Spectrum of Clinical and Hematological Changes in Patients of Malaria: A Tertiary Care Hospital Experience in Gujarat

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Abstract

Background: One of the most common infections caused by protozoa in India is malaria. Malaria cases have different geographic distribution in different areas. So it is important that hospitals in different areas draw their own set of data regarding clinical and hematological characteristics of malaria. The present study was conducted to evaluate the spectrum of clinical and hematological changes in patients of malaria.

Material and method: We conducted retrospective study at Pathology department, Sumandeepvidyapeeth, with 55 patients aged between 5 to 75 years.

Results: Out of 55, 40 were males and 15 were females. PV constituted majority of the cases, followed by PF. We reported anemia in 34 of malaria cases. Maximum cases of anemia was seen in PF. Thrombocytopenia was seen in 42 of malaria cases. Maximum cases was seen in PV. Leucocyte count was within reference range in majority of our cases 42.

Conclusion: Fever with rigors and chills, headache and splenomegaly are the most common clinical alteration and anemia and thrombocytopenia are most common hematological alteration in cases of malaria. Presence of these classic picture in a patient ever, helps diagnosing malaria at the earlier stages. In that way, early treatment can be introduced.

Keywords: *Anemia, Fever, Malaria,Plasmodium falciparum, Thrombocytopenia.*

Introduction

One of the most common infections caused by protozoa in India is malaria. There are five different species of plasmodium (P.) that are responsible for malaria infection in humans. These are Plasmodiumfalciparum (PF), Plasmodium vivax (PV), Plasmodiumovale, Plasmodiummalariae and Plasmodiumknowlesi. A bitefron infected female Anopheles type of mosquito is the main route of transmission. Other routes are via blood transfusion, marrow transplants and across the placenta. Causative agent of severe and complicated malaria is usually PF. Other species causes usually mild disease. [1] Although there is continuous ongoing work to decrease the number of case by various means, malaria still remains the most common protozoan infection in developing countries. [2] World health organization report states that 6% of the cases all over the world are detected in India. [3]

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Most common clinical features of malaria are fever which is intermittent and high grade in nature, rigors and chills, headache, nausea and vomiting.[4] There are certain characteristic hematological changes that are attributed to malaria and commonly seen among malaria patients. Some of the common findings are anemia, thrombocytopenia, leucopenia and splenomegaly. [5-7] The present study was carried out to have insight into the clinical and hematological spectrum of changes in patients of malaria in Gujarat.

Material and Method

We conducted this retrospective study at Hematologylaboratory, Pathology department, Sumandeepvidyapeeth, Vadodara. We included total 55 patients aged between 5 to 75 years with either gender. Details regarding demographic, clinical and laboratory investigations of each patients were noted. Patients below 5 years and more than 75 years were excluded from the study. Two mililitres blood was collected in EDTA vaccuttee and processed oncell counter SYSMEX KX-21. All hematological report details were noted. We prepared blood films for both thick and thin smears as per the standard protocols and were processed further with giemsa stain and leishman cytochrome stain. A positive diagnosis of malaria was confirmed by pathologist after examination of thick and thin smear. Malaria species identification was done for different species. We called the patient has an anemia when the hemoglobin (Hb) was less than 13g/dl in a male patient and less than 12 g/dl in a female patient. Thrombocytopenia was diagnosed when the platelet count was less than 1.5 lacs/cumm. Leucopenia and leucocytosis when total leucocyte count(TLC) was less than 4000 cells/cumm and more than 11000 cells/cumm respectively. We used Epi info software for calculating various statistics.

Results

We conducted this retrospective study at Hematologylaboratory, Pathology department, Sumandeepvidyapeeth, Vadodara. We included total 55 patients aged between 5 to 75 years with either gender. Details regarding demographic, clinical and laboratory investigations of each patients were noted.

There were total 55 cases of malaria, 40(72.7%) were males and 15(27.3%) were females. We found male preponderance of the disease. (Table – 1) Male to female ratio in our study was found to be 2.6:1.

Table 1. Gender wise distribution of the cases

Gender	Cases	Percentage (%)
Male	40	72.7
Female	15	27.3
Total	**55**	**100**

We divided the cases into 3 groups as per species identification. (Table – 2) Highest numbers were of PV 41(74.5%), followed by PF 12(21.8%) and mixed infection 2 (3.6%) type.

