



SPECTRUM OF CASES OF ACUTE KIDNEY INJURY SEEN IN A REFERRAL CENTRE IN NORTHERN KARNATAKA

Nephrology

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ABSTRACT

Background: Acute renal failure is a common clinical condition encountered in our hospital. This study is an attempt to evaluate the clinical profile of acute renal failure in 120 patients admitted to Karnataka Institute of Medical Sciences, Hubli. **Methods:** This prospective study was done at Karnataka Institute of Medical Sciences, Hubli, over a period of one year. This study included 120 patients with clinical and laboratory evidence of acute renal failure in patients admitted to our hospital. **Results:** There were total of 120 cases of which 81 were males and 39 were female patients with mean age of 46.16 years. Oliguria and vomiting were most common presenting symptoms. Other common symptoms were fever, loss of appetite, jaundice and loose stools. The etiological factors were classified as prerenal, renal and postrenal causes. Among 120 cases, Renal ARF was seen in 65(54.17%) patients, 44(36.67%) patients had prerenal ARF and 11(9.17%) had postrenal ARF. Oliguria and vomiting were common clinical features. Septicemia was predominant etiological factor in our patients followed by snake bite and acute gastroenteritis. **Conclusion:** This study helps in reflecting data in this part of the country. Study indicates Oliguria was still the predominant symptom in acute renal failure and septicemia was most common etiological factor for ARF.

KEYWORDS

Acute Renal Failure, Etiology, Prerenal, Postrenal

INTRODUCTION:

Kidney is relatively unique among the organs of the body in its ability to recover from almost complete acute loss of function. Acute Renal Failure (ARF) is responsible for major morbidity and mortality of hospitalized patients because of serious nature of the underlying illness and the high incidence of complications. ARF is usually asymptomatic initially and diagnosed when biochemical monitoring of hospitalized patients reveal a recent increase in blood urea and serum creatinine concentrations.¹

The term ARF is now replaced by acute kidney injury (AKI). AKI is a common clinical condition in hospitalized patients. It complicates 5-7% of acute care hospital admissions and up to 30% of admission to the ICU. The most common causes of ARF are volume depletion, hypotension, aminoglycoside antibiotics and radio contrast agents. Major surgery is also an important cause of ARF. Advanced age, liver diseases, underlying renal insufficiency and diabetes have been implicated as risk factors for the development of ARF.²

There is a paucity of data from this area of the country regarding the incidence and causes of acute renal failure. Hence, this study is being under taken to study the clinical spectrum and incidence of acute renal failure in Hubli, Karnataka.

MATERIALS AND METHODS

This is a study of patients with acute renal failure admitted to Karnataka Institute Of Medical Sciences, Hubli between January 2011 to December 2011. It is Prospective hospital based time bound study. The study protocol was that all these patients included, were studied with a detailed history, general physical examination, systemic examination and investigated as per the proforma, after considering the inclusion and exclusion criteria. All the patients were followed up till the time of discharge. The selection criteria were- patients with increased serum creatinine of more than 2mg/dl at admission with no history suggestive of any chronic kidney disease, patient with normal serum creatinine at admission and subsequent values increased as defined by RIFLE criteria.³ The exclusion criteria were- patients with known chronic kidney diseases, patients lost to follow up and age less than 15 years.

The following method for collection of data was followed. For the purpose of selection of the cases for the study, ARF was defined as sudden decline in the renal function presenting either as oliguria for at least 48 hrs or rise in the serum creatinine level of more than 50% of the base line or more than or equal to 2mg/dl. The socio demographical, clinical, laboratory parameters and outcomes were collected. Demographic data included age, sex, ethnic background and geographical location. Detailed clinical data were recorded including- symptoms related to etiology of renal failure, its predisposing factors and involvement of other organs. Past history of any diseases contributing to chronic kidney diseases were elicited. Laboratory

investigations included complete blood count, peripheral smear, urine analysis on 2 occasions, blood urea, serum creatinine, serum electrolytes, ultrasonography of abdomen for all the patients. Wherever necessary, LFT, bleeding profile, stool examination, 24 hour urinary protein and renal biopsy were done. Information was collected through the pretested and structured proforma for each patient after the consent. Data was presented in the form of tables and diagrams. Appropriate statistical tests were used for analysis of data.

RESULTS

Out of 120 cases studied, 81(67.50%) patient were males and 39(32.50%) were females. The age distribution is as described in the Table 1. Age of patients ranged from 16 to 65 years with mean age of 46.16 years. These patients were divided into six age groups. Maximum incidence was seen in age group between 41 to 50 years.

