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Clinical Profile of Severe Plasmodium vivax Malaria in a Tertiary Care Centre of North Karnataka

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***Abstract*- Background:** Plasmodium vivaxis the most widely distributed human malarial parasite with risk population of 2.5 billion persons. Pl. vivaxmono infection could also result in multiple organ dysfunction and severe life-threatening disease as seen in P.falciparum infection.[1,2] We describe here the clinical profile of patients with severe vivax malaria.

Method and Material: We recruited 95 patients fulfilling the criteria for severe malaria during the study period from June 2011 to May 2012. Detailed history, clinical examination, routine hematological and biochemical investigations were done. The end points were discharge from wards or death.

Results: We had 95 patients with severe malaria of which 50 (52.6%) patients had severe vivax and 45 (47.3%) had severe falciparum malaria. Amongst vivax group 29(58 %) were males and 21(42 %) females. Thrombocytopenia 24(48%) was the most common complication followed by renal (46%), hepatic (42%) cerebral (16%) and pulmonary (4%) involvement. Most patients were in the age group of 15-35 years and mortality increased with increasing age. The mortality observed in severe vivax malaria was 12% (6).

Conclusions: Severe vivax malaria is now very common with increasing mortality. The mortality in vivax malaria increases with increasing age. Thrombocytopenia is very common in severe vivax infection.

***Index Terms*-** Vivax malaria, Thrombocytopenia, North Karnataka.

I. Introduction

In India 60 to 65% of the infections are due to Vivaxand 35% due to P. falciparum. Long thought to be a benign infection, Plasmodium vivaxis now recognized as a cause of severe and fatal malaria despite its low parasite biomass, the increased deformability of vivax-infected red blood cells and an apparent paucity of parasite sequestration. Large studies from bothhalves of the island of New Guinea (Indonesian Papua[3-5]and Papua New Guinea, or PNG[5]) now show a strong association between P. vivax infection and severe disease and death.Due to paucity of literature from north Karnataka, we studied the clinical profile of patients admitted with severe vivax malaria in a tertiary care center in North Karnataka from June 2011 to May 2012.

II. Methods and Material

A prospective study was planned from June 2011 to May 2012in a tertiary care Centre in North Karnataka. Patients willing to give consent, older than 15 years of age and of either sex, with smear positive for Plasmodium spp. were included in the study. Patients with co-existent vivax and falciparum infection were excluded from the study. Detailed history and clinical examination was done. Of the 95 patients admitted, 50 were with severe vivax malaria and 45 with severe falciparum malaria. Routine hematologica land biochemical investigations were carried out. Patients were followed up till discharge or death. Clinical profile of these 50 patients with vivax malaria was studied. The study was approved by hospital ethical committee.

III. Results

Out of 100 admissions of severe malaria defined according to WHO criteria, 95 patients of severe malaria were recruited in the study after excluding cases with mixed vivax and falciparum infection. There were 50 patients admitted with severe vivax malaria, 29 males and 21 females. The most common age group was 15-30 years. Seasonal variation was observed with pooling of cases from July to September. The most common symptom was fever (98%), vomiting (72%), headache (50%), jaundice (40%)followed by cough, pain abdomen and altered sensorium. The most common laboratory abnormality was Thrombocytopenia 24(48%) was the most common complication followed by renal (46%), hepatic (42%) cerebral (16%) and pulmonary (4%) involvement(table).6 patients died of severe vivax malaria (12%). The mortality in vivax malaria group increased with advancing age.

IV. Discussion

The reported severe manifestations in vivax malaria include cerebral malaria[6], hepatic dysfunction[7,8] renaldys function [9,10], severe anemia [11,12], ARDS, and multiple organ involvement. In this prospective study, we recruited95 patients fulfilling the criteria for severe malaria during the study period from June 2011 to May 2012.Out of these, 50(52.6%) were admitted with severe Plasmodium vivax malaria and 45 (47.4%) had severe Plasmodiumfalciparummalaria. Death rate observed in severe vivax malariawas 12%. Mortalityhas been relatively similar across various hospital-based trials regarding severe malaria, despite differences in inclusion criteria, patterns of presenting

