A Four-Year Period Overview of Moderate to Severe Acute Renal Failure in Nephrology Department: Report of 80 Cases from a Single Center

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Introduction

Acute renal failure (ARF) can present in all medical settings but is predominantly acquired in hospitals. The condition develops in 5% of hospitalized patients and approximately 0.5% of hospitalized patients require dialysis. Acute renal failure is frequently defined as an acute increase of the serum creatinine level from baseline (i.e., an increase of at least 0.5 mg per dL [44.2 μmol per L]). Etiologically, this common condition can be categorized as prerenal, intrinsic or postrenal. Using a systematic approach, physicians can determine the cause of acute renal failure in most patients. Depending on the severity of renal failure, the mortality rate can range from 7% to as high as 80%. The high mortality rate can be attributed to an increasing number of elderly patients who develop ARF, also to an increasing patients number presented with other significant illnesses complicated with ARF. Many data suggest that the prognosis for non-oliguric ARF is better than that of oliguric ARF. We believe that the outcome of ARF is a matter of data presentation, since most of the reported studies include patients with ARF who have a variable degree of severity and in whom the condition is caused by many different factors, such as surgical, obstetrical, sepsis, toxic exposure etc.

Aim of the Study: To assess the outcome of ARF concerning patients with ARF who are treated exclusively in the medical ward (Nephrology Department).

Materials and Methods

We studied prospectively 80 adult patients (47 female and 33 male); ages 15 to 78 years old (median age 43.3 ±19.28), with ARF who were treated in our Nephrology Department during a four-year period (1998-2002). Diagnosis of ARF was based on complete medical history, physical examination, laboratory findings, renal sonogram and clinical course. Patients with pre-existing chronic renal insufficiency, glomerulonephritis, vasculitis and surgical or obstetrical ARF, as well as those who were treated in the Intensive Care Unit (ICU) were excluded from the study. Patients with ARF due to obstructive uropathy and postoperative were excluded from the final analysis. Causes of ARF were classified as "iatrogenic", "probably iatrogenic" and "non-iatrogenic". Age, sex, complete medical history, physical examination, a meticulous history of drug administration before ARF recognition were recorded for each of the patients. The presence of infection and jaundice, dependency on dialysis, number of dialysis sessions needed, the number of days to recovery of renal function were also recorded. Each of the patients underwent renal ultrasound examination within 24 to 48 hours after the recognition of an increase in creatinine levels. Serum creatinine, blood urea nitrogen (BUN) serum potassium and sodium, as well as urinary volume, arterial blood pressure and the body temperature were also measured daily. Urine cultures were collected routinely. Hypernatremia and hyponatremia were defined respectively as serum sodium levels above 145 mEq/L or less 135 mEq/L, while a serum potassium level above 5.5 mEq/L or less than 3.5 mEq/L were defined as hyperkalemia and hypokalemia respectively. Dialysis was performed due to the presentation of the following conditions: hyperkalemia, uremia, fluid overload that was unresponsive to diuretics, central nervous system manifestations, marked acidosis, or a pericardial rub. Access for hemodialysis was obtained through subclavian, femoral or internal jugular veins using dual-lumen dialysis catheters. Intermittent peritoneal dialysis was performed too. Complete recovery of renal function was defined as a decrease in serum creatinine to stable levels below 1.5 mg/dl.

The results were expressed as the mean ± SD. For the statistical analysis we used the Student's t-test for unpaired data (the lower significance level, $p< 0.05$) and chi-square one.

Results

The major causes of ARF in our patients resulted as follow: prolonged volume depletion 39 cases (48.75%), nephrotoxicity (mainly due to antibiotics) 22 cases (27.5%), rhabdomyolysis 7 cases (8.7%), obstructive uropathy 4 cases (5%), sepsis and acute renal glomerulonephritis 8 cases (10%). Four of the 80 pts. (5%) who had obstructive uropathy were excluded from the final analysis.

Among the remaining 76 pts., 57 (75%) were non-oliguric and 19 pts. (25%) were oliguric and underwent dialysis therapy. Hyperkalemia and the peak plasma creatinin levels were significantly higher in the oliguric pts., respectively $p< 0.05$ and $p< 0.01$. Dialysis dependency was higher in

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the oliguric patients. The overall mortality rate among the 76 pts. was 3.9% (3/76). All of them were dialysis dependent. The mortality rate in dialysis dependent group was 15.8% (3/19).

Discussion

Although the etiology of ARF is often multifactorial our study shows that hypovolemia and nephrotoxic agents are the major causes of ARF in patients treated in the medical ward. Probably this is attributed to the education surrounding and "policy" of drug administration in our country. Nephrotoxicity was due mainly to antibiotics as aminoglycosides alone or in combination with cephalosporins.

The incidence of non-oliguric ARF ranges from 25% to 88%. In our study we found it in 75% (57/76 pts.), so not very different from that reported in other studies. Probably it is related to the increased use of potent diuretics in the presence of oliguria as well as the increased frequency of nephrotoxic antibiotics.

Many studies have shown there is a difference in morbidity and mortality between non-oliguric and oliguric ARF, in favour of non-oliguric one. In pts. with ARF, oliguria and need for dialysis are considered as markers of renal disease severity. Also need for dialysis is considered to be a significant risk factor in pts. with ARF (not age depended) and also to be related more strongly to fatal outcome in the elderly. In our study the mortality rate in dialysis dependent group (3/19 pts. or 15.8%) was the same with the overall mortality rate (3/76 pts. or 3.9%).

Conclusion: Although the etiology of ARF is often multifactorial, the major causes of in pts. with moderate and severe ARF treated exclusively in the medical ward were prolonged volume depletion and nephrotoxicity. The mortality rate of ARF was particularly low. The need for dialysis has been pointed to be a significant risk factor related to fatal outcome of ARF.

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