

# A study of acute kidney injury (AKI) with reference to varied etiology admitted in Intensive care unit of PIMS

Deepa G

Associate Professor, Department of Medicine, Prathima institute of medical sciences, Karimnagar, Telangana, India

Address for correspondence: Department of medicine, Prathima institute of medical science, nagnur road, karimnagar

Email ID- deepagandra@yahoo.co.in

**Abstract:** - AKI is an ailment characterized by a rapid loss of renal excretory function with an increase in nitrogenous wastes in blood & with different outcomes.

**Aim:** - The study is an attempt to analyze the common causes & clinical manifestation of AKI in 50 hospitalized patients at PIMS.

**Materials & Methods:** 50 Patients (aged = 15 years old) with AKI presenting to our Hospital ICU were included in this study during a period of 1 year from February 2015 to February 2016. An etiological analysis, clinical manifestations & type of AKI were studied in the patients.

**Statistical analysis used:** - Data analysis was done using SPSS version 19 (SPSS Inc; Chicago, IL). Data is presented in form of tables.

**Results:** - total number of 50 case of ARF patients, admitted to PIMS, karimnagar,

who met the inclusion criteria were studied. Out of 50 cases studied, 32 (64%) patients were males and 18 (36%) were females. The age ranged from 20 to 65 yrs. with mean age of 48.1 yrs. 46 (92%) patients had vomiting, 40 (80%) had oliguria, 36 (72%) patients had history of fatigue. Fever was seen in 35 (70%) cases & 16 (32%) had loose stools. 15 (30%) had hypotension, 14 (28%) patients had edema & 12 (24%) had icterus and GPE. Renal ARF was seen in 38 (76%) patients, 10 (20%) patients had prerenal ARF & 2 (4%) patients had post renal ARF. Out of 10 patients with prerenal ARF, 4 (8%) had acute gastroenteritis, 5 (10%) patients had malaria & 1 (2%) patient had ARF following septicaemia. Out of the 38 (78%) patients with renal ARF, malaria was seen in 12 (24%) patients, 6 (12%) patients had nephrotoxic ARF, 6

(12%) patients had septicemia. 2 (4%) patients had post infectious glomerulonephritis, 2 (4%) had snake bite & 1 (2%) had rhabdomyolysis. Acute GE is seen in 5 (10%) patients, CCF in 1 (2%). Out of 50 patients, 2 (4%) patients had post renal ARF due to bladder outlet obstruction. Among 50 cases, 37 (74%) patients were managed conservatively & 13 (26%) patients underwent hemo dialysis. Among the patients managed

conservatively 1 (2%) patient died & among those who underwent hemo dialysis, 4 (8%) patients died.

**Conclusion:** Renal origin of ARF was identified as the commonest cause of AKI Followed by pre renal & then post renal AKI. Higher incidence of infections like Malaria & leptospirosis causing AKI has been seen in this study.

**Keywords:** Acute kidney injury, pre renal, renal

## INTRODUCTION

Acute renal failure (ARF) or Acute kidney injury (AKI) is a syndrome characterized by rapid (hours to weeks) decline in glomerular filtration rate (GFR) and retention of nitrogenous waste products such as blood urea nitrogen (BUN) and creatinine and perturbation of extra cellular fluid volume and electrolyte and acid base homeostasis.

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 and diagnosed when biochemical monitoring of hospitalized patients reveal a recent increase in blood urea and creatinine concentration.

The incidence of ARF in hospitalized patients is between 2% and 5% [1, 2]. In

A study done showed oliguria was common clinical feature seen in 85.2% of patients followed by clinical features of encephalopathy, vomiting and acidosis. The most common causes of ARF are; volume depletion, hypotension, aminoglycoside antibiotics and radio contrast agents. Major surgery is also an important cause of AKI. Advanced age, liver diseases, underlying renal insufficiency and diabetes have been implicated as risk factors for development of acute kidney injury [3, 4, 5].

## SUBJECT & METHODS

This is a study of 50 patients who presented with Symptoms of AKI to PIMS between February 2015 to February 2016. All patients aged more than 15 years with clinical or

biochemical evidence of ARF was included in the study. Patients with pre-existing chronic kidney disease were excluded from the study.