Table 2. Distribution of cases as per the malaria species identification

Malaria Species	No of Cases	Percentage
P. Falciparum	12	21.8%
P. Vivax	41	74.5%
Mixed Infection	02	3.6%
Total	**55**	**100%**

We evaluated clinical data of all the cases of malaria. Fever was seen in all the cases 55(100%). Apart from fever, the most common clinical features were rigors and chills 34(61.8%) followed by headache 26(47.2%), nausea and vomiting 20(36.3%) and splenomegaly 28(50.9%) (Figure 1).

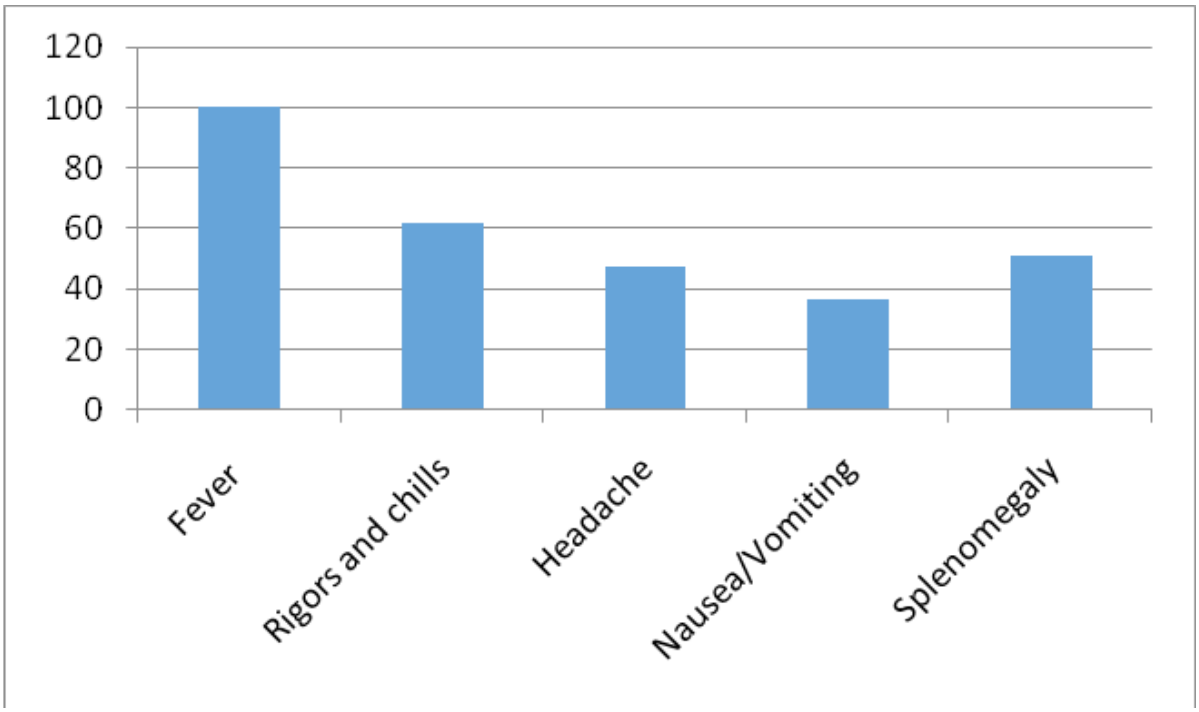

Figure 1. Distribution of cases as per the clinical features

We found anemia in 34(61.8%) of malaria cases. Other 21(38.2%) cases had normal hemoglobin levels. Out of these 34 cases maximum cases of anemia was seen in PF 11(91.6%), followed by PV 22(53.6%) and mixed infection 01(50%). (Table 3).

Table 3. Distribution of anemia cases in different types of malaria

Type of Malaria	Cases with Anemia	Cases With Normal Hemoglobin	Total
P. Falciparum	11(91.6%)	01(8.3%)	12(21.8%)
P. Vivax	22(53.6%)	19(46.3%)	41(74.5%)
Mixed Infction	01(50%)	01(50%)	2 (3.6%)
Total	**34(61.8%)**	**21(38.2%)**	**55(100%)**

We found thrombocytopenia in 42(76.4%) of malaria cases. Other 13(23.6%) cases had normal platelet counts. Out of these 42 cases maximum cases of thrombocytopenia was seen in PV 31(75.6%), followed by PF 9(75%) and mixed infection 0(0%). (Table 4).

