

ORIGINAL RESEARCH

A PROSPECTIVE STUDY OF AETIOLOGY AND OUTCOME OF ACUTE KIDNEY INJURY IN TYPE 2 DIABETES PATIENTS

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Abstract

Introduction: Acute kidney injury (AKI) is a protean syndrome of varied severity. It is characterized by a rapid (hours to weeks) decline in the glomerular filtration rate (GFR) and retention of nitrogenous waste products such as blood urea nitrogen (BUN) and creatinine.^{1,2} The RIFLE criteria, proposed by the Acute Dialysis Quality Initiative (ADQI) group, aid in the staging of patients with AKI.

Materials and methods: A prospective study was conducted at the Shaheed Nirmal Mahato Medical College (SNMMCH), Dhanbad from January 2021 to December 2021 (1 year). Type 2 diabetic patients 30 years or above, irrespective of gender, diagnosed to have acute kidney injury using KDIGO criteria, admitted to ICU or wards under the Shaheed Nirmal Mahato Medical College (SNMMCH), Dhanbad were included. Patients with preexisting renal disease and those who received renal transplantation. Type 2 diabetic patients admitted in the ICU and wards under Shaheed Nirmal Mahato Medical College (SNMMCH), Dhanbad were evaluated in detail after taking prior consent. Evaluation includes detailed history taking and physical examination. Acute kidney injury will be assessed on the basis of their serum creatinine and/or urine output fulfilling the KDIGO criteria.

Results: The study was conducted in a total of 75 diabetic patients who developed acute kidney injury. There were 47 males and 28 females. The aetiology and outcome of acute kidney injury in the above patients were found out. Blood urea, serum creatinine, serum electrolytes, fasting and post-prandial blood sugar, WBC count, platelet count and haemoglobin were included as the baseline parameters.

Conclusion: Infection was the most common cause of AKI in Type 2 diabetes patients in our study. Among drug induced renal failure patients, NSAIDs were noted to be most common cause. Age >60 and male gender were prevalent in the majority of AKI patients. About 52.66% of the total patients recovered to normal renal function, 13.3% recovered partially, with 14% of the total patients progressed for

maintenance hemodialysis. Crude mortality rate among patients with AKI in the study group was 20%.

Key Words: Acute kidney injury, Acute Dialysis Quality Initiative, haemoglobin.

INTRODUCTION

Acute kidney injury (AKI) is a protean syndrome of varied severity. It is characterized by a rapid (hours to weeks) decline in the glomerular filtration rate (GFR) and retention of nitrogenous waste products such as blood urea nitrogen (BUN) and creatinine. The RIFLE criteria, proposed by the Acute Dialysis Quality Initiative (ADQI) group, aid in the staging of patients with AKI.¹

AKI has been estimated to occur in 3-7% of hospitalized patients. More recently, a study using the RIFLE staging system identified that 18% of patients admitted to a large urban medical center had evidence of AKI. The incidence of AKI in the intensive care unit (ICU) has been characterised more clearly due to established data collection systems at 25-30%.²

AKI can result from decreased renal or intrarenal perfusion, a toxic or obstructive insult to the renal tubule, tubulointerstitial inflammation and edema or primary reduction in the filtering capacity of the glomerulus.³ Ischemia and toxins, often in the setting of sepsis, account for the largest number of cases of AKI. It is estimated that 19-33% of in hospital AKI causes are attributed to drug nephrotoxicity.⁴ In developed countries trauma and surgery constitute the main cause of acute renal failure whereas in developing countries more than 60% are related to medical cause.

MATERIALS AND METHODS

Study design: A prospective study.

Study location: Department of Medicine, Shaheed Nirmal Mahato Medical College (SNMMCH), Dhanbad

Study Duration: January 2021 to December 2021 (1 year).

Study population: Type 2 diabetic patients with acute kidney injury irrespective of age and gender.

Inclusion criteria: Type 2 diabetic patients 30 years or above, irrespective of gender, diagnosed to have acute kidney injury using KDIGO criteria, admitted to ICU or wards under the Department of medicine, Shaheed Nirmal Mahato Medical College (SNMMCH), Dhanbad. **Exclusion Criteria:** Patients with preexisting renal disease and those who received renal transplantation. Type 2 diabetic patients admitted in the ICU and wards under Medicine and Nephrology department, Shaheed Nirmal Mahato Medical College (SNMMCH), Dhanbad were evaluated in detail after taking prior consent. Evaluation includes detailed history taking and physical examination. Acute kidney injury will be assessed on the basis of their serum creatinine and/or urine output fulfilling the KDIGO criteria.