All the patients included in the study were evaluated with a detailed history in order to differentiate between pre renal, intrinsic renal and post renal causes, general physical examination, systemic examination & they were investigated using blood investigation like hemoglobin, total count, Differential count, Erythrocyte Sedimentation rate, platelet count, Blood urea, Serum creatinine, Serum electrolytes, Serum proteins, Liver function tests and peripheral smear. Urinary indices were used to differentiate between pre renal & intrinsic renal failure. Imaging procedures like USG abdomen, IVP, CT abdomen were used whenever required.

RESULTS:

A total number of 50 cases of acute renal failure patients, admitted to Prathima Institute of Medical Sciences, Nagoonur, Karimnagar; who met the inclusion criteria were studied.

1. Sex Distribution:

Out of 50 cases studied, 32(64%) patient were males and 18(36%) were females.

2. Age Distribution:

Their age ranged from 20 to 65 years with mean age of 48.1 years. These patients were divided into six age groups.

TABLE – 1                      Age group of the patients

Age Group	Number	Percentage
<24	5	10.0
25 – 34	11	22.0
35 – 44	8	16.0
45 – 54	6	12.0
55 – 64	10	20.0
>65	10	20.0
Total	50	100.0

3. Clinical Symptoms:

Out of 50 cases studied, 32(64%) patient were males and 18(36%) were females.

4. Clinical Signs:

Out of total number of patients studied 15(30%) patients had hypotension, 14(28%) patients had oedema and 12(24%) had icterus on general physical examination.

TABLE 2                      clinical signs and symptoms of the patients

Signs and symptoms	Number of patients	Percentage
vomiting	46	92%
oliguria	40	80%
fatigue	36	72%
Fever	35	70%
Loose stools	16	32%
edema	14	28%
jaundice	12	24%

5. Past History:

Out of 50 patients, 6(12%) had history of nephrotoxic drug intake. Out of 50 patients, 6(12%) patients had history of diabetes mellitus and 6(12%) patients had hypertension.

6. Type of Acute Renal Failure:

Out of 50 cases, Renal ARF was seen in 38(76%) patients, 10(20%) patients had prerenal ARF and 2(4%) had post renal ARF.

Table 3: Type of acute renal failure and diagnosis

Type of ARF	Number	Percentage
Renal	38	76
Pre renal	10	20
Post renal	2	4
Total	50	100

9. Post Renal ARF:

Out of 50 cases 2(4%) patients had ARF following bladder outlet obstruction.

10. Management:

Among 50 cases, 37 (74%) patients were managed conservatively and 13(26%) patients underwent hemodialysis. Among the patients managed conservatively 1(2%) patient died and among those who underwent hemodialysis 4 (8%) patients died.

11. Outcome:

Out of 50 cases studied, 45(90%) patients survived. Mortality was seen in 5(10%) patients. 4 patients had ARF following septicemia and one patient died due to drug induced renal failure.

## DISCUSSION

Renal failure is really and distressing thing for patient as well as family. When we studied age and sex statistics of the AKI patients in rural Telangana ,we noted that , age of the patients ranged from 20 to 70 years with mean age of 48.1 years. There were 32(64%) were males and 18(36%) were females. Bernieh B et al<sup>[6]</sup> in their study of pattern of acute renal failure( ARF), found that 58% were males and 36% were females. Mean age of these patients was 56.2 years. In the present study mean age was less compared to other studies. In our study, vomiting and oliguria were most common symptoms comprising of 92% and 80% respectively. This finding is comparable with other studies done by singhal AS et al.<sup>[7]</sup>, which showed that oliguria was seen in 85.2% of patients and that 80% of patients had vomiting. In the present study, fever was seen in 70% of patients. In our study, hypotension was seen in 30% of patients. In a study by Bernieh et al.<sup>[6]</sup>, 52% of patients had hypotension and 20.6% of patients had hypotension in a study by Singhal AS.

In the present study, 12% of patients had ARF following drug nephrotoxicity. Lithium induced ARF was seen in one patient, one patient had received herbal medicine. All patients, except one, had normal renal function after discontinuation of drug. Singhal A. S.<sup>[7]</sup> et al., has reported drug induced ARF in 3% of patients. In the present study, out of 50 patients, 48(96%) of patients had ARF due to a medical cause and 2(4%) were due to a surgical cause. In a study done by Gurucharan Avathi<sup>[8]</sup> et al., 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.

