THE PATTERN OF ACUTE RENAL FAILURE IN NORTHERN PAKISTAN: A STUDY OF 100 CASES

ARBAB NISAR AHMAD KHAN, NAVEED ABBAS ZAIDI AND AKHTER ALI

Department of Nephrology,
Postgraduate Medical Institute,
Lady Reading Hospital, Peshawar.

SUMMARY

100 patients with acute renal failure (ARF), age range 5 to 65 years were studied during 9-month period (July 1997- March 1998). Septicaemia alone was the commonest cause (20%). Other common causes included diarrhoeal illnesses (14%), acute glomerulonephritis (11%), abortion (10%), obstructive uropathy (10%), puerperal sepsis (9%) and nephrotoxins (6%). Overall, medical causes were responsible for 63%, surgical 16% and obstetric 21% cases of ARF. Dialysis was given in 70% of the cases. Mortality was 8%. The results of this study shows that the aetiological pattern of ARF in our region is different from the developed countries and was responsible, we believe, for the low mortality in this study.

INTRODUCTION

Acute renal failure (ARF) is a common problem in clinical nephrology. The aetiological pattern varies from one region to another and is closely related to the socio-economic and environmental factors within the region. In the developed countries, ARF usually occurs in patients following a major surgical procedure complicated by multiorgan failure (MOF) and often associated with a very high mortality.[1,2] Studies from developing countries, however, show a different disease pattern and a better outcome despite relatively poor facilities.[3] The aim of our study was to look at the aetiological pattern of ARF in our region and compare this with other parts of the world.

MATERIAL AND METHODS

One hundred patients with ARF referred to the department of nephrology, Postgraduate Medical Institute, Lady Reading Hospital Peshawar, between July 1997 and March 1998 were studied. Referrals came from general practitioners, other hospitals within the province and the casualty department and other units of our hospital. For the purpose of study, ARF was defined as acute deterioration in renal function manifested by a rise in serum creatinine of at least 3mg/dl. Patients with previous chronic renal disease, hypertension and diabetes mellitus were excluded from the study. All patients had routine urinalysis, full blood count, biochemistry including blood urea, serum creatinine and electrolytes and ultrasound of the abdomen. Other investigations were done selectively according to the clinical need. These included a plain X-ray of the kidneys, ureter and bladder, coagulation profile, peripheral blood film for malarial parasites, liver function tests and renal biopsy.

RESULTS

A total of 100 (male 51, female 49) patients with ARF were seen between July 1997 and March 1998. Their ages ranged from 5 to 65 years (mean 32.6). Aetiologically, patients were divided into medical (63%), surgical (26%) and obstetric (21%) groups. Table-I shows the causes of ARF.

Septicaemia alone (20%) was the most common cause of ARF in the medical group, followed by diarrhoeal illnesses associated with dehydration (14%). Acute glomerulonephritis (GN) was found in 11 patients. Nephrotoxins accounted for six patients. Of these, two were caused by contrast nephropathy, two by non steroidal anti inflammatory drugs (NSAID) and one each by an angiotensin converting enzyme inhibitor (ACEI) and a cephalosporin. There were three cases each due to haemolytic uraemic syndrome (HUS) and rhabdomyolysis, whilst two cases each were seen from cardiác failure/cardiogenic shock, acute pyelonephritis and glucose 6 phosphate dehydrogenase (G-6-PD) deficiency related intra vascular haemolysis (IVH).

Of the surgical group, eight patients had obstructive uropathy from stones. Post operative ARF was seen in four cases and two cases each were caused by bullet injuries and trauma from road traffic accidents. In the obstetric groups, post abortion ARF occurred in 10 cases, puerperal sepsis was found in nine patients and the remaining two cases were due to ante partum haemorrhage.

TABLE – I

CAUSE OF ACUTE RENAL FAILURE (N=100)

CAUSES	NO.& %
MEDICAL	
SEPTICAEMIA	20
DIARRHOEAL ILLNESSES	14
ACUTE GLOMERULONEPHRITIS	11
NEPHROTOXINS	6
HAEMOLYTIC URAEMIC SYNDROME	3
INTRA VASCULAR HAEMOLYSIS (G6PS DEFICIENCY)	2
RHABDOMYOLYSIS	3
ACUTE PYELONEPHRITIS	2
CARDIAC FAILURE	2
SURGICAL	
OBSTRUCTIVE UROPATHY (STONES)	10
TRAUMA AND POSTOPERATIVE	6
OBSTETRIC	
POSTABORTION	10
PUERPERAL SEPSIS	9
ANTEPARTUM HAEMORRHAGE	2

TABLE – II

METHODS USED TO TREAT ARF AND MODE OF RENAL REPLACEMENT THERAPY

METHOD	NO. & %
CONSERVATIVE	30
HAEMODIALYSIS	48
PERITONEAL DIALYSIS	18
HAEMODEALYSIS AS WELL AS PERITNEAL DIALYSIS	2
CONTINUOUS ARTERIO VENOUS HAEMO FILTRATION	1
NEPHROSTOMY	1

Oliguria was the most common clinical feature (83%). Uraemic symptoms were present in 64% patients. Serum creatinine of presentation ranged between 3.5 to 22.6 mg/dl (average 10.5). Dialysis was given in 70% patients. Table-II shows the various approaches undertaken to deal with the different complications of renal dysfunction. The most common indications for dialysis were fluid overload (69%) followed by uraemic symptoms (53%). Overall mortality was 8%. Causes of death were: acute GN (two), septicaemia (one), post operative MOF (one), puerperal sepsis (one), acute rhabdomyolysis (one), cardiac failure (one), massive falciparum parasitaemia with IVH (one). The final outcome of the patients is shown in Table–III.