Table 4. Distribution of thrombocytopenia cases in different types of malaria

Type of Malaria	Cases with Thrombocytopenia	Cases With Normal Platelet Count	Total
P. Falciparum	9(75%)	03(25%)	12(21.8%)
P. Vivax	31(75.6%)	10(24.3%)	41(74.5%)
Mixed Infction	0(0%)	02(100%)	2 (3.6%)
Total	**42(76.4%)**	**13(23.6%)**	**55(100%)**

In our study, maximum cases had leucocyte count within normal reference range e.g 42(76.4%). Leucocytosis was present in 8(14.5%) and leucopenia in 5(9.1%) cases. Out of these, PF showed higher number of leucocytosi (8.3%), while PV showed higher cases of leucopenia, while both the cases of mixed infection showed normal TLC. (Table 5).

Table 5. Distribution of leucocytosis and leucopenia cases in different types of malaria

Type of Malaria	Cases with Leucocytosis	Cases With Leucopenia	Cases With Normal Tlc	Total
P. Falciparum	1(8.3%)	1(8.3%)	10(83.3%)	12(21.8%)
P. Vivax	1(2.4%)	4(9.8%)	36(87.8%)	41(74.5%)
Mixed Infction	0(0%)	0(0%)	02(100%)	2 (3.6%)
Total	8(14.5%)	5(9.1%)	42(76.4%).	55(100%)

Discussion

The present retrospective study included total 55 patients with age ranging from 5 years to 75 years. There was male preponderance in our study with male to female ratio of 2.6:1. This finding was comparable with many other studies carried out previously [4, 8-9] This can be due to increased exposure to males attributed to their more outdoor work as compared to females in some areas. In this study, there was maximum number of cases of PV type of malaria. Many other studies also showed the similar findings. [8-10]

In our study, fever was seen in all cases 55(100%). Apart from fever, the most common clinical features were rigors and chills 34(61.8%) followed by headache 26(47.2%), nausea and vomiting 20(36.3%) and splenomegaly 28(50.9%). These findings were comparable to the study done by Chaudry et el. [8]

The most frequent finding in malaria is anemia. It can result from combination of many etiological factors. Eg. Lysis of infected red blood cells, bone marrow inefficiency, splenomegaly etc. Total 34(61.8%) patients out of 55(100%) patients presented with anemia in our study. Whis is comparable to the previous literatures. [4] Study done by Chaudry et el., Awoke N et al. and Abro AH et al. showed maximum cases of anemia in PF cases as compared to other types of malaria. We found the similar results in our study. [8, 11-12]

Thrombocytopenia is very common hematological change that is seen in malaria. These can be due to various reasons. Eg. immunological mechanism, splenomegaly, or bone marrow inefficiency. We found thrombocytopenia in 42(76.4%) of total malaria cases. These results are comparable to that of the studies done by Abro AH et al., Jojera et al and Haroon et al. [12-14] Our study showed maximum cases of thrombocytopenia in PV 31(75.6%) as compared to PF 9(75%) and mixed infection 0(0%). These findings were comparable to that of the study done by Chaudry et el. [8]

Majority of the cases in our study showed leucocyte count within normal reference range e.g 42(76.4%). Leucocytosis was present in 8(14.5%) and leucopenia in 5(9.1%) cases. These findings are similar to previous published literature. [4, 8-9] Leucopenia in malaria can be attributed to various theories e.g. immune mediated, low cell life, cell migration, increased inflammation, sequestration, bone marrow inefficiency etc. Study done by Abro AH et al. showed leucopenia to be more associated with PV than PF cases. We found the similar results in our study. [12]

Conclusion

High prevalence of malaria indicates importance of its timely diagnosis and treatment. Presence of classic clinical and hematological picture in a patient with fever, helps diagnosing malaria at the earlier stages. In that way, early treatment can be introduced and mortality occurring as a consequence of complicated cases on long run can be prevented.

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Conflict of Interest: Nil

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