ORIGINAL RESEARCH

Study of Spectrum of Renal Disease in Falciparum Malaria

Nithya Chandra[1], V Chandra Sekhar[1], Prudhvi Chand Mallepaddi[2]

ABSTRACT

Introduction: Malaria still remains the foremost reason for death among the developing countries. Aim of the study was to study the clinical profile, renal parameters and the renal complications in falciparum malaria.

Materials & Methods: History of 70 patients of Plasmodium falciparum was taken and clinical examination was done for all patients. Peripheral blood smear was examined and tested for presence of malaria parasite by QBC method, severity of parasitaemia was assessed by EPI. Other investigations done were blood urea, Blood sugar, Serum creatinine, Serum electrolytes(Na, K), Serum bilirubin, TC, DC, ESR, Hb. Serum creatinine > 3gm/dl was taken as renal failure. Urinary investigations include urine for Albumin, sugar deposits and 24 hours urine protein.

Results: Among 70 patients, 48(68%) were males and 22 (32%) were females, in which incidence of occurrence of cases was more during 3rd, 4th and 5th decades in males & in females it was during 2nd & 3rd decade of life. Total percentage of occurrence of clinical features like fever was (100%) in both males and females, neck stiffness(57%), chills and rigors(91.4%), ARDS(0%), jaundice (45.7%), ↓ urine output (10%), altered sensorium (27.1%), convulsions (8.5%), vomiting (57%), diarrhoeae (8.57%), dyspnoea (8.5%), dehydration (15.7%), anemia (72.8%), hypotension (14.2%), splenomegaly (62.8%), hepatomegaly (38.5%), hepatosplenomegly (21.4%). 84.2% of patient's WBC count were in normal range, 1.4% showed leucopenia, 14% showed leucocytosis. 5.7% patients were anemic. 20% patients were severe by anemic with hyperparasitemia showing >5% of EPI Index. 4.28% patients were hypoglycemic. >3 mg/dl of serum creatinine levels were seen in 4% and <3 mg/dl is found in 88% of patients in our study. The mean values of blood urea and serum creatinine who had ARF was 160.60 ± 28.30 mg% & 7.98 ± 22.16 respectively. 57.14% of serum bilirubin of <3mg/dl was seen, where as 42.8% were >3 mg/dl. 57.14% were hyponaraemia, 1.42% were hyperkalaemia. 15.7% were hypokalaemia. 31.4% of patient's 24 hr protein in urine remained in normal limits. Out of 70 patients included in study 6 (8.5%) patients had acute renal failure, among which death was seen in 4(66.66%) and 2(33.33%) survived.

Conclusion: Among the renal manifestations, ARF is the most common manifestation of severe falciparum malaria. The clinical spectrum of renal involvement in Plasmodium falciparum infection ranges from mild proteinuria and urinary sediment, abnormalities in electrolytes to acute renal failure. The renal involvement in P. falciparum infection is usually reversible if treated appropriately.

Keywords: Falciparum malaria, clinical examination, erythrocyte parasitic index (EPI), serum creatinine, renal complications, acute renal failure.

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INTRODUCTION

Malaria today, still remains as it has been for centuries, one of the most serious parasitic disease of the world affecting 300-500 million people and causing over 1 million deaths each year.[1] Human malaria is a parasitic disease of red blood cells transmitted by female anopheles mosquito caused by four species of plasmodium genus. In India, P.vivax and P. falciparum are the main cause of malaria. Almost every organ system is affected in patients with P. falciparum infection. In fact it is an important cause of multiple organ failure[2] including brain, kidneys, liver and heart[3] etc. The clinical spectrum of renal involvement in P.falciparum infection ranges from mild proteinuria and urinary sediment abnormalities electrolyte changes to acute renal failure.[4] Among the renal manifestations ARF is the commonest manifestation of severe falciparum malaria. Unlike the renal involvement in P.malariae infection which is associated with chronic progressive glomerulonephritis leading to chronic renal failure,[5] renal involvement in P.falciparum infection is usually reversible if treated appropriately. The incidence of acute renal failure in falciparum infection ranges between 1% to 4.8%.[5-7] Because of cerebral symptoms cerebral malaria is usually diagnosed and the renal aspect of the disease is overlooked.[8] In view of above the present study is undertaken to study the spectrum of renal disease in falciparum malaria.

MATERIALS AND METHODS

In this prospective study, Seventy patients diagnosed of plas-

modium falciparum malaria were included. Clinical history & Clinical examination was done for all patients. Peripheral blood smear was examined for the presence of malaria parasite by QBC method the severity of parasitaemia was estimated by EPI. The other investigations done were blood urea, blood sugar, serum creatinine, serum electrolytes(sodium, Potassium), serum bilirubin, TC, DC, ESR, Hemoglobin. Serum creatinine > gm/dl was taken as renal failure. Urinary investigations included urine for Albumin, sugar, Deposits, 24 hours urine protein.

