Transition of Vivax Malaria from Benign to Malignant Clinical Profile: A Cause of Concern

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Original Research Article

ABSTRACT

This present research aimed to study hepatic dysfunction, renal dysfunction and prevalance of thrombocytopenia in children with malaria in tertiary care centre of Bundelkhand region. Children in the age groups of 1 to 15 yrs, whose peripheral smear were positive for malarial parasite were included in the study group from amongst those admitted in pediatric ward of tertiary care hospital in Jhansi. A detailed history and clinical examination was done, followed by investigations like hemogram, platelet count general blood picture, reticulocyte count, serum bilirubin, SGOT, SGPT, serum alkaline phosphatase, blood urea and serum creatinine. Raised level of SGPT, SGOT and total serum bilirubin were seen in 31%, 30% 53% respectively. In our study 11% of cases had raised level of blood urea or serum creatinine or both. Greatest affected group was 10-15 yrs in which 6 cases had increased urea and creatnine level. There were 88 cases (88%) in which platelet count was < 1.5 lac/Cu mm, among them P.falciparum cases were 47(47%) and P.vivax cases were 41(41%). Liver functions are commonly affected in malaria and liver dysfunction ranges from mild elevation of liver enzymes to the range of acute hepatitis . There was no significant difference in incidence of thrombocytopenia between vivax and falciparum cases. Mild renal impairement was present in a number of cases and it was noted that dehydration also plays role in the genesis of renal impairement in children with malaria.

KEY WORDS: falciparum, liver dysfunction, renal dysfunction, thrombocytopenia

INTRODUCTION:

Malaria due to P.vivax had been considered to have benign course. It is known for multiple relapses and falciparum infection was associated with complicated malaria. However in the past few years there is a changing trend in the clinical manifestations of vivax malaria from severe or complicated disease to sometimes even causing death. Hepatic dysfunction is usual in severe malaria. Jaundice is common, other like reduction in clotting factor synthesis, metabolic clearance of drugs, biliary excretion, and failure of gluconeogenesis contributes to lactic acidosis and hypoglycaemia.

The activity of a broad range of cytochrome p450 mixed function oxidase is reduced including cyp3a4 which is responsible for quinine 3 hydroxylation which is the principle route of quinine metabolic clearance, that is reduced in proportion of disease severity[1]. Jaundice in malaria has haemolytic, hepatic, and cholestasis components. Choestasis jaundice may persist well into the recovery period. Liver damage may result from an alteration in vascular flow through the organ as the parasitized RBCs adhere to endothelial cells, blocking sinusoids and obstructing intrahepatic blood flow. Intravascular hemolysis of parasitized and nonparasitized RBCs has been considered as an important factor in the causation of mild to moderate jaundice, in which bilirubin is predominantly unconjugated. However, hemolysis is never the sole cause of severe jaundice nor the conjugated hyperbilirubinemia . Increase in the serum levels of aspartate amino transferrase (AST) and alanine amino transferase (ALT) are seen in many patients. In severe malaria renal microvasculature obstruction occurs due to sequestration in the kidneys. Impaired perfusion may be compounded by reduced erythrocyte deformability and the release of significant amount of haemoglobin and cellular debris during hemolysis. Massive hemolysis accounts for black water fever complicating severe malaria.

Thrombocytopenia is common among people indigenous to the tropics, and non- immune subjects infected by Plasmodium falciparum or P. vivax .

Malaria-related thrombocytopenia may result from either a decrease in palatelet production or an

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increased platelet turnover due to different mechanisms of destruction.

It has been stated in different literature about various immunological and nonimmunological destruction of platelet leading to thrombocytopenia[2].

MATERIAL AND METHODS:

The present study was conducted in the Department of paediatrics with active collaboration of the department of pathology. Children between age group of 1 to 15 years, who were admitted to paediatrics ward of this hospital from June 2016 to july 2017 were studied.

This study included patients in whom a diagnosis of malaria were confirmed by the presence of malaria parasite in the blood either a smear positive for plasmodium species and/or malarial antigen positive by RDT (rapid diagnostic test). Suspected cases of smear negative malaria and RDT negative were excluded from the study. Study plan was approved by hospital research committe.

A detail history was taken and clinical examination was done to rule out any past history of renal, cardiovascular, hepatic, endocrine, or metabolic disorder. The history of fever, its duration and severity, vomiting, loose motion, headache, convulsion, abdominal pain, hemoglobinuria, jaundice, bleeding manifestation, any h/o malaria were recorded.

Patient were examined for dehydration, pallor, hypotension, CNS manifestation, jaundice, edema, respiratory distress, evidence of bleeding. Liver size, spleen size, and urine output were noted. The patients were then subjected to thorough systemic examination.

