

Is vivax malaria really benign? — A Karachi-based study

Sabeen Aatif, Qaisar Jamal, Anila Altaf, Salimullah

Abstract

Objective: To observe the disease pattern of vivax malaria, and to identify the various laboratory abnormalities associated with it.

Methods: The descriptive cross-sectional study was conducted at the Department of Medicine, Abbasi Shaheed Hospital, Karachi, from July to September 2011. Clinical features and laboratory abnormalities of all patients who tested positive for Plasmodium Vivax mono-infections were collected and analysed to work out the disease pattern. SPSS 20 was used for statistical analysis.

Results: There were 107 patients who tested positive for vivax malaria. The most common clinical feature was fever which was present in all the 107 (100%) patients. Besides, 4 (3.7%) patients had haematemesis and 2 (1.9%) had haematuria. Thrombocytopenia was the commonest laboratory abnormality, found in 66 (61.7%) cases; 47 (43.9%) patients had significant leucopenia; between 2000-4000/cumm. One (0.93%) patient developed adult respiratory distress syndrome and expired.

Conclusion: Atypical presentations with changing phase of severity were observed with plasmodium vivax infection. It can also lead to severe malaria, resulting in significant morbidity and mortality.

Keywords: Vivax Malaria, Thrombocytopenia, Karachi. (JPMA 63: 721; 2013)

Introduction

Malaria is a parasitic disease transmitted through infected Anopheles mosquito. The five species that infect the humans are Plasmodium Falciparum (PF), Malarie (PM), Vivax (PV), Ovale (PO) and Knowlesi (PK). The disease is endemic in tropical and sub-tropical areas of Asia, North and South America and Africa. Pakistan with an estimated burden of 1.6 million cases annually has been categorised in group-3 countries of the Eastern Mediterranean Region, along with Afghanistan, Djibouti, Sudan, Somalia and Yemen; sharing 95% of the total regional burden. The National Health Management Information System (HMIS) reported 4.5 million suspected malaria cases in 2008 at Primary Healthcare facilities of the country.¹

Worldwide most of the infections are caused by PV, with 2.85 billion people living under the risk of infection.² It is the predominant infection (>74%) in Pakistan, with maximum number being reported from Khyber Pakhtunkhwa (26%) and the federally administered tribal area (FATA) regions.³ In Karachi and other areas in Sindh, PV infection is two times higher than PF.⁴ In Pakistan, there is a well-established seasonal pattern of malaria with the peak of PV transmission during July to October.⁵

The relatively severe course of PF compared to PV

separates these two species and, hence, the terms Malignant and Benign Tertian Malaria are used respectively.⁶

With the bite of an infected Anophiline mosquito, dozens of sporozoites reach the liver where they divide actively and form tissue schizonts. The active primary tissue schizont matures in about 7 days with the release of merozoites in the blood, causing acute malaria. PV sporozoites that remain dormant in hepatocytes, can at a later time bloom into the same activity, resulting in a relapse.^{7,8}

PV causes Benign Tertian Malaria with fever paroxysms every third day and has a benign course.⁹ However, isolated cases of Vivax Malaria with delirium, seizures, renal failure, shock, hepatic dysfunction, severe anaemia, pulmonary oedema and acute respiratory distress syndrome (ARDS) have been reported.¹⁰⁻¹⁵

The aim of this study was to identify the various clinical presentations, laboratory abnormalities and complications of PV malaria.

Patients and Methods

The descriptive cross-sectional study was conducted at the Medicine Department of Abbasi Shaheed Hospital, Karachi, during July to September 2011. Adult febrile patients presenting to the out-patient clinic or emergency were tested for malaria through peripheral blood film or Immunochromatographic assay (ICT). Patients confirmed

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Department of Medicine, Karachi Medical & Dental College, Abbasi Shaheed Hospital, Karachi.

Correspondence: Sabeen Aatif. Email: sabeenaatif@hotmail.com

to have PV mono-infection were included in the study.

Those having concomitant infection with Falciparum or having Dengue were excluded from the study. Patients with haematological malignancies, chronic liver disease and having hypersplenism due to other causes were also excluded.

