SPECTRUM OF ACUTE RENAL FAILURE IN A SERVICE HOSPITAL

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ABSTRACT

A prospective study of 82 patients with acute renal failure was carried out over the last 2 years. Mean age of the patients was 35.6 years (8-82 years). Male to female ratio was 3.5:1. The etiological factors were septicemia in 18 patients (21.95%), aminoglycoside toxicity in 16 patients (19.51%), open heart surgery in 8 patients (9.76%), volume depletion and blood loss in 12 patients (14.63%), glomerulonephritis in 4 patients (4.88%), renal allograft dysfunction in 4 patients (4.88%), and miscellaneous causes in 20 patients (24.39%). Non-oliguric renal failure was observed in 39.02 per cent cases. Dialysis support was required in 65.8 per cent of the cases; with average 5.6 (4 to 11) dialysis sessions. Four patients of acute renal failure following open heart surgery were given continuous arterio-venous haemofiltration. Overall mortality was 32.5 per cent, septicemia accounting for 60 per cent of the deaths.

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KEYWORDS: Antibiotics; Aminoglycoside; Renal failure acute; Septicemia.

Introduction

Acute renal failure (ARF), defined as rapid deterioration in renal function, is an important cause of morbidity and mortality. ARF can develop in patients with any disease and thus no physician can ignore it [1]. The frequency of ARF varies greatly depending upon the clinical setting. For example, the frequency among patients is 1 per cent at admission to the hospital [2], 2 to 5 per cent during hospitalization [3,4], and as high as 4 to 15 per cent after cardiopulmonary bypass [5]. In India, the spectrum of ARF is somewhat different from that of the western world; the geographical location, population explosion, poverty, malnutrition, poor socio-economic status, rains and flood havocs, all contributing to the modified picture [6]. The predisposing factors giving rise to ARF also vary from place to place within the country. Thus snake-bite induced ARF is as high as 28 per cent in north India [7], while leptospirosis is an important cause in Kerala and Tamil Nadu [7,8]. Epidemic gastroenteritis and bacillary dysentery which coincide with the rains and floods constitute

the major cause of ARF in north eastern India [10]. Moreover, the pattern and presentation of ARF has been changing over the years [11,12]. The present study was carried out to review the etiology, risk factors, clinical course and outcome of ARF in our setting and compare our data with others.

Materials and Methods

Eighty two cases of ARF admitted to a large military hospital over a period of two years formed the material for this study. The criteria of diagnosis of ARF was acute deterioration of renal function as evidenced by a progressive rise of serum creatinine by more than 0.5 mg/dL or by > 50 per cent over the baseline values if it was already above 2.0 mg/dL [13]. Patients with pre-renal azotemia and obstruction were excluded from this study. ARF was classified as non-oliguric if the urine output was >400 mL/day.

Detailed history, physical examination and laboratory investigations were undertaken in each case to establish the cause of ARF. Kidney biopsy was carried out when the cause was suspected to

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be either rapidly progressive glomerulonephritis (RPGN) or acute interstitial nephritis or when the cause was obscure or when the patient failed to show recovery even 3 weeks after the onset of ARF.

Haemodialysis, peritoneal dialysis and continuous arteriovenous haemofiltration was carried out depending upon the clinical requirements. The patients were followed-up till return of renal function to normal or death.

Observations

A total of 82 patients satisfied the criteria of ARF. There were 64 males and 18 females, (M:F ratio being 3.5:1). The age of the patients ranged from 8 to 82 years. Baseline serum creatinine was less than 1.5 mg/dL in 75 cases.

The aetiology of ARF is charted in the Table. Septicaemia was found to be the commonest cause (18 patients) followed by aminoglycoside toxicity (16 patients). Eleven patients developed ARF in the post-operative period out of which 8 patients had undergone open heart surgery. Volume depletion and blood loss accounted for ARF in 12 patients, glomerulonephritis in 4 and graft dysfunction in 5 patients. Among the miscellaneous causes, the important ones were falciparum malaria, burns and viperine snake envenomation.

TABLE I
Etiological factors of acute renal failure

Etiological factor	No. of patients	Percentage
Septicaemia	18	21.95
Nephrotoxic drugs	16	19.51
Volume depletion	4	4.88
Blood loss	8	9.76
Open heart surgery	8	9.76
Graft dysfunction	4	4.88
Glomerulonephritis	4	4.88
Snake bite	1	1.22
Falciparum malaria	2	2.44
Pregnancy related	2	2.44
Cardiogenic shock	4	4.88
Burns	2	2.88
Miscellaneous	9	11.08

Oliguria was observed in 59.2 per cent of cases whereas 41.8 per cent were non-oliguric. Non-

oliguric ARF was more common following nephrotoxic insult. Dialysis was required in 62.8 per cent of patients with an average of 5.6 (4 to 11) dialysis sessions. Four patients who had developed ARF following open heart surgery were taken up for continuous arteriovenous haemofiltration.

Kidney biopsy was done in 26 patients. Renal histology revealed acute tubular necrosis in 16 patients, diffuse proliferative glomerulonephritis in 3 cases, crescentic glomerulonephritis in one case, acute interstitial nephritis in 3 patients and features of acute rejection in 3 cases.

Overall mortality was 32.5 per cent. Septicaemia accounted for death in 15 patients, gastrointestinal bleed in 3, circulatory failure in 3 patients, pulmonary oedema in 2 and hyperkalaemia in 2 cases.

Discussion

ARF is a common clinical syndrome and is associated with high mortality. Only a few studies have reported the spectrum of ARF. The entity is more common in seriously ill patients admitted to intensive care units [3,4,14].

The pattern of ARF is variable in different studies and within India itself, there are differences in the etiology of ARF in different parts of the country [15-18]. Moreover the pattern has changed considerably in recent years [11,12].

In our hospital based study, septicaemia has emerged as the commonest cause of ARF, accounting for 22 per cent of the cases of ARF. In some of the other studies also, septicaemia has been reported as one of the leading causes of ARF particularly in a hospital setting [4,12,14,19]. Volume depletion and blood loss due to trauma have been reported to be the main causes of ARF in other studies [6,10,17]. However in our study they accounted for a much lesser number of cases, most likely due to better medical care available even in the peripheral hospitals of the armed forces.

Our results have also shown a high incidence of ARF due to aminoglycosides. The incidence of ARF due to aminoglycosides is reported to be on the rise [13,14,19] because of their widespread use particularly in the seriously ill and immunocompromised patients. The renal failure due to aminoglycosides could be minimized by a careful watch

over the hydration status of the critically ill patients and regular monitoring of their renal function.

The commonest histological lesion observed in the patients subjected to kidney biopsy was acute tubular necrosis as has been the observation in almost all the reported studies.

The mortality in ARF remains particularly high despite considerable advances in the dialysis modalities. The mortality in our study has been comparable with other studies [4,12,19,21,22] and the major causes of mortality are also the same. The control of infection with appropriate measures is an important step towards reducing the mortality.

In summary, septicæmia and aminoglycoside toxicity have emerged as the main causes of ARF in our study, with infection being the major cause of mortality. The incidence of ARF and the related mortality and morbidity could be curtailed by meticulous attention to control of infection and judicious use of drugs.

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