A RETROSPECTIVE STUDY ON CLINICAL PROFILE, COMPLICATIONS AND OUTCOME OF MALARIA CASES ADMITTED IN NMCH, JAMUHAR, BIHAR

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ABSTRACT

BACKGROUND

Traditionally plasmodium vivax has been considered to be the cause for benign malaria and plasmodium falciparum to cause severe malaria. The incidence of P. vivax malaria in Rohtas district (Bihar) and neighbouring districts is quite high and P. vivax cases with severe complication are coming to NMCH, Rohtas for treatment. Thus, the present study was conducted to find out morbidity and mortality of P. vivax and P. falciparum malaria.

MATERIALS AND METHODS

The study period was from January 2015 to June 2018 and was conducted at NMCH (Narayan Medical College and Hospital), Jamuhar, Rohtas, Bihar. Patients of 16 years and above who were smear positive and/or malaria antigen positive were included in this study.

RESULTS

Total number of cases included for study were 306 out of which 192 (62.75%) were P. vivax, 102 (33.33%) cases of P. falciparum and 12 (3.92%) cases were mixed infection of P. vivax and P. falciparum. The commonest age group was 16-40 years and the commonest complication was thrombocytopenia followed by renal impairment, hepatic dysfunction, cerebral malaria and ARDS in that order. Statistically, there was no significant difference in clinical profile, morbidity and mortality in P. vivax and P. falciparum/mixed group.

CONCLUSION

Vivax malaria is no more a benign malaria and morbidity and mortality are comparable to P. falciparum/mixed infection.

KEYWORDS

P vivax, P falciparum.

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BACKGROUND

Malaria is an important cause of mortality in tropical and developing countries like India, inspite of the fact that global incidence of malaria is gradually falling. The global estimate of malaria cases was 232 million cases in 2003 and 165 million in 2013 (29% decrease in incidence).[1] NVBDCP (National Vector Borne Disease Control Programme) has compiled Indian data and has documented 1.09 million cases in 2016.[2] The world malaria report has revealed a high percentage of vivax malaria in South-East Asia.[3,4] The global death rate due to malaria has been recorded to be 4.45 lacs in 2016 and thus really a great social challenge and an economic burden.[3]

The estimated new cases as per WHO estimate is 24 million cases every year.[5] India has been figured as the highest malaria burden in South East Asia.[5] In India half of the total malaria cases are being reported from Bihar, Jharkhand, Orissa, Chhattisgarh, and West Bengal.[6]

This study is a retrospective and observatory study performed for three and half year from Jan 2015 to June 2018 and was conducted at NMCH (Narayan Medical College and Hospital), Jamuhar, which is a tertiary care and referral hospital of Rohtas district, Bihar. Patients are coming here from Rohtas as well as neighbouring districts of Bihar and Jharkhand. Large number of complicated plasmodium vivax malaria cases are coming to our institution for treatment which created an interest of conducting this study, because traditionally it is expected that plasmodium falciparum is the culprit for severe and complicated malaria. The belief that P. vivax malaria causes only benign tertian malaria and rarely responsible for a life-threatening condition, has been challenged in several studies.[7-9] Recently several studies

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reports have shown a remarkable increase in the incidence and complications of P. vivax malaria.[10-13]

Aims and Objectives

This study was aimed to compare the prevalence of P. vivax and P. falciparum cases in our part and to know the clinical presentation, complication, morbidity, mortality and response to treatment in both groups (P. vivax and P. falciparum) as large number of cases are coming to NMCH presenting as a case of severe and complicated malaria contrary to the belief that P. vivax causes benign malaria.

MATERIALS AND METHODS

In this study only confirmed and admitted malaria cases either in general ward or in Medical I.C.U, have been considered. O.P.D. cases have not been included due to difficulty in follow up and proper assessment in O.P.D. cases. The admitted cases of acute febrile illness not confirmed to be malaria (either by smear or rapid test) but responding to therapeutic trial of anti-malarial treatment was not included in the study. Thus, only those cases were included in this study who were either thick and thin smear positive or antigen positive in R.C.T (Rapid card test). Patients with pre-existing end stage kidney or liver disease or having other acute febrile illness like dengue, enteric fever or viral hepatitis were excluded for better assessment of severity and complication of malaria.

NS1 antigen was done for dengue. But if the duration of fever was more than five days then dengue antibody (IgM and IgG) test was done.

Inclusion Criteria

1. Malaria patients aged 16ys or above were considered in this study.
2. Only I.P.D (admitted) cases, either in general ward or Medical I.C.U. were included in this study.
3. Malarial patients confirmed by positive thick and thin blood smear and/or positive for rapid malaria antigen has been considered.

