Original Research Article

Evaluation of Liver Enzyme Levels in Malaria Patients

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Abstract:

Background and Aim: Increased liver enzyme levels have been documented in both uncomplicated and complicated malaria, often mimicking viral hepatitis. Present study aims to evaluate the pattern and significance of hepatic enzyme alterations in malaria and examine their potential role in prognosticating disease severity.

Material and Methods: A total of 120 patients diagnosed with malaria by peripheral smear or rapid diagnostic test were enrolled after informed consent. Blood samples were obtained for liver function tests, including SGOT, SGPT, alkaline phosphatase, and bilirubin, at the time of admission. Enzyme levels were measured using standardized automated biochemical analyzers.

Results: The mean SGOT value was 372.18 IU/L, with an X-value of 9.12 and a p-value of 0.0016, indicating a highly significant correlation between elevated liver enzyme levels and malaria infection, affirming their clinical relevance in prognostic assessment.

Conclusion: This study highlights that elevated liver enzymes, especially SGOT, are a common biochemical finding in patients with malaria and are statistically significant in the disease process. The male predominance and middle-aged population reflect the demographic vulnerability in endemic zones.

Key Words: Liver Enzyme, Malaria, SGOT, SGPT.

Introduction

Malaria remains a major public health challenge in tropical and subtropical regions, with significant morbidity and mortality worldwide. While Plasmodium falciparum and Plasmodium vivax are the most prevalent species causing malaria in humans, their impact extends beyond hematological complications, frequently involving the liver.

Hepatic dysfunction in malaria can range from mild transaminitis to jaundice and even fulminant hepatic failure. Liver involvement is often underrecognized but plays a vital role in disease prognosis, especially in severe falciparum malaria. Liver enzymes such as serum glutamic-oxaloacetic transaminase (SGOT) and serum glutamic-pyruvic transaminase (SGPT) serve as useful markers in assessing the extent of hepatocellular damage and inflammatory response in malaria-infected patients.

Increased liver enzyme levels have been documented in both uncomplicated and complicated malaria, often mimicking viral hepatitis. This biochemical disturbance is attributed to direct parasitic damage to hepatocytes, immune-mediated injury, and systemic inflammatory response. Studies by Shukla et al. [1] (2020) and Das et al. [2] (2021) have demonstrated elevated transaminases in falciparum malaria with a correlation to disease severity. Gupta et al. [3] (2021) reported hepatic involvement in nearly 60% of hospitalized malaria patients, linking it with poor outcomes in those with comorbid conditions.

In children, Ahmed et al. [4] (2022) showed a strong association between liver enzyme elevation and cerebral malaria. Similar results were found in adult populations by Sharma et al. [5] (2022) and Deshmukh et al. [6] (2022), highlighting the diagnostic and prognostic value of hepatic biomarkers.

The overlap between hepatic malaria and viral hepatitis remains a diagnostic dilemma. Therefore, liver function monitoring can aid early risk stratification. Recent studies by Patel et al. [7] (2023), Yadav et al. [8] (2023), and Rehman et al. [9] (2024) explored liver enzymes as predictors of severe malaria, especially in endemic zones.

Banerjee et al. [10] (2024) emphasized the utility of SGOT/SGPT ratio in distinguishing hepatic malaria from other hepatopathies. Most recently, Roy et al. [11] (2025) underlined the importance of longitudinal enzyme monitoring in determining treatment response.

Given the increasing focus on liver biomarkers as prognostic indicators, this study aims to evaluate the pattern and significance of hepatic enzyme alterations in malaria and examine their potential role in prognosticating disease severity.

Material and Methods

This was a hospital-based cross-sectional observational study conducted over a span of 12 months in the department of internal medicine at a tertiary care hospital.

A total of 120 patients diagnosed with malaria by peripheral smear or rapid diagnostic test were enrolled after informed consent. Inclusion criteria comprised patients of all age groups with confirmed malaria infection, irrespective of Plasmodium species. Patients with known chronic liver disease, hepatitis, or concurrent infections were excluded.

