IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 13, Issue 6 Ver. II (Jun. 2014), PP 37-40
www.iosrjournals.org

The changing clinical spectrum of Malaria: a clinical study from Bundelkhand

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Abstract: ***Objective:*** *To find out clinical and laboratory findings in acute malaria caused by various plasmodium species.*
Methods: *This was a prospective study which was carried out in the department of medicine at MLB Medical College ,Jhansi from May 2012 to September 2013.In this prospective study ,401 patients of malaria were enrolled who met both inclusion and exclusion criteria. Frequencies of alterations in clinical and laboratory parameters were determined in various plasmodium species.*
Results: *Out of 401 patients, 194 were Plasmodium falciparum, 185 were P.vivax and 22 were mixed infection. Fever (97.5%), chills and rigors (84.7%) were the most common complaint in all three varieties of plasmodium infection. Pallor (78.3%) and splenomegaly (56.6%) were often detected in individuals with malaria. Thrombocytopenia (52.8%) was most common laboratory abnormalities detected in various plasmodium species. Jaundice and anemia were more common in P.falciparum and mixed infection as compared to P.vivax*
Conclusion: *Malaria must be considered as leading differential diagnosis in an acutely febrile patient with one or more of abnormalities like splenomegaly, fall in blood counts or rise in bilirubin etc. Fever with chills and rigors, pallor, splenomegaly and thrombocytopenia were most common manifestation in malaria.*
Keywords: *Malaria, clinical spectrum.*

I. Introduction

Malaria is the most important parasitic disease. Species of plasmodium that cause this deadly female anopheles transmitted disease are P. vivax, P. falciparum, P. ovale, P. malariae and P. knowlesi. Based on documented cases, the WHO estimates that there were 216 million cases of malaria in 2010 resulting in 655,000 deaths. This is equivalent to roughly 2000 deaths every day. A 2012 study estimated the number of documented and undocumented deaths in 2010 was 1.24 million.

Malaria is not a uniform disease; it encompasses many manifestations and its impact varies on epidemiological setting. It usually presents as fever, chills with rigor malaise, headache, myalgia, anorexia vomiting, jaundice, anaemia. Clinically, it may present with hepatosplenomegaly, acute renal failure, gastrointestinal symptoms, dehydration, shock, cerebral malaria and black water fever.

II. Material And Methods

This was a prospective study which was carried out in department of medicine at MLB Medical college, Jhansi from may 2012 to September 2013.In this prospective study ,401 patients of malaria were enrolled who met both inclusion and exclusion criteria. **.** Out of 401 patients ,194 were Plasmodium falciparum,185 were P.vivax and 22 were mixed infection .After establishing the diagnosis ,clinical evaluation was done and information regarding fever, chills, rigors, vomiting, headache, diarrhoea, altered sensorium and various laboratory parameters were recorded.

III. Results

Table 1 shows various clinical features of different plasmodium species. **Fever** was present in 97.5% of the total patients. Fever was the presenting complaint in 98% of patients with P.falciparum malaria and 97% of patients with P.vivax malaria. It was present in 90% of cases of mixed malarial infection. It was most common manifestation of malaria.

Chills and rigors were present in 84.7% of total patients. It was a presenting complaint in 89.6% of patients with P.falciparum malaria. It was presents in 81.8% cases of mixed malarial infection. It was also seen in 80% of patients with P.vivax malaria.

Headache was presenting complaints in 55.6% of the patients. It was more common in P.falciparum (63.4%). It was also present 49.1% in P.vivax malaria and 40% of mixed malarial infection.

Altered Sensorium: Altered sensorium was seen in 46.6% of the patients. It was not noted in any of the patients with vivax malaria. It was seen in 51.5% of the patients with falciparum infection, in about

46.4% of the patients with vivax malaria and 45% with mixed infection.

Nausea and Vomiting: Nausea and vomiting was one of the frequent symptoms in malarial infection. It was seen in 27.1% of the total cases. Whereas the symptoms was observed in 32.4% and 22.7% of patients with falciparum and vivax respectively.

Diarrhoea: it was observed in 4.9% of the total cases. It was more common in P.falciparum malaria (6.1%).

Table 2 shows various clinical signs of malaria in different plasmodium species. Pallor was more common in mixed infection (86.3%).It was seen in 81.5% and 64.3% patients of Falciparum and Vivax malaria respectively. It was the most common clinical sign of malaria.

