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A Study Correlating the Derangement of Liver Function Tests in Vivax and Falciparum Malaria

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Abstract
Objectives*: Malaria has been and is still the cause of human morbidity and mortality. Although,the disease has been eradicated in most temperate zones,it continues to be endemic through out the tropics and subtropics. Here we have made an attempt to study the correlation between severity of malaria infection with derangements in liver function tests and how it will help the outcome and prognosis of the disease.*
Method: *100 patients were included in the study who have been diagnosed to have malaria through MPFT/MP smear test done in Father Muller Medical College Hospital,Mangalore,Karnataka.*
Results: *Patients included in the study were 15-72 years of age with mean age of 35 years. Ratio of males to females were 3.3:1. Among 100 cases studied 34% had vivax malaria and 66%had falciparum malaria. Ratio between vivax and falciparum malaria was 1.9:1.Fever and jaundice were the presenting complaint in all cases.Icterus and hepatosplenomegaly were the major clinical signs noticed. The serum bilirubin levels ranged from 1.5 to 6.9 mg% with mean and SD of 2.97± 1.37. The AST/ALT levels ranged from 17 to 593 IU/l and 14 to 544 IU/l with mean and SD 98.98 ± 77.167 IU/l and 82.39 ± 69.08 IU/l, respectively.*
Conclusion: *Changes in LFT such as hyperbilirubinemia and elevated transaminases were observed in our study with more affection towards falciparum malaria compared to vivax malaria based on our statistical results.*
Keywords: *Malaria,liver function tests,jaundice,transaminases.*

I. Introduction

Malaria is an important parasitic disease affecting 300-500 million people worldwide. Malaria is caused by a protozoan parasite plasmodium.Humans occasionally become infected with four different species namely vivax, falciparum, malariae and ovale.

Recent studies have highlighted the association between malaria and life threatening complications like ARDS, severe anaemia,neurological manifestations and hepatic complications.Here is an attempt to correlate the derangements in liver function tests among vivax and falciparum malaria.

Jaundice is a common clinical presentation in severe malaria,seen in approximately 2.5% patients with falciparum infections, but hepatitis is unusual, although hepatic dysfunction are being increasingly reported in patients with p.falciparum infection. The extent of hepatocellular dysfunction ranges from mild abnormalities in liver function tests to hepatic failure. Patients with hepatocellular dysfunction in malaria have favourable outcomes, if hepatic involvement is recognized early and managed properly.

Here we have made an attempt to study the correlation between severity of malaria infection with derangements in liver function tests and how it will help the outcome and prognosis of the disease.

II. Results

A total of 100 patients admitted to Father Muller medical college hospital having MPFT positive for plasmodium vivax or falciparum malaria were analysed as mentioned below.

Age Distribution

AGE(in years)	NUMBER	PERCENT
15-20	11	11%
21-30	38	38%
31-40	19	19%
41-50	16	16%
51-60	10	10%
>60	6	6%

Patients included in the study were 15-72 years. The mean age in this study was 35 years.

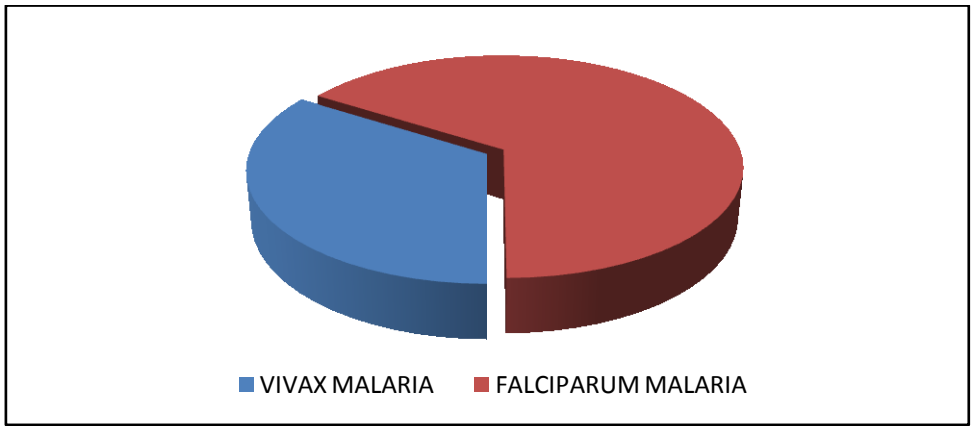
Sex Distribution of cases

SEX	NUMBER	PERCENT
MALE	77	77%
FEMALE	23	23%

Among 100 cases studied 77 (77%) were males and 23 (23%) were females. Ratio of males to females is 3.3:1.

