



ORIGINAL RESEARCH ARTICLE

CLINICAL PROFILE AND OUTCOME OF ACUTE KIDNEY INJURY IN INTENSIVE CARE UNIT OF A TEACHING HOSPITAL

Bidhan Shrestha,^{1*} Sabita Shrestha,² Rakshya Shrestha,² Pramod Paudel,¹ Hari Krishna Dhakal,¹ Mukesh Ranjan Shah,¹ Suresh Kumar Deep,¹ Sabina Sedhai¹¹Department of Internal Medicine, Chitwan Medical College Teaching Hospital, Bharatpur, Chitwan, Nepal²Department of Obstetrics & Gynaecology, Chitwan Medical College Teaching Hospital, Bharatpur, Chitwan, Nepal**Correspondence to: Dr Bidhan Shrestha, Department of Medicine, Chitwan Medical College, Bharatpur, Chitwan, Nepal.**Email: bidhansabi@gmail.com.*

ABSTRACT

Objectives: Acute kidney injury is one of the most common cause of hospitalization in developing countries. Causes of AKI are multifactorial. Most of AKI are community acquired. The objective of the study was to identify the clinical profile and outcome of acute kidney disease. **Subject and Methodology:** 30 patients from Chitwan Medical College outpatient clinic were included in the study from November 2014 to April 2015. A brief history and clinical examinations were taken from all patients along with laboratory tests for Renal function tests, urine output, metabolic parameters and hematological profile. **Results:** 19 males (63.3% and 11 females (36.7%) were studied. The main causes for AKI were sepsis (46.6%) followed by hepatic causes (16.6%), gastroenteritis (10%) and others (10.2%). Out of 30 patients, 19 recovered (63.3%) and were discharged and 11(36.7%) died. Most of the deaths were in injury (37.5%) and failure (42.8%) stages of RIFLE criteria. Out of 19 recovered 16(84.21%) patients did not need any renal replacement therapy whereas 3(15.8%) patients had to undergo hemodialysis. **Conclusion:** Early identification of kidney injury may lead to lesser renal replacement therapy and better prognosis. However late presentations of AKI have higher hospital mortality rate.

Key Words: AKI, ICU, Teaching Hospital

INTRODUCTION

Acute kidney injury, previously termed as acute renal failure, is a spectrum of disease characterized by abrupt onset of deterioration in kidney function resulting in retention of nitrogenous and other waste products. AKI is a heterogenous group of conditions sharing common features mainly increase in level of serum urea, creatinine and decrease in production of urine.¹ Many experts tried to classify Acute Kidney Injury, amid controversies, RIFLE system was developed and advocated in 2007. Later in 2012 a larger multidisciplinary group proposed a slight modification in RIFLE criteria called as AKIN (Acute Kidney Injury Network) criteria.² Both these criteria have been proposed to achieve an early diagnosis and prognosis of AKI patients.⁴ One of the most common clinical condition in a hospitalized patient in ICU is AKI the incidence being 2-5%.³ Hospital mortality is

directly proportional to the stages of AKI. There has been an increase in the incidence of ICU related AKI during last few decades probably the reason being increased diagnosis of sepsis related admissions, increase prevalence of risk factors for AKI such as Chronic Kidney Disease, Diabetes Mellitus and Congestive heart failure.² Major surgeries, advanced age, liver diseases have also been implicated as risk factors for development of AKI.³ AKI is a significant contributor towards morbidity and mortality in ICU patients as supported by the program to improve care in acute renal disease (PICARD) and beginning and ending supportive therapy for kidney (BEST) trials.⁴ Early recognition and management can make AKI reversible but at the same time delay in diagnosis may lead to higher rate of morbidity and mortality. The most common cause for the mortality in AKI are elderly people with complex diseases, sepsis and multi organ failure. AKI is not the cause

of death however it tells us the depth of underlying disease. Treatment in AKI depends on its early recognition, comprehensive understanding of the clinical spectrum of disease and potential areas of intervention.¹

We undertook a prospective evaluation in patients with AKI in relation to the most susceptible population, ethnic groups, etiology, outcome and modality of treatment in an Intensive Care Unit of a Teaching Hospital of Chitwan district in Nepal.

METHODOLOGY

The study was conducted by the Department of Internal Medicine in Chitwan Medical College and teaching hospital, a tertiary centre in Mid Central Nepal, during the period of November 2014 to April 2015. We screened and prospectively studied all the patients who were admitted and fulfilled the inclusion criteria during ICU stay.

