



PROGNOSTIC MARKERS IN DENGUE – A COMPARATIVE STUDY BETWEEN HAEMATOCRIT VALUE AND PLATELET COUNTS IN PREDICTING THE CLINICAL OUTCOMES AMONG DENGUE PATIENTS.

General Medicine

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ABSTRACT

BACKGROUND: - Dengue fever is an infectious disease which is difficult to distinguish from other prevalent viruses as there are no specific markers that can diagnose the disease early. Because it is a disease that can evolve with serious consequences and even be fatal, this study aimed at analyzing laboratory dynamics in order to try to identify biomarkers that are predictive of severity.

AIM & OBJECTIVES:- To study the impact of hematocrit values and Platelet count values on clinical outcome of dengue fever and to compare hematocrit and Platelet counts as predictive factors for complications in dengue fever.

METHODS: - A total of 2314 clinically and serologically proven dengue cases were analyzed over 1 year from January to December 2017, along with hematocrit and relevant hematology data (obtained from patients clinical case records).

CONCLUSION:- Raise in Haematocrit in dengue was associated with dengue associated complications like ARDS, Circulatory shock and Death. It also showed that the incidence of hospitalization to critical care unit is statistically significant in patients with raised haematocrit. On the contrary, Thrombocytopenia in dengue did not show any statistically significant association while predicting morbidity and mortality in dengue patients.

KEYWORDS

Dengue Fever, Thrombocytopenia, Haematocrit Values

INTRODUCTION:-

Dengue infected patients are either asymptomatic or they have one of three clinical presentations: Undifferentiated Fever, Dengue Fever with or without haemorrhage, Dengue Haemorrhagic Fever or Dengue Shock Syndrome⁽¹⁾.

As many as one half of all dengue infected individuals presents with undifferentiated fever with mild non-specific symptoms that can mimic acute febrile illnesses and they recover fully without need for hospital care. Patients with DF with or without hemorrhage will have fever, viral prodrome, maculopapular rash and mild hemorrhagic manifestation in the form of petechiae⁽²⁾. Patients with DF do not develop substantial plasma leak or extensive clinical hemorrhage. The third clinical presentation results in the development of DHF, which in some patients progresses to DSS.

Evidence of plasma leak includes sudden increase in hematocrit ($\geq 20\%$ increase from baseline), presence of ascites, pleural effusion, or hypoalbuminemia. Patients exhibiting signs of increasing intravascular depletion, impending or frank shock, or severe hemorrhage should be admitted to an appropriate level intensive care unit for monitoring and intravascular volume replacement^(2,3). If left untreated, this can lead to intravascular volume depletion and cardiovascular compromise.

In this context, the present study aimed to assess the hematological dynamics like Hematocrit and Platelet counts of dengue patients in order to sensitize the importance of above in diagnosing and appropriate management⁽⁴⁾.

OBJECTIVES:

- To study the impact of hematocrit values and platelet values on clinical outcome of dengue fever.
- To compare hematocrit and platelet counts as predictive factors for complications in dengue fever.

MATERIALS & METHODS:-

This is a descriptive, retrospective study done on 2314 patients with dengue positive serology in General Medicine department of JSS Medical College and Hospital and Mysuru, over a 1 year period from January to December 2017.

A total of 2314 seropositive dengue cases were correlated with routine investigations like Complete Blood Count, Peripheral Blood Film, Malarial antigen card test, Random Blood Sugar, Urine microscopy, Dengue IgM and IgG by ELISA were extracted from existing medical records data. Special importance given to haematocrit and Platelet count with reference to each patient's need for fluid resuscitation, need for blood transfusion, need for inotropes. Clinical outcome in terms of morbidity and mortality of such patients who had thrombocytopenia and raised haematocrit were assessed. The data collected was tabulated and analysed.

INCLUSION CRITERIA:

All patients with acute febrile illness, serologically (NS1 positive or IgM positive or both positive) confirmed for Dengue infection were taken into the study.

EXCLUSION CRITERIA

- Pediatric age group,
- Patients with serologically negative febrile illness with thrombocytopenia,
- The patients with concomitant infections such as Malaria and Typhoid along with dengue were also excluded from the study.
- Coagulation disorders, Patients on anticoagulants,
- Diagnosed Autoimmune disorders and immunocompromised status were excluded in this study.

RESULTS AND DISCUSSION:-

Out of 2314 study group, 713 patients were had Haematocrit $>46\%$. The mean haematocrit was 55.92%. Majority of people (198/713) had

hematocrit between 46.1- 47%. Significant number of patient had elevated Haematocrit symbolically represents the pathognomic events that happens in critical phase of dengue fever.

Table No.1 Haematocrit value Distribution

No.of patients n = 2314	Haematocrit %
713	More than 46%
1601	Less than 46 %

There were 24 cases of ARDS found in total study group (2314). Significantly 15 cases had Heamatocrit more than >46%. The incidence of ARDS increases with increased haematocrit than with normal hematocrit. Hence elevated haematocrit can indicate the herald of respiratory compromise and subsequent failure needing ventilator support.