Classification Of Cases Based On Type Of Malaria

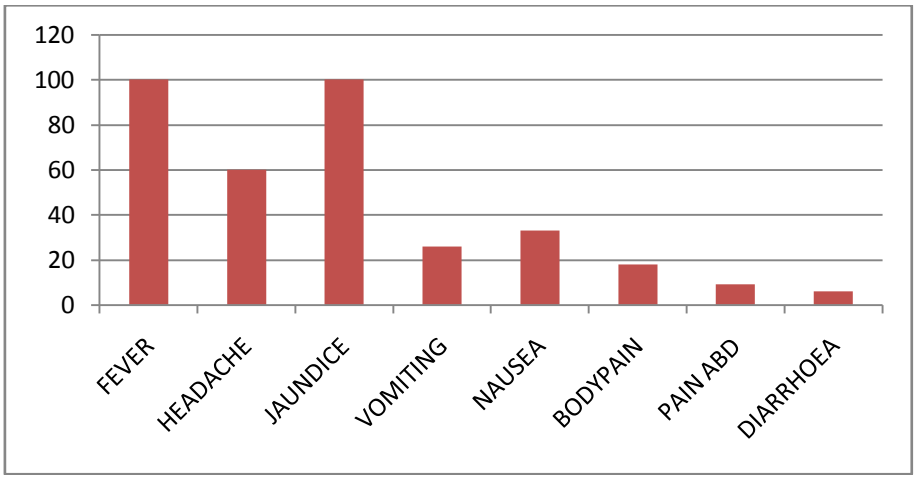
Malaria	Number	Percentage
Vivax	34	34%
Falciparum	66	66%



Among 100 cases studied 34 individuals (34%) had vivax malaria and 66 individuals (66%) had falciparum malaria. Ratio between vivax and falciparum malaria is 1.9:1.

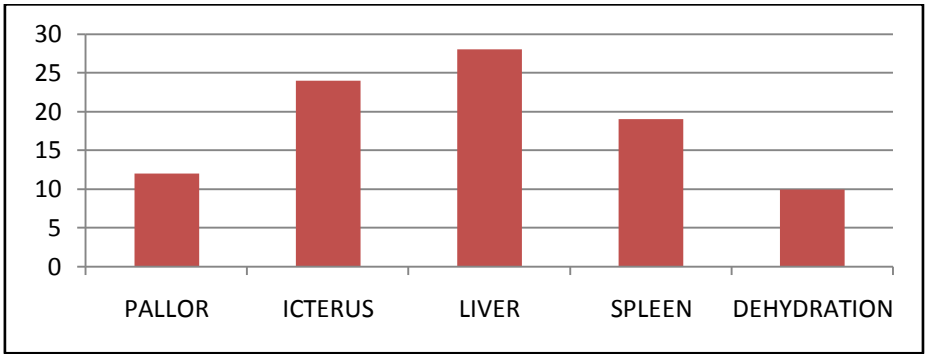
Clinical Spectrum of the disease

Symptoms	**No of patients**	**Percentage**
Fever	100	100%
Headache	60	60%
Jaundice	100	100%
Vomiting	26	26%
Nausea	33	33%
Bodyache	18	18%
Abdominal pain	9	9%
Diarrhoea	6	6%



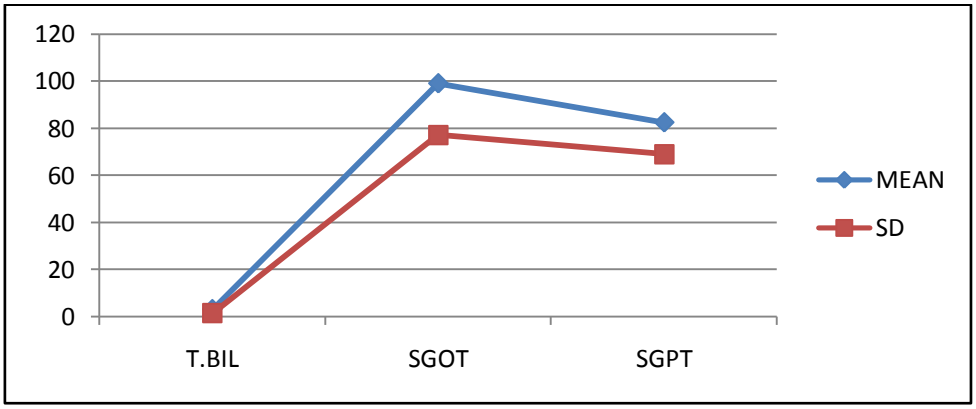
Fever and jaundice was the presenting complaint in 100 individuals (100%). Headache was seen in 60 cases (60%), vomiting in 26 cases (26%), nausea in 33 cases (33%), bodyache in 18 cases (18%), abdominal pain in 9 cases (9%) and diarrhoea in 6 cases (6%).