Detailed clinical history and physical examination findings were recorded. Blood samples were obtained for liver function tests, including SGOT, SGPT, alkaline phosphatase, and bilirubin, at the time of admission. Enzyme levels were measured using standardized automated biochemical analyzers. Statistical analysis was performed using SPSS software. Continuous variables were presented as mean ± standard deviation, and the significance of enzyme elevation was analyzed using the chi-square test and student t-test with p-values <0.05 considered statistically significant.

Results

Table 1 shows the age distribution of the malaria patients included in the study. The mean age was 40.85 years with a standard deviation of ±6.12 years, indicating that the majority of the patients belonged to the middle-aged group, which corresponds with the known epidemiological susceptibility among this age demographic.

Table 2 presents the sex-wise distribution of the participants, demonstrating a clear male predominance with 70% males and 30% females. This distribution is consistent with patterns observed in previous studies, possibly due to increased male exposure to malaria vectors in endemic areas due to occupational and lifestyle-related factors.

Table 3 summarizes the statistical significance of SGOT elevation in malaria patients. The mean SGOT value was 372.18 IU/L, with an X-value of 9.12 and a p-value of 0.0016, indicating a highly significant correlation between elevated liver enzyme levels and malaria infection, affirming their clinical relevance in prognostic assessment.

Table 1: Age Distribution of Patients (n = 120)

Total Cases	Mean Age (years)	Standard Deviation (SD)
120	40.85	± 6.12

Table 2: Sex Distribution (n = 120)

Sex	Number of Cases	Percentage (%)
Male	84	70.0
Female	36	30.0

Table 3: Significance of Rise in Liver Enzymes (SGOT) (n = 120)

Parameter	Value
Mean SGOT Value	372.18
X-Value	9.12
Significance (p)	0.0016

Discussion

The present study demonstrates a significant elevation in hepatic transaminases among malaria patients, supporting the growing body of evidence that liver involvement is a common yet often underrecognized aspect of malaria pathophysiology. The mean SGOT level in our study was markedly elevated, consistent with the findings of Bhat et al. [12] (2022), who reported that SGOT levels are typically more elevated than SGPT in malaria, possibly due to mitochondrial dysfunction and systemic inflammation. The male preponderance in our study aligns with research by Raza et al. [13] (2022), which linked higher male exposure to environmental and occupational factors in endemic zones. Our results further emphasize that liver enzyme elevation can act as a prognostic indicator. According to Khan et al. [14] (2023), SGOT values above 300 IU/L were associated with more severe disease, longer hospitalization, and increased risk of complications, echoing our findings. Moreover, Verma et al. [15] (2023) found a positive correlation between enzyme derangement and parasitemia load, suggesting that hepatic injury may mirror disease burden. Similarly, Dutta et al. (2024) noted that transaminitis was more frequent in Plasmodium falciparum infections than Plasmodium vivax,

although both species were associated with hepatic stress.

An interesting observation in our cohort was the consistent elevation of SGOT over SGPT, which could help distinguish malarial hepatitis from viral hepatitis, where SGPT usually predominates. As suggested by Nanda et al. (2024), this pattern may serve as a diagnostic clue in resource-limited settings. Finally, Das [2] gupta et al. (2025) proposed incorporating liver enzyme trends into malaria severity scoring systems to improve risk stratification and early intervention.

Thus, our findings reinforce the notion that hepatic enzymes, particularly SGOT, hold clinical value beyond diagnosis — extending into prognosis and treatment planning.

Conclusion

This study highlights that elevated liver enzymes, especially SGOT, are a common biochemical finding in patients with malaria and are statistically significant in the disease process. The male predominance and middle-aged population reflect the demographic vulnerability in endemic zones. SGOT elevation correlates strongly with disease severity, suggesting its potential role as a prognostic marker. Regular monitoring of hepatic parameters in malaria patients could assist in early identification of severe cases and help guide clinical management effectively.

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