

## ORIGINAL ARTICLE

## A Study of Clinical and Investigative Profile of Malaria and Hepatitis E Virus Infection in Patients of Fever with Jaundice

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### ABSTRACT

**BACKGROUND:** To study clinical manifestations, biochemical investigations and complications of malaria and H E, alone and in coexistent infection. **MATERIALS AND METHODS:** The present study was conducted on 100 patients both malaria and Hepatitis E, admitted in SSG Hospital, Vadodara. This was an observational clinical study retrospective and prospective. **RESULTS:** Maximum patients of both infections were in age group 21-40 years. Male affected more commonly than females in malarial group while females were affected more commonly than males in positive group. All patients of coexistent malaria and HEV infections were females. Maximum patients in malaria were positive for Plasmodium vivax. The most common presenting symptom in malaria group was fever while yellowish discoloration of urine and eyes in HEV. On clinical examination, most common finding in malaria, Hepatitis coexistent infection group was icterus. Maximum patients in malaria group had thrombocytopenia while all patients normal platelet counts in HEV group.

**Key words:** Malaria, Hepatitis E, coexistent, fever, icterus

### INTRODUCTION

Malaria, a widespread and potentially lethal infectious disease, has afflicted people for much of human history, and has affected settlement patterns. Malaria is commonly associated with poverty, and can indeed be a cause of poverty and a major hindrance to economic development. As malaria remains a major public health problem, understanding its history and clinical profile is the key. Data on clinical profile of malaria from Vadodara are limited and therefore this study has been undertaken in our hospital. HEV is the causative agent for Hepatitis E, a major form of acute viral hepatitis. Much information is now available on the epidemiology, virology, transmission, and pathogenesis of HEV, however data on clinical profile of HEV from Vadodara are limited and this study has been undertaken in our hospital. Also, association between

Both infections in form of coexistence is rare, only 3 such cases have been reported in world literature, all from India. We strive to find and evaluate such association in patients presenting to our institution with fever and jaundice.

### AIMS AND OBJECTIVES

- To study clinical manifestations of malaria and Hepatitis E separately and in coexistent infection
- To study biochemical investigations in patients of malaria and Hepatitis E
- To study complications of malaria and Hepatitis E, alone and in coexistent infection

### MATERIAL AND METHODS

The present study was conducted on 100 patients, of both malaria and Hepatitis E, admitted in SSG Hospital, Vadodara. This was an observational clinical study; both retrospective and prospective.

### Inclusion criteria:

- Age > 18 years
- Able to give written informed consent or in illiterate patient consent of impartial witness or legally authorized representatives
- Patient who has fever and is tested PS for MP positive.

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- Patients having yellowish discoloration of urine and /or sclera with hyperbilirubinemia and elevated liver enzymes.
- Patient who is tested anti-HEV IgM positive.

**Exclusion criteria:** Patients not giving consent to be enrolled in study were excluded

**Method:** Detailed clinical history was taken in each patient with special emphasis on presenting complaints like fever, vomiting, malaise, decreased appetite, yellowish discoloration of urine and sclera, abdominal pain and altered sensorium. Detailed physical examination was carried out in each patient looking

**Table 1: Sex Distribution and Number of Cases**

Number of Cases n=100	P.VIVAX n=38 (%)	P. FALCI n=22(%)	MIXED MALARIA n=2 (%)	TOTAL n=62 (%)	HEV n=34 (%)	Coexistent Hev & Malaria n=4		
						P. VIVAX	P. FALCI	Mixed
Male	21 (55.26)	9(40.9)	2 (100)	32 (51.61)	11(32.35)	0	0	0
Female	17 (44.74)	13 (59.1)	0 (0)	30 (48.39)	23 (67.65)	1	2	1

Among the total number of patients in our study 54% were in reproductive age group of 21 -40 years.

Males were affected more commonly than females (51.61%) in malarial group while females were affected more commonly than males (67.65%) in HEV positive group. All patients of coexistent malaria and HEV infections were females. Maximum patients (61.29%) in malaria group were positive for Plasmodium vivax on peripheral smear.

Mean age of presentation in malaria group was 38.03 years.

Mean age of presentation in HEV positive group was 33.29 years.

Mean age of presentation in coexistent HEV & malaria group was 29.25 years

**Table 2: Clinical Presentation**

Clinical Presentation	Malaria (%) n=62	HEV (%) n=34	Coexistent Hev & Malaria (%) n=4
Fever	100	41.18	100
Vomiting	40.32	52.94	0
Malaise	33.87	29.41	50
Decreased Appetite	12.9	41.18	0
Yellowish Discoloration	37.1	88.24	75
Abdo. Pain	20.97	35.29	0
Altered Sensorium	4.84	26.47	25
Pallor	53.23	52.94	50
Icterus	56.45	97.06	100
Hepatomegaly	9.68	11.77	0
Splenomegaly	6.45	2.94	25
Pregnant	6.45	47.06	25

especially for pallor and icterus. Routine haematological, biochemical with PSMP, S. protein, S. albumin, PT-INR and anti-HEV IgM, carried out in indicated patient. All patients were treated according to their condition with antimalarials and supportive management.