RESULTS

Among 70 patients, 48(68.5%) males and 22(31.39%) females (Table No. 1) were recorded between the age group of 13 to 72 years. Total percentage of occurance of clinical features in males and females like fever was (100%), neck stiffness(57%), chills and rigors(91.4%), ARDS(0%), jaundice (45.7%), ↓ urine output (10%), Altered sensorium (27.1%), Convulsions (8.5%), Vomitings (57%), diarrhoeae (8.57%), Dyspnoea (8.5%), dehydration (15.7%), Anemia (72.8%), Hypotension (14.2%), splenomegaly (62.8%), Hepatomegaly (38.5%), Hepatospleomegly (21.4%) were seen (Table:1).

84.2% of patient's WBC count were in normal range, 1.4% showed leucopenia, 14% showed leucocytosis. 5.7% patients were anaemic, 20% patients were severe anaemic with hyperparasitemia showing >5% of EPI Index. 4.28% patients were hypoglycemic. >3 mg/dl of serum creatinine levels were seen in 11.4% and <3 mg/dl is found in 88% of patients in our study. (Fig. 1)

The mean values of blood urea and serum creatinine who had ARF was 160.60 ± 28.30 mg% & 7.98 ± 22.16 respectively. 57.14% of serum bilirubin of <3mg/dl was seen, where as 42.8% were >3 mg/dl. (Fig. 2)

57.14% were hyponatremia, 1.42% were hypernatremia. 15.7% were hypokalaemia. 15.7% were hyperkalaemia, remaining 75.7% patient's potassium levels remained in nomal limits. 30.4% of patient's 24 hr protein in urine remained in normal limits. (Fig. 3).

Fever was the most common symptom among the ARF patients accounting for 100% followed by jaundice in 83%. (Fig. 4)

Out of 70 patients included in study 6 (8.5%) patients had acute renal failure, among which death is seen in 4 (66.66%) which 2 (33.33%) survived.

Symptom	Total no (%)	Males (%)	Females (%)
Fever	70	48	22
Neck Stiffness	4	4	0
Chills and rigors	64	44	20
ARDS	0	0	1
Jaundice	32	22	10
↓Urine output	7	4	3
Altered sensorium	19	13	6
Convulsions	6	4	2
Vomitings	40	17	13
Diarrhoea	6	4	2
Dyspnea	6	4	2
Dehydration	11	3	3
Anaemia	51	13	18
Hypotension	10	5	5
Splenomegaly	44	30	14
Hepatomegaly	21	16	11
Hepatosplenomegaly	15	11	4

Table-1: Occurance of clinical features - sex wise

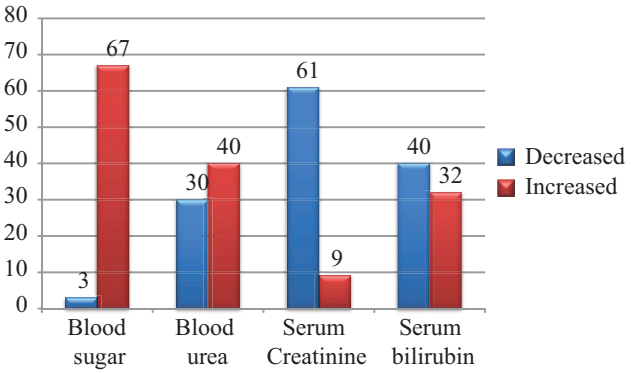

Figure-1: Relation between blood sugar, blood urea, serum creatinine & serum bilirubin

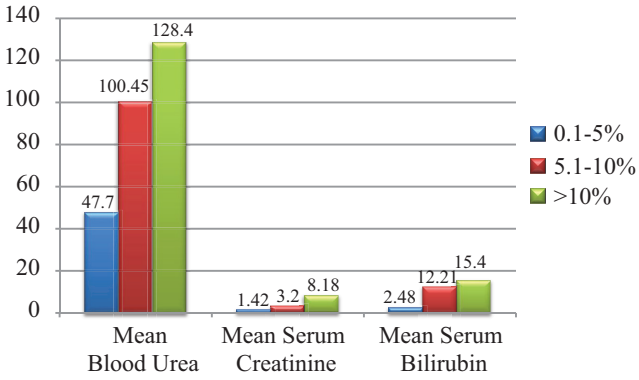

Figure-2: Relation between mean blood urea, mean serum creatinine & mean serum bilirubin

DISCUSSION

Falciparum malaria is one of the common parasitic diseases causing high morbidity and mortality in the tropics. The clinical spectrum of renal involvement varies widely.[18] Some authors reported <1% of overall prevalence of ARF in Falciparum malaria.[19] Due to endemicity of Malaria in Eastern parts of India, the incidence of malarial ARF is high.[20] Few authors explained the association of urinary sediment abnormalities, mild proteinuria, fluid and electrolyte changes and acute renal failure (ARF) with falciparum malaria.[21]

The incidence of Malaria was more in males than in females in the ratio of 2:1. Mean age was 36.38±14.83 which coincides with study by Nitya Nand et al[9] where mean age is 32.7 ± 14 years and Maheshwari A et al[4], where mean is 35.5

