Thrombocytopenia in Patients of Malaria – Correlation with type of Malaria and it's Clinical Significance

[a]Maya Pai Dhungat, [b]Pradip Pai Dhungat
[a]Associate Professor, Department of medicine ,MIMER Medical college, Talegaon -Dabhade, Mawal, Pune 410507, Maharashtra, India
[b]Associate Professor, Department of medicine, MIMER Medical college, Talegaon - Dabhade, Mawal, Pune 410507, Maharashtra, India

Abstract

Malaria is a major health problem in the tropics, affecting more than 219 million people worldwide and causing 6,60,000 deaths per year (1). Malaria is a multisystem infection and the affection of haematological, renal & central nervous system adds to the mortality. With emergence of advanced investigative aids, it has now become clear that the malarial parasite produces haematological dysfunction termed as malarial hematopathy. Thrombocytopenia has been identified as key indicator of malaria in patients with acute febrile illness.

Aim - The study was undertaken to evaluate incidence of thrombocytopenia in patients of malaria and to correlate with the type of malaria and it's clinical significance.

Material & methods - We studied 100 patients of malaria admitted in BHAUSAHEB SARDESSAI TALGAON RURAL HOSPITAL (BSTRH) during a period of 1 year (Jan2011 - Dec2011) .The patients were diagnosed by peripheral blood smear and/or RCT. The platelet counts were done on 1st, 3rd and 7th day of admission and the results compared using appropriate statistical methods.

Conclusion - Although a reliable diagnostic marker, there is no prognostic significance of thrombocytopenia in malarial fevers .It is seen almost equally in P. Vivax , P. Falciparum and Mixed infections . It's severity does not have any bearing on the clinical outcome.

KEYWORDS - malaria, falciparum, vivax, thrombocytopenia

Introduction

Malaria, is an important parasitic infection with considerable morbidity & mortality. This infection has affected the humankind for millennia and will continue to do so. Severe malaria is a global problem affecting health and wealth of the nation and individuals alike. It is understood to be both, a disease of poverty and a cause of poverty (2).

Malaria is caused by protozoan parasite of genus plasmodium. Five species of the plasmodium –P. Falciparum, P. Vivax, P. Ovale, P. Malariae & P. Knowlesi cause malaria in humans (3).Infection is initiated when sporozoites from the salivary glands of a female anopheles mosquito are inoculated during a blood meal into the human blood stream.

Platelets originate from megakaryocytes in the bone marrow .Normal range of platelet count is 1,50,000-4,00,000/cmm. Thrombocytopenia is defined as platelet counts below 1,50,000/cmm . In malarial hematopathy , thrombocytopenia is attributed to excessive platelet pooling and a shortened platelet life span. Thrombocytopenia appears to be associated with elevated serum concentrations of both pro- and anti-inflammatory cytokines(4).

Falciparum malaria presents with protean manifestations and is associated with variety of complications and has a high mortality due to progression of Multi Organ Failure(5). However the changing trends in the presentation of P. vivax malaria leading to multi organ failure are well documented in recent studies(6,7).Profound thrombocytopenia with platelet count as low as 5000 /cmm in P. Vivax infection has been reported in the Indian literature(8,9) .

Aim

The study was undertaken to evaluate the incidence of thrombocytopenia in patients of malaria and correlate with the type of malaria and it's clinical significance.

Material and methods

This is a retrospective and descriptive study in which 100 patients admitted to BHAUSAHEB SARDESSAI TALGAON RURAL HOSPITAL from Jan 2011 to Dec 2011 for the treatment of malaria, were evaluated.

Inclusion criteria – All the cases tested positive for malaria by peripheral smear examination with conventional microscopy of thick and thin smears and /or RCT , on admission were included in our study.

Exclusion criteria – Patients with severe malaria(as per WHO criteria),patients with co-morbidities, patients presenting with fever (malaria smear /RCT- negative) but treated empirically for malaria and patients presenting with clinical features mimicking malaria(malaria smear /RCT negative) as in leptospirosis ,dengue and sepsis were excluded.

Platelet counts were done by cell counter on days 1, 3 and 7 of admission , by Spart cell counter. Very low platelet counts were re-evaluated by manual method as it is a routine practice in our hospital.

All patients of Falciparum malaria & Mixed infection were treated with ACT – Artesunate plus Sulphadoxine / Pyrimethamine . Patients with Vivax malaria were treated with Chloroquine. Patients of malaria with Vivax and mixed infections were administered Primaquine for a period of 14 days as a radical treatment.

Data was entered in Excel spreadsheet. Paired t- test was applied to analyse the data.

Results

A total no. of 100 patients in the age group 15- 85 years , admitted in BSTRH for the treatment of malaria were included in this study.