Signs	No of patients	Percentage
Pallor	12	12%
Icterus	24	24%
Dehydration	10	10%
Hepatomegaly	28	28%
Splenomegaly	19	19%



Splenomegaly was present in 19 (19%) patients and 28 (28%) patients had hepatomegaly. Pallor was seen in 12 (12%) and 24 (24%) had icterus. Signs of dehydration (mild, moderate and severe) were seen in 10 (10%) patients.

Mean And Standard Deviation Of The Results



	Mean	SD
T.BIL	2.972	1.370768
SGOT	98.98	77.16177
SGPT	82.39	69.08901

III. Discussion

According to the WHO, jaundice is one of the cardinal manifestations of severe malaria. It results from the intravascular haemolysis of parasitized erythrocytes, hepatic dysfunction and possibly an element of microangiopathic haemolysis associated with disseminated intravascular coagulation.

The changes in liver may result from alteration in blood flow through the organ as parasitized red blood cells adhere to endothelial cells, blocking the sinusoids and obstructing the intrahepatic blood flow. The histopathological changes reported in the malaria patients include hepatocyte necrosis, cholestasis, bile stasis, granulomatous lesions and malarial nodules. The bile stasis is due to impairment of bilirubin transport because of reticulo-endothelial blockage and disturbance of hepatocyte microvilli.

Intravascular haemolysis of parasitized and non-parasitized red blood cells has been considered as an important factor in the causation of mild to moderate jaundice, but there the bilirubin is predominantly unconjugated and its levels do not rise very high. Apart from intravascular haemolysis and disseminated intravascular coagulation, the authors observed evidence of hepatocellular jaundice secondary to histopathological changes of liver in malaria as an important contributory factor.

In a study done by D K Kochar et al about Hepatocyte dysfunction and hepatic encephalopathy in *Plasmodium falciparum* malaria, serum bilirubin levels ranged from 3 to 48.2 mg% (mean ± SD 10.44 ± 8.71 mg%), with AST levels 40–1120 IU/l (mean ± SD 294.47 ± 250.67 IU/l) and ALT levels 40–1245 IU/L (mean ± SD 371.12 ± 296.76 IU/l)

In another study done by M Sharma et al in Rohtak,Haryana about liver functions in falciparum malaria,serum bilirubin was raised in 19 patients of the study with a mean of 7.5±9.5mg %.Mean AST and ALT were 168.1±11.9 and 173.73±158 IU respectively.

In the present study, we observed predominantly conjugated hyperbilirubinaemia, with a proportionate rise in AST and ALT levels.The serum bilirubin levels ranged from 1.5 to 6.9 mg% with mean and SD of 2.97± 1.37. The AST/ALT levels ranged from 17 to 593 IU/l and 14 to 544 IU/l with mean and SD 98.98 ± 77.167 IU/l and 82.39 ± 69.08 IU/l, respectively.In our study we observed lower values compared to other studies which may be due to the absence of clinical jaundice in many patients.

The findings in our study also correlates with a similar study done among malaria infected patients in Ikeja Lagos State,Nigeria where they found out AST, ALT, bilirubin were 37.6±5.5, 34.8±5.4, 3.8±1.0 IU/l.

IV. Conclusion

Malaria is a common cause of fever in the tropics. Various hepatocellular derangements apart from other systemic involvement can be seen in malaria.

Higher frequency of mild to severe derangements in LFT were observed.

Presence of deranged LFT in a febrile patient heightens the suspicion of this disease and prompt initiation of treatment.

Changes in LFT such as hyperbilirubinemia and elevated transaminases were observed in our study with more affection towards falciparum malaria compared to vivax malaria based on our statistical results.

It would be beneficial to study and compare the LFT parameters in both immune and semi immune individuals living in endemic areas along with other aspects in order to prevent the poor prognosis and outcome of much severe form of the disease.

The early diagnosis of the disease and keen observation of the clinical and hepatic profile and early effective treatment can limit mortality and further lifethreatening complications.

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