

“To Study Clinicohematological Profile of Plasmodium Vivax Malaria”

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Abstract:

Aims : To study clinical and hematological profile of patient with plasmodium Vivax malarial infection & study complication and outcome of plasmodium Vivax malaria infection in tertiary care hospital.

Methods: General information, General examination, Clinical examination, Investigations, Complications
It was explained to all study participants that the information will be kept confidential. The research was a part of thesis dissertation and that the results would be used for improving services. Institutional Ethical Committee approval was obtained before the start of the study.

Result: Anemia was present in 47.3% of the patients, while 5.5% had severe anemia. Leucopenia was present in 20% of the patients and leucocytosis was present in 5.5% of the patients. Platelet count of < 150000/cmm was present in 69.1% of the patients while 9.1% of the patients had platelet count < 50000/cmm. Acute renal failure & acute respiratory distress syndrome were present in 2 patients each. Hypotension & hypoglycaemia were present in 4 patients each. Serum bilirubin levels > 5mg% were present in 2 patients. Serum SGPT levels > 40 IU/lit was present in 40% of the patients while 7.3% had levels > 100 IU/lit. 2 patients had serum creatinine levels between 3-10 mg/dl while 1 patient had levels > 10 mg/dl. 96.36% of the patients had parasitic index between 0-5% & rest had levels between 6-10%.

Conclusion: Leucopenia & thrombocytopenia were present in 20% & 69.1% of the patients respectively. Acute renal failure, acute respiratory distress syndrome & bleeding tendencies in the form petechiae were present in 2 individuals each while hypoglycemia & hypotension were present in 4 individuals each. Maximum patients had parasite index between 0-5percent.

Keywords: P. Vivax-Plasmodium vivax, PI-Parasitic index, Hb-Hemoglobin, Plt- Platelets

I. Introduction

Malaria is well-known to human being since centuries; it is a disease of tropical and subtropical countries particularly Africa and Asia. It is caused by protozoan Plasmodium, transmitted by female anopheles mosquitoes, which typically bite between dusk and dawn.¹ According to the World Malaria Report 2014, 22% (275.5m) of India's population live in high transmission (> 1 case per 1000 population) areas, 67% (838.9m) live in low transmission (0-1 cases per 1000 population) areas and 11% (137.7m) live in malaria-free (0 cases) areas.² Infection with Plasmodium falciparum (P. falciparum) is known to cause thrombocytopenia and severe malaria but severe cases in Plasmodium vivax (P. vivax) malaria patients have been reported in the last decade.⁴ The hematological abnormalities that have been reported to consistently accompany which comprise anemia, thrombocytopenia, atypical lymphocytosis and infrequently disseminated intravascular coagulation. Leucopenia, leucocytosis, Neutropenia, Neutrophilia, Eosinophilia and monocytosis also have been reported. In tropical countries like India, the majorities of the shared complications commencing due to malarial consequences is from hyperparasitemia. There are reports of jaundice as the most common complication in Plasmodium vivax infection.³ This clinical spectrum depends on the complex interaction between the parasite, human host and environmental factors.⁵

Aims

1. to study clinical and hematological profile of patient with plasmodium Vivax malarial infection.
2. To study complication and outcome of plasmodium Vivax malaria infection in tertiary care hospital.

II. Methods And Materials

It is Hospital based Cross Sectional Longitudinal Study carried out in MGM Medical College Aurangabad during July 2013 to October 2015 including Age more than 18 years, Patients with fever and peripheral smear or rapid malarial test positive for plasmodium vivax excluding Patients not admitted in wards or treated at outpatient department. Patients with plasmodium falciparum malaria co-infection. Patient with underlying hepatic, hematological, renal disorder. Sampling Technique: Universal sampling, i.e. all patients