**RESULTS**

Out of total of 62 patients of malaria, 38 (61.29%) were P. vivax positive, 22 (35.48%) were P. falciparum positive and 2 (3.23%) were mixed malarial infections.

Male: female ratio in malaria cases was 1.07 : 1.

Male: female ratio in HEV positive cases was 0.48 : 1.

The most common presenting symptom on admission in malaria group was fever (100%) followed by vomiting (40.32%), yellowish discoloration of urine and eyes (37.1%), malaise (33.87%), abdominal pain (20.97%), decreased appetite (12.9%) and altered sensorium (4.84%).

The most common presenting symptom on admission in HEV group was yellowish discoloration of eyes and urine (88.24%) followed by vomiting (52.94%), fever (41.18%), decreased appetite (41.18%), abdominal pain (35.29%), malaise (29.41%) and altered sensorium (26.47%).

The most common presenting symptom on admission in coexistent HEV and malaria group was fever (100%) followed by yellowish discoloration of eyes and urine (75%), malaise (50%) and altered sensorium (25%).

On clinical examination most common finding in malaria group was icterus (56.45%) followed by pallor (53.23%), hepatomegaly (9.68%) and splenomegaly (6.45%).

On clinical examination most common finding in HEV group was icterus (97.06%) followed by pallor (52.94%), hepatomegaly (11.77%) and splenomegaly (2.94%).

## Malaria and Hepatitis E Virus Infection in Patients of Fever with Jaundice

On clinical examination most common finding in coexistent malaria and HEV group was icterus (100%) followed by pallor (50%) and splenomegaly (25%).

**Table 3: Number of Patients with Anemia**

Hb gm (%)	P.VIVAX (%) n=38	P.FALCI (%) n=22	MIXED (%) n=2	HEV (%) n=34	Coexistent Malaria And Hev (%) n=4
<5	7.89	9.09	0	2.94	0
5 to 10	26.32	50	0	14.71	50
>10	65.79	40.91	100	82.35	50

Anaemia (Hb<10 gm/dl) was present in 38.71% in malaria group, 17.65% in HEV group and 50% in coexistent infections group. Out of total malaria cases in our study, 5/62 (8.06%) patients had hemoglobin <5 gm/dl (severe malarial anemia as per WHO criteria<sup>6</sup>) whereas only 1.2% patients had severe anemia in study by S. Shivakumaret al<sup>2</sup>. So our study showed higher incidence of severe anaemia.

**Table 4: Platelet Count**

Platelet Count (/mm <sup>3</sup> )	P.VIVAX (%) n=38	P.FALCI (%) n=22	Mixed (%) n=2	HEV (%) n=34	Coexistent Malaria And Hev (%) n=4
<50000	13.16	31.81	50	0	25
0.5-1 lac	42.11	36.36	50	0	0
>1 lac	44.74	31.81	0	100	75

Maximum patients in malaria group had thrombocytopenia (platelet count <1lac/mm<sup>3</sup>) 61.29% while all patients had normal platelet counts in HEV group. Only one patient in coexistent infections group had platelet count of <50000/mm<sup>3</sup>. The study conducted by S. Shivakumar et al<sup>2</sup> showed 5% of patients with P. falciparum malaria and 0.9% of patients with P. vivax malaria had thrombocytopenia with platelet count <1 lac/mm<sup>3</sup> while our study demonstrated higher number of patients in both group with thrombocytopenia. In our study 15/22 (68.18%) of P. falciparum infected patients and 21/38 (55.26%) of P. vivax infected patients had thrombocytopenia.

**Table 5: Total Bilirubin Level**

T.BILIRUBIN (mg/dl)	P.VIVAX (%) n=38	P.FALCI (%) n=22	Mixed (%) n=2	HEV (%) n=34	Coexistent Malaria And Hev (%) n=4
<3	65.79	63.64	50	2.94	0
3 to 10	28.95	27.27	50	55.88	100
>10	5.26	9.09	0	41.18	0
Highest Total Bilirubin Level In Mg/Dl	17.7	25.2	7.9	22.6	9.4

Maximum patients in malaria group (64.52%) had serum bilirubin levels <3 mg/dl. Out of malaria cases in our study, 22/62 (35.48%) of patients had S. Bilirubin > 3 mg/dl while only 8% of patients had S. Bilirubin > 3 mg/dl in the study conducted by S. Shivakumar et al<sup>2</sup>.

