS for scores above 11.5. Blood samples were obtained, and albumin levels were recorded. Severity assessment of dengue fever was done in relation to hypoalbuminemia. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

**RESULTS**

The mean age of the patients was 51.3 years. 69 percent of the patients belonged to the age group of more than 45 years. 71 percent of the patients were males while the remaining were females. While classifying dengue fever patients in terms of severity, it was found that 33 percent, 39 percent, and 38 percent of the patients were of DF, DHF and DSS respectively. Hypoalbuminemia was seen in 35 percent of the patients. While correlating the severity of dengue fever with the occurrence of Hypoalbuminemia, it was seen that incidence of hypoalbuminemia was significantly higher among patients with higher severity of dengue fever.

**Table 1: Incidence of hypoalbuminemia**

Hypoalbuminemia	Number	Percentage
Present	35	35
Absent	65	65
Total	100	100

**Table 2: Correlation of hypoalbuminemia with severity of dengue fever**

Dengue fever	Hypoalbuminemia present	Hypoalbuminemia absent	Total
DF	6	27	33
DHF	8	31	39
DSS	21	17	38
Total	35	65	100
p-value	0.001 (Significant)		

**DISCUSSION**

Dengue fever is an arthropod-transmitted viral disease having the greatest epidemiological, social, and economic impact. It is an increasing threat to global public health. To determine the magnitude of the problem and to guide and evaluate public health interventions, a reliable surveillance system is required to allow valid estimation of the damage caused by the

disease, as well as the changing patterns of morbidity and mortality. However, previous studies have identified problems that may affect the notifications of dengue fever cases, thus compromising the validity of the information obtained by the system. Generally, hypoalbuminemia is known to be associated with complications and mortality in patients with acute

infectious disease.<sup>7-10</sup> Hence; the present study was conducted for assessment of the occurrence of Hypoalbuminemia in dengue and its relation to severity. The mean age of the patients was 51.3 years. 69 percent of the patients belonged to the age group of more than 45 years. 71 percent of the patients were males while the remaining were females. While classifying dengue fever patients in terms of severity, it was found that 33 percent, 39 percent, and 38 percent of the patients were of DF, DHF and DSS respectively. Hypoalbuminemia was seen in 35 percent of the patients. While correlating the severity of dengue fever with the occurrence of Hypoalbuminemia, it was seen that incidence of hypoalbuminemia was significantly higher among patients with higher severity of dengue fever. Villar-Centeno LÁ et al evaluated biochemical alterations as potential prediction markers for severity in dengue. They randomly selected 125 severe dengue cases and 120 controls with non-severe dengue for measuring LDH, CK, CRP and albumin serum levels using acute phase sera. There was association among the CRP levels < 9.8 mg/L, <400 U/L LDH levels and <4 mg/dl albumin levels with the severity of dengue. In contrast, the CK levels showed no association with the severity of the disease. Their findings suggested an association of CRP, LDH and albumin levels with the severity of dengue. These biochemical tests could be used as predictive tools in the clinical course of the infection.<sup>11</sup>

## CONCLUSION

Hypoalbuminemia can be used as a predictor for assessing the severity of disease in dengue fever patients.

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**How to cite the article:** Dhanaraju K M, K. Srinivas. Evaluation of Hypoalbuminemia in Dengue Patients and its Relation to Severity of Disease at a Tertiary Care Hospital. *Int J Med Res Prof.* 2015, 1(3); 283-85.