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EVALUATION OF ACUTE KIDNEY INJURY AND ITS MANAGEMENT IN HOSPITALIZED PATIENTS

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ABSTRACT

Acute kidney injury (AKI) is marked by a rapid decline in kidney function, identified by elevated serum creatinine (Scr), blood urea nitrogen (BUN), and reduced urine output. AKI is common among hospitalized patients and it poses significant health risks and contributes to global morbidity and mortality. This study aimed to evaluate the prevalence, risk factors, and management of AKI. This study was conducted for a period of nine months at St. Philomena's Hospital, Bengaluru and enrolled 143 patients. The prevalence rate of AKI was 3.37%, with males (64.33%) being more affected than females (35.66%). Most cases occurred in individuals aged 61 years and older. The common risk factors were Hypertension (8.39%), Type 2 diabetes mellitus (22.37%), and followed by Acute Gastroenteritis. The management strategies include administration of intravenous fluids (24.47%), antihypertensives (2.79%), diuretics (0.69%), and oral hypoglycaemic agents, with 14.68% requiring dialysis. Addressing AKI risk factors and implementing effective treatments are crucial for reducing its prevalence and improving patient outcomes.

KEYWORDS: Acute kidney injury, Chronic kidney disease, Acute gastroenteritis, Acute on chronic kidney disease.

INTRODUCTION

Acute kidney injury (AKI) is a sudden loss of kidney function, identified by reduced urine output or increased serum creatinine. It can result from reduced blood flow, kidney damage, or urinary obstruction, requiring prompt management. Acute kidney injury (AKI) is classified as pre-renal (reduced kidney perfusion), renal (direct kidney damage), or post-renal (urinary obstruction). Each type affects kidney function differently, leading to reduced glomerular filtration rate (GFR).[1]

AKI symptoms vary by cause and include decreased urine output, edema, electrolytes imbalance, sudden weight gain, or abdominal and flank pain.[1]

The common risk factor like advanced age, CKD, and conditions such as diabetes and hypertension, which compromise kidney health. Dehydration, sepsis and infection can impair kidney perfusion and function. Medications like NSAIDs or contrast agents may also cause direct kidney damage. Critically ill patients, particularly those in the ICU with shock or major surgery, face heightened risk.[2]

Management of AKI focus on the risk stratification and tailored interventions, including cautions fluid resuscitation and vasopressor to maintain blood pressure. Loop diuretics may reduce metabolic demand but lack consistent benefit. Blood glucose control (110-149 mg/dL) is recommended for critically ill patients to reduce AKI risk.[3]

AKI evaluation begins with a detailed review of medical history, medications and risk factors, assessing severity using KDIGO criteria. Key considerations include hemodynamic status, sepsis, CKD, electrolyte imbalance and the need for renal replacement therapy.

Prevention of AKI involves discontinuing nephrotoxic agents, ensuring adequate volume and perfusion, and managing contrast-associated AKI with IV hydration. Hyponatremia and acidosis should be addressed with fluid restriction and careful monitoring, while diuretics are used for hypertension unless there are signs of volume depletion.[4]

If affects 3-18% of hospitalized non-critical patients and up to 60% of critically ill adults, with rising hospitalization rates over the years. Early detection and multi-pathway treatment improve outcomes.[5]

METHODS

Study Site

The study was conducted at St. Philomena's Hospital, Bangalore.

Study Period

The study was conducted for a period of nine months.

Study Design

Hospital based Prospective observational study.

Inclusion Criteria

Patients of both genders above 18 years of age who were confirmed with AKI in In -Patients wards.

Exclusion Criteria

- Patients who were not willing to participate in the study.
- Patients those who were CKD and those who were on regular dialysis.

Source of data

- Patients case sheets
- Interview with patient/attender
- Interview with physicians

METHOD OF STUDY

Patients diagnosed with AKI, as per the inclusion criteria, were enrolled in the study. Detailed information, including demographics, social history, clinical complaints, past medical history, and laboratory findings, was carefully extracted from prescriptions and case sheets using a structured data collection form. Risk factors were assessed based on KDIGO criteria, and treatment patterns were systematically documented. The collected data were pooled and analysed using descriptive statistical methods to generate meaningful insights.

RESULTS

The study has been carried for a period of nine months after obtaining Institutional ethical committee clearance from the hospital. During the study period, total of 4234 patients got admitted in the study site, among them 143 Acute Kidney Injury (AKI) patients who met the inclusion criteria were enrolled.

