

## Research Article

# Clinical and etiological profile of acute kidney injury in cases attending a tertiary care center

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## ABSTRACT

**Background:** Acute kidney injury or acute renal failure is a common problem in hospitalized patients. A large number of conditions can cause AKI which can present with different clinical features. The aim of present study was to analyze etiological and clinical features of AKI.

**Methods:** This study involved 68 patients of AKI admitted in a teaching hospital. The clinical and laboratory data were collected at admission and during follow up till the final outcome and these data were analyzed.

**Results:** 68 patients were studied. Largest no of patient was in the age group of 41-50 years and 55.88% of patients were male. The causes of AKI were medical (77.94%), surgical (11.76%) and obstetrical (10.29%). Sepsis was the most common medical cause (41.50%). Patients were treated either by conservative methods or by haemodialysis. Overall mortality was 20.58%.

**Conclusions:** Non-oliguric AKI was more common but oliguric AKI has high mortality. The mortality in dialysis treated patients is high than patients who are treated conservatively. The high mortality in dialysis treated patients is due to multi organ failure.

**Keywords:** Acute kidney injury, Clinical, Etiological, Oliguric, Profile

## INTRODUCTION

Acute Renal failure is characterized by sudden reduction in renal function resulting in retention of nitrogenous and other waste products in the body.

Due to usage of more than 30 definitions of ARF in literature, there is wide variations in reported incidence and outcome, the term ARF was recently replaced by acute kidney injury with a view to provide uniform definition and to standardise patient care.<sup>1</sup>

AKI is not a single disease but rather a heterogenous group of conditions that share common diagnostic

features specifically an increase in blood urea nitrogen (BUN) concentration and/or increase in serum creatinine concentration often associated with a reduction in urine volume. Reduction of urine volume to less than 400 ml in 24 hours is called oliguria. Oliguria is a frequent but not invariable feature.<sup>2</sup>

AKI is defined as any of the following,<sup>3</sup>

1. Increase in serum creatinine by 0.3 mg/dl within 48 hours or
2. Increase in serum creatinine to 1.5 times baseline value which is known or presumed to have occurred within prior 7 days or

3. Urine volume to less than 0.5 ml/kg/hour for 6 hours

Kidney is unique among the organ of the body in its ability to recover from almost complete loss of function.<sup>4</sup> AKI is reversible when recognized and managed early.<sup>5</sup> Delay in diagnosis may lead to increased mortality and morbidity.<sup>6</sup>

#### **Acute kidney injury is sub classified into three categories**

Pre renal, intrinsic renal disease and post renal. Pre renal failure is the most common form and is characterized by renal hypoperfusion without compromising the integrity of renal parenchyma. Intrinsic renal failure is produced by disorders that directly involve renal parenchyma i.e due to ischemia, various nephrotoxins and diseases of glomeruli or interstitium. Post renal failure is due to urinary tract obstruction.<sup>7</sup>

Advanced age, liver disease, underlying renal insufficiency and diabetes have been implicated as risk factors for the development of AKI.<sup>8</sup>

The incidence of AKI in hospitalised patients is 2-5%.<sup>8</sup> The high mortality is due to sepsis, respiratory failure and multi organ dysfunction.

AKI tells the gravity of underlying disease and not the cause of death.<sup>9</sup> The present study was done to describe various etiological and clinical features of AKI in a teaching hospital of north Bihar.

#### **METHODS**

Material and methods-this was hospital based study of patients with AKI admitted to Katihar medical college hospital, Katihar from October 2013 to September 2014. Patients of more than 15 years of age who presented with oliguria or anuria for more than 24 hours with rise in blood urea and serum creatinine concentration or rise in serum creatinine concentration more than 50 percent over normal values were selected for the study. The exclusion criterion was patients of less than 15 years of age, with underlying CKD or bilaterally small kidneys.

All patients were enquired about nausea and/or vomiting, breathlessness, loose stools, fever, any bleeding, yellowish discolouration of sclera, change in colour of urine or any difficulty in passing urine during micturition.

History regarding current or past use of medications, any underlying chronic disease or hepatitis/jaundice in past, was taken.

After history taking all patients were clinically evaluated. Routine and microscopic examination of urine, complete blood count, blood urea, serum creatinine, serum electrolytes and ultrasonography of whole abdomen was

done in all patients. Arterial blood gas analysis was done in selected patients when required.

**Table 1: Age distribution of patients of AKI.**

Age	No of PTS	Percentage (%)
16-20	3	4.41
21-30	9	13.23
31-40	13	19.11
41-50	16	23.52
51-60	11	16.17
61-70	12	17.64
>70	4	5.88

**Table 2: Sex distribution of patients of AKI.**

Sex	No of patients	Percentage
Male	38	55.88
Female	30	44.12

Out of 68 patients of AKI studied male to female ratio was 1.26:1.

**Table 3: Etiology of AKI.**

Etiology	No of patients	Percentage
Medical	53	77.94
Surgical	8	11.76
Obstetrical	7	10.29

**Table 4: Medical causes of AKI.**

Causes	No of cases	Percentage
Sepsis	22	41.50
Acute gastroenteritis	13	24.53
Malaria	8	15.09
CCF	4	7.54
Acute glomerulonephritis	2	3.77
Chronic liver disease	2	3.77
Drug toxicity	1	1.88
Organophosphorus poisoning	1	1.88

All patients were followed up with daily input/output charting and regular blood urea and serum creatinine concentration.

