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# OUTCOME OF MALARIA ASSOCIATED RENAL FAILURE (MARF) TREATED WITH ACUTE PERITONEAL DIALYSIS.

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In most of the developing world, peritoneal dialysis is widely used for MARF. In developed countries, it has been supplanted by hemodialysis (HD) and, most recently, by hemofiltration. The relative efficacy of peritoneal dialysis and hemofiltration in MARF is not known. This study was conducted in Nephrology department of Chittagong Medical College, a tertiary referral center in Southern part of Bangladesh between January 2002 and July 2005. Hundred and four adult patients with severe falciparum malaria were enrolled; 64 were assigned to peritoneal dialysis. Others were managed with conservative approach. There were 91 males and 13 females with mean age of 35.3 ±13.6 years. Most were critically ill on presentation with blood urea levels between 177 and 247mg% and serum creatinine concentrations between 4 and 8 mg%. Anemia accompanied by hyperbiluribanaemia was present in 64% of patients. The mortality rate was 30 percent (18 patients) in the group assigned to peritoneal dialysis, as compared with 50 percent (22 patients) in the group managed conservatively (P <.05). Azotaemia & hyperbiluribanaemia were significantly less in recovered patients in conservative group. Patients with lower Glasgow Coma Score (GCS) & higher Bilirubin level were found to be bad prognostic indicators (p <0.001). Intermittent Peritoneal dialysis (IPD) < 24 hrs was associated with significant case fatality (p<.05). Early detection & less multi-organ involvement plus early institution of peritoneal dialysis were found to be of favorable out come.

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## Introduction

Malaria is endemic throughout South East Asia Africa and South America. It accounts for 2-3 million deaths per year in those areas [1]. Malaria has always been a major health problem in Bangladesh. Plasmodium Falciparum malaria accounts for most of the morbidity & mortality. Clinically significant renal involvement is associated with plasmodium Falciparum and plasmodium Malariae. Plasmodium Falciparum causes acute renal failure often requiring dialysis. Acute renal failure occurs in 1-5% cases of plasmodium Falciparum malaria[2]. Renal failure is multifactorial and carries a high mortality, especially in late referral and if early, renal replacement therapy whatever in form is not available. In the developed world, both hemodialysis and peritoneal dialysis are used in acute renal failure, though in resource-poor country often peritoneal dialysis is the only available facility [3]. The aim of the present study was to analyze the outcome of MARF treated with IPD.

## Material and methods

The study was carried out at Nephrology Department of Chittagong Medical College Hospital, a tertiary referral center in Southern part of Bangladesh. 104 case of Malaria associated renal failure during three years period between January 2002 and July 2005 were reviewed. Inclusion Criteria were all smear positive malaria cases with ARF and smear negative cases with high clinical suspicion and already started anti malarial treatment. Pregnancy, age <16 years, any other condition leading to ARF and Malaria patient treated with HD were excluded from the study. The patient were grouped as fallows; group-1, 43 patients managed with conservative treatment as per patient choice and group-2, 61 patients treated with IPD. In each group Patients were further subdivided into two sub-groups: those who survived and those who expired during the period. Age, oligo-anuria, Jaundice and shock were taken as clinical variables. Blood urea,

serum creatinine, serum electrolyte, LFT was taken as Laboratory parameters to compare the two groups in univariate analysis. Serum creatinine >2 mg/dl was taken to be indicative of renal failure and serum bilirubin >3 mg/dl was taken as indicator of Jaundice. Peripheral Blood film stained with giemsa stain was available in all patients. However quantification of parasitaemia was not possible in all patients. So it was not considered during analysis. Complete blood count was performed in all patients. Blood urea, serum creatinine and serum electrolyte were analyzed in auto analyzer. Serum bilirubin, SGPT, SGOT and prothombin time were available in some cases. Urine when available was examined by dipstick and microscopy of centrifuged sediments. All patients were treated with quinine sulphate for 7 days. The first 6 dosages with 10mg/kg every 8 hourly and next 5 days with 2/3 of original dose every 12 hourly. IPD was done in patients with oligoanuria (Urine volume <400 ml/day), rising serum creatinine with or without oliguria and serum bilirubin >3 mg/dl. Same type of dialysis fluid supplied by IPH (Institute of public Health, Mohakhali, Dhaka) was used for all patients. Catheter used was 'peritocat catheter' set, manufactured by B. Braun Melsengen AG, Germany. In each liter of IPD fluid 0.1 cc (100-unit) heparin was added. Duration of dialysis was 48 hours in all patients who survived. A. P - value of < 0.05 was taken as significant for statistical analysis. The data was processed using soft ware package SPSS, version -12. Samples were obtained with the informed consent of the subjects or their attendant relative. The department committee approved the study.