Table 1: Age distribution

Age groups	No of cases
16-20 years	7(5.83%)
21-30years	15(12.50%)
31-40years	21(17.50%)
41-50years	32(26.67%)
51-60years	24(20.00%)
> 61years	21(17.50%)
Total	120
Mean $\pm$ SD age	46.16 $\pm$ 15.63

The age distribution by gender is presented in Table 2. In all age groups males predominated females except in the age group from 21-30.

Table 2: Age distribution by gender

Age groups	Male	Female	Total
< 20 years	4(57.14%)	3(42.86%)	7
21-30years	6(40.00%)	9(60.00%)	15
31-40years	16(76.19%)	5(23.81%)	21
41-50years	24(75.00%)	8(25.00%)	32
51-60years	15(62.50%)	9(37.50%)	24
> 61years	16(76.19%)	5(23.81%)	21
Total	81	39(32.50%)	120
Mean $\pm$ SD age	47.86 $\pm$ 15.01	42.62 $\pm$ 16.49	46.16 $\pm$ 15.63

The presenting complaints were as presented in Table 3. Of the 120 cases, oliguria was seen in 101 (31.96%), vomiting was seen in 18 (5.70%) patients, loose stools was seen in 19 (6.01%) patients and fever was seen in 47 cases (14.87%). Signs observed were altered sensorium in 18 patients (5.70%), breathlessness 27 (8.54%) and jaundice in 24 (7.91%) patients. Data collected from past medical history showed that of 120 cases studied, 13 patients were diabetic but not having evidence of diabetic nephropathy. One patient was a known case of carcinoma cervix. 5 patients were alcoholic. Among the 120 cases studied large number belonged to medical diseases, with a total

of 95 (79.16%) cases. Surgical cases were 16 (13.33%), gynaecology cases were 9 (7.5%).

Table 3: Distribution by presenting complaints

Chief complaints	No of cases
Oliguria	101(84.17%)
Pedal edema	5(4.17%)
Fever	47(39.17%)
Loose stools	19(15.83%)
Vomiting	18(15.00%)
Breathlessness	27(22.50%)
Jaundice	25(20.83%)
Altered sensorium	18(15.00%)
Others	56(46.67%)

Table 4 describes the causes for ARF and Table 5 describes the types of ARF.

Table 4: Diagnosis/ causes

Diagnosis/causes	No of cases
Cardiogenic shock	1(0.83%)
DIC	2(1.67%)
HR Syndrome	7(5.83%)
Post strepto GN	1(0.83%)
Rhabdomyolysis	3(2.50%)
Snake bite	22(18.33%)
Viral hemorrhagic fever	4(3.33%)
AIN	1(0.83%)
APH	1(0.83%)
Blood loss	4(3.33%)
Burns	1(0.83%)
GE	18(15.00%)
Leptospirosis	1(0.83%)
Lupus nephritis	1(0.83%)
Malaria	4(3.33%)
Obstructive uropathy	11(9.17%)
PPH	3(2.50%)
Septicemia	29(24.17%)
Urinary Tract Infection	6(5.00%)
Total	120

Table 5: ARF distribution

Type of ARF	No of cases
Pre renal	44(36.67%)
Renal	65(54.17%)
Post renal	11(9.17%)
Total	120

Table 6, Table 7 and Table 8 describe the causes for pre-renal, renal and post-renal ARF respectively.

Among the Pre-renal ARF cases, Septicemia contributed to the large number of cases total of 24 (54.54%) followed by hepato renal syndrome 7 (15.9%). Blood losses due to various causes were 4 (9.09%). Gastroenteritis were 5 (11.36%). Cardiogenic shock, viral fever, DIC, PPH contributed to pre renal ARF with 1 (2.72%) case in the each group.

Table 6. Distribution of Pre renal ARF

Diagnosis	Total
Hepatorenal syndrome	7(15.9%)
Septicemia	24(54.54%)
Blood loss	4(9.09%)
PPH	1(2.72%)
GE	5(11.36%)
DIC	1(2.72%)
Viral hemorrhagic fever	1(2.72%)
Cardiogenic shock	1(2.72%)
TOTAL	44

Among the renal causes of ARF, snake bite contributed to total of 22 (33.84%) cases followed by gastroenteritis 13 (20.0%), infectious conditions- UTI 6 (9.23%), Malaria 4 (6.15%), viral hemorrhagic fever 3 (4.61%), septicemia 5 (7.69%), rhabdomyolysis 3 (4.61%), PPH 2 (3.1%), lupus nephritis 1 (1.53%), AIN 1 (1.53%), Burns 1 (1.53%), poststreptococcal glomerulonephritis 1 (1.53%),

Leptospirosis 1 (1.53%), DIC 1 (1.53%), APH 1 (1.53%).