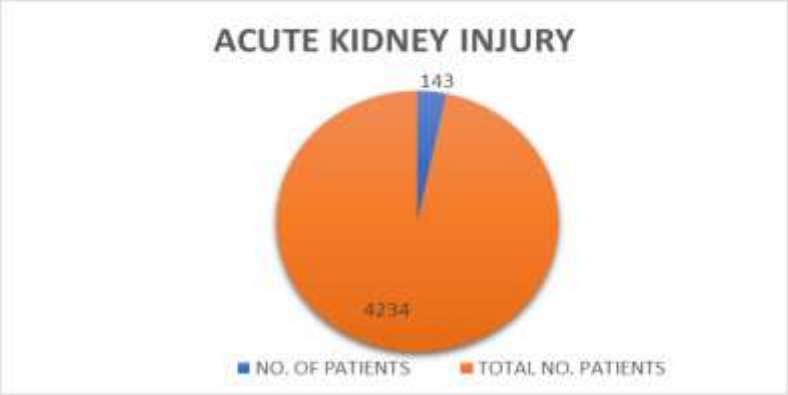

Figure 01: Distribution of Patients Based on Prevelance of Aki.

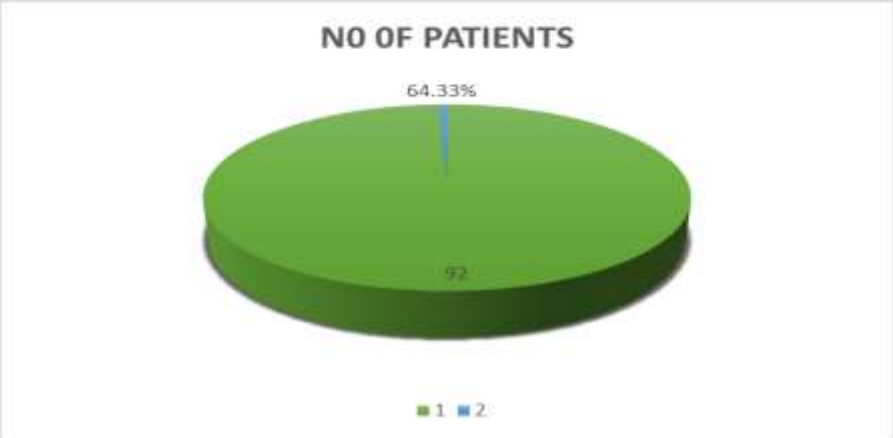

Figure 02: Distribution Of Patients Based On Gender.

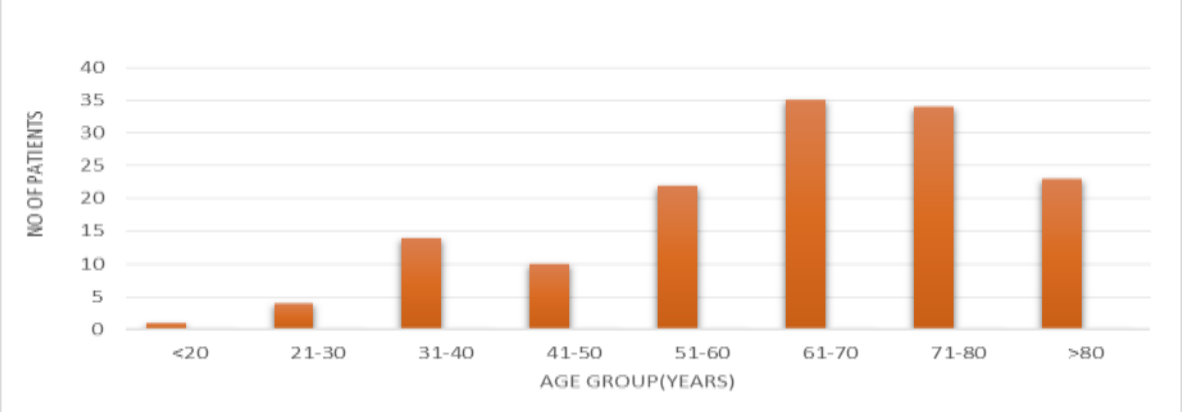

Fig 03: Distribution Of Patients Based On Age Group.

Table 01: Distribution of Patients Based on Comorbidity.

SL.NO	COMORBIDITY STATUS	NO. OF PATIENTS	PERCENTAGE (%)
1	WITH COMORBIDITIES	120	83.91%
2	WITHOUT COMORBIDITIES	23	16.08%
TOTAL		143	100%