Diagnostic methods used were conventional thick and thin peripheral smear stained with Leishman stain, examined under oil immersion. Rapid diagnostic test were based on detection of specific plasmodium antigen. Other lab investigation were undertaken like hemogram, platelet counts, general blood picture, recticulocyte count, serum bilirubin (total and direct), SGOT, SGPT, serum alkaline phosphatase, blood urea, serum creatinine, urine for routine examination.

About 8 ml of blood was collected by venipuncture from every patient after correction of dehydration if present taking due aseptic precaution. Statistical analysis was done.

RESULTS:

In this study maximum number of patient affected were in the age group of 5-10 yrs and the least affected group was 1-5 yrs, which was 38% and 25 % respectively. 37% of affected children were between the age of 10-15yrs.

Total number of P.falciparum affected patient were 58 (58%), and P.vivax positive cases were 42(42%). P.falciparum cases were maximum 27(27%) in the age group of 10-15 years. P.vivax affected cases were 17%, 15%, 10% in the age groups of (1-5), (5-10), (10-15) yrs respectively.

In this study, it was found that malaria can present with a wide range of symptoms. The number of cases presented with fever were 99 (99%) and 1% case was without fever. P.falciparum cases with fever were 57 (57%), whereas P. vivax cases with fever were 42 (42%). Total 16% of cases presented with abdominal pain, of which 10% were P. falciparum and 6% were P.vivax positive cases. Among all cases 5% had diarrhea and 24 (24%) had convulsions, in which 17 (17%) were P. falciparum positive and 7 (7%) cases were P. vivax positive. Jaundice was seen in 18 (18%) cases at the time of admission in our hospital, in which 8 (8%) were P. falciparum positive and 10 (10%) were P.vivax positive . Bleeding manifestation was noted in 19 (19%) cases, in which 13(13%) were P.falciparum and 6% were P.vivax positive.

The number of cases those presented with decreased urine output were 11% and 5% of total cases presented with cough. Edema was present in 5% of total cases in which 3% were P. vivax and 2% cases were P.falciparum positive. There were 43 (43%) cases who had pallor among which 30 (30%) were P.falciparum and 13 (13%) were P.vivax positive. Two (2%) cases had signs suggestive of Congestive heart failure. Single Case (1%) was noted with black water fever.

There were 92% (92) cases who had splenomegaly/ hepatosplenomegaly/ hepatomegaly. Isolated hepatomegaly was present in 9% of total cases, whereas isolated splenomegaly was present in 21% of total patient. The number of patient those had hepatosplenomegaly were 62(62%) .

The number of cases whose haemoglobin level were between 6-9.9 gm% were 34 or 34% of total, 20 cases of them were P. faciparum and 14 cases were P.vivax positive. 24% of patients had haemoglobin level between 10-12gm% and 4% cases have Hb level of > 12gm% . It was observed that 27% of cases who had Hb% <6gm were P. falciparum cases and 11% cases were vivax positive .

In this study 53%(53) of cases had increased level of total serum bilirubin (>1mg%). The number of P. falciparum and P.vivax infected person who had increased level of total serum bilirubin were 29(29%)

Table 1: Number of cases and parasite distribution in each age group.

Age group	1-5 yrs	5-10 yrs	10-15 yrs	Total
No. of cases	25%	38%	37%	100%
P.vivax	17%	15%	10%	42%
P. falciparum	8%	23%	27%	58%

Table 2: Presentation of malaria

Symptoms/signs	P.falciparum	P. vivax	Total
Fever	57	42	99
Without fever	1	0	1
Abdominal pain	10	6	16
Diarrhea	2	3	5
Convulsion	17	7	24
Jaundice	8	10	18
Bleeding	13	6	19
Oliguria	5	6	11
ARI	2	3	5
Edema	2	3	5
Moderate to severe pallor	30	13	43
CHF	1	1	2
Black water fever	1	0	1

Table 3: Correlation between hepatosplenomegaly, Hb%, Serum bilirubin, SGOT, SGPT , Thrombocytopenia, renal functions and type of malaria.

Parasite	P.falciparum	P.vivax	Total
Hepatosplenomegaly	32	30	62
Hepatomegaly	4	5	9
Splenomegaly	15	6	21
Hb%			
<6gm%	27	11	38
6-9.9gm%	20	14	34
10-12gm%	16	8	24
>12gm%	3	1	4
S.bilirubin (>1mg%)	29	24	53
SGOT (>80U/L)	19	11	30
SGPT (>80U/L)	20	11	31
Platelet count			
<50,000	22	18	40
50,000 -1lac	13	11	24
1-1.5lac	12	12	24
Renal functions			
S.urea (>40mg/dl) S.creatinine(>1mg/dl)	5	6	11

Table 4: Correlation between raised blood urea, raised serum creatinine and type of malaria.