In this present study of 50 cases, about 10(20%) patients had ARF due to prerenal cause, 5 patients had malaria and 4 had acute gastroenteritis and one patient had septicemia. However, most of these patients had hypotension. Patients were treated conservatively, along with the specific treatment to treat the underlying disease. One patient underwent dialysis. These results were comparable with the study done by Liano F et al.,<sup>[9]</sup> which has shown prerenal ARF was seen in 21% of patients.

In the present study, 38(76%) patients had AKI due to renal cause. Majority of patients had malaria 12(24%). Other common presentations were septicaemia in 6(12%) patients, drug nephrotoxicity 6(12%), leptospirosis 3(6%), snakebite 2(4%), acute gastroenteritis 5(10%), Rhabdomyolysis 1(2%), congestive cardiac failure 1(2%) and postinfectious glomerulonephritis was seen in 2(4%) patients. Out of 38 cases, 10 patients underwent haemodialysis, and the rest were managed conservatively. 34 patients had complete recovery of renal functions and 4 patients died. However, those patients who died had septicaemia and associated complications like respiratory failure. Singhal AS <sup>[7]</sup> et al., in their study found

that malaria was the predominant cause of ARF involving about 46% of patients followed by snakebite (20%) patients, acute GE 12 % patients, septicemia 12%, drug nephrotoxicity 3% and acute gastroenteritis in 2% of patients. However in a study done by Bernieh B <sup>[6]</sup> 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.

In the present study, malaria is the dominant cause of ARF, probably due to its endemicity in the study place. Out of 50 cases, 17(34%) patients had malaria.

Among this, falciparum was seen in 70% of patients and vivax malaria was seen in 24% of patients and 6% of patient had mixed malaria. All these patients with renal failure were treated conservatively. All these patients resumed normal renal function.

Prakash J et al<sup>[10]</sup> in their study of acute renal failure, 15% of patients had malaria. P. Falciparum and P. vivax malaria were responsible for ARF in 76 (80.9%) and 11(11.7%) of the patients.

Septicemia was next common cause in the present study among 6(12%) of patients. 3 patients were treated conservatively. 3 patients underwent haemodialysis and all these patients died. These patients also had other associated complications like multi organ failure.

Acute gastroenteritis was seen in 5(10%) of the patients. Most of these patients had severe dehydration on admission and hypotension was present in most of these patients. All these patients were treated conservatively and resumed normal renal function.

Acute glomerulonephritis was seen in 2(4%) of the patients. This was proved following renal biopsy and also they had low serum compliment levels and high ASO titer, which supported the diagnosis. Both the patients were managed conservatively and both resumed normal renal function.

In the present study, about 6% of patients had ARF following leptospirosis. All 3 patients had positive IGM antibody for leptospira. All 3 patients were managed conservatively and all patients had resumed normal function.

In the present study, about 2(4%) of the patients had obstructive uropathy. This was comparable to a study done by Singhal AS <sup>[7]</sup> et al., about 5% of patients had obstructive uropathy.

In this present study series of 50 cases, 45(90%) patients survived and about 5(10%) patients expired (2 males and 3 female). Mean age of recovered patients was 48.30 years while mean age of expired patients was 46 years. Among 50 cases, 37(74%) of patients were managed conservatively and 13(26%) patients underwent haemodialysis. Among 37 patients with conservative management, one patient died whereas 4 patients

died who underwent haemodialysis. The survival rate out of 13 patients who underwent dialysis, was 69.3% (had complete recovery) while 30.7% expired. The survival rate among patients who were managed conservatively was 97.3%. Most of the patients who died had septicemia and associated complications like respiratory failure.

In a study done by Bernieh B et al., 58% of patients were managed conservatively while 42% patients were managed with dialysis, but they observed 67% mortality in their study.

The major risk factors affecting prognosis of the patients were presence of multi organ failure, high baseline serum creatinine level and complications developed during the course of illness. In the present study, mortality was seen among the patients who had high serum creatinine at admission while compared to patients that survived.

The overall mortality in the present study is 10%. The predominant cause was septicemia and associated complications. Low mortality in our patients may be due to large number of patients with medical acute renal failure, younger age, early diagnosis and treatment.

CONCLUSION:

Acute kidney injury is common in India. We studied AKI in tertiary care hospital catering the needs of rural Telangana. It showed renal AKI to be most common cause, vomiting to be most common symptom, and malaria as most common cause of renal AKI probably due to endemic nature of the disease in the area. The study highlights that many common causes like malaria are easily preventable as well as treatable before going to AKI stage, reducing the economic burden on the society.

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