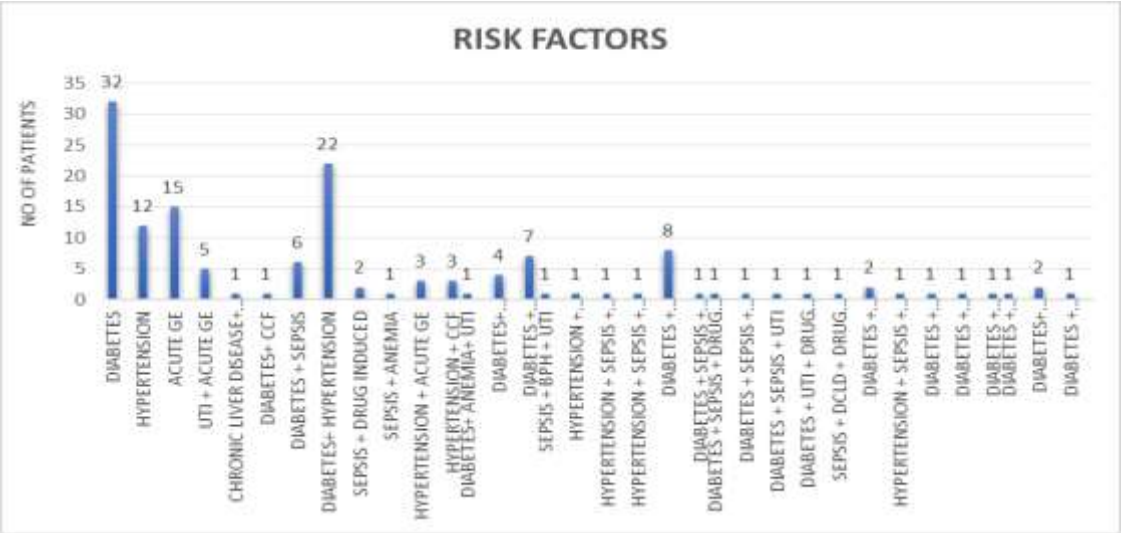

Figure 04: Distribution of Patients Based On Risk Factors.

Table 02: Distribution Of Patients Based On Kdigo Scale.

SL.NO	KDIGO SCALE	CREATININE LEVEL	NO OF PATIENTS	PERCENTAGE %
1	STAGE – I	1.5-1.9	61	42.65%
2	STAGE – II	2-2.9	55	38.46%
3	STAGE – III	3-4	27	18.88
TOTAL			143	100%

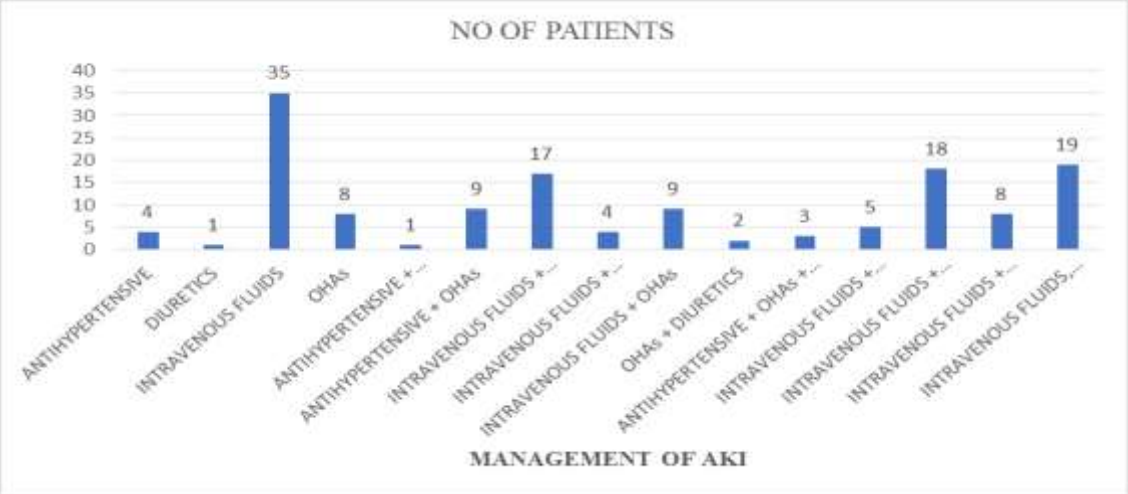

Figure 05: Distribution of Patients Based on Management of Aki.

Table 03: Distribution of Patients Based On Underwent Dialysis.

SL.NO	UNDERWENT DIALYSIS	NO OF PATIENTS	PERCENTAGE%
1	YES	21	14.68%
2	NO	122	85.31%
TOTAL		143	100

DISCUSSION

During the study period of 9 months, a total of 4234 patients were admitted and out of which 143 patients were found to be AKI, the prevalence rate of AKI was found to be 3.37%.

Out of 143 patients, 92 were male and 51 were female, representing 35.66%. This distribution shows a higher prevalence of AKI among male patients compared to female patients.