World Health Organisation guidelines[16] were followed for separating PV and PF cases. PV infection was diagnosed on Peripheral Blood Film and/or Immunochromatographic assay (ICT) in all the patients. Samples were obtained for Complete Blood Count (CBC), Random Blood Sugar (RBS), Liver Function Tests (LFT), Blood Urea Nitrogen (BUN), serum Creatinine and Urine Detailed Report (UDR) from all the patients. Following laboratory reference ranges were used:

Haemoglobin (Hb): Anaemia; Hb <12.5g/dl; severe anaemia: Hb <6g/dl; White Blood Cells (WBC): Counts between 2000-4000 per cubic millilitre (cumm) and less were labelled as leucopenia; Platelets: Counts below 150000/cumm were taken as thrombocytopenia; LFT: Total Bilirubin 0.3-1.9 mg/dl was taken as normal. Alanine-Aminotransferase (ALT) <33IU for females, <55 IU for males; BUN: 7-20mg/dl was taken as normal; Creatinine: 0.7-1.2 mg/dl was considered normal; and RBS: Greater than 70 mg/dl and less than 200 mg/dl were taken as normal.

Data was recorded and analysed on SPSS 20.0. Descriptive analysis was performed for the presentations, complications and laboratory abnormalities. Confidence interval was calculated for important laboratory abnormalities.

Results

The age of the 107 patients in the study ranged between 15 and 76 years, with a mean of 30.21 ± 14.6 years. There were 72 (67.3%) males and 35 (32.7%) females.

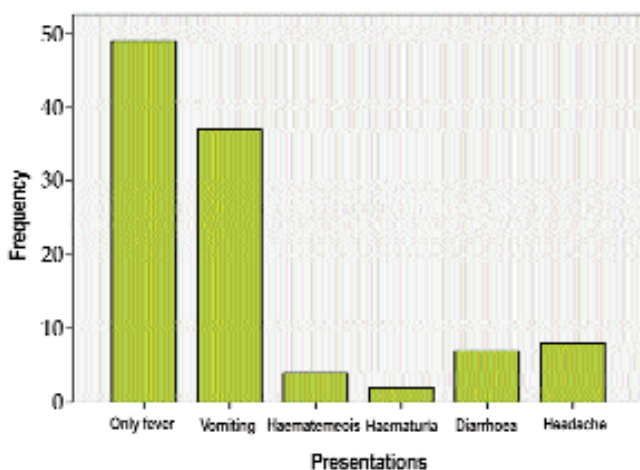


Figure-1: Presentations.

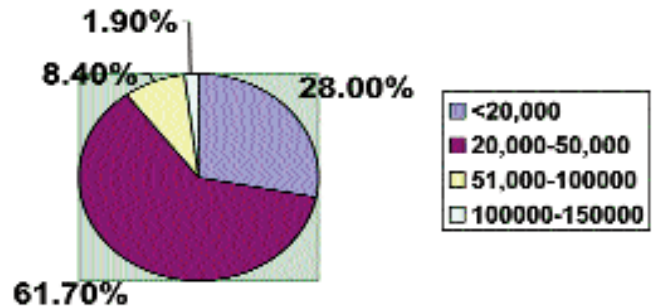


Figure-2: Platelet counts in PV patients.

Table: Laboratory abnormalities.

Lab abnormality	Frequency (n)	Percentage (%)	95% CI
Haemoglobin (g/dl)			
<6	23	21.5	21.43-21.57
6-7.9	14	13.1	13.03-13.16
8-9.9	31	29	28.91-29.08
10-12.5	21	19.6	19.52-19.67
WBC (/cumm)			
2000-3000	21	19.6	19.52-19.67
3100-4000	26	24.2	24.11-24.28
Platelets (/cumm)			
<20000	30	28	27.91-28.08
20,000-50,000	66	61.7	61.60-61.79
51,000-1,00,000	9	8.4	8.33-8.46
1,00,000- 1,50,000	2	1.9	1.82-1.97

Majority of these patients (n=96; 89.7%) had no co-morbid condition; 7 (6.54%) had co-morbid conditions such as hypertension, diabetes and ischaemic heart disease; and 2 (1.86%) were pregnant at the time of presentation.

All 107 (100%) patients had fever at presentation. Fever alone was the presenting feature in 49 (45.8%) (CI= 45.70-45.89). The other presentations were vomiting 37 (34.6%), headache 8 (7.5%), haematemesis 4 (3.7%) and haematuria 2 (1.9%). (Figure-1).