Table No.2:- Distribution of patients with ARDS complications.

Haematocrit value	No.of cases	ARDS
Less than 46 %	1601	15 out of 1601 (0.93%)
More than 46%	713	9 out of 713 (1.26%)
Total :-	2314	24

Out of 77 patient with Inotropic support in study group(2314), 30 patients had haematocrit >46%.It was statistically significant. Hypotension in dengue fever is a sign of increasing intravascular depletion, impending or frank shock, or severe hemorrhage which is invariably associated with elevated haematocrit.

Table No.3:- Distribution of patients who has Hypotension

Haematocrit value	No.of Cases	Cases with Hypotension
Less than 46 %	1601	47 out of 1601 (3.32%)
More than 46%	713	30 out of 713 (4.20%)
Total	2314	77

Out of 229 ICU cases in total study group , 141 patients had hematocrit > 46%. It was statistically significant .This once again stresses the fact that raising hematocrit alarms the beginning of intravascular fluid depletion, shock, multiorgan dysfunction necessitating ICU stay.

Out of 27 deaths in study group (2314) , 9 deaths were found to have Haematocrit more than 46%. It was statistically significant. Hence mortality was significantly increases with increasing hematocrit value. This implies patients exhibiting signs of increasing intravascular depletion, impending or frank shock, or severe hemorrhage should be admitted to an appropriate level intensive care unit for monitoring and intravascular volume replacement.

Table No.3:- Distribution of patient's accoeding to their Mortality:-

Haematocrit value	No.of Cases	No. of deaths
Less than 46 %	1601	18 out of 1601 (0.7%)
More than 46%	713	9 out of 713 (1.26%)
Total	2314	77

We also evaluated dengue patients with low haematocrit (<36%). Out of 2314 patients, 428 patients were found to have low haematocrit, out of which 6 patient had bleeding gums,3 had epistaxis and 2 had heamatochesia. No cases were documented to have internal bleed in the study. Large number of patients with low haematocrit is likely because of inadvertent and overenthusiastic use of IV fluids in patients with dengue fever.

44.98 % of NS1Ag positive patients had thrombocytopenia whereas only 18.40% of patients with IgM positive patients had thrombocytopenia indicating that NS1Ag may over diagnose other viral fever cases as dengue and it is a nonspecific tests. It also provides us valid thought that not all cases with thrombocytopenia are dengue.

Table. No.4:- Patients with thrombocytopenia with Dengue Positive serology

Serology	No of caseS	percentage
NS,Ag Positive	1041	44.98%
IgM Positive	426	18.40%
Both NS1Ag and IgM positive	847	36.60%
total	2314	100%

Haemorrhagic manifestation is uncommon clinical symptom in dengue fever as it is seen only in 11% of our study group. Surprisingly bleeding manifestation was seen maximum in patients with mild thrombocytopenia followed by in patients with moderate thrombocytopenia indicating that bleeding manifestation in dengue is multifactorial and the role of capillary endothelial dysfunction, qualitative assay of platelets needs to be assessed.

Out of 2314 Patients, 1304 had mild thrombocytopenia, 926 moderate thrombocytopenia, 84 patients had severe thrombocytopenia.

Table No 5:- distribution of patients according to the severity of thrombocytopenia.

Severity of thrombocytopenis	No. of cases
Mild (1lakh – 1.5laks)	1304
Moderate (50,000 – one lakh)	926
Severe (less than 50,000)	84
Total	2314

Among patients with severe thrombocytopenia, ARDS was seen in 10 patients, Hypotension was seen in 24 patients and 2 patient died of multiorgan failure.

Table no:6:- distribution of complications in patients with severe thrombocytopenia:-

Dengue complications in patients of severe thrombocytopenia	No of Patients
ARDS	10 out of 84
HYPOTENSION	24 out of 84
DEATH	2 out of 84

CONCLUSION & RECOMMENDATIONS:-:-

When patient enters a period of plasma leak and hemorrhage, it is vital to implement appropriate therapies replacing intravascular losses and stabilizing effective volume. If left untreated, this can lead to intravascular volume depletion and cardiovascular compromise. Anticipatory management and monitoring indicators are essential in effectively administering therapies as the patient enters the Critical Phase.

In this context frequent monitoring of **haematocrit is a gold standard** method to assess the pathophysiological changes. Haematocrit is a highly effective, simple, diagnostic, and prognostic tool in dengue. The timely intervention by frequent monitoring of haematocrit will improve the clinical outcome. Pitfalls in thrombocytopenia are that over diagnosis of dengue in thrombocytopenia cases and no conclusive evidence that fall in platelets is associated with bleeding manifestations. Also the association of severe thrombocytopenia with ARDS and hypotension was not significant in our study indicating the questionable role of thrombocytopenia as a predictable parameter.

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