OCCURRENCE AND SEVERITY OF ACUTE RENAL FAILURE IN MALARIA

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ABSTRACT

Objective: To assess the occurrence and severity of acute renal failure in hospitalized malaria patients.

Patients and Methods: In a hospital based set up out of 400 cases of fever, 102 were detected with positive malarial parasite. Clinical history and assessment were recorded in all the study patients and all other known etiological causes of fever and jaundice were excluded by relevant investigations. The renal function test including both Blood urea and serum creatinine was done for the patients.Acute Renal Failure(ARF): Those with serum creatinine >1.5 mg% and normal size kidneys on USG were included in ARF and further divided in 3 groups: mild (Scr < 2 mg%), moderate (Scr 2-5 mg%) and severe (Scr>5mg%).

Result: Of total 102 malaria positive patients, Plasmodium falciparum was seen in 6 patients (5.88%), plasmodium vivax in 46(45.09%) and mixed infection in 50patients (49.01%). Eleven patients (10.78%) out of 102 patients had ARF and malarial positive.

Plasmodium falciparum was the causative agent in 1; *P.vivax* in 3 and mixed infection in 7 patients. Out of 102 patients two patients had severe renal failure with creatinine values more than 5mg/dl. 89.22% of patients with malaria had serum creatinine below 1.5mg/dl.

Conclusion: It can be concluded that in south kanara region it is the mixed and plain *P.vivax* which was more common.ARF occurs commonly in *plasmodium falciparum* malaria but in our study it has been reported in mixed & *plasmodium vivax*.

KEY WORDS: Malaria, Acute renal failure, Occurrence, Severity.

1. INTRODUCTION

Malaria is caused by four species of the genus *Plasmodium* namely, *Plasmodium vivax, P. falciparum, P. malariae and P. ovale*. Common clinical presentations of infection with all four *Plasmodia* species are periodic paroxysm, chills, rigors, sweating, body aches, headache, nausea, general weakness and prostration[1]. Severe life-threatening complications such as cerebral malaria (CM), severe anemia, acidosis, respiratory distress, jaundice, acute renal failure (ARF), acute respiratory distress syndrome (ARDS), etc occur mostly with *P. falciparum* infection. A few reports have appeared indicating association of severe complications of malaria with *P. vivax* infection [2-4]. An upsurge in the incidence of ARF in malaria has been reported in India and varies from 13% to 17.8%[5].

Acute renal failure (ARF) occurs as a complication of *P. falciparum* malaria in

less than 1% of cases, but the mortality in these cases may be upto 45%[6].The overall prevalence of ARF in *falciparum* malaria varies between < 1% to 60%[7]. ARF occurs commonly in *plasmodium falciparum* malaria, although it's rare occurrence has been reported in *plasmodium vivax* malaria[8]. ARF is usually associated with intravascular haemolysis or heavy parasitaemia [9]. ARF lasts from few days to several weeks and is occasionally non oliguric type. Several factors; including various chemical mediators, catecholamine release, cytoadherence of parasitized erythrocytes and associated haemorrhaeologic changes, intravascular coagulation, intravascular haemolysis, hyperbilirubinaemia and severe hyperpyrexia have been implicated in the pathogenesis of ARF in Malaria [10].
Only a few research studies are available from Indian subcontinent on malarial acute renal failure. This study was conducted with the aim to study the occurrence and severity of ARF in malaria.

2. MATERIALS AND METHODS

The present study is a hospital based prospective study done in A.J. INSTITUTE OF MEDICAL SCIENCES. It is a tertiary referral centre. This hospital is located in Mangalore, in South Kanara district, Karnataka. The study was done among patients admitted in department of General Medicine, 400 cases of fever suspected to have malaria were evaluated for malarial parasite by florescent technique, and 102 were detected with positive malarial parasite.

2.1. Inclusion criteria:

Patients with fluorescent technique positive for malarial parasite (MP) were included in the study.

2.2. Exclusion criteria:

While patients with other systemic illness interfering with study is excluded.
Patient with age group <15yrs were excluded.Clinical history and assessment were recorded in all the study patients and all other known etiological causes of fever and jaundice were excluded by relevant investigations. The renal function test including both Blood urea and serum creatinines were done for the patients. All the patients were subjected to complete haemogram, routine examination of urine, estimation of blood sugar, liver function tests, ultrasonography (USG) of abdomen, serum leptospira antibody, HIV, HBsAg and HCV were done.
Estimation of coagulation profile for disseminated intravascular coagulation (DIC) and arterial blood gas analysis were carried out when indicated. All the patients were subjected to peripheral smear. Blood was obtained by pricking finger. Thick and thin smears were prepared, stained with Giemsa and examined under the microscope.