Exclusion Criteria

1. O.P.D malaria cases were not considered.
2. The cases responding empirically to antimalarial drugs but not smear and/or R.C.T positive were excluded in this study.
3. Patients with pre-existing liver or kidney disease or having other acute febrile illness were not considered.

A detailed history, clinical examination, haematological and biochemical examination, CXR and if needed additional investigation like C.T head, USG of abdomen, 2D-ECHO, and CSF examination were done. Severe malaria in all the three groups was categorised according to WHO classification.[14] Statistical analysis was done by using Chi square test.

RESULTS

The total number of diagnosed cases of malaria admitted in NMCH (Jan 2015 to June 2018) in this study (after exclusion by exclusion criteria as already discussed) was 306, out of which 170 were male and 136 were female cases in age range of 16 yrs. to 74 yrs. Out of 306 cases, 192 cases were P. vivax and 102 cases of P. falciparum and 12 cases were mixed infection of P. vivax and P. falciparum both. As per laboratory reports 88 cases were positive for smear as well as Rapid malaria test (antigen), 74 cases were only smear positive and 144 cases were positive for rapid malaria test (antigen) only.

The commonest age group of malaria cases observed in our study was 16- 40 years. The clinical presentation in all the groups were almost same. All the patients presented with fever. The commonest clinical features noted were pallor, headache, mild jaundice, altered sensorium and hepatosplenomegaly.

Age Group	P. vivax		P. falciparum		Mixed	
	Male	Female	Male	Female	Male	Female
16 - 30 yrs.	38 (19.8%)	34 (17.7%)	21 (20.6%)	17 (14.2%)	3 (25%)	2 (16.7%)
31 to 40 yrs.	27 (14.1%)	21 (10.9%)	13 (12.7%)	10 (9.8%)	3 (25%)	1 (8.3)
41 to 50 yrs.	16 (8.3%)	15 (7.8%)	12 (11.8%)	9 (8.8%)	1 (8.3%)	1 (8.3%)
51 to 60 yrs.	12 (6.3%)	10 (5.2%)	8 (7.8%)	6 (5.9%)	1 (8.3%)	0 (0%)
61 to 70 yrs.	9 (4.7%)	5 (2.6%)	3 (2.9%)	2 (1.9)	0 (0%)	0 (0%)
>70	4 (2.1%)	1 (0.5%)	1 (.9%)	0 (0%)	0 (0%)	0 (0%)
Total	106 (55.2%)	86 (44.8%)	58 (56.9%)	44 (43.1%)	8 (66.6%)	4 (33.3%)

Table 1. Age and Sex Distribution of Malaria Cases

It is a common belief that only P falciparum and/ or Mixed infection cause severe malaria. Moreover, the total number of patients in mixed infection group was very small (12) and a sizable number of patients in falciparum group (102). Considering the above two facts both the groups (falciparum and mixed) have been considered together henceforth for statistical analysis purpose.

The commonest complications noted in our study were thrombocytopenia, renal impairment, hepatic dysfunction and cerebral malaria in order. Different complications recorded in P. vivax malaria and P. falciparum/Mixed malaria groups were comparable and statistically insignificant.

Clinical Feature	P. Vivax N= 192	P. Falciparum/ Mixed N=114	P Value
Fever	192 (100%)	114 (100%)	
Headache	65 (33.9%)	42 (36.8%)	0.3414
Vomiting	32 (16.7%)	20 (17.5%)	0.4804
Pallor	137 (71.4%)	84 (73.6%)	0.3808
Pain Abdomen	27 (14.1%)	17 (14.9%)	0.4814
Tachypnoea	35 (18.2%)	21 (18.4%)	0.5408
Petechiae	31 (16.1%)	19 (16.7%)	0.5125
Oliguria	32 (16.7%)	19 (16.7%)	0.5664
Jaundice	45 (23.4%)	25 (21.9%)	0.4378
Hepatomegaly	56 (29.2%)	31 (27.2%)	0.4073
Splenomegaly	58 (30.2%)	31 (27.2%)	0.3345
Altered Sensorium	74 (38.5%)	42 (36.8%)	0.3724
Seizure	18 (9.4%)	12 (10.5%)	0.4435

