Research Article

Clinical profile of acute kidney injury in patients admitted to medical wards in a tertiary care setting

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ABSTRACT

Background: Acute kidney injury (AKI) is a global problem. Its incidence varies in different geographical region as well as the targeted population under the study. Most common causes are sepsis, volume depletion, nephrotoxic medication, and illnesses related to the heart and liver. In developing countries, it can be due to snake bite, malaria, and secondary to poisonings. **Objectives:** The study is conducted to analyze the types, etiological factors, and comorbidities associated with AKI in patients admitted into the medical wards in a tertiary care hospital. **Materials and Methods:** A total of 60 patients were selected based on the Kidney Disease Improving Global Outcomes criteria of AKI. An increase in serum creatinine >0.3 mg/dl or >1.5 times the baseline and a fall of urine output <0.5 ml/kg/h for 6–12 h were the criteria for selection. A history of volume depletion, nephrotoxic drugs, febrile illness, trauma, surgeries, diabetes mellitus, hypertension, and any history of cardiovascular, renal, and liver disorders was taken. Patients were classified into pre-renal, renal, and post-renal as per etiologies found during the study. Data collected were analyzed statistically. **Results:** Of 60 patients, 39 were males and 21 were females. The mean age of the study group was 60 ± 5. Diabetes and hypertension were the most common comorbidities. Infections were found to be most common cause which included diarrheal illness (12 patients) followed by urinary tract infection (10 patients) and community-acquired pneumonia (8 patients). Nonsteroidal anti-inflammatory drug abuse was seen in 12 patients, and an equal number of patients had chronic kidney disease and 6 patients had coronary artery disease. **Conclusion:** Pre-renal AKI is one of the common complications in the hospitalized patients. The key to management lies in high index of suspicion and early intervention while the injury is still reversible.

KEY WORDS: Acute Kidney Injury; Kidney Disease Improving Global Outcomes Guidelines; Infections

INTRODUCTION

Acute kidney injury (AKI) is a global problem. Its incidence varies in different geographical regions as well as the targeted population under the study. According to one meta-analysis, the pooled incidence rates of AKI in adult were 21.6–20% of hospitalized adult patients experienced AKI during a hospital care which is associated with high expenditure of resources and lead to adverse outcomes.[1] AKI leads to high mortality in critically ill patients and in patients undergoing cardiac surgeries.[2]

Unlike the high-income countries, the data from low- and medium-income countries are very few. In the developing countries like India, most of the data are from urban setting, and the AKI occurring in the communities is largely unreported. The annual incidence of AKI in hospitalized patients was found to be 6.6/1000 admissions.[3] The epidemiology of AKI in developing countries is unique in that certain causes, such as the infections, obstetric causes, and nephrotoxins, which

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are largely obsolete in developed countries remain important causes in developing countries.[4]

Recent epidemiological studies demonstrate the wide variation in the etiologies and risk factors associated with AKI[5] and describe the increased mortality associated with the disease and suggest the relationship to the development of chronic kidney disease (CKD) and progression to dialysis dependency.[6,7] In keeping with the spectrum of changes seen in AKI, a diagnostic classification scheme was developed. More recently, the "Kidney Disease Improving Global Outcomes" (KDIGO) classification appears to have provided increased diagnostic sensitivity and outcome-prediction capability.[8,9] AKI is a syndrome characterized by a rapid (hours to days) deterioration of kidney function.[9] AKI with a rise in serum creatinine as modest as 0.3 mg/dL is associated with a 70% increase in mortality risk and increased risk of death by 6.5 times. AKI management in non-intensive care unit setting incurs the third highest median direct hospital cost, after acute MI and stroke.[10]

Aims and Objectives

- The study is conducted to analyze the clinical profile, etiology, types, and comorbidities associated with AKI in a tertiary care hospital.

MATERIALS AND METHODS

- Study design: This was a cross-sectional and observational study
- The study is conducted over a time period of 6 months from January 2017 to June 2017.

Selection Criteria

Inclusion criteria

The following criteria were included in the study:
- Age >18 years
- Patients on the time of admission with their serum creatinine levels raised above baseline >0.3 mg/dl or fall in urine output of 0.5 ml/kg/h for 6 h.

Exclusion criteria

The following criteria were excluded from the study:
- Patients on maintenance hemodialysis
- In patients of critical care unit.

Methods

- The institutional ethical committee approval and written informed consents were obtained from the patients.
- 60 patients were selected at the time of admission based on the rise of serum creatinine levels >0.3 mg/dl over the baseline values or decrease in the urine output 0.5 ml/kg/hr over 6 h.
- History of volume depletion, nephrotoxic drugs, recent trauma, surgeries, type 2 diabetes, hypertension, and nonsteroidal anti-inflammatory drug (NSAID) abuse were taken.
- Detailed general physical examination and systemic examinations were done.
- Serum creatinine and blood urea, USG abdomen, and other necessary investigations were done.
- Estimated glomerular filtration rate was calculated according to Cockcroft-Gault formula.
- The clinical and biochemical profiles were followed up during the entire hospital stay.