Among 143 patients, the majority of AKI cases were among older adults, with the highest prevalence in the 61-70 years age group (24.47%), closely followed by the 71-80 years group (23.77%). Additionally, 16.08% of cases are patients over 80 years, underscoring the elevated risk of AKI among older individuals. In contrast, younger age groups show significantly lower rates, with only 0.69% of patients under 20 and 2.79% in the 21-30 years range**.** These results were similar to the study done by Mehta RL, et al.[5]

Among 143 patients diagnosed with Acute Kidney Injury (AKI), a substantial majority of patients (83.91%) had one or more comorbid conditions, while only 16.08% were without any comorbidities. These results were similar to the study done by Weisbord SD.[6]

Among the study population, the most prevalent risk factor identified was diabetes, affecting 32 patients (22.37%), indicating a strong correlation between diabetes and the development of AKI. Hypertension was notable, affecting 12 patients (8.39%) of the study population. Other significant contributors to AKI included acute gastroenteritis (GE), observed in 15 patients (10.48%), and a combination of diabetes with chronic conditions like congestive cardiac failure and sepsis, which showed varying incidences. The interplay of diabetes, hypertension, and sepsis was particularly noteworthy, affecting 8 patients (5.59%). Several patients also exhibited multifactorial risk factors, emphasizing the complexity of these conditions in AKI development. This highlights the intricate relationships among these risk factors in the pathogenesis of AKI.

Drug-induced AKI was observed among study population. The commonly identified nephrotoxic drugs were including NSAIDs, aminoglycosides, and certain antibiotics. These medications caused renal impairment either directly or by aggravating existing risk factors. Identifying and discontinuing the offending drugs were essential steps in managing and preventing further kidney damage.

Intravenous fluids were the most common management approach, which was given for 24 patients (24.47%). Other strategies included the use of oral hypoglycaemic agents (OHAs) in 8 patients (5.59%) and a combination of intravenous fluids (24.47%) with antihypertensives (2.79%), which was used in 17 patients (11.88%).

In terms of combinations, intravenous fluids alongside antihypertensives and OHAs were used in 18 patients (12.58%), indicating a multi-faceted approach to managing AKI. Less frequently diuretics were used alone, which was prescribed for 1 patient (0.69%), and 4 patients (2.78%) received diuretics with other drugs.

Among 143 patients, the majority of patients were in Stage I, with 61 individuals (42.65%), reflecting a significant incidence of mild acute kidney injury. Following closely, Stage II was observed in 55 patients (38.46%), indicating moderate kidney impairment. Stage III, which signifies severe acute kidney injury, was represented by 27 patients (18.88%). This distribution highlights the prevalence of acute kidney injury among the admitted patients, with a notable percentage in the earlier stages of the KDIGO scale. These results were similar to the study done by Mehta RL.[5]

Among 21 AKI patients undergoing dialysis, 3 (14.28%) achieved serum creatinine levels below 1.5 mg/dl, indicating a favourable response. Most patients (55%) had levels between 1.6 and 3.5 mg/dl, showing partial improvement. However, 7 patients (33.32%) had levels exceeding 3.6 mg/dl, indicating persistent renal impairment.

CONCLUSION

In conclusion, this nine-month study at tertiary care teaching Hospital showed an AKI prevalence of 3.37%, primarily affecting males and patients aged 61 and above. Hypertension, type 2 diabetes, and acute gastroenteritis were the most common risk factors. Most patients had mild to moderate AKI, with conservative management using fluids and

medications. Timely identification of risk factors and appropriate treatment are crucial in preventing the progression of AKI and its consequences.

REFERENCES

1. Di Piro JT. Pharmacotherapy: a pathophysiologic approach. 11th edition. New York: McGraw Hill Medical, 2020.
2. Rangaswamy D, Sud K. Acute kidney injury and disease: Long-term consequences and management. Nephrology [internet], 2018 Nov; 23(11): 969–80. Available from: https://doi.org/10.1111/nep.13408
3. Moore PK, Hsu RK, Liu KD. Management of Acute Kidney Injury: Core Curriculum. Am Kidney Dis [internet], 2018 Jul; 72(1). Availablefrom:https://pubmed.ncbi.nlm.nih.gov/29478864/.
4. Khwaja A. KDIGO Clinical Practice Guidelines for Acute Kidney Injury. Nephron Clin Pract.[internet], 2012 Aug 7; 120(4): 79–84. Available from: https://doi.org/10.1159/000339789.
5. Mehta RL, Kellum JA, Shah SV, Molitoris BA, Ronco C, Warnock DG, et al. Acute Kidney Injury: A Clinical and Patient-centred Approach. Clin J Am Soc Nephrol [Internet], 2016; 11(4): 13961405. Availablefrom http//: doi:10.2215/CJN.06380615.
6. Weisbord SD, Palevsky PM. Acute kidney injury in patients with chronic kidney disease. Clin J Am Soc Nephrol [Internet], 2009; 4(6): 1003-1015. Available from http//: Doi: 10.2215/CJN.00790109.