DISCUSSION

The pattern of ARF varies between different geographic areas. Whereas, acute tubular necrosis (ATN) following surgery is

TABLE – III

FINAL OUTCOME IN PATIENTS WITH ACUTE RENAL FAILURE

	Total No. %	Survival No. %	Mortality No. %
MEDICAL	63	57(90.5)	6(9.5)
SURGICAL	16	15(93.7)	1(6.2)
OBSTETRIC	21	20(95.2)	1(4.8)

the commonest causes of ARF in the western countries, studies from the developing countries have attributed ARF to medical causes in the majority of patients.[4-6] In one study from India, medical causes were found in 68.3% cases of ARF.[7] We also divided ARF into medical (63%), obstetric (21%) and surgical (16%) causes and made some interesting observations.

Septicaemia alone (20%) was the commonest aetiology in our medical group. Infection was also found as an additional aetiological factor in most other cases. In comparison, diarrhoeal illnesses accompanied by dehydration was the most frequent aetiology in some Indian studies.[7,8] Our incidence of diarrhoeal illnesses (14%) was still high when compared to the western studies where this cause of ARF is extremely uncommon.[9] Haemolytic uraemic syndrome (HUS) is a known complication of acute gastro enteritis which was present in three of our cases.[10] ARF related to acute GN (11%) was comparable to other studies from the subcontinent and the middle east.[3,4,7] Acute GN was mostly post infectious proliferative type, as supported by a high ASO titre, mild increase in serum creatinine and recovery on conservative measures in the majority. Renal biopsy was carried out in five cases of proteinuria with rapidly progressive course. Three cases were found to have crescentic GN (one associated with SLE and two with c-ANCA positive vasculitis) and two had acute interstitial nephritis.

Contrast nephropathy is not uncommon with increased risk in certain groups.[11,12] One of our two patients had diabetes and coronary artery disease and developed ARF following coronary angiogram, the other case had intravenous urography. Acute interstitial nephritis (AIN) from various NSAID is a frequently under-diagnosed cause of ARF.[13] There were two such cases of NSAID induced AIN including one confirmed on renal biopsy. ACEI are used increasingly for hypertension and cardiac failure. In addition, they have been shown have beneficial effects in diabetic nephropathy and other glomerulonephritides.[14,15] However, patients with renal artery stenosis are at risk from developing renal failure with ACEI.[16] One of our patients who had recently been commenced on captopril required dialysis before recovering from ARF. Aminoglycoside antibiotics are still routinely used without monitoring the blood levels and cause ATN with usually non-oliguric ARF.[17] Some of our surgical patients on presentation were receiving gentamicin which we believe could have been a contributing factor. There are numerous other nephrotoxic drugs including various antibiotics.[18-21] One patient in our study had ceftrioxone for suspected septicaemia and developed AIN with ARF which recovered when the antibiotic was stopped.

Malaria is endemic in our community. Falciparum malaria causes ARF in several ways including volume depletion, IVH, hyperparasitaemia, cholestatic jaundice and hypotension.[22] One of our patients with massive falciparum parasitaemia who presented with jaundice and shock, died within hours of admission. IVH is, however, more commonly seen in those with G-6 PD deficiency following treatment with antimalarial chloroquine.[23] Rhabdomyolysis is frequently seen following trauma in addition to other causes.[24] We had three patients including a young Afghan who were subjected to severe physical virlence. Acute pyelonephritis, a rare cause of ARF was present in two cases.

Our overall incidence of surgical ARF was 10%. In contrast, ARF related to surgery and trauma dominates the picture in the developed countries.[25] This difference is mainly due to the increased number of elderly patients undergoing major surgical procedures in the developed countries. These patients have usually multiple medical problems with increased chance of complications.[26] Stones causing obstruction is an important cause of ARF in Pakistan.[27] We had 10 patients with obstructive uropathy due to stones. Six of these patients had obstruction to the only functioning kidney. Interestingly, only one required surgical intervention to relieve obstruction while the rest recovered spontaneously with the passage of stone.

Pregnancy related ARF is uncommon in the developed countries.[28] This is mainly due to excellent care both in the antenatal as well as during delivery and in the immediate postnatal period. In our countries, however, there is lack of adequate antenatal care and deliveries are still conducted in the houses by illiterate and untrained daaees for the majority, hence the increased risk of complications rate.[7,29] Our incidence of pregnancy related ARF (21%) was relatively higher than the Indian studies, however, septic abortion, a common clinical finding in some parts of India, was not seen by us. Induced abortion is relatively uncommon as compared to other developing countries.

The mortality (8%) in our patients was surprisingly low. Table-III shows survival in the different groups. Factors responsible for increased mortality include old age and the presence of MOF. [26,30] Our patient population was relatively young and without MOF. A significant number had mild renal failure and required conservative measures only. Dialysis was given to those with fluid overload associated with oliguria, hyperkalemia, severe acidosis, severe azotaemia (creatinine> 15mg/dl) and clinically severe uraemia including encephalopathy. Peritoneal dialysis was mainly given for either cardiovascular instability or lack of space in the haemodialysis unit.

In summary, this study, the first of its kind, shows the pattern of ARF in our province. Medical cases account for the major bulk of ARF in this region. Septicaemia, diarrhoeal illnesses associated with volume depletion and acute GN are the main causes among this group. Pregnancy related ARF is also frequently seen in our population. This aetiological pattern differs significantly when compared to the western countries where the bulk of ARF is attributed to surgery and trauma. Inspite of the poor facilities, mortality in our series was only 8% which, we believe, is due to the relatively young age of our patients the presence of reversible aetiological factors such as volume depletion and the absence of MOF. It will be interesting to see whether this aetiological pattern and mortality rate will change as the number of patients and duration of study increases in the near future.

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