RESULTS

In this study, 31 patients (51.60%) were in the age group of 50–70 years, 28.30% were between 30 and 50 years, and 15% of patients accounted to 70–90 years [Table 1]. Males were 39 (65%) and 21 were females (35%). Diabetes was the most common comorbidity (46.6%) followed by hypertension (35%). 12 patients (20%) had pre-existing CKD, and an equal number of cases had NSAID abuse [Figure 1]. Most common clinical presentation was fever accounting to 33.3% followed by vomiting (25%) [Table 2]. Of the 60, 45 patients (75%) belonged to KDIGO Stage1. 8 patients belonged to Stage 2 (13%). Rest of the patients belonged to Stage 3. Pre-renal AKI was more common (57%) followed by renal cause (41%), and only 2% of Patients had post-renal cause. Gastroenteritis was most commonly associated followed by pneumonia in pre-renal

Table 1: Age distribution

Age groups (years)	Male	Female	Total
20–30	3	0	3
30–40	6	3	9
40–50	5	3	8
50–60	11	7	18
60–70	7	6	13
70–80	5	2	7
80–90	2	0	2

Table 2: Clinical presentation

Symptoms	Number of cases (%)
Fever	20 (33.3)
Vomiting	15 (25)
Loose stools	12 (20)
Oliguria	7 (12)
Shortness of breath	7 (11)
Burning micturition	6 (10)
Diabetic foot	4 (6)

AKI [Figure 2]. Complicated urinary tract infection (UTI) was found in 16% of patients which accounted for renal cause [Figure 3]. Bladder outlet Obstruction accounted for post-renal cause (2%).

Of 60 cases, 55 (91.6%) patients were managed conservatively and 5 (8.33%) patients underwent hemodialysis. Serum creatinine returned to baseline in 49 patients, and for 11 patients, SSerum creatinine did not return to baseline after treatment