meeting the inclusion criteria's were enrolled in the study. include Method of collecting data, General information, General examination, Clinical examination, Investigations, Complications. It was explained to all study participants that the information will be kept confidential. The research was a part of thesis dissertation and that the results would be used for improving services. Institutional Ethical Committee approval was obtained before the start of the study. Investigations done Haemoglobin, Total leucocyte count, Platelets Random blood glucose, S. bilirubin, S.creatinine, Peripheral smear/ rapid malarial parasite for malarial parasite. PI was estimated by counting the number of parasitized red blood cells (RBCs) among 1000 RBCs. Only a sexual forms (ring, trophozoite and schizont) were included for calculating the PI. The parasitic load was graded on a scale of I-IV corresponding to 0-5%, 6-10%, 11-20% and >20%, respectively.⁶

III. Results And Discussions

The current study was conducted in a tertiary care hospital. It was a hospital based cross sectional study. This study was done to study clinical and hematological profile of patient with plasmodium Vivax malarial infection. This study was also done to study complication and outcome of plasmodium Vivax malaria infection. Total 55 patients of positive for p. vivax malaria, > 18 yrs old and admitted in the wards were examined. The findings of this study, presented as results are discussed in detail with appropriate comparisons with the findings of the relevant studies.

Table no.1 : Age distribution of the study participants

Age Group	Frequency	Percentage
19-28	13	23.6
29-38	21	38.2
39-48	13	23.6
49-58	5	9.1
>58	3	5.5
Total	55	100.0

The above Table shows age distribution among study participants. 23.6% of the participants were from the age group of 19-28 yrs, while 38.2% from 29-38 yrs group, 23.6% from 39-48 yrs group, 9.1% from 49-58 yrs group & 5.5% patients were > 58 yrs old. Limaye Charulata, Londhey Vikram and Nabar ST conducted a study of complications of vivax malaria in comparison with falciparum malaria in Mumbai. They found that median age of patients of vivax malaria was 29 yrs whereas that of falciparum malaria was 30.5 yrs.⁷ Muley Arti, Lakhani Jitendra, BhirudSaurabh et al conducted study in a tertiary care hospital, Pipariya regarding thrombocytopenia in plasmodium vivax malaria. Patients were divided in two groups based on the platelet count with the cut off 100000/cmm. Mean age in > 1lac/cmm group was 27yrs while mean age in < 1lac/cmm group was 25yrs.⁴ Naik Bolar Sadananda conducted a prospective study to look for the incidence of jaundice in plasmodium vivax malaria patients in Moodabidriin South India. They found that mean age was 29yrs.³

Table no. 2 : Sex distribution of the study participants

Sex	Frequency	Percentage
Male	35	63.6
Female	20	36.4
Total	55	100.0

The above table shows sex distribution of the study participants. 64% of the study patients were male as compared to 36% of the females. Don Oh Myoung, Shin Hyungshik et al conducted a study on clinical featur of vivax malaria in South Korea. Male to female ratio was 93:8 in this study.⁸

Table no.3 : Clinical profile of the study participants Fever was present in all the study participants.

Symptoms & signs	Present study	Don Oh Myoung,	Prakash J	Kashinkunti Mohan
Headache	34.5	83.2	20.4	-
Vomiting	14.5	16.8	46.7	15
Cough	38.2	14.9	-	-
Dyspnoea	9.1	-	-	-
Spleenomegaly	40.0	42	12.2	-
Hepatomegaly	5.5	15.8	15.8	-

The above table shows presence of symptoms among the study participants. 34.5% of the patients had headache at the time of presentation whereas 65.5% didn't have headache. Vomiting was present in 14.5% of the patients whereas it was absent in 85.5% of the patients. 38.2% of the plasmodium vivax malaria patients had cough at the time of the presentation while in 61.8% of the patients it was absent. Dyspnoea was present in 9.1% of the P. Vivax malaria patients. The above table shows presence of spleenomegaly in study participants.