Statistical Analysis: Results were presented as frequency and percentages for Categorical variables and mean +/- SD for continuous variables. Statistical calculations were done using Chi-square tests for categorical data and on independent t-test. For continuous data. P<0.05 was considered significant. The calculations were carried out using SPSS (Statistical Package for the Social Sciences).

RESULTS

The study was conducted in a total of 75 diabetic patients who developed acute kidney injury. There were 47 males and 28 females. The aetiology and outcome of acute kidney injury in the above patients were found out. Blood urea, serum creatinine, serum electrolytes, fasting and post-prandial blood sugar, WBC count, platelet count and haemoglobin were included as the baseline parameters.

Age group	Number of patients (Percentage)
<50 years	15 (20%)
50-59 years	30 (40%)
60-69 years	21 (28%)
≥70 years	9 (12%)
Total	75 (100%)

Table 1: Age Distribution

Gender	Mortality		P Value
	Yes	No	
Male	17 (23%)	58 (77%)	0.096
Female	3 (11%)	25 (89%)	

Table 2: distribution of mortality among male and female diabetic AKI patient

Infection	Mortality		P Value
	Yes	No	
No infection	2(7%)	23 (96%)	0.096
UTI	5 (28.57%)	13 (71.42%)	
LRTI	0(0)	8 (100%)	
Sepsis	3 (33.33%)	5 (66.66%)	
Leptospirosis	5 (83.33%)	1 (5.71%)	
UTI & Sepsis	2 (100%)	0(0)	

Table 3: distribution of mortality with various infections in diabetic AKI patients

Aetiology	Mortality		P Value
	Yes	No	
Drugs	0(0)	5 (100%)	0.096
CAD/LVD	0(0)	5 (100%)	
Infection	5 (22%)	19 (78%)	
Volume depletion	0(0)	2 (100%)	
Urological Obstruction	2 (13%)	11 (87%)	
IRC/N	0(0)	3 (100%)	
Drugs and Infection	1 (100%)	0(0)	
Accl HTN & CAD/LVD	0(0)	2 (100%)	
CAD/LVD & volume depletion	0(0)	2 (100%)	
Infection & Urological obstruction	2 (100%)	0(0)	
Infection & IRGN	1 (100%)	0(0)	

Table 4: distribution of mortality with aetiology in diabetic AKI patients

S.No	Outcome	Number of patients	Percentage
1	Fully recovered	39	52.66
2	Partially recovered	10	13.33
3	Dialysis Dependent	11	14
4	Mortality	15	20

Table 5: distribution of outcome of AKI in Type 2 diabetes

52.66% had full recovery and 13.33% had partially recovered. Dialysis dependent found to be 20% and 14% was put on maintenance hemodialysis (Dialysis dependent).

DISCUSSION

Infections were found to be the most common cause of AKI in the study. It accounted for 54 % of cases, among which UTI was found in more than half of the cases. In a prospective study by Khan and Ahmed, the most common focus of infection was found to be urinary tract (71.2%).⁶

Infections were found to be the most common cause of AKI in the study. It accounted for 54 % of cases, among which UTI was found in more than half of the cases. In a prospective study by Khan and Ahmed, the most common focus of infection was found to be urinary tract (71.2%). Sepsis was found to be the most common cause for AKI in several studies. The lower proportion of sepsis in this study might be attributed to the fact, unlike the above studies, the majority of patients selected for were not critically ill patients from ICU, but from medicine and nephrology wards.⁷

Urinary tract obstruction was the second most common cause in this study that accounted for 23%. Vakrani et al found sepsis (52.9%) and urinary tract obstruction (50%) as the leading causes for renal failure in diabetics. Jha et al., and Prakash et al., which evaluated AKI had shown that nephrotoxic drugs were the most common cause of AKI. The risk for mortality was found to be increased with increasing age, male sex, sepsis with UTI, BPH, increased mean blood urea and serum creatinine levels. Similar results were found in studies of Eswarappa et al.⁸

Mortality was also found to be increased in patients with high mean FBS, PPBS, total WBC counts and serum potassium, and low serum sodium and platelet counts. The increase in awareness of these risk factors will help in the early identification of kidney injury that is critical for treatment or prevention of AKI.^{9,10}

CONCLUSION

Infection was the most common cause of AKI in Type 2 diabetes patients in our study. Among drug induced renal failure patients, NSAIDS were noted to be most common cause. Age >60 and male gender were prevalent in the majority of AKI patients. About 52.66% of the total patients recovered to normal renal function, 13.3% recovered partially, with 14% of the total patients progressed for maintenance hemodialysis. Crude mortality rate among patients with AKI in the study group was 20%.

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