conditions, and standard of care. The report from Bikaner on case series of severe vivax malaria had mean age of29.65 ± 11.72 years. Thus our study saw patients admitted with severe vivax malaria in the age groups 15-30 years. The mortality was observed in older individuals, thus increasing age could indicate a red flag while treating patients with vivax malaria and extra caution could be exerted. The factors responsible for the age pattern include outdoor work for young adult males and outdoor sleeping habits are more prone to getmosquito bites. Mortality in vivax malaria increased with age. The reportedcase-fatality rate associated with severe malaria varies widely. A large multicenter treatment trial conducted in Asia concluded that presenting syndromes in severe malaria depend on age and age is an independent risk factor for a fatal outcome of the disease.[11]Thrombocytopenia was the most common finding in vivax malaria. Bleeding due to thrombocytopenia was seen in the form of epistaxis, melena, petechiae, ecchymosis, hematuria, subdural hematoma all necessitating platelet transfusions. The frequency of renal failure was 46% in severe vivax malaria. Majority of the patients were treated conservatively with fluid and diuretic therapy, but 4%required renal replacement therapy in the form of hemodialysis. The maximum creatinine observed in severe vivax malaria was 8.7mg%. Areport on case series of severe vivax malaria done in Bikaner states that complications observed were hepatic dysfunction and jaundice in 23 (57.5%) patients, renal failure in 18 (45%) patients.[8]Thus hepatic dysfunction was the most common complicationseen in severe vivax malaria in the study in followed byrenal failure. The article on burden of malaria in India highlighted increasing frequency of renal failure in severe malaria.[8]Another study done in Banaras Hindu University concluded that P. vivax malaria can cause ARF, which occurs more commonly in P. falciparum malaria. The prognosis of ARF in P.vivax malaria is favourable.[6]The incidence of hepatic involvement was 42% in vivax malaria. The maximum bilirubin seen was 9 mg% in vivax malaria. None of the patients invivax malaria group with hepatic involvement had signs of encephalopathy. Cerebral involvement was seen in 16% of patients with severe vivax malaria. Cerebral malaria was seen in all age groups but maximum patients were in the extremes of their ages. Three patients presented with status epilepticus. Status epilepticus due toPlasmodium vivax malaria has been reported in India andTurkey.[12]The possible mechanism for cerebral malaria in vivax malaria has been proposed to be due to nitric oxide production. We found 2 patients with vivax malaria with ALI/ARDS both succumbed to death. 8 patients had multi organ dysfunction. The proportion mortality was higher in vivax malaria with lung involvement. The arterial pH in dead patients was significantly lower in vivax malaria. The mean pH observed was 7.30 with the lowest value of7.10. Lactic acidosis has been identified as an important cause of death in severe malaria.[13] Thus our study also came to the same inference that metabolic acidosis is an independent risk factor for outcome of severe malaria.75% of patients who died of severe vivax malaria had multi organ dysfunction. The commonest organ combination observed was thrombocytopenia with renal involvement. This was recently reviewed in a WHO sponsored workshop at Rourkela which revealed an increasing trend in favor of renal and hepatic failure and multiple organ dysfunction.

V. Conclusions

Severe vivax malaria is now very common with increasing mortality and increases with increasing age. Thrombocytopenia is very common in severe vivax infection. Also, renal, hepatic, lung and cerebral involvement are also occurring with increasing frequency. Along with age, severe metabolic acidosis is an independent risk factor for fatal outcome. Malaria is a significant and serious health problem in Karnataka state and increasing in North Karnataka. In the recent years there has been a sharp rise in the incidence of malaria in this region due to rapid growth and development, which has led to construction boom and deforestation and now represents a major challenge for public health in urban areas. There is a rise in the number of malaria cases with the onset of rainy season and so is the incidence of Vivax in the recent years, which is a matter of concern. In spite of advances in detection and management of malaria, deaths due to its complications are still inescapable. It is indicated that adequate vector control measures associated with active surveillance with the help of primary health care system will certainly reduce the malaria transmission and severe morbidity and mortality of the diseases in this part of India.

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Table: clinical features and laboratory parameters

CLINICAL FEATURES	NUMBER OF PATIENTS	%
Fever	49	98

Nausea and vomiting	36	72
Headache	25	50
Jaundice	20	40
Cough	18	36
Pain abdomen	10	20
Altered sensorium	8	16
LABORATORY PARAMETERS		
Thrombocytopenia	24	48
↑creatinine	23	46
↑bilirubin	21	42
Low hemoglobin	18	36
Blood Ph< 7.3	9	18

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