Splenomegaly was present in 40% of the patients while absent in 60% of the patients. Hepatomegaly was present in 5.5% of the patients & was absent in 94.5% of the patients. Don Oh Myoung, Shin Hyungshik et al conducted a study on clinical features of vivax malaria in South Korea. Headache was present in 83.2% of the patients. Vomiting was present in 16.8 % of the patients. Cough was present in 14.9 % of the patients. Splenomegaly was present in 42% of the patients. Hepatomegaly was present in 15.8% of the patients.⁸ Beg MA, Sani N et al conducted study on comparative features & outcomes of malaria at a tertiary care hospital in Karachi, Pakistan. In this study, headache was present in 20.4% of the p. Vivax patients. In this study, vomiting was present in 46.7 % of the p. Vivax patients. In this study, splenomegaly was present in 12.2 % of the p. Vivax patients. In this study, hepatomegaly was present in 15.8 % of the p. Vivax patients.⁹ Kashinkunti Mohan, Alevoor Shruithi conducted a study on clinical, haematological & coagulation profile in malaria in a tertiary care hospital in Karnataka. This study showed that nausea & vomiting were present in 15% of the p. Vivax patients. Cough was absent in all the study participants.¹⁰

Table no.4 : Haemoglobin levels among study participants

Haemoglobin	Frequency	Percentage
< 5 gm%	3	5.5
5 – 10 gm%	23	41.8
> 10 gm%	29	52.7
Total	55	100.0

The above tables shows haemoglobin levels among study participants. 5.5% of the patients had HB levels < 5 gm%, 41.8% had levels between 5-10 gm% & 52.7% had levels > 10 gm%. Naik Bolar Sadananda conducted a prospective study to look for the incidence of jaundice in plasmodium vivax malaria patients in Moodabidri in South India. The mean Haemoglobin level was 12.8 gm/dl. 15.8% of the patients were anemic.³ Patel Ameetkumari, Jain Sudha, Patel Bhavin et al conducted a cross sectional study in central hospital laboratory of a tertiary care hospital of Surat, Gujarat. They found that mean haemoglobin level was 10.26 gm/dl in p.vivax malaria patients.¹ Limaye Charulata, Londhey Vikram and Nabar ST conducted a study of complications of vivax malaria in comparison with falciparum malaria in Mumbai. Severe anemia (Hb < 5 gm/dl) was found 2.96% of the p. Vivax malaria patients.⁷

Table no.5 : Total leucocyte count among study participants

Total leucocyte count	Frequency	Percentage
< 4000	11	20.0
- 11000	41	74.5
> 11000	3	5.5
Total	55	100.0

The above table shows total leucocyte count in study participants. 20% of the patients had total leucocyte count < 4000/cmm (leucopenia), 74.5% had 4000-11000/cmm & 5.5% had counts > 11000/cmm (leucocytosis). Don Oh Myoung, Shin Hyungshik et al conducted a study on clinical features of vivax malaria in South Korea. In their study, 19.9% of the patients had leucopenia, 77.2% had normal levels and 2.9% patients had leucocytosis.⁸

Akhtar Shamim et al conducted a study regarding haematological changes in malaria in a tertiary care hospital in Maharashtra. They found that 7.40% of the p. Vivax patients had leucocytosis while 11.11% of patients had leucopenia.¹¹ Limaye Charulata, Londhey Vikram and Nabar ST conducted a study of complications of vivax malaria in comparison with falciparum malaria in Mumbai. They found that leucopenia was present in 19.53% of the cases.⁷

Table no.6 : Platelet count among study participants

Platelet count	Frequency	Percentage
< 50000	5	9.1
50000 – 150000	33	60.0
> 150000	17	30.9
Total	55	100.0