Majority of patients had low Hb; 23 (21.5%) (CI= 21.43-21.57) had less than 6gm/dl, 14 (13.1%) had 6-7.9gm/dl, 31(29%) had 8-9.9gm/dl, 21 (19.6%) had 10-12.5mg/dl and 18 (16.8%) had Hb of more than 12.5gm/dl.

White blood cells count was also found to be low in many of our patients; 21 (19.6%) (CI= 19.52-19.67) had WBC counts between 2000-3000cumm; 26 (24.2%) (CI= 24.11-24.28) had a count between 3100-4000cumm (Table-1).

Thrombocytopenia was conspicuous in our study, with majority (n=66; 61.7%) (CI= 61.60-61.79) patients having a count between 20,000-50,000/cumm. A very low platelet

count of less than 20,000 was recorded in 30 (28%) (CI= 27.91-28.08) patients. None of our patient had a platelet count above 1,50000/cumm (Figure-2).

Serum creatinine was found to be raised in 4 (3.73%) patients. The maximum value was 1.9mg/dl. All of them had a normal value for Blood Urea Nitrogen. Three (2.8%) patients had marginally raised Total Bilirubin, maximum value being 3.3mg/dl.

There was 1 (0.93%) mortality during the study. The patient was a young male who developed ARDS. He was put on ventilatory support, but he expired on the 3rd day of illness.

Discussion

Plasmodium Vivax, considered to be a cause for benign malaria, with a low case-fatality ratio, can also cause significant morbidity and can even lead to mortality, as observed in our case study of 107 patients.

There have been only few case reports available regarding the atypical presentation of PV malaria and number of patients in these reports are not many.¹⁷⁻²²

In our study of 107 patients, fever was present in all the cases. In a retrospective analysis of PV malaria patients, fever was the commonest feature on presentation.²³

The other presentations, like vomiting, diarrhoea and headache, are also reported in other studies.²⁴⁻²⁶

In 49 (45.8%) of our patients, fever was the only presenting complaint, while 4 patients had haemetemesia and 2 had haematuria at presentation. All of these patients had a platelet count between 50,000 to 100000. Though low platelet count is often reported, overt bleeding in Vivax Malaria is uncommon.²⁰

In our study 96 (89.7%) patients had no co-morbid while 7 patients had co-morbid and 2 patients were pregnant at the time of admission. Acute and chronic co-morbidities are frequently reported with Vivax Malaria. Complications in pregnant women are also reported.²⁶

Haemoglobin (Hb) was found to be less than 6gm/dl in 23 (21.5%) patients. Severe anaemia caused by PV is reported in literature in several studies.^{17-19,22}

Leucopaenia was found in as many as 47 (43.9%) of our patients. Such significant leucopaenia with Vivax Malaria was reported only in one case report from India in 2010.²⁰

Thrombocytopenia has been reported quite often with PV malaria.^{17,19-23,27} In our study, platelet count of less than 20,000 was present in 30 (28%), while 66 (61.7%) patients had a count of 20,000 to 50,000.

Patients with Vivax Malaria have also been reported to have acute renal injury.^{16,17,21} In our study, 4 patients had a raised serum creatinine on presentation but no subsequent renal impairment developed.

Jaundice and deranged liver enzymes have also been reported with Vivax Malaria.^{17,19,23,27} There were 3 patients in our study with marginally raised Bilirubin and Alanine Aaminotransferase (ALT). But this was self-limiting and the patients did not develop any further liver injury.

One of our patients developed ARDS and died. ARDS has been reported in many other studies as well.^{9,15,17,18,21,23}

Fortunately, none of our patients developed Cerebral malaria, which has also been a reported complication of Vivax Malaria.^{10,19,23,28}

Mortality is reported rarely^{19,27} and in our study also, all the patients except one recovered completely.

Conclusion

Although often regarded as a cause of benign malaria infection, there is sufficient evidence that atypical presentations with changing phase of severity are also observed with Plasmodium Vivax infection. It can also lead to severe malaria, resulting in significant morbidity and mortality. Further research is needed to study the possible genotypic abnormalities that the parasite or its carrier might have acquired over a period of time, and which may be responsible for this hostile behaviour.

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