Table 7. Distribution of Renal ARF

Diagnosis	Total
Snake bite	22(33.84%)
UTI	6(9.23%)
AIN	1(1.53%)
Lupus Nephritis	1(1.53%)
Burns	1(1.53%)
Malaria	4(6.15%)
GE	13(20.0%)
Septicemia	5(7.69%)
Rhabdomyolysis	3(4.61%)
Post streptococcal GN	1(1.53%)
Viral hemorrhagic fever	3(4.61%)
PPH	2(3.07%)
Leptospirosis	1(1.53%)
DIC	1(1.53%)
APH	1(1.56%)
TOTAL	65

There were 11 post renal cases. Cases with renal calculi were 4 (36.36%), BPH were 3 (27.27%), fibroid uterus 1 (9.09%), Ca Cervix 1 (9.09%), Ca bladder 1 (9.09%) and ureteral injury 1(9.09%).

Table 8. Distribution of Post renal ARF

Diagnosis	Total
Fibroid uterus	1(9.09%)
Ca Cx	1(9.09%)
Renal calculi	4(36.36%)
Ca Bladder	1(9.09%)
Ureter injury	1(9.09%)
BPH	3(27.27%)
TOTAL	11

DISCUSSION

A total of 32000 (aged more than 15yrs) patients were admitted to the Karnataka Institute of Medical Sciences, Hubli during the period of January 2011 to December 2011. Incidence of ARF was 0.375%. This is less compared to the incidence from other studies. In the study of Sakhuja V et al incidence of ARF was 1.5%.¹ This decreasing trend of ARF can be explained by decrease in the number of obstetric causes leading to ARF, specific management of conditions like malaria, leptospirosis and adequate resuscitation measures with IV fluids in the conditions like acute GE, viral hemorrhagic fever.

In the present study, age of the patients ranged from 16 to 70 years with mean age of 46.16 years. There were 81(67.50%) males and 39(32.50%) were females. Bernieh B et al, in their study of, "pattern of acute renal failure", found that 58% were males and 36% were females. Mean age of these patients was 56.2 years.² In all the age groups male predominated, except in the age group of 21-30 which is explained by this age group containing the obstetric causes for ARF in addition to the other causes. In the present study mean age was less compared to other two studies.

A study of common presenting symptoms and signs was made. We noted that, oliguria was the most common, comprising of 84.17%. This finding is comparable with other studies done by Singhal AS et al which showed that oliguria was seen in 85.2% of patients.⁶ This findings is also comparable with studies of Bernieh et al⁵, Liano et al⁷ In the present study, fever was seen in 39.17% of patients, it is less compared to the study by Singhal AS et al where fever was seen in 68% of the patients.⁶ This difference is explained by the more number of the noninfectious conditions in our study example - snake bite, GE, obstructive uropathy as compared to the infections. Jaundice was seen in 20.83% patients. It is comparable to study by Singhal AS et al where jaundice was seen in 20% patients.⁶

In the present study, out of 120 patients, 95(79.16%) of patients had ARF due to a medical cause and 16(13.33%) were due to a surgical cause. In a study done by Gurucharan Avathi et al.⁸ it was found that the highest incidence of ARF attributable to a medical cause was about 68%, followed by a surgical cause in 21.2% of patients, which is similar to our findings.

In this present study of 120 cases, about 44(36.67%) patients had ARF

due to prerenal cause. These results were comparable with the study done by Liano F et al., which has shown prerenal ARF was seen in 21% of patients.⁷ Septicemia was the commonest cause among the pre renal causes seen in 24(54.54%) patients. Hepato renal syndrome was seen in 7(15.90%) patients. Blood loss due to various causes seen in 4 (9.09%) cases, 5(11.36%) patients had acute gastroenteritis. PPH, DIC, cardiogenic shock secondary to inferior wall Myocardial Infarction, viral hemorrhagic fever each 1(2.72%) causes. Most of these patients had hypotension. Majority of them were treated conservatively as these patients were haemodynamically unstable to be subjected to dialysis or they were not meeting the criteria to be subjected to dialysis or they were suffering from other organ dysfunctions. They were treated with the specific treatment to treat the underlying disease. Mortality was 40.91% (18 patients).