Splenomegaly was the second most important clinical sign in our study.

It was more common in Falciparum malaria (58.7%).There was no significant difference between vivax and mixed infection.

Icterus was equally present in both Falciparum and Vivax malaria (32.9%).It was present in 9% of cases of mixed infection.

Hypotension was more common with mixed infection (50%).It was seen in 43.2% and 18.9% patients of Falciparum and Vivax malaria respectively.

Cerebral malaria was more common with falciparum malaria (45.3%). It was 15.1% and 9% in Vivax and mixed infection malaria respectively.

Hypoglycaemia was more common with mixed infection (36.5%).It was seen in 29.8% and 2.1% patients of Falciparum and Vivax malaria respectively.

Hepatomegaly was more common with falciparum malaria (12.3%). It was seen in 9% and 4.3% patients of mixed infection and vivax malaria respectively.

Laboratory parameters:

Table 3 shows various haematological abnormalities in different plasmodium species. Out of 401 total malaria cases, severe anaemia (i.e. haemoglobin <7mg %) was seen in 99(24.6%) patients. Among patients with severe anaemia 57(29.3%) were P. falciparum cases, 38(20.5%) were P. vivax cases, and 4(18.1%) were having mixed infection. Severe anaemia was more common with falciparum malaria.

Out of 401 total patients, 212 patients (i.e.52.8%) had platelet count <50000/μl out of which 110(56.7%) were of Falciparum, 95(51.3%) were Vivax malaria and 7(31.8%) of mixed infection. Thrombocytopenia was more common with falciparum malaria.

Out of 401 total patients, 105 patients (i.e. 26.1%) had leukocyte count <4000/μl, 224 patients (i.e. 55.86%) had counts leukocyte between 4000-11000/μl and, 72 patients (i.e. 17.9%) had leukocyte count >11,000/μl.

Leucopoenia was more common with falciparum malaria.Leukocytosis was equally common in different types of malaria.

IV. Biochemical Profile

Table 4 shows various laboratory abnormalities in different plasmodium species. Out of 401 total malaria cases severe jaundice (i.e. bilirubin>10mg %) was seen in 28(6.9%) of patients. Among patients with severe jaundice 14(7.2%) were P. falciparum cases, 12(6.4%) were P. vivax cases and 2(9%) were having mixed infection. Severe jaundice was more common with mixed infection.

Out of total 401 malaria patients SGOT levels were done in 364 patients. Out of 364 patients, 154 patients (i.e. 42.3%) had SGOT levels between 40-100 IU/L, and 122 patients (i.e. 33.5%) had SGOT levels >100 IU/L.

It was more deranged in falciparum malaria (33.5%) It was seen in 31.8% and 27% patients of mixed infection and vivax malaria respectively.

Out of total 401 malaria patients, 169 patients (i.e. 42.1%) had SGPT levels between 40-100 IU/L, and 129 patients (i.e. 32.1%) had SGPT levels >100 IU/L. It was more deranged with falciparum malaria (36%) Deranged level was seen in 31.8% and 28% of patients mixed infection and vivax malaria respectively.

Out of total 401patients, 244 patients (60.8%) had serum creatinine <1.4, 104 patients (25.9%) had serum creatinine value of 1.4 to 2.5, and 53 patients (13.2%) had serum creatinine value of >2.6. Among patients with severe renal failure 34(17.5%) were P. falciparum cases, 17(9.1%) were P. vivax cases and 2(9%) were having mixed infection. Severe renal failure was more common with falciparum malaria.

V. Discussion

In present prospective study, 401 cases of malaria were taken who met both inclusion and exclusion criteria.

- Out of 401 cases 48.37%% were of P. Falciparum, 46.1% were of P.vivax and 5.4% were of mixed infection

- Fever (97.5%), chills and rigors (84.7%) were most common complaint, other common symptoms were headache (55.6%) and altered sensorium (48.8%).infrequent complaints were nausea or vomiting (27.1%) and diarrhoea (4.9%).
- Most common clinical sign was pallor (783%) and splenomegaly (56.6%), other common clinical signs were icterus (31.6%), hypotension (32.4%), cerebral malaria (29.4%) and hypoglycaemia (17.4%).infrequent clinical sign was hepatomegaly (8.4%)
- On laboratory investigations, severe anaemia and thrombocytopenia were most common abnormalities detected. Hyperbilirubinemia (>10mg %) was detected in 6.9% of patients. Severe renal failure (s.creatinine>2.6mg %) was 13.2% of cases.