Table 2. Comparison of Clinical Profile in Different Groups

Morbidity	P. Vivax N-192	P. Falciparum/Mixed N-114	P Value
Thrombocytopenia < 1.5 lakh- <1.0 lakh- <50,000-	 153 (79.7%) 114 (59.4%) 60 (31.25%)	 92 (80.7%) 70 (61.4%) 36 (31.57%)	 0.830 0.726 0.952
Circulatory Collapse	18 (9.4%)	12 (10.5%)	0.743
Cerebral Malaria GCS< 10	33 (17.2%)	19 (16.6%)	0.907
Renal Impairment Creatinine>1.5mg% Creatinine>3mg%	 97 (50.5%) 11 (5.7%)	 55 (48.24%) 7 (6.14%)	 0.700 0.883
Hepatic Involvement (Total bilirubin >2mg%, raised SGPT &SGOT)	46 (23.9%)	27 (23.7%)	0.957
ARDS	7 (3.6 %)	6 (5.26%)	0.498
Severe Hypoglycaemia BS<40mg/dl	5 (2.6%)	3 (2.6%)	0.998
Severe Anaemia Hb<5gm/dl	17 (8.8%)	11 (9.64%)	0.816

Table 3. Comparison of Complications of Malaria

Outcome	P. Vivax N-192	P. Falciparum/Mixed N-114	P Value
Death	9 (4.7%)	8 (7.01%)	0.390
Survived	183 (95.3%)	106 (92.98%)	

Table 4. Mortality Profile in Different Groups

Percentage of severe malaria cases observed in our study was almost same in P. falciparum/Mixed and P. vivax group and the difference was not significant statistically. The categorisation of severe malaria was done as per WHO classification.[14] Slightly higher mortality rate was observed in Falciparum/Mixed infection group (7.01%) in comparison to P. vivax (4.7%) group but it was found to be statistically insignificant.

DISCUSSION

The cases of P. Vivax is gradually increasing which has been supported by WHO 2010 report also[15] and contrary to the past belief, P Vivax is equally responsible for severe malaria and high fatality. The changes in the clinical profile and complication of P. Vivax malaria might be due to genetic changes of the parasite or vector or chloroquine resistance.[7] Due to the availability of the recently developed rapid malaria antigen test, it has been now evident that P. vivax mono infection can cause severe malaria and death.[16] All the patients were treated with injection Artesunate and few patients with Mefloquine also. In our study malaria cases

were found to be more in males and younger age group (16 to 40 years). This might be due to outdoor work and outdoor sleeping habits although a genetic probability can't be ruled out. Commonest haematological abnormality in both groups was thrombocytopenia similar to the observation made in other studies.[17-21] The lowest platelet count observed in this study was 8, 000 cells. Platelet transfusion was done only in 5 cases due to severe thrombocytopenia associated with clinical bleeding (petechiae, epistaxis, hematemesis or melena). The thrombocytopenia in malaria may be due to sequestration, immunological reactions, lytic effects and oxidative stress.[22-24] The other haematological abnormality observed was anaemia and leucopenia as found in other studies also.[25] Leukopenia resolved after treatment.

Multisystem involvement was comparable in both groups and difference was not statistically significant. Severe renal impairment was observed in equal proportion in both the groups (table 3) and 10 patients were subjected to haemodialysis during the course of treatment. Renal failure is predominantly due to acute tubular necrosis. Hepatic involvement was observed in equal proportion in both the groups and the difference was statistically insignificant. Four patients, (two in each group) of malarial hepatitis developed severe jaundice and encephalopathy. Jaundice is due to haemolysis, cholestasis, and hepatocellular injury. There was no statistical difference in cerebral symptoms ranging from seizure to coma in both the groups. Percentage of ARDS in both groups was almost the same and the difference was statistically insignificant. The possible cause of ARDS in malaria is the sequestration of parasitised RBC in pulmonary microvasculature, progressive alveolar capillary dysfunction, small airway obstruction and gas exchange alteration.[25-27]

It is remarkable to note that there was no statistically significant difference in clinical profile as well as complication of malaria in both the groups and signifying that severe complication attributed to only falciparum malaria was equally present in P. Vivax group also. In this study mortality pattern was equally distributed in both groups.

CONCLUSION

Malaria is an important cause of morbidity and mortality in Rohtas and neighbouring districts of Bihar. The prevalence of P. vivax malaria is quite high in comparison to P. falciparum/mixed infection. Contrary to the previous thinking that P. falciparum is responsible for severe malaria, P. vivax was found to be equally responsible for severe malaria in our study. This shows the changing pattern of P. vivax infection as well as its virulence and it needs a further study for genetic changes and drug resistance to antimalarial treatment.

The most common complications of malaria observed in our study were thrombocytopaenia followed by renal impairment, hepatic dysfunction and cerebral malaria in that order.

The clinical presentation, complication and severity were found to be similar in P. vivax and P. falciparum/Mixed group. The mortality rate in P. falciparum/Mixed group was slightly higher than vivax group but was insignificant statistically.

REFERENCES

[1] Murray CJ, Ortblad KF, Guinovart C, et al, Global, regional, and national incidence and mortality for HIV, tuberculosis, and malaria during 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. Lancet 2014;384(9947):1005-1070.