Out of these patients 26% were suffering from Falciparum malaria , 54% from Vivax malaria and 20% from Mixed infection (Vivax & Falciparum).

We had 68% males and 32% females in this study group.

The commonest presenting manifestations were fever with chills and rigors, headache, body ache , nausea and vomiting.

Table 1. Age wise distribution of the patients according to the type of malaria

Age in years	Type of malaria		
	Falciparum(F) n=26	Vivax (V) n=54	Mixed(F+V) n=20
15-24	5 (19.2 %)	20 (37%)	5 (25%)
25-34	5 (19.2 %)	9 (16.7%)	6 (30 %)
35-44	8 (30.7%)	15 (27.8%)	6 (30 %)
45-54	4 (15.4 %)	7 (13 %)	0
>=55	4 (15.4 %)	3 (5.6%)	3 (15 %)

The maximum number of patients were in the age group of 15-44 yrs ,in all the three types of malarial infections.

Table 2. Distribution of patients according to the platelet count in different type of malaria

Platelet count/cmm	Type of infection		
	Falciparum (F) n=26	Vivax (V) n=54	Mixed(F+V) n=20
50,000	13 (50 %)	19 (35.2%)	10 (50 %)
50,000 – 1,50,000	10 (38.5%)	24 (44.4%)	9 (45%)
Above 1,50,000	3 (11.5 %)	11 (20.4%)	1 (5%)

Thrombocytopenia was detected in 88.5% of the patients suffering from falciparum malaria , 79.6% of patients with vivax malaria and 95% of patients with mixed infection .

15% of patients in this study had normal platelet count.

Table 3. Showing average platelet count (in thousands) in the patients of different types of malaria on day 1, day 3 & day 7 of admission.

	Falciparum malaria n=26	Vivax malaria n=54	Mixed - Falciparum & vivax n-=20
Day 1	69.5 +/- 49.09	85.96 +/-54.12	71.77+/-65.55
Day 3	79.54 +/-37.81	113.02 +/-67.64	82.9 +/-51.76
Day 7	169.6 +/-39.28	184.7 +/-49.65	175.5 +/- 37.97

average	105.64 +/-30.6	127.89 +/-47.51	109.92 +/- 40.18
reduction	111.8 +/-29.50	114.72 +/-47.43	121.95 +/- 46.76

Data was analysed between various types of malarial patients using unpaired t test after verifying normality of data. There was no significant difference in average platelet count on day 1,3 and 7 between the patients of Falciparum malaria, Vivax malaria and those of Mixed type. So also there was no difference in the reduction of platelet count in the patients suffering from Falciparum ,Vivax and Mixed type of malaria. The lowest count noted was 12,000/cmm. None of the patients had bleeding manifestations and their platelet count improved spontaneously with antimalarial treatment. None of them required platelet transfusion.

Discussion

In the present study, young and middle aged male patients were mostly affected. This could be due to this group being more active outdoors from dawn to dusk. The females in India are better clothed hence less exposed.

The presence of thrombocytopenia in a case of fever is often an indicator of malaria. It is pertinent to look out for the possibility of malaria in endemic area in a febrile patient with low platelet counts. Thrombocytopenia was found in 88.5% of the patients with falciparum malaria , 79.6% in patients with vivax malaria and 95% patients with mixed infection .This finding is similar to the study by M.Nadkar et al. Thrombocytopenia is seldom accompanied by clinical bleeding or biochemical evidence of DIC. Platelet counts as low as 12000 /cmm are encountered in our study . The count rises rapidly during the recovery of the patient after the antimalarial treatment , as seen in other studies(10).

Profound thrombocytopenia is a well-recognised complication of falciparum malaria, as documented by various studies (11-13) .However hitherto it was less often documented in patients suffering from Vivax malaria. Incidence of thrombocytopenia was common in plasmodium Vivax infection in our series and is comparable to reported literature (14,15).

The aetiology of severe thrombocytopenia in Vivax malaria is not clearly known and poorly understood. Experimental data and clinical studies have successfully emphasised the role of immune mechanisms involving specific platelet associated IgG antibodies that bind directly to the malarial antigen in the platelets have been recently reported to play a role in the lysis of the platelets and the development of thrombocytopenia . Destructive sequestration of the platelets with coagulation disturbances, spleenomegaly ,bone marrow depression and oxidative stress are also important factors contributing to thrombocytopenia(16,17).

A good tolerance of low platelet count is well known in malaria as also is confirmed in our study. This could be explained by platelet activation and enhanced aggregability. In most of the studies including ours,thrombocytopenia has not been associated with any adverse events or mortality .

Contrary to previous belief that it is more common in plasmodium falciparum malaria , the present study has confirmed the findings of recently published studies(18-20) that thrombocytopenia is equally prevalent in plasmodium falciparum ,plasmodium vivax and also in mixed infection. It has no bearing on the complications or disease process and it does not warrant any intervention .The platelet count reverts back to normal levels after completion of treatment and clinical recovery of the patient.