Definition: The definition of Acute kidney injury was proposed on the basis of RIFLE criteria in 2002 by Acute Dialysis Initiative which was especially for AKI in critically ill patients. RIFLE includes risk, injury, failure, loss and End stage kidney disease where the first three defined the grades of severity and the last two the outcome classes. Recently in 2007 Acute Kidney Injury Network composed of Nephrologist and Intensivist modified the Rife criteria and defined AKI as an abrupt (within 48 hours) reduction in kidney function i.e. absolute increase in serum creatinine of more than or equal to 0.3 mg/dl, increase in serum creatinine of more than equal to 50% or a reduction in urine output (documented oliguria of < than 0.5 ml/kg/hr for more than 6 hours).⁵

Total number of patients who fulfilled the inclusion criteria were 30. Exclusion criteria were Chronic Kidney Disease who were on RRT (renal replacement therapy) and who didn't give the consent. All the patient with Standard demographic, clinical and physiological were studied in detail. Demographic study included age, sex, gender, ethnicity, and duration of ICU stay. Clinical data included primary diagnosis, presence of comorbid conditions, laboratory investigations, treatment history, and need for renal replacement therapy. Data on kidney function included serum creatinine, urea, sodium, potassium, urine output, metabolic profile and

hematological profile.

We defined diagnostic category on the basis of documentation during the admission by a treating Physician. The primary reason for sepsis and septic shock were made and patients admitted with sepsis related secondary to Pneumonia, Acute gastroenteritis, Urinary Tract Infections, soft tissue infections and sepsis of Undetermined source. Follow up data regarding their renal function status was collected. Statistical calculations were done by SPSS version (statistical package for the social sciences). Ethical clearance was obtained from the Ethics Review Committee. Informed written consent was obtained from patients, or from the closest relative. All investigations that the patients were subjected to were a part of the routine workup done in any critically ill patient. No personal information was collected.

RESULTS

A total of 30 patents admitted in ICU who met the inclusion criteria were studied. Out of 30 cases 19 were males and 11 were females. Maximum number of patents were in between 51-60 years (33.3%). According to sex, out of 30, nineteen (63.3%) were male and eleven (36.7%) were female.

Table 1: Age distribution of patients

Age	Number of patients	Percentage
18-30	2	6.7
31-40	3	10
41-50	2	6.7
51-60	10	33.3
61-70	7	23.3
71-80	4	13.3

In this study ten out of thirty patients were in the age group between 51-60 years i.e 33.3%. 7 patients (23.3%) were in age group 61-70.

Table 2: Ethnicity

Ethnicity	Frequency	Percentage
Brahmin	6	20
Chhetri	7	23.3
Mongol	9	30
MADHESI	2	6.7

OTHERS	6	20
TOTAL	30	100

Among the thirty patients, the maximum belonged to the Mongolian group i.e. 30% followed by Brahmin and chhetris and the lowest being the madhesis i.e. 6.7%.

Table 3: Causes Of AKI

Diagnosis	Frequency	Percentage
Sepsis	14	46.6
Gastroenteritis	03	10.0
Hepatic	05	16.6
Cardiac	01	3.4
Surgical	02	6.6
Obstetrical	02	6.6
Others	03	10.2
Total	30	100

Sepsis was the most common cause of AKI among the patients admitted in ICU. Fourteen out of thirty i.e. around 47% of AKI was due to sepsis. The other causes of AKI were hepatic (alcoholic hepatitis), gastroenteritis, postoperative cases, obstetric cases and one of them was due to cardiac case respectively.

Table 4: RIFLE CRITERIA

RIFLE	Frequency	Percentage
Risk	04	13.3
Injury	16	53.3
Failure	07	23.3
Loss	03	10.0
Total	30	100

According to the RIFLE criteria more than 50% of patients fall in Injury group, which was followed by failure and risk. Only 10% of the cases were in loss category.

Table 5: RIFLE criteria and outcome

RIFLE	Outcome		Total
	Recovery	Death	
Risk	03	01(14.2%)	04
Injury	10	06(37.5%)	16
Failure	04	03(42.8%)	07
Loss	02	01(33.3%)	03
Total	19	11	30

According to RIFLE Criteria, 10 out of 30 patients fell in injury group and six patients from the same group died.

Table 6: Need of RRT

Need of RRT	Outcome		Total
	Recovery	Death	
Yes	03	05	8(26.7%)
No	16(84.21%)	6	22(73.3%)
Total	19(63.3%)	11(36.7%)	30

In this study of 30 cases, 19(63.3%) patients survived and about 11 (36%) died. 8 patients (26.7%) needed RRT out of which only 3 survived and 5 died. However, 22 patients did not undergo any RRT, 16 patients survived with conservative management whereas 6 patients died before undergoing any RRT.