[2] National Vector Borne Disease Control Programme 2017. http://nvbdcp.gov.in/malaria3.html

[3] Key points: world malaria report 2017. https://www.who.int/malaria/media/world-malaria-report-2017/en/

[4] World Health Organization. Regional Office of South East Region. Health topics: Malaria: World Malaria Report 2011. Available at: http://www.who.int Accessed 22 December 2012.

[5] World Health Organization. World Malaria Report fact sheet. 2012. http://www.who.int Accessed 5 August 2013.

[6] Basu S, Gupta P. Malaria. In: Ghai OP, Gupta P, eds. Text book of social and preventive medicine. 3rd edn. New Delhi: CBS Publisher and Distributors 2010:214-230.

[7] Nadkar MY, Huche AM, Singh R, et al. Clinical profile of severe plasmodium vivax malaria in a tertiary care centre in Mumbai from June 2010-January 2011. J Assoc physicians India 2012;60:11-13.

[8] Islam N, Qamruddin K. Unusual complicated in benign tertian malaria. Trop Geogr Med 1995;47(3):141-143.

[9] Mohapatra MK, Padhiary KN, Mishra DP, et al. Atypical manifestations of plasmodium vivax malaria. Indian J Malariol 2002;39(1-2):18-25.

[10] Rahimi BA, Thakkinstian A, White NJ, et al. Severe vivax malaria: a systematic review and meta-analysis of clinical studies since 1900. Malar J 2014;13:481.

[11] Beg MA, Khan R, Baig SM, et al. Cerebral involvement in benign tertian malaria. Am J Trop Med Hyg 2002;67(3):230-232.

[12] Nautiyal A, Singh S, Parmeswaran G, et al. Hepatic dysfunction in a patient with plasmodium vivax infection. Med Gen Med 2005;7(1):8.

[13] Mohapatra MK, Padhiary KN, Mishra DP, et al. Atypical manifestations of plasmodium vivax malaria. Indian J Malariol 2002;39(1-2):18-25.

[14] Severe falciparum malaria. Organization Health Organization, Communicable disease cluster. Trans R Soc Trop Med Hyg 2000;94 Suppl 1:S1-90.

[15] Autino B, Corbett Y, Castelli F, et al. Pathogenesis of malaria in tissues and blood. Mediterr J Hematol Infect Dis 2012;4(1):e2012061.

[16] Picot S. Is plasmodium vivax still a paradigm for uncomplicated malaria? Med Mal Infect 2006;36(8):406-413.

[17] Kochar DK, Das A, Kochar SK, et al. Severe plasmodium vivax malaria: a report on serial cases

from Bikaner in north-western India. Am J Trop Med Hyg 2009;80(2):194-198.
[18] Antinori S, Galimberti L, Erika G, et al. Thrombocytopenia and Plasmodium vivax malaria. Clin Infect Dis 2005;41(8):1210-1212.
[19] Makkar RP, Monga A, Gupta AK. Plasmodium vivax malaria presenting with severe thrombocytopenia. Braz J Infect Dis 2002;6(5):263-265.
[20] Sharma A, Khanduri U. How benign is benign tertian malaria? J Vector Borne Dis 2009;46(2):141-142.
[21] Narang GS, Singla N. Thrombocytopenia and other complications of plasmodium vivax malaria. Curr Pediatric Res 2011;15(2):117-119.
[22] Yamaguchi S, Kubota T, Yamagishi T, et al. Severe thrombocytopenia suggesting immunological mechanism in two cases of vivax malaria. Am J Hematol 1997;56(3):183-186.
[23] Fajarda OF, Talent C. Malaria parasites within human platelets. JAMA 1974;229(9):1205-1207.
[24] Rodríguez-Morales AJ, Sánchez E, Vargas M, et al. Occurrence of thrombocytopenia in plasmodium vivax malaria. Clin Infect Dis 2005;41(1):130-131.
[25] Anstey NM, Jacups SP, Cain T, et al. Pulmonary manifestations of uncomplicated falciparum and vivax malaria: cough small airway obstruction, impaired gas transfer, and increased pulmonary phagocytic activity. J Infect Dis 2002;185(9):1326-1334.
[26] Torres JR, Perez H, Postigo MM, et al. Acute non-cardiogenic lung injury in benign tertian malaria. Lancet 1997;350(9070):31-32.
[27] Anstey NM, Handojo T, Pain MC, et al. Lung injury in vivax malaria: pathophysiological evidence for pulmonary vascular sequestration and post-treatment alveolar capillary inflammation. J Infect Dis 2007;195(4):589-596.