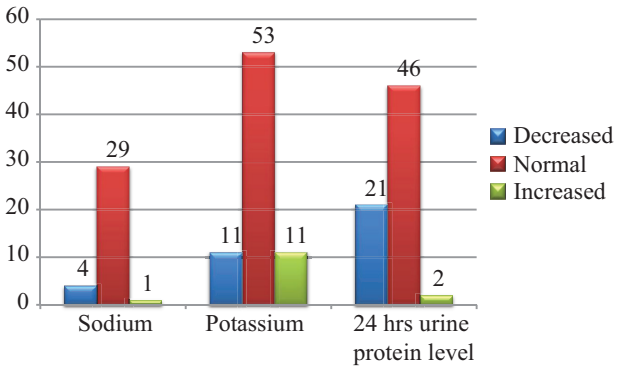

Figure-3: Relation between serum electrolytes (sodium, potassium) & 24 hrs urine protein levels

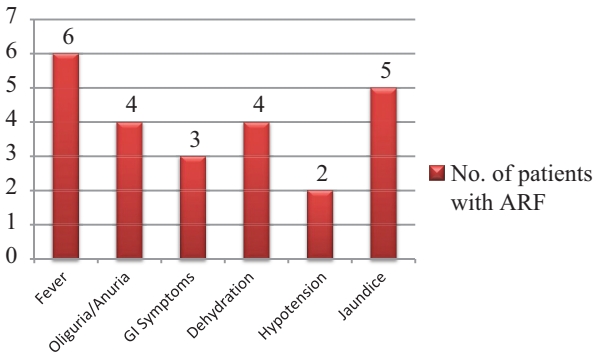

Figure-4: Clinical features in patients with acute renal failure

yrs. Fever was the universal clinical feature accompanied by chills and rigors in 92.5% cases. The percentage of different clinical features presented by the patients in the present study was corroborated by different studies as shown in Table. 2

The results and percentage in our study regarding ARDS (1.4%), Hepatomegaly (38.5%), Mean blood urea in patients with ARF(160.66±28.30 mg%), Serum Creatinine(8.8%) & Mean Serum Creatinine in patients with ARF(7.98±2.16) were similar to the studies carried by DK Kochar[14] (1.64%), AK Bhattacharya[15] (25%), AK Sharma[16] (163.7±71 mg%), DK Kochar[17] (9.07%) & AK Sharma[16] (7.8±2) respectively. Where as the results of Altered sensorium (27.1%) and Severe anemia (57%) with <5mg/dl were in contrast with results of Nitya Nand et al[13] (75%) & DK Kochar[14] (4%) respectively

Dehydration was found in our study in 15.7% of patients and Neck stiffness in seen in 4 patients and this finding is well documented in "Mansons Tropial Diseases" and "Harrisons Principle of Internl Medicine"[3].

CONCLUSION

4 out of 6 patients in our study died due to acute renal failure in falciparum malaria infection. This only shows that increased morbidity and mortality with acute renal failure

Clinical Features		Present study	Nitya Nand et al[9]	Kochar DK et al[10]	Prakash J et al[11]	Rubina Naqvi et al[12]
Jaundice		45.55	46.6%	58.85%	-	50%
Altered sensorium		27.1%	46.6%	-	-	-
Convulsions		11.4%	-	21.31%	15.4%	-
Anemia		7.8%	78.3%	-	-	-
Hypotension		14%	-	19.2%	19.2%	-
ARDS		1.4%	-	1.64%	-	-
Oliguria		10%	11.6%	5%	-	-
GI Symptoms (Diarrhoea)		8.5%	10%	-	-	-
Splenomegaly		62.8%	60%	62.35%	30.8%	-
Hepatomegaly		38.5%	33.3%	9.07%	34.6%	-
Hepatosplenomegaly		21.4%	-	20.4%	-	-
Total WBC Count	Normal	84.2%	-	80.95%	-	-
	<4000	1.4%	-	5.44%	-	-
	>400	14%	-	13.6%	-	-
Hb mean values	7.96±2.03%	7.4±2.8gm%	-	-	-	8.6±2.7%
EPI Index	81.4%	-	-	-	30.8%	-
Meal Blood Glucose	100.8±45.60	97.3±11.6mg%	-	-	-	-
Mean Blood Urea	62.57±45.26mg%	68.06±83.58mg%	-	-	-	-
Mean serum creatinine	2.34±2.16mg%	2.1±2.09mg%	-	-	-	-
Mean bilirubin	4.8±7.69mg%	7.6±8.8mg%	-	-	-	-
Hyponatraemia	57.14%	-	-	-	57%	-
Hypernatraemia	1.42%	6.8%	-	-	-	-
Hypokalaemia	15.7%	27.2%	-	-	19.2%	-
Hyperkalaemia	15.7%	2.2%	-	-	-	-
24 Hrs protein in Urine (tubular range)	67.5%	-	-	-	57.7%	-

Table-2: Clinical feautres

in falciparum infection depends mostly on prevalence of disease, reffereal patterns and other factors present in that area. In developing countires, limited medical resources at primary health care centres and late referals compound outcomes. It is important to note that acute renal failure and other multiple complications in malaria needs urgent recognition and management in any tertiary care hospital with available multidisciplinary approach.

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