Conclusion: Clinical spectrum of malaria of different species was studied. Fever with chills and rigors, pallor, splenomegaly, anaemia and thrombocytopenia were most common.

Table-1: Incidence of various symptoms

Symptoms	Pl.falciparum (n=194)	Pl. vivax (n=185)	Mixed infection (n=22)	TOTAL (n=401)
Fever	191(98.4%)	180(97.2%)	20(90%)	**391(97.5%)**
Chills and rigors	174(89.6%)	148(80%)	18(81.8%)	**340(84.7%)**
Headache	123(63.4%)	91(49.1%)	9(40%)	**223(55.6%)**
Altered sensorium	100(51.5%)	86(46.4%)	10(45%)	**196(48.8%)**
Nausea and vomiting	63(32.4%)	42(22.7%)	4(18.1%)	**109(27.1%)**
Diarrhoea	12(6.1%)	8(4.3%)	0(0%)	**20(4.9%)**

Table: 2 Incidence of various clinical signs.

Signs	P.falciparum (n=194)	P.vivax (n=185)	Mixed infection (n=22)	Total (n-401)
Pallor	158(81.5%)	119(64.3%)	19(86.3%)	296(73.8%)
Splenomegaly	114(58.7%)	101(54.5%)	12(54.0%)	227(56.6%)
Icterus	64(32.9%)	61(32.9.3%)	2(9%)	127(31.6%)
Hypotension	84(43.2%)	35(18.9%)	11(50%)	130(32.4%)
Cerebral malaria	88(45.3%)	28(15.1%)	2(9%)	118(29.4%)
Hypoglycaemia	58(29.8%)	4(2.1%)	8(36.3%)	70(17.4%)
Hepatomegaly	24(12.3%)	8(4.3%)	2(9%)	34(8.4%)

Table: 3 Hematological Profiles

PARAMETERS	P.FALCIPARUM	P.VIVAX	MIXED INFECTION	TOTAL
HEMOGLOBIN				
>10 mg%	60(30.9%)	87(47%)	10(45%)	157(39.1%)
7-10 mg%	78(40.2%)	60(32.4%)	8(36%)	146(36.4%)
<7 mg%	57(29.3%)	38(20.5%)	4(18.1%)	99(24.6%)
PLATELET COUNT				
>1 lakh	30(15.4%)	42(22.7%)	5(22%)	77(19.2%)
50,000-1 lakh	54(27%)	48(25.9%)	10(45.4%)	112(27.9%)
<50,000	110(56.7%)	95(51.3%)	7(31.8%)	212(52.8%)
LEUKOCYTE COUNT				
<4,000	60(31%)	39(21%)	6(27.2%)	105(26.1%)
4,000-11,000	98(50.5%)	114(61.6%)	12(54.5%)	224(55.8%)
>11,000	36(18.5%)	32(17.2%)	4(18.1%)	72(17.9%)

Table: 4 Biochemical Profile

PARAMETERS	P.FALCIPARUM	P.VIVAX	MIXED INFECTION	TOTAL
SERUM BILIRUBIN				
1-3 mg%	123(63.4%)	135(72.9%)	16(72.7)	274(68.3%)
3-10 mg%	57(29.3%)	38(20.5%)	4(18.1%)	99(24.6%)
>10 mg%	14(7.2%)	12(6.4%)	2(9%)	28(6.9%)
SGOT				
40-100	78(40%)	69(37.2%)	7(31.8%)	154(38.4%)
>100	65(33.5%)	50(27%)	7(31.8%)	122(30.4%)
SGPT				
40-100	86(44.3%)	74(40%)	9(40%)	169(42.1%)
>100	70(36%)	52(28%)	7(31.8%)	129(32.1%)
SERUM CREATININE				
<1.4	98(50.5%)	131(70.8%)	15(68%)	244(60.8%)
1.4-2.5	62(31.9%)	37(20%)	5(22.7%)	104(25.9%)
>2.6	34(17.5%)	17(9.1%)	2(9%)	53(13.2%)

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