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Hyperferritinemia as an Indicator of Severity in Dengue Fever - A Prospective Observational Study

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Abstract: ***Background: Dengue fever remains a significant public health concern in endemic regions like India. Early prediction of severe cases is crucial to reduce morbidity and mortality. Serum ferritin, a known acute phase reactant, may serve as a potential marker of disease severity. Objectives: To evaluate serum ferritin levels in patients diagnosed with dengue fever and determine its correlation with disease severity. Methods: A prospective observational study was conducted on 100 adult patients with confirmed dengue infection. Serum ferritin levels were measured on admission and correlated with WHO-defined clinical severity markers. Statistical analysis was performed to identify significant associations. Results: Serum ferritin levels were significantly elevated in patients with severe dengue compared to those with non-severe disease (p<0.05). Ferritin levels >1000 ng/mL were strongly associated with complications such as thrombocytopenia, elevated hematocrit, liver dysfunction, and prolonged hospitalization. A positive correlation was observed between ferritin levels and disease severity score. Conclusion: Hyperferritinemia is significantly associated with severe dengue and may serve as a cost-effective, early biomarker for prognostication. Routine ferritin measurement may aid in triaging high-risk patients for closer monitoring and early intervention.***

Keywords: Dengue Fever, Serum Ferritin, Hyperferritinemia, Disease Severity, Biomarker, Prospective Study

1. Introduction

Dengue is a rapidly spreading mosquito-borne viral illness caused by the dengue virus (DENV), transmitted mainly by Aedes aegypti. It manifests in a wide spectrum ranging from asymptomatic infection to severe dengue, which includes plasma leakage, hemorrhage, and organ impairment. As dengue burden rises in India, early predictors of severity have become essential to prevent complications and deaths.

Serum ferritin is an acute phase reactant that rises in response to inflammation. In conditions like macrophage activation syndrome and sepsis, hyperferritinemia has been associated with poor outcomes. However, limited data is available on its utility in dengue fever. This study aims to evaluate the role of serum ferritin as a severity marker in dengue infection.

2. Methodology

This prospective observational study was conducted at the Department of General Medicine, Narayana Medical College, over a period of 6 months. A total of 100 adult patients (>18 years) with confirmed dengue (NS1 antigen or IgM positive) were enrolled after obtaining informed consent.

Inclusion Criteria:
- Positive NS1 antigen or IgM dengue test
- Admission within 5 days of symptom onset

Exclusion Criteria:
- Known chronic inflammatory or hematologic diseases
- Liver disorders, malignancies, or recent transfusions

Data Collection:
- Clinical data: Symptoms, vitals, WHO severity criteria
- Laboratory data: CBC, LFT, renal parameters, serum ferritin (ELISA method)
- Outcomes assessed: Severity, duration of hospitalization, complications

Statistical Analysis:
Data were analyzed using SPSS v26. Continuous variables were compared using t-tests, and categorical data using chi-square. A p-value <0.05 was considered statistically significant.

3. Results and Discussion

Out of 100 patients, 68% were male, and the mean age was 32 ± 10.5 years. Based on WHO classification:
- 62% had non-severe dengue
- 38% had features of severe dengue

Ferritin Findings:
- Mean ferritin in non-severe group: 480 ± 120 ng/mL
- Mean ferritin in severe group: 1450 ± 310 ng/mL (p<0.001)
- Ferritin >1000 ng/mL had 85% sensitivity and 78% specificity for predicting severe dengue.

Complications Correlated with High Ferritin:
- Platelet count <50, 000/mm³
- Elevated hematocrit
- Transaminitis (SGOT >100 IU/L)
- Evidence of plasma leakage or shock
- Longer hospital stays (>5 days)

These findings are consistent with earlier studies indicating the role of ferritin in dengue pathogenesis due to immune activation and cytokine storm. Hyperferritinemia appears to reflect the underlying inflammation and endothelial dysfunction.

4. Conclusion

Serum ferritin levels are significantly elevated in severe dengue cases and can serve as a reliable early biomarker for disease severity. Its routine assessment at admission may guide risk stratification, closer monitoring, and timely interventions, especially in resource-limited settings.

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