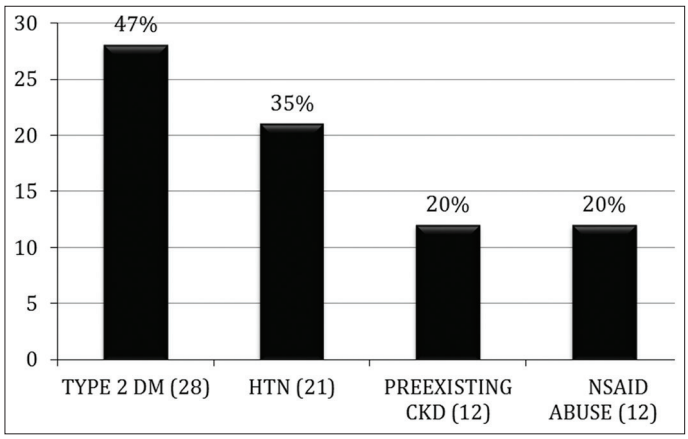

Figure 1: Risk factors

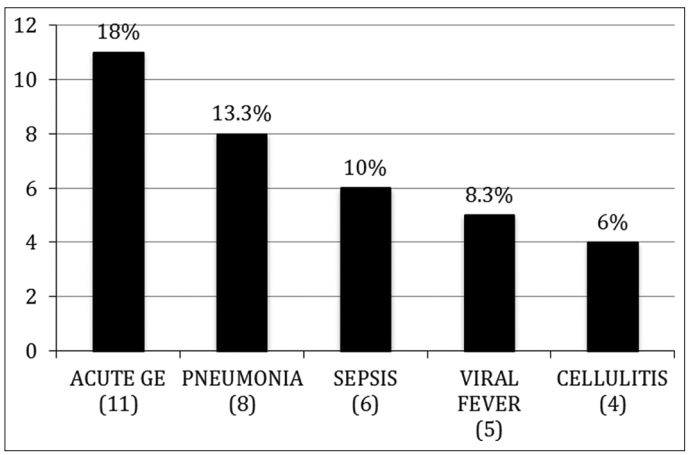

Figure 2: Pre-renal causes

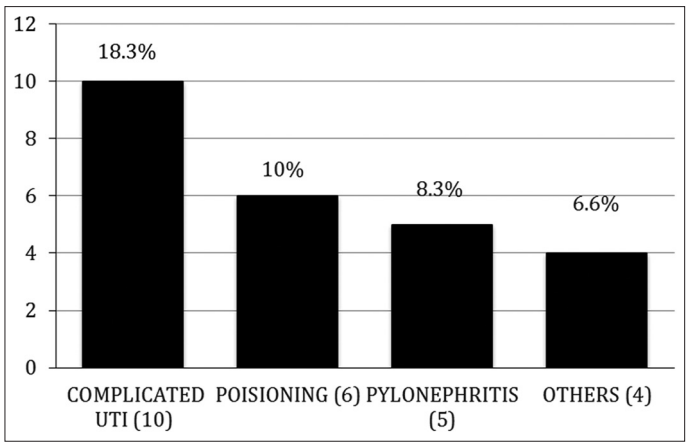

Figure 3: Renal causes

as there were having pre-existing CKD. Of 5 patients who underwent hemodialysis, 4 patients recovered completely and 1 patient was maintained on hemodialysis. The mean serum creatinine at admission was 2.4 mg/dl (ranging from 1.7 mg/dl to 6.2 mg/dl). The mean duration for the serum creatinine to come to normal took 4 days, and this duration was directly proportional to the level of initial serum creatinine values. The mean serum creatinine at the time of discharge was 1.8 mg/dl. The standard deviation is 1.33 and ranges 2.07–2.7 with 95% confidence interval. There was no mortality seen in any of the patients during the period of the study.

DISCUSSION

This was a cross-sectional and observational study. The mean age of presentation is 51.60%. This study is co-related with Eswarappa *et al*.[11] where the mean age of presentation is 55.5%. 40.7% was the mean age group in Nagamani *et al.*[12] [Table 3]. In Kumar et al. study,[13] it was 48.96%. Fever was the most common presentation in our study (33.3%). It correlated with Eswarappa et al. (52%) and 53% in Nagamani *et al*. [Table 4]. Similarly in study by shende *et al*[14],the common presentations were vomiting (80%), fever (56%) and loose stools (22%) .

34 patients had pre-renal AKI (57%) which correlated with 60% of patients of Nagamani et al. 36% of patients of Nagamani et al. had renal AKI which correlated with 41%

Table 3: Age distribution

Study	Mean age (%)	Males (%)	Females (%)
Present study	56.6	65	35
Eswarappa *et al.*	55.5	63.6	36.4
Kumar *et al*.	48.96+18.3	61	38.2
Nagamani *et al*.	40.72	64	36

Table 4: Comparision of clinical symptoms

Symptoms	Present study (%)	Eswarappa *et al.* (%)	Nagamani *et al.* (%)
Fever	33.3	52	56
Vomiting	25		68
Loose stools	20		28
Oliguria	11.6	67	36
Dyspnea	11.6		
Burning micturition	10		
Jaundice	2	21	28

Table 5: Comparision of types of renal failure

Acute kidney injury	Present study (%)	Kumar *et al.* (%)	Nagamani *et al.* (%)	Liaño and Pascual (%)
Pre-renal	57	20.6	60	21
Renal	41	69.6	36	58
Post-renal	2	9.8	4	10

in the present study. 2% of post-renal cause in this study is correlated by 4% in Nagamani *et al*. [Table 5].In their study conducted by Balushi et al(15), in 100 patients ,the incidence of pre renal AKI was 50.9, obstructive in 4.6% and acute tubular necrosis (ATN) in the remaining was 44.4%.

Acute GE in this study accounted for 19%. It correlated with 21% in Kumar *et al* and Type 2 diabetes and hypertension are the most common associated comorbidities. This is consistent with Kumar et al. In our country, infections are one of the leading causes of most of these patients were treated conservatively and resumed normal function. High serum creatinine level at the initial presentation showed delayed recovery. Of 60 cases, 25 (41%) have renal causes of AKI. Of these 25 cases, UTI is the most common cause. 69.6% of the cases in Kumar et al., 36% of the cases in Nagamani et al. and 58% of the cases in Liaño and Pascual[16] it was 48.8 % Mujeeb *et al*.[17]

In patients requiring hemo dialysis the cause of AKI was infections and poisioning .in study done in Ethiopia by Ibrahim *et al*[18] infections was found to be the most common cause for AKI requiring hemo dialysis. In study by sara korula *et al*[19], septicaemia was the most common cause of AKI requiring hemo dialysis.

Only 2% of cases have post-renal cause. This is consistent with Nagamani et al. (4%). 28% in Nagamani et al.

Drawbacks/Limitations

- Done only in medical wards.
- Baseline creatinine before admission was not available for all patients.
- Duration of the study is limited.

CONCLUSION

AKI is a common entity complicating the hospitalized patients. Pre-renal, intrinsic, and post-renal causes are responsible for AKI. Infections are still the common causes of AKI in this part of our country. The key to management lies in early diagnosis and early intervention while the injury is still reversible.

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