



CORRELATION BETWEEN SEVERITY OF DENGUE FEVER AND SERUM FERRITIN LEVELS

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50 patients with IgM +ve Dengue patients were selected. Their platelet count, SGOT, SGPT and serum ferritin levels on admission were measured.

ABSTRACT

Dengue fever, a viral infection prevalent in various parts of India is a cause of widespread mortality and morbidity. In this study, attempt is made to co-relate the severity of Dengue fever with that of serum ferritin levels.

Aim: Correlation between severity of dengue fever and serum ferritin levels.

Methods: 50 patients with IgM +ve Dengue patients were selected. Their platelet count, SGOT, SGPT and serum ferritin levels on admission were measured.

Results: There is a strong co-relation between the severity of the disease and serum ferritin levels.

Conclusion: It can be concluded that Serum ferritin levels can be taken as a significant marker for assessing the severity of Dengue Fever.

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INTRODUCTION

Dengue fever is one of the widely prevalent viral infections in various parts of world afflicting humanity in terms of morbidity and mortality. Every year, there are around 50 million dengue cases and around 500,000 individuals are hospitalized with DHF/DSS, mainly in Southeast Asia. In India, dengue has dramatically expanded over the last few years, with rapidly changing epidemiology(1). The dengue virus has four serotypes and is transmitted to humans by Aedes mosquitoes especially Aedes aegypti (2). Infection with any of the four serotypes may be asymptomatic as in the majority of cases or may result in a wide spectrum of clinical symptoms that ranges from a mild flu-like syndrome also known as dengue fever to the most severe forms of the disease, that are characterized by coagulopathy, increased permeability, vascular fragility which is known as dengue haemorrhagic fever (DHF). If this progress to hypovolemic shock it is known as dengue shock syndrome (DSS)(3).

Dengue infection needs to be addressed as a single disease with various clinical presentations that ranges from asymptomatic infections to severe clinical courses which may lead to high morbidity and mortality. The dengue illness can progress to potential complications like dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS),

both defined as severe dengue by WHO (2). National Vector Borne Disease Control Program (NVBDCP), Govt. of India(4) has recommended the use of

- enzyme linked immune-sorbent assay (ELISA) based NS1 antigen detection test starting from 1st day of infection for diagnosing the cases, and
- antibody detection test immunoglobulin M (IgM) capture ELISA (MAC-ELISA) after the 5th day of onset of disease to confirm the dengue infection(5)

Ferritin is an acute phase reactant which is released by the reticulo-endothelial cells. Hyperferritinemia is generally associated with coagulation disturbances and immune activation (6). Patients with hyperferritinaemia should be monitored carefully, because they are at risk to develop severe disease due to extensive immune activation. Increase in serum ferritin levels was observed to have a linear correlation with severity of dengue fever. Therefore, serum ferritin may serve as a predictor in assessing the severity of dengue illness (7).

Criteria for severity assessment of Dengue Fever

Mild case

- Duration of hospital stay <3 days
- Platelet count >50,000/mm³
- Fever without complications like bleeding, hypotension, organ involvement or any evidence of capillary leakage.

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Moderate case

- Duration of hospital stay 3-5 days
- Platelet count 20,000/mm³ - 50,000/mm³
- Fever with minor bleeding, capillary leakage and hypotension.

Severe case

- Duration of hospital stay <5 days
- Platelet count <20,000/mm³
- Fever with shock, capillary leakage, significant bleeding, severe organ involvement and severe metabolic abnormalities.

Aim and Objective

Correlation between severity of dengue fever assessed by haematological profile with that of serum ferritin levels.

METHODS

This prospective observational study was conducted over a period of 2 months from 1st September 2019 to 31st October 2019 and the study population included 50 patients who were IgM ELISA positive with age >18 years from medicine ward at SRMSIMS, Bareilly, Uttar Pradesh, India.

Inclusion criteria

- Age >18 years
- Dengue IgM ELISA positive
- No prior management for the current illness