In the present study, 65(54.17%) patients had ARF due to renal cause. Majority of patients had snake bite 22 (33.8%). Other causes includes Acute GE 13(20%) , UTI 6(9.23%), Septicemia 5(7.7%), Malaria 4(6.1%), viral hemorrhagic fever 3(4.6%), rhabdomyolysis 3(4.6%), PPH2 (3.07%), AIN, APH, Lupus nephritis, burns, PSGN, Leptospirosis, DIC each 1(1.5%) causes. Majority of the patients were treated with hemodialysis along with the specific cause. 56 (86.15%) patients had complete recovery of renal functions and 9 (13.85%) patients died. However, those patients who died had septicemia and associated complications like respiratory failure. Singhal AS et al., in their study found that malaria was the predominant cause of ARF involving about 46% of patients followed by snakebite in 20% patients, acute GE in 12% patients, septicemia in 12%, drug induced nephrotoxicity in 3% and acute gastroenteritis in 2% of patients.⁶ However in a study done by Bernieh B et al., septicemia was the predominant cause of ARF seen in 58% patients followed by drug nephrotoxicity and rhabdomyolysis in 12% and 9% patients respectively.⁵

In the present study septicemia due to various etiologies was responsible for ARF in 24.17% of the total ARF cases. Septicemia leading to ARF including both pre renal and renal, was leading cause of ARF in our study. These cases include both medical and surgical conditions ultimately leading to sepsis. Most of these were associated with the MODS. They were haemodynamically not stable. This group of patients contributed large to the mortality in our study. Snake bite cases leading to ARF was seen in 22 patients. Most of these patients underwent hemodialysis and had good recovery rate. Only 2 patients expired in this group, these were associated with the coagulopathies and cellulites of the limb.

Acute GE leading to ARF was seen in 18 patients, 13 patients were treated with hemodialysis. All patients improved. No mortality was seen. It was observed in our study that Acute GE cases were more during the month of May to September 2011. More number of patients leading to the ARF was seen in the same period. Malaria leading to ARF was seen in 4 patients. All of them treated with specific treatment and 3 of them required hemodialysis. They have good survival rate. Compared to the other studies in our study malaria cases were less as this area is not endemic to malaria Blood loss either traumatic (RTA) / iatrogenic leading to ARF was seen in 4 patients, all of them improved with the good resuscitation measures. Rhabdomyolysis secondary to RTA, seizures leading to ARF was seen in 3 patients. These groups of patients had better survival. These patients had raised CPK level, more than 10 times the normal. Hepato Renal Syndrome leading to ARF was seen in 7 patients. All of them treated with conservative management. This group had higher mortality, which was attributed to poor outcomes of advanced liver disease itself. PPH leading to ARF was seen in 3 patients. Two (2) patients recovered and 1 died. Viral hemorrhagic fever leading to ARF was seen in 4 patients with 3 patients died. This high mortality is explained by nature of primary disease itself, associated other organ involvement. PSGN, Lupus nephritis, AIN secondary to NSAID use was seen in 1 patient in each category. These patients had good recovery rate.

In the present study, 11 (9.17%) patients had obstructive uropathy. This was comparable to a study done by Singhal AS et al., about 5% of patients had obstructive uropathy. Hakim AI et al, in their study 9% of patients had ARF following bladder outlet obstruction⁸. Obstructive uropathy leading to ARF was seen in 11 patients. All of them had good recovery, 1 patient expired. Majority of cases leading to obstruction were renal calculi (4), followed by others like benign prostatic hypertrophy (BPH) (3), carcinoma of cervix (Ca Cx) with ureteral

involvement, massive fibroid with bladder outlet obstruction (BOO).

CONCLUSION

The data regarding incidence of ARF from western India are scarce. This study showed that ARF is a frequent condition in the western part of India. Most patients had recovery in their renal function. Prevention, early recognition, and treatment of causative factors remain the key to reduce incidence and mortality due to ARF. This study helps in determining etiological factors contributing toward ARF.

REFERENCES:

1. Joseph V. Bonventre, Sushrut S. Walikar. Acute kidney injury. Harrison's principles of internal medicine. Vol.2. 18th edition, McGraw Hill, 2012: 2293-308.
2. Hou SH, Broc ME. Hospital acquired renal insufficiency. A prospective study. American Journal of Medicine 1983;74:24-8
3. Lopes J, Jorge S. The RIFLE and AKIN classifications for acute kidney injury: a critical and comprehensive review. Clin Kidney J 2013;6:8-14.
4. V Sakuja & K Su. ARF in the Tropics. Saudi Journal Of Kidney Diseases & Transplantation. 1999;9(4):247-60.
5. Bernieh B, Levy DW, Chaudhuri MD. Pattern of acute renal failure. Transplantations proceeding 2003;36:1780-3
6. Singhal AS, Salkar AR, Chaudhary A, Fuscay SM. Clinical profile of acute renal failure. JAPI 2002;50:71-3.
7. Liano F, Abero K. Acute renal failure. Kidney international 1996 ;50:820-4.
8. Avathi G, Verpoetes G. Acute renal failure in medical and surgical intensive care unit. Renal failure; 2003 ; 25 : 105 - 113.
9. Hakim AL and acute renal failure in intensive care unit. Transplantation proceedings diagnosis 2004: 40:1960-6.