The above figure shows platelet count among study participants. Platelet count of < 50000/cmm was present in 9.1% of the patients, 50000-150000/cmm in 60% of the patients and 150000/cmm in 30.9% of the patients. Patel Ameetkumari, Jain Sudha, Patel Bhavin et al conducted a cross sectional study in central hospital laboratory of a tertiary care hospital of Surat, Gujarat. Mean platelet count was 99487/cmm. They also found that as the severity of increases, the platelet count decreases.¹ Limaye Charulata, Londhey Vikram and Nabar ST conducted a study of complications of vivax malaria in comparison with falciparum malaria in Mumbai. Platelet count of < 100000/cmm was present in 68% of the p. vivax patients.⁷ Akhtar Shamim et al conducted a

study regarding haematological changes in malaria in a tertiary care hospital in Maharashtra. They found that thrombocytopenia was present in 59.25% of the p. vivax malaria patients.¹¹ Beg MA, Sani N et al conducted study on comparative features & outcomes of malaria at a tertiary care hospital in Karachi, Pakistan. Mean platelet count was 91000/cmm.⁹

Table no.7 : Serum bilirubin levels among study participants

Serum bilirubin	Frequency	Percentage
< 1.2	43	78.2
1.2 – 5	10	18.2
> 5	2	3.6
Total	55	100.0

The above table shows serum bilirubin levels among study participants.78.2% of the patients had serum bilirubin levels < 1.2 mg%, 18.2% of the patients had levels between 1.2 – 5 mg% and 3.6% had levels > 5 mg%. Don Oh Myoung, Shin Hyungshik et al conducted a study on clinical features of vivax malaria in South Korea. 89% of the p. vivax malaria patients had serum bilirubin levels < 2mg/dl, 8.9% had levels between 2.1 – 3.0 mg/dl and 2% had levels > 3 mg/dl.⁸ Naik Bolar Sadananda conducted a prospective study to look for the incidence of jaundice in plasmodium vivax malaria patients in Moodabidriin South India. Mean serum bilirubin in this study was 4.47 mg%.³ Gohil Soham, Mody Priyank, Nimavat Khyati conducted a study on a haematological profile of malaria patients in a hospital of Jamnagar district. 69.09% of the participants had serum bilirubin levels < 1.2 mg/dl, 29.09% of the participants had levels between 1.2-5 mg/dl and 1.81% of the participants had levels between 5-10 mg/dl.¹² Limaye Charulata, Londhey Vikram and Nabar ST conducted a study of complications of vivax malaria in comparison with falciparum malaria in Mumbai. 5.32% of the p. vivax malaria patients had serum bilirubin levels > 3 mg%.⁷

Table no. 8 : Serum SGPT levels among study participants

Serum SGPT	Frequency	Percentage
10-40	33	60.0
41-100	18	32.7
> 100	4	7.3
Total	55	100.0

The above table shows serum SGPT levels in study participants. 60% of the participants had SGPT levels < 40 IU/lit, 32.7% had levels between 42-100 IU/lit & 7.3% had levels > 100 IU/lit. Gohil Soham, Mody Priyank, Nimavat Khyati conducted a study on a haematological profile of malaria patients in a hospital of Jamnagar district. < 40 IU/lit levels were present in 56.36% of the participants, levels between 41-100 IU/lit were present in 32.73% of the participants and SGPT levels > 100 IU/lit were present in 10.91% of the participants.¹²

Table no. 9 : Serum Creatinine levels among study participants

Serum creatinine	Frequency	Percentage
1.4 – 3	52	94.5
3 – 10	2	3.6
> 10	1	1.8
Total	55	100.0

The above table shows serum creatinine levels among study participants. 94.5% Of the patients had serum creatinine levels between 1.4 – 3mg/dl, 3.6% had levels between 3- 10mg/dl and 1.8% had levels > 10mg/dl.