Exclusion criteria

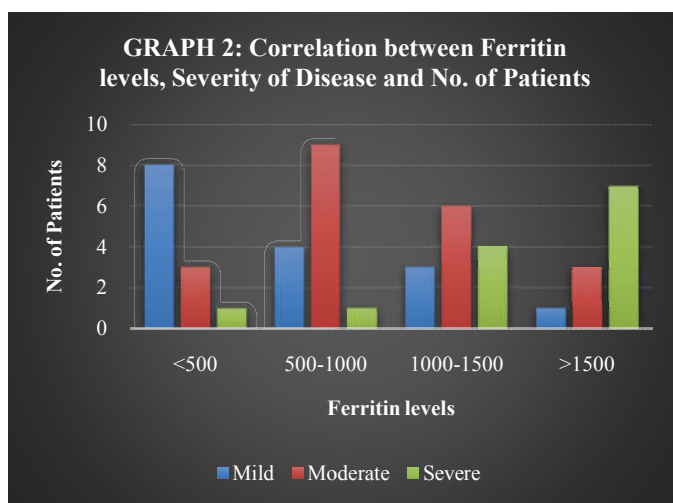
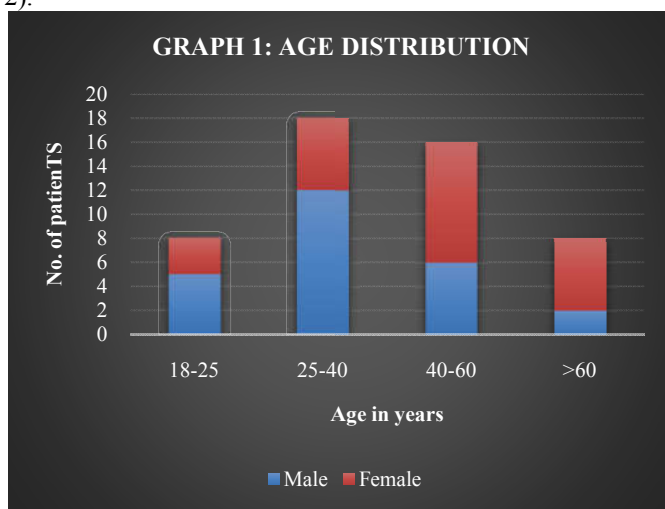
1. Age <18 years
2. Patients with pregnancy
3. Patients with known haematological or platelet disorders
4. Patients with other febrile illness and mixed infections
5. Patients on heparin, radiotherapy and chemotherapy
6. The patients were subjected to detailed clinical history, clinical examination and investigations like Hb, TLC, Platelet count, Serum Ferritin, Dengue Serology, SGOT, SGPT levels(8).

RESULTS

In the present study, 50 IgM ELISA positive patients were taken into consideration, out of which 25 patients were male, and 25 were female. It was observed that the maximum number of patients were in the age group of 25 - 40 years (n=18) followed by the age group of 40-60 years (n=16) (Graph 1). There were 16 mild cases, 21 moderate cases and 13 severe cases with serum ferritin levels increasing as the severity increases.

Out of 16 mild cases, 8 case had serum ferritin level <500ng/dl, 4 between 500-1000ng/dl, 3 between 1000-1500ng/dl and only 1 case had serum ferritin >1500ng/dl. Out of 21 moderate cases, 3 case had serum ferritin level <500ng/dl, 9 between 500-1000ng/dl, 6 between 1000-1500ng/dl and 3 cases had serum ferritin >1500ng/dl.

Out of 13 severe cases, only 1 case had serum ferritin level <500ng/dl, 1 between 500-1000ng/dl, 4 between 1000-1500ng/dl and 7 cases had serum ferritin >1500ng/dl (Graph 2).



DISCUSSION

In this study 50 patients were taken with Dengue IgM ELISA positive results out of which 25 were males and 25 females, the gender ratio was kept equal for simplicity sake.

Total 8 patients were of age group 18-25 years, 18 were of 25-40 years age group, 16 were of 40-60 years age group and 8 were more than 60 years of age.

Out of 16 mild cases, maximum number of cases (n=8) had serum ferritin levels less than 500ng/dl and only 1 case had serum ferritin levels more than 1500ng/dl, which in comparison to 13 severe case where maximum number of cases (n=7) had serum ferritin levels more than 1500ng/dl and had only 1 case with serum ferritin levels less than 500ng/dl. In case of moderate cases, maximum cases were with serum ferritin levels of 500-1000ng/dl. In the severe cases, 3 patients had DSS/DHF and all the 3 has serum ferritin levels >1500ng/dl.

It is observed that with increase in the ferritin levels, there is increase in the severity of cases with longer hospital stay, decreased platelet counts and increased number of platelet

transfusion. In a Tamil Nadu based study(9), it was also concluded that raised serum ferritin levels correlates with the severity of dengue fever as it has a P value of <0.05. *Subhayan Bhattacharya et al(10)* in his study also concluded that the serum ferritin levels may serve as a significant marker for differentiating between dengue fever and fever of other aetiology. *R. Soundravally et al(11)* showed in his study that the elevated serum ferritin level could predict the disease severity on the day of admission with highest sensitivity and specificity of 76.9% and 83.3% respectively, and on defervescence same was found to be 90% and 91.6%. *Muhammad Nadeem et al(12)*, in his study showed significant association between ferritin levels and severe dengue as compared with dengue fever.

In our study, the P value was <0.05 calculated by Chi-Square formula with 4x3 contingency table. This implies that there is a strong correlation between the serum ferritin levels and the severity of Dengue fever as is implied by Graph 2.

CONCLUSION

The serum Ferritin as evaluated in the present study may serve as a significant marker for assessing the severity of the Dengue fever. However, further prospective trials and studies involving larger number of cases are required to strengthen the evidence base in favour of ferritin being an index or a marker for assessing the severity of Dengue fever.

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