## Results

Between January 2002 and July 2005 104 case of malaria associated renal failure were enrolled. Malaria affects young and male predominates over female. fever, jaundice and oliguria are main characteristics of malaria associated renal failure (Table I). Patients are anaemic with serum creatinine concentration >4 mg% (Table II). In patients managed with conservative treatment, hyperbiluribanaemia and albuminuria had significant correlation with mortality (Table III).In dialysis group expired group is of higher age, had more systolic and diastolic blood pressure, more anaemic ; oligo-anuria and hyperbilirinaemia were more frequent and had more severe degree of renal impairment (Table IV). There were 18 deaths (30 percent) in the group assigned to peritoneal dialysis as compared with 22 (50 percent) in the conservative group. In dialysis group only 2(11%) death occurs when dialysis continued for more than 24 hours (TableV)

**Table I**: Demographic and clinical characteristics

| Parameter | Number (percentage) |
|---|---|
| Total ARF pts | 293 |
| Study Population | 104(35 .49%) |
| Age(mean±SD) | yrs 35.3 ±13.6 |
| Gender(M:F) | 7:1 |
| Fever | 104(100%) |
| Oliguria | 62 (60%) |
| Anuria | 17(16.3%) |
| Jaundice | 67(64.3%) |
| GIT symptoms | 13(12.5%) |

**Table II**: Laboratory variables

| Variables | Mean ±SD | CI(95% of mean) |
|---|---|---|
| Hemoglobin(g/dl) | 8.515 ± 2.49 | 7.75-9.22 |
| Blood urea(mg/dl) | 212.45 ± 89.87 | 177.75-247.18 |
| Serum creatinine (mg/dl) | 6.30 ± 3.42 | 4.89-7.71 |
| Platelet(mm3) | 102923 ±89682 | 60950-144896 |

**Table III**: Indicators of mortality in conservative group

| variables | percentage |
|---|---|
| Raised ALT (more than twice) | 14% |
| Hyperbilirubinaemia | 95.5% |
| Hyponatraemia (<130meq/l) | 20.8% |
| Hyperkalaemia (>5.5meq/l) | 6% |
| Albuminuria (+ or more) | 42.5% |

**Table IV**: Indicators if mortality in IPD group

| Indicators | Recovered (n-=43) | Expired (n=18) |
|---|---|---|
| Age(Yrs) (Mean ±SD) | 36.10±9.81 | 36.45±13.46 |
| SBP (mmHg) | 114.50 ±13 | 119.58±20.24 |
| DBP (mmHg) | 65.62 ±14.98 | 71.25 ±6.40 |
| Oligo-or anuria | 21(48.8 %) | 10(55.6%) |
| GCS <12 | 11(18.03 %) | 10(55.6%) *p<0,001 |
| Hb (gm %) | 8.71 ±2.49 | 8.53 ±2.38 |
| Bilirubin >3mg% | 8(18%) | 13(72%) *p <0.001 |
| Urea (mg %) | 178.87 ±96.25 | 253.12 ±113.4 |
| Creatinine (mg %) | 5.70 ±1.95 | 6.47 ±3.1 |

*p value : <0.05 significant

**Table V**: Comparison of Mortality in Conservative & Dialysis group

| | Conservative | IPD | | |
|---|---|---|---|---|
| | 43 (40%) | 61 (56%) | | |
| Expired | 22 (50%) | 18 (30%); p=0.05 | | |
| Dialysis duration | | >24 hrs | <24 hrs | p-Value |
| | | 02(11%) | 16(89%) | <0.05 |

**Discussion**

Acute renal failure associated with malaria and septicemia are major causes of death among adults in the developing world4. In resource-poor country renal-replacement therapy is often beyond the capacity due to high cost and lack of logistic support. However, infection-related acute renal failure has a mortality rate of over 70 percent if treated conservatively5.In contrast to the situation in developed countries, acute renal failure in resource-poor countries often affects the young as in our study [6]. Different factors contribute to high mortality besides degree of renal failure. They are anaemia, hyperbiluribanaemia, hypotension and less GSC at the time of renal failure detection. It is consistent with other studies[7]. Acute peritoneal dialysis instead of haemodialysis has been used extensively in developing countries for the treatment of acute renal failure because of its relatively less expense and more practical in our situation. In richer countries, short-term peritoneal dialysis is soon replaced by either short-term hemodialysis or continuous hemofiltration[5]. These effective techniques are not available at all hospitals in our country though IPD can be done even at remote upazilla health care centres. Peritoneal dialysis was first introduced at this referral center in 1986. In Vietnum it resulted in a 50 percent decrease in mortality from malaria-associated acute renal failure[5]. In our study also there is only 30% mortality in IPD group where as is as high as 50% in conservative group. Only with minor training and with minimum cost IPD can be conducted in rural hospitals. Because of relatively small study death may not be the primary outcome measure, yet it is significant. In other studies even in developing country mortality is not significantly different in haemodialysis than IPD[5]. Though even in IPD, expired groups are clinically sicker and had more severe renal impairment yet continuing dialysis more than 24 hours reduces mortality significantly. It is also consistent with other studies [8].

**Conclusion**

Like other studies our findings provide evidence that early detection, less multi-organ involvement, early institution of IPD and continuing use of peritoneal dialysis for MARF is associated with a significantly better clinical outcome.

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