DISCUSSION

AKI is one of the most common syndrome encountered in ICU. In our study of 30 patients, nineteen (63.3%) were males and eleven (36.6%) were female which is similar to the studies done by Chettri et al.⁵ Most of AKI patients were from age group of 51- 60 years (33.3%). In contrast to our study Cystowski et al. showed that most of AKI occur above the age of 65 years and has higher burden of illness.⁶ We also tried to compare which of the ethnic groups suffered from AKI and we found Mongol group to be mostly affected. However, no such studies on ethnic groups in our country are available till date.

The most common cause of AKI in our study was sepsis which was followed by other medical causes such as gastroenteritis, hepatic and cardiac cases. There were few surgical and obstetrics cases too. Eswarappa et al who evaluated acute kidney injury in tertiary centre in South India found sepsis to be the commonest cause of acute kidney injury. Shende et al also found that sepsis to be the most common cause of AKI admitted in ICU.⁶ However in contrast to our studies Ghimire et al⁷ concluded pneumonia to be the commonest cause of AKI admitted in tertiary centre ICU. A study conducted by Khakurel et al. found gastroenteritis to be the most common cause of AKI in Nepal.¹⁰

In this study most of the patients fell into injury group comprising maximum deaths and recovery in same group. The hospital mortality rate was 14.2% for risk

patient, 36% injury, 42% in failure and 33% in loss patient similar to the mortality study conducted by Park et al (29% for risk, 36% for injury, 51% for failure patients).¹¹

Out of total 30 patients admitted in ICU, nineteen (63.3%) survived and eleven (36.7%) died. Only 3 patients who survived needed renal replacement therapy, however 5 out of 6 patients who died underwent renal replacement therapy. In contrast the studies conducted by Chiioke et al found mortality (46.6%) higher than the studies conducted in our hospital.⁸ The main reason behind RRT were multifactorial, the most common cause being decreased urine output followed by refractory hyperkalemia and metabolic acidosis. Studies conducted by Daniel et al found metabolic acidosis to be the most common indication for RRT.⁹ The research conducted by Daniel et al⁹ had higher renal recovery rate (80%) as compared to our studies (63.3%).

CONCLUSION

The results in this study show that AKI patients can be treated without doing RRT if patients conditions are detected early with judicious investigations. However late stages in AKI have poorer prognosis even with RRT. Our studies showed sepsis to be the most common cause of AKI admitted in ICU.

REFERENCES

1. Kashinkunti MD et al. Clinical spectrum of acute kidney injury: a study from tertiary care hospital. *International Journal of Pharmaceutical and Biological Research*. 2013; 04; 165-169.
2. Hady HA, Baghdadi IM, Kora MA. Acute kidney injury outcome in critically ill patients: *International Journal of Current Research*. 2014; 02; 5018-5025.
3. Shende P, Shara SK, Vikhe VB. Clinical profile of acute kidney injury in intensive care unit in tertiary care centre: *Indian Journal of Basic and Applied Medical research*. 2014; 02; 511-516.
4. Eswarappa M, Gireesh MS, Kumar D. Spectrum of acute kidney injury in critically ill patients: a single center study from South India. *Indian Journal Of Nephrology*. 2014; 24; 280-284.
5. Chhetri PK, Manandhar DN, Pahari LR. Acute renal failure in Nepal Medical College Teaching Hospital. *Nepal Medical College Journal*. 2008; 10; 132-135.
6. Czystowski M, Daniewska D, Gellert R. acute renal injury incidence is growing in the elderly inpatients-a tertiary level academic single centre observation over 5 consecutive years. *Postepy Nauk Medycznych*. 2013; 02; 125-126.
7. Ghimire M, Pahari B, Sharma SK. Outcome of sepsis associated acute kidney injury in an intensive care unit: an experience from tertiary care centre of central Nepal. *Saudi Journal of Kidney Diseases and transplantation*. 2014; 25; 912-917.
8. Chijioke A, Makusidi AM. Severe acute kidney injury in adult Nigerians from University of Ilorin teaching hospital. *Borno Medical Journal*. 2011; 8; 1-5.
9. Franzen D, Rupprecht C, Hauri D, Bleisch JA. Predicting outcome in critically ill patients with acute kidney injury undergoing intermittent hemodialysis- a retrospective cohort analysis. *International Journal Artificial Organs*. 2010; 33; 15-21.
10. Khakurel S, Satyal PR, Agarwal RK, Chhetri PK. Acute renal failure in a tertiary care center in Nepal. *Journal of Nepal Medical Association*. 2005; 44; 32-35.
11. Park WY, Hwang EA, Jang MH. The risk factors and outcome of acute kidney injury in the intensive care units. *The Korean Journal of Internal Medicine*. 2010; 25; 181-187.