Age group	1-5yrs	5-10yrs	10-15yrs	Total
P.vivax	0	1	4	5
P.falciparum	1	3	2	6
Total	1	4	6	11

and 24%(24) respectively. Most affected age group was 5-10 yrs in which 22% cases had increased level of serum bilirubin and least affected group was 1-5 yrs in which 13 % of patients had increased level of total serum bilirubin.

It was observed that the total number of cases in whom raised level of SGPT(>80IU/L), SGOT (>80IU/L) and total serum bilirubin seen were 31 %, 30% ,53% respectively. Highest number of cases who had increased level of liver enzymes and serum bilirubin were seen in P. falciparum cases, which was 20%, 19%, 29% for SGPT,SGOT and serum bilirubin respectively. There was no stastically significant difference between these elevated SGPT, SGOTand serum bilirubin in P.falciparum and P.vivax cases.

In our study, 88 cases (88%) had platelet count < 1.5 lac/mm3 . P.falciparum cases who had platelets counts < 1.5 was 47 (47%) and rest were P. vivax positive cases which were 41 (41%) . Cases in which platelets counts were less than 50000 were 40 (40%) of total cases, where 22 (22%) cases were P. falciparum positive and 18(18%) were P.vivax positive. There were 24 (24%) cases in whom platelets counts was between 0.5-1 lac and 24 (24%)cases had platelet counts between 1-1.5lac/mm3 .

In Our study 11 (11%) of cases had raised level of blood urea (40mg/dl) or serum creatinine (1mg/dl) or both. Greatest affected group was 10-15 yrs in which 6 cases had increased urea and creatinine level, next was age group of 5-10 years and least affected was 1-5 years age group.

DISCUSSION:

This study was conducted in tertiary care hospital of Jhansi which caters to a vast area of Bundelkhand region which is endemic for malaria. This study was a modest attempt to study the changes in liver and renal functions along with occurence of thrombocytopenia in children affected with malarial parasite.

In this study 9% of cases presented with hepatomegaly, 21% with isolated splenomegaly. Overall hepatomegaly /splenomegaly/ hepatosplenomegaly was present in 92% of the cases which correlated with study of Nityanand et al[3].

It was observed that 88% of cases had platelet count below 1.5 lac/mm3, 64% cases below 1 lac/Cumm, 40% cases below 50000/mm3.

Platelets were diminished in association with intravascular coagulation. It took 5-7 days after start of treatment before it retrun to normal. Thrombocytopenia is a common finding in faciparum malaria and may be due to sequestration of platelets in capillaries of internal organs. It was seen many times in patients with vivax malaria without severe forms also had thrombo-cytopenia.

Among the cases of malaria, 53% had elevated level of serum bilirubin of which 29% were of p. falciparum and 24% of P.vivax. This was in concordance with the study by Patwari et al[4] where serum bilirubin was raised in 26% of cases infected with P.vivax. Serum bilirubin was also shown to be increased in many other studies by Mishra et al[5] and Goyal et al[10].

In our study SGPT was raised in 31% cases and SGOT was raised in 30% of cases which is higher than those reported by Bag et al[6] may be, it was astudy of small series of 16 cases of falciparum malaria .

Renal impairement was depicted in our study as raised levels of blood urea and serum creatinine in 11% of the cases . Ahmad et al[7] reported impaired renal function in 48% of cases of total malaria out of which 66% accounted for falcipuram malaria 30% for vivax malaria. Habte et al[8] reported acute renal failure in 33% of patients of severe malaria whereas Weber and boker et al[9] reported acute renal failure in 29.03% of falciparum malaria cases in one series. In one of the study impaired renal functions were reported in 12% of P.falciparum and 8.4% of P.vivax cases that supported our study[13].

The incidence of malaria varies from study to study and this variation remained unexplained and probably depends on individual susceptibility. The disturbance in renal microcirculation is responsible for acute renal failure and immunological reaction to parasites accounts for glomerular lesion as stated in study by Sitprija et al[12]. In our study none of the patients required dialysis due to early recognition of impaired renal function and aggressive management thus improvement in renal microcirculation.

It was also seen that there was statistically no significant difference between hepatic dysfunctions, renal impairment and incidence of thrombocytopenia between P.falciparum and P.vivax cases in our study. The study by Goyal et al[10] supports it as they also concluded no such statistical difference. Kumar et al[11] also concluded impairments in liver and renal functions equally high in both the types of malaria in different age groups with no significant difference between these groups.

CONCLUSION:

To conclude it was found that there was statistically no significant difference between the hepatic dysfunctions, Renal dysfunctions and incidence of thrombocytopenia in both the types of malaria (P.falciparum and P.vivax). The hepatic dysfunction ranges from mild elevation to the range of acute hepatitis. Mild renal impairment was present in a number of cases and it was seen that dehydration also plays a role in the genesis of renal impairement in children with malaria.

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