Beg MA, Sani N et al conducted study on comparative features & outcomes of malaria at a tertiary care hospital in Karachi, Pakistan. The mean serum creatinine levels in the subjects was 1.1 mg/dl.⁹ Gohil Soham, Mody Priyank, NimavatKhyati conducted a study on a haematological profile of malaria patients in a hospital of Jamnagar district. They found that 11.82% of the participants had levels between 1.4-3 mg/dl, while 3.63% had levels between 3-10 mg/dl and 0.9% had levels > 10mg/dl.¹²

Table no.10 : Parasitic index among study participants

Parasitic index	Frequency	Percentage
0-5 %	53	96.36
6-10 %	2	3.64
11-20%	0	0.0
>20 %	0	0.0
Total	55	100.0

The above table shows parasitic index among all the study participants. 96.36% of the patients had parasitic index between 0-5% & rest had levels between 6-10%. PI was estimated by counting the number of parasitized red blood cells (RBCs) among 1000 RBCs. Rajkumar Aarathi, Rao Shalinee and Sundaram Sandhya conducted a study on Clinical Outcome in Malaria - Reiterating the Role of Parasitic Index. In their study they found that 81.48% of the p. vivax malaria patients had parasitic index between 0-5%, 14.81% had index between 6-10% and only 3.70% had index between 11-20%.¹³

Table no.11 : Complications among the study participants

Complications	Present study	LimayeCharu lata et al	Prakash J et al	Kashinkunti Mohan et al	AkhtarShamimEt al	NaikBolarSadanandaEt al	Don Oh Myoung
Thrombocytopenia	69.1	-	-	-	59.25	-	-
Anemia	47.3	-	-	-	-	15.8	-
Hypotension	7.3	5.32	36.8	-	-	-	-
Hypoglycemia	7.3	-	-	-	-	-	-
Jaundice	5.5	-	-	10.1	-	-	-
Bleeding tendency	3.6	-	-	-	-	-	3
Acute renal failure	3.6	3.5	16.12	-	-	-	-
Acute respiratory distress syndrome	3.6	3	-	-	-	-	-

Acute renal failure was present in 3.6% of the participants. 3.6% of the patients had acute respiratory distress syndrome. Hypotension was present in 7.3% of the patients. Hypoglycemia was present in 7.3% of the participants. 5% of the p. Vivax malaria patients developed jaundice. 3.6% of the participants had bleeding tendencies which was mainly in the form of petechie. Limaye Charulata, Londhey Vikram and Nabar ST conducted a study of complications of vivax malaria in comparison with falciparum malaria in Mumbai. Acute renal failure (serum creatinine <3mg/dl) was present in 3.55% of the p. vivax patients. ARDS was present in 3% of the p. vivax malaria patients. In this study hypotension was present in 5.32% of the p. vivax malaria cases.⁷ Prakash J, Singh AK, Kumar NS and Saxena RK did study on acute renal failure in plasmodium vivax malaria. They found that 36.8% of the patients with p. vivax malaria patients with acute renal failure had hypotension.¹⁴ Naik Bolar Sadananda conducted a prospective study to look for the incidence of jaundice in plasmodium vivax malaria patients in Moodabidri in South India. In this study jaundice was present in 10.1% of the p. vivax malaria cases.³ Muley Arti, Lakhani Jitendra, BhirudSaurabh et al conducted study in a tertiary care hospital, Pipariya regarding thrombocytopenia in plasmodium vivax malaria. Petechie were present in 1.3% of the participants.⁴ Don Oh Myoung, Shin Hyungshik et al conducted a study on clinical features of vivax malaria in South Korea. Petechie were present in 3% of the patients.⁸

IV. Conclusion

In this study, maximum patients belonged to 18-28yrs age group with males more than females. Headache & cough were the commonest symptoms while splenomegaly was present in 40% of the patients. Severe anemia was present in 5.5% of the patients. Leucopenia & thrombocytopenia were present in 20% & 69.1% of the patients respectively. Acute renal failure, acute respiratory distress syndrome & bleeding tendencies in the form of petechie were present in 2 individuals each while hypoglycemia & hypotension were present in 4 individuals each. Maximum patients had parasite index between 0-5%.

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