Out of total 34 patients of HEV infection, only 1 (2.94%) patient had S. Bilirubin < 3 mg/dl (anicteric hepatitis).

All 4 patients of coexistent malaria & HEV infection had total bilirubin levels between 3-10 mg/dl.

**Table 6: Serum Creatinine Level**

S.CREATIN (mg/dl)	P.VIVAX (%) n=38	P.FALCI (%) n=22	MIXED (%) n=2	HEV (%) n=34	Coexistent Malaria And Hev (%) n=4
<1.5	89.47	81.81	50	88.24	100
1.5-3	2.63	9.09	0	8.82	0
>3	7.89	9.09	50	2.94	0

Maximum patients in all three groups had serum creatinine <1.5 mg/dl. In malaria group, HEV group and coexistent infections group S. Creatinine <1.5 mg/dl was found in 85.48%, 88.24% and 100% respectively. Out of total 38 patients of P. vivax malaria, 10.53% patients had raised S. creatinine while only 1.9% patients of P. vivax in study by S. Shivakumar had raised S. creatinine. Out of total 22 patients of P. falciparum malaria, 18.18% patients had raised S. creatinine while 7.5% patients and 39.02% patients of P. falciparum in studies by S. Shivakumar and Singh R et al had raised S. creatinine respectively.

Out of total malaria cases in our study, 6/62 (9.68%) patients had S. creatinine > 3 mg/dl while only 2.8% patients had S. creatinine > 3 mg/dl in the study conducted by S. Shivakumar et al<sup>2</sup>.

**7: Comparison of Clinical Profile of Co-Existent Hev and Malaria Infection in Our Study As Compared To Case Reports By U. C. Ghoshal Et Al<sup>3</sup> and Ravi Bansal et al.<sup>4</sup>**

	Case 1	Case 2	Case 3	Case 4	Case Report By U.C.Ghoshal Et Al	Case Report By Ravi Bansal Et Al
Age	28	28	35	26	20	38
Sex	Female	Female	Female	Female	Female	Male
P/S Mp	Mixed	P. Vivax	P. Falciparum	P.Falciparum	P. Falciparum	P. Vivax
Fever	Present	Present	Present	Present	Present	Present
Vomiting	Absent	Absent	Absent	Absent	Present	Absent
Altered Sensorium	Absent	Absent	Present	Absent	Present	Absent
Yellowish Discolouration	Present	Present	Present	Present	Present	Present
Paillor	Present	Absent	Absent	Present	Absent	Present
Icterus	Present	Present	Present	Present	Present	Present
Hepatomegaly	Absent	Absent	Absent	Absent	Present	Present
Spleenomegaly	Absent	Absent	Absent	Absent	Absent	Absent
Hb	5.2	12.5	10.6	9.4	11.4	5.5
Tlc	12400	18200	9200	41000		9000
Pc	23000	242000	150000	661000		76000
S. Bilirubin	9.4	9.2	8.68	6.3	11.7	20.1
Sgpt	69	360	950	258	2000	167
Sgot	53	168	456	146	1560	244
Alp	564	260	167	620	117	338
S. Urea	74	19	21	25		113
S. Creatinine	0.72	0.71	0.82	1.4	Normal	2.2
Pt(T)		14.2	38.4	45.9	41.8	23
Total Protein	6.7	6.4			6.6	
S. Albumin	2.8	3.8			3.1	

All patients with co-existent malaria and HEV infection were in reproductive age range (20-40 years). All our cases were females. None of them had hepatosplenomegaly on clinical examination. Only one patient in coexistent infections group had platelet count of <50000/mm<sup>3</sup>. All 4 patients of coexistent malaria & HEV infection had total bilirubin levels between 3-10 mg/dl while cases reported by U.C. Ghoshal et al<sup>3</sup> and Ravi Bansal<sup>4</sup> et al had bilirubin levels >10 mg/dl. All patients had serum creatinine levels <1.5 mg/dl.

**CONCLUSIONS**

As both malaria and viral hepatitis E are frequent illnesses in India, and both being monsoon related illnesses, patients of malaria and jaundice who have clinical picture of hepatitis should be investigated for hepatitis viral markers before labelling them as malarial hepatopathy. Also, larger epidemiological studies need to be done to study the possible transmission of hepatitis E virus by mosquitoes.

**Ethical Issues:** As this study was observational one, no approval from ethics committee was needed. Patients were treated according to accepted guidelines.

**Conflict of Interest:** On behalf of all authors, corresponding author states that there is no conflict of interest.

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