Conclusion

Our findings suggest that thrombocytopenia is a common occurrence in plasmodium Falciparum, plasmodium Vivax and in Mixed infections .It has no specific prognostic significance. The severity of thrombocytopenia has no bearing on clinical outcome as recovery was identical in all three groups, without any complications. We did not find any bleeding tendencies even with platelet count as low as 12000/cmm. Hence we infer that it is a benign finding in mild and moderate cases of malaria and does not warrant platelet transfusion thereby avoiding an unnecessary expenditure in the poor strata of patients.

References

1. World Malaria Report 2012 .Fact Sheet 17 Dec 2012.

2. Suman Rajeev. Malaria – still unconquered .JAPI2006; 54:843-844

3. Nicolas J.White, Joel G.Breman. Harrison's Principles of Internal Medicine.18th edition. Volume I.The McGraw-Hill Cmpanies, Inc. US : 1688

4. A.Mahmood , M.Yasir ,Thrombocytopenia :a predictor of malaria among febrile patients of Liberia. Infectious Diseases Journal 2008 ;14:41-44

5.Jadhav U M, Patkar V S, Kadam N N. Thrombocytopenia in malaria-co-relation with type and severity of malaria. JAPI August 2004;(52):615-618

6. Kochar D K ,Das A, Kochar A, Middha S, Acharya S et al. throbocytopenia in plasmodium falciparum, plasmodium vivax and mixed infection malaria- a study from Bikaner. Platelets 2010; 21(8):623-7

7.Saravu K, Docheria M, Vassudev A, Shashtry B A. Annals of Tropical Medicine Parasitology Dec 2011 ;105(8):593-98

8. Kakar A, Bhoi S, Prakash V Kkr S. Profound thrombocytopenia in plasmodium Vivax malaria. Diagn Microbiol Infec Dis. 1999;35:243-4

9. Ravindra Pal Singh Makkar, Surabhi Mukhopadhyay, Monga Abhitab , Gupta Ajay Kr. The Brazilian Journal of Infectious Diseases 2002; 6(5):263-265

10.Dhanashri S Kelkar, Mrinal M Patnaik, Shashank R Joshi. Malarial Hamatopathy. JAPI Aug 2004 ;52:611-612

11.Jaganmani Srikant, Sunkara Srinivas, Cherukumilli RPS Krishna et al. Prevelence of thrombocytopenia in a diagnosed case of malaria in rural population of south India .Journal of Dr NTR university of health sciences 2012;1(3):152-155

12.Qurban Hussain Shaikh,Syed Masoor Ahmad ,Amanullah Abbasi et al .Thrombocytopenia in malaria .Journal of college of physicians and surgeons. Pakistan 2009;19(11):708-10

13.Milind Nadkar, Abhinay M Huchche, Raminder Singh, Amar R Pazare. Clinical profile of severe plasmodium vivax malaria in a tertiary care centre in Mumbai from June 2010 – January 2011.JAPI oct 2012;60(10):11-13

14.A Kumar, Shashirekha. Thromocytopenia – an indicator of acute vivax malaria .Indian journal of pathology and microbiology 2006;49(4):505-8

15.Leowattana W, Tangpukdee N, Thar SK, et al – Changes in platelet count in uncomplicated and severe falciparum malaria. Southeast Asian J Trop Med Public Health 2010; 41(5):1035-1044

16. Alfonso J ,Rodriguez –morales, Sanchez Elia, Vargas Minguel, Piccolo Carmelina. Occurence of thrombocytopenia in plasmodium vivax malaria. Clinical infectious diseases, Oxford journals;41(1):130-131

17.Shetty Guruprasada, K Sheedhara Avabratha, Gonsalves Seema, Dany Aby, Rai B Sanjeev. Thrombocytopenia in children with malaria-a study from costal Karnataka, India. Asian Pacific Journal of Tropical diseases 2012 :107-109

18.Shiraj Jamal Khan, Yasir Abbass, Mumtaj Ali Marwat .Thrombocytopenia as an indicator for malaria in adult population.Malaria Research and treatment .www.hindawi com /journals/mrt/2012 article ID405981:4 pgs.

19.Shetty Guruprasada, K Sheedhara ,Avabratha, Gonsalves Seema, Dany Aby, Rai B Sanjeev .Thrombocytopenia in children with malaria-a study from costal Karnataka, India. Asian Pacific Journal of Tropical diseases 2012 :107-109

20.Charulata S Limaye, Vikram A Londhey,S T Nabar. The study of Complications of vivax malaria in comparision with falciparum malaria in Mumbai. JAPI oct2012;60(10):15-18