2.3. Acute Renal Failure:

Those with serum creatinine >1.5 mg% and normal size kidneys on USG were included in ARF and further divided in 3 groups: mild (Scr < 2 mg%), moderate (Scr 2-5 mg%) and severe (Scr >5 mg%).

3. RESULTS

The Study was conducted among 102 patients with MPFT positive result. Out of these majority of patients 79(77.45%) were males. The common age group affected were between 20-45(67.64%). Table I.
All the patients were investigated for renal impairment. Serum creatinine was checked. Of total 102 malaria positive patients, *Plasmodium falciparum* was seen

in 6 patients (5.88%), *plasmodium vivax* in 46(45.09%) and *mixed infection* in 50 patients (49.01%) Table II. Eleven patients (10.78%) out of 102 patients had ARF and malarial positive. *Plasmodium falciparum* was the causative agent in 1; *P.vivax* in 3 and mixed infection in 7 patients. Out of 102 patients two patients had severe renal failure with creatinine values more than 5mg/dl.89.22% of patients with malaria had serum creatinine below 1.5mg/dl. Six of the patients had mild renal failure out of 1 each was *P.falciparum* and *P.vivax* and four were mixed infection. Three patients had moderate renal failure. *P.Vivax* was detected in 1 and mixed infections were noted in 2 patients. 2(1.96%) patients among 102 came with severe renal failure and needed haemodialysis

4. DISSCUSSION

Incidence of ARF in malaria in our study group was 10.78%. Only two patients needed haemodialysis. Mixed infection was the commonest but *P.vivax* was also found to be the cause of severe ARF.

P.falciparum was the least noted in our study (5.88%) and mixed infection showing 49.01% and *P.vivax* showing 45.09%; thus showing that in South Kanara region it is the mixed and plain *P.vivax* which was more common.

Men were more affected in our study as compared with women, similar to observations of other groups [11-13].This could be explained by the fact that men are more mobile and also the working class was more affected compared to the geriatric population.

Our study showed no mortality in malarial ARF, which was not consistent with other studies which reported 15-45% mortality [14].

Among the plasmodium species, only *falciparum* was usually associated with ARF. This finding is documented in majority of the studies [15] but our study also showed 27.3% of patients having ARF with *P.vivax* similar to some other studies[12, 16].

Precise mechanism of renal failure in malaria is not clearly known. Several hypotheses including mechanical obstruction by infected erythrocytes, immune mediated glomerular pathology, fluid loss due to multiple mechanisms and alterations in the renal microcirculation, etc have been proposed [17].

5. CONCLUSION

It can be concluded that in South Kanara region it is the mixed and plain *P.vivax* which was more common.ARF occurs commonly in *plasmodium falciparum* malaria but in our study it has been reported in patients with mixed infection & *plasmodium vivax*. In the patients presenting with fever, jaundice and acute renal failure, there should be a high index of suspicion for malaria even in the face of negative blood film. Early and prompt diagnosis along with anti-malarial therapy, are the main measures likely to reduce the malarial ARF in this setting. Haemodialysis is an effective treatment for malarial ARF. Early referral of malarial ARF patients to dialysis facility unit and early institution of haemodialysis in complicated *falciparum* malaria may further reduce mortality and enhance recovery function.

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Table I: Age and sex distribution in the study group

Sex (%)			
AGE	**MALES(%)**	**FEMALES(%)**	**TOTAL(%)**
15-19 YEARS	10(9.80%)	2(1.96%)	12(11.76%)
20-45 YEARS	57(55.88%)	12(11.76%)	69(67.64%)
45 &ABOVE	12(11.76%)	09(8.82%)	21(20.58%)
Total	79(77.45%)	23(22.55%)	102(100%)

Table II: Serum creatinine levels in study groups

	S.creat(<1.5) Normal(%)	**S.creat(1.5- 2mg Mild (%)**	**S.creat(2-5) Moderate(%)**	**S.creat (>5mg/dl) severe(%)**	**Total**
P.falciparum	5(83.33%)	1(16.66%)	0	0	6(5.88%)
P.vivax	43(93.47%)	1(2.17%)	1(2.17%)	1(2.17%)	46(45.09%)
Mixed	43(86%)	4(8%)	2(4%)	1(2%)	50(49.01%)
Total	91(89.21%)	6(5.88%)	3(2.94%)	2(1.96%)	102(100%)