Patients were treated either by conservative method or haemodialysis. The indications for haemodialysis were encephalopathy, metabolic acidosis, hyperkalemia, oliguria/oedema not responding to diuretics rising blood urea and/or serum creatinine concentration and uremic pericarditis.

The outcome of treatment was noted for all patients.

**Table 5: Surgical causes of AKI.**

Cause	No of patients	Percentage
Post-operative	4	50.00
orthopaedic surgery	3	37.50
Urinary tract obstruction	1	12.50

**Table 6: Obstetrical causes of AKI.**

Cause	No of patients	Percentage
Puerperal sepsis	5	71.42
Pre eclampsia	2	28.57

**Table 7: Relation of type of AKI to mortality.**

Type of AKI	Total No of patients	Survival	Death
Oliguric	31 (45.58)	20 (64.51)	11 (35.49)
Non oliguric	37 (54.42)	34 (91.89)	3 (8.11)

Figure in ( ) indicates percentage, Chi square=7.73 p<0.05(Significant), oliguric AKI has high mortality.

**Table 8: Relation of Treatment modality to mortality.**

Mode of treatment	No of patient	Survival	Death
Conservative	46(67.64)	38(82.60)	8(17.40)
Dialysis	22(32.36)	16(72.72)	6(27.28)

Figure in ( ) indicates percentage, Chi square=3.20 , p <0.05 (Significant) , Hgh mortality present in patients treated with dialysis.

**Table 9: Clinical features of AKI patients.**

Symptoms and sign	No of patients	percentage
Vomiting	47	69.11
Dyspnoea	42	61.76
Oliguria	31	45.58
Loose stools	16	23.52
fever	33	48.52
Jaundice	14	20.58

**Table 10: Complications of AKI.**

Complications		Percentage
Metabolic acidosis	13	19.11
Hyperkalemia	29	42.64
Encephalopathy	12	17.64
Hypotension	19	27.94
Multi organ dysfunction	17	25.00
Pulmonary oedema	26	38.23
Bleeding tendency	3	4.41

## RESULTS

The study included 68 patients of AKI between 15-75 years of age group.

Maximum numbers of patients were in the age group of 41-50 years. The male to female ratio was 1.26:1. Causes leading to AKI were medical (77.94%), surgical (11.76%), and obstetrical (10.29%). Among medical causes most common cause was sepsis (41.50%) followed by hypovolemia due to gastroenteritis (24.53%). Postoperative lack of care was the most important cause of AKI in the surgical group. Puerperal sepsis and pre eclampsia were the two conditions associated with AKI in obstetrical cases. Patients were treated either conservatively or by haemodialysis. 46 patients (67.64%) were treated conservatively and 22 patients (32.36%) were treated by haemodialysis. Out of 46 patients who were treated conservatively 38 (82.6%) survived and 8 (17.40%) expired. Out of 22 patients who were treated by haemodialysis 16 (72.7%) survived and 8 (27.28%) expired. Out of 68 patients 31 (45.58%) had oliguria 78.57% of death was due to oliguric AKI. Among the 54 patients who survived 38 (70.3%) were treated conservatively and 16 (29.7%) were treated by haemodialysis. Out of 14 patients who expired 8 (57.14%) were treated conservatively and 6 (42.86%) were treated by haemodialysis.

Vomiting was the most common symptom reported in 69.11% of patients followed by breathlessness in 67.76%. Fever was present in 48.52% of patients. Hyperkalemia was the most common complication in 42.64% of patients. Multi organ dysfunction was present in 23.52% of patients.

## DISCUSSION

Acute kidney injury is a very common condition in hospitalised patients. This study included 68 patients of AKI studied over one year period. Barret et al reported 200 patients of ARF in three year period.<sup>10</sup>

In this study cause of AKI was medical (77.94%), surgical (11.76%) and obstetrical (10.29%). Liano et al has grouped ARF into medical (34%), ICU (27%), surgical (23%), obstetrical (1%), nephrological (13%) and traumatic(2%).<sup>11</sup> Saxena et al in his review classified etiology of ARF into medical (75%), obstetrical (15%), obstructive and surgical (10%).<sup>12</sup> Naqvi et al reported medical cause (57%) followed by obstetrical (24%), obstructive (7%), surgical (5%) and undetermined cause (7%).<sup>13</sup> These differences in etiology is due to the fact that infectious diseases are less prevalent in developed countries but are still a significant problem in developing countries. In developed countries sepsis and multi organ failure is the commonest cause and most cases of AKI occur in older age group due to presence of comorbid illnesses. In developing world due to poor sanitation and unhygienic practices infectious diseases like gastroenteritis and malaria is more prevalent. AKI is more common in younger age group in healthy individuals in developing countries.

Mortality in ARF in hospitalized patients is reported from 14-70% in different studies.<sup>10</sup> Mortality in this study was 20.58%.

Non oliguric AKI was more common in this study. Oliguric cases had high mortality in this study. Non oliguric AKI is recognized more frequently and causes less mortality and morbidity and dialysis is required less often.<sup>10</sup> Dialysis is required in oliguric cases more frequently. Obialio and associates reported oliguria as a factor causing high mortality and morbidity.<sup>10</sup> In this study patients who were treated with dialysis had high mortality. This high mortality was due to association of multi organ failure in those cases who required dialysis.

## CONCLUSION

AKI is a common problem in hospitalized patients. Early diagnosis and management is essential. Early and aggressive management of sepsis, restoration of intravascular volume and avoidance of nephrotoxic medications reduces mortality due to AKI.

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