Original Research Article

Study of clinical profile of patients with acute kidney injury

Anil Rathi[1], Gajanan Gondhali[2*], Sushil Bhattad[3]

[1]Professor and HOD, Department of Medicine MIMSR Medical College Latur, Maharashtra, INDIA.
[2]Associate Professor, [3]Senior Resident, Department of Medicine, MIMSR Medical College, Latur, Maharashtra, INDIA.
Email: anilrathi8@gmail.com

Abstract

Background: Acute kidney injury is a common cause for admissions in ICU's and wards, with high mortality and its separate independent effect on the risk of death and resource use. Acute kidney injury is caused by multiple etiologies, is basically preventable to a large extent, and is potentially reversible if diagnosed and treated early. The aim of this study is to describe the clinical profile of adult AKI patients admitted to our hospital. **Material and Methods:** This prospective hospital-based observational study was conducted in department of medicine more than 18 years age patients with AKI. **Results:** Total 120 patients were included in this study. We noted 41-50 years age group (30 %) as most common age group, followed by age group of 51–60 years (24.17 %). Mean age in our study was 52.17 years. Male patients were 60.83 % and 39.17 % patients were female. Male to female ratio was 1.55:1.Septicemia was most common etiology noted in 40 % patients, followed by acute gastroenteritis in 16.67% patients and 9.17% cases with malaria, 8.33 % patients with obstetric causes. Cause of ARF, when considered pre-renal (67.5 %), renal (26.67 %) and post-renal (5.83%). The mortality rate in this study was 7.5%. **Conclusion:** Sepsis remains common cause of AKI in present study. Prevention, early recognition, and treatment of causative factors remains the key to reduce incidence and mortality due to AKI.

Key Word: Acute kidney injury, hemodialysis, acute renal failure

***Address for Correspondence:**
Dr. Gajanan Gondhali, Associate Professor, Department of Medicine, MIMSR Medical College, Latur, Maharashtra, INDIA.
Email: anilrathi8@gmail.com
Received Date: 10/08/2019 Revised Date: 16/09/2019 Accepted Date: 02/10/2019
DOI: https://doi.org/10.26611/10211212

INTRODUCTION

Acute kidney injury is a common cause for admissions in ICU's and wards, with high mortality and its separate independent effect on the risk of death and resource use[1]. Acute kidney injury (AKI) previously known as Acute Renal Failure, is a clinical syndrome characterized by an abrupt decline in glomerular filtration rate sufficient to decrease the elimination of nitrogenous waste products (urea and creatinine) and other uremic toxins. The annual incidence of AKI in hospitalized patients was found to be 6.6/1000 admissions[1]. In India, Acute Kidney Injury constitutes 1.5% of all general hospital admissions, of which 60% are due to medical causes[2].Acute kidney injury is caused by multiple etiologies, is basically preventable to a large extent, and is potentially reversible if diagnosed and treated early. The epidemiology of AKI in developing countries is different than developed countries. Common causes, such as the infections, obstetric causes and nephrotoxins, are largely obsolete in developed countries. There is heterogeneity in the pattern of AKI across distinct geographical regions with wide variability in the contributing factors. Common causes for AKI are acute volume depletion (diarrhoeal diseases, haemorrhage), sepsis, infection (malaria, pneumonia, viral hepatitis), snake bite, acute cardiac failure, nephrotoxic drug use, malignancy, SLE, hypertension, major surgeries, radio contrast agents. etc. Causes of AKI are generally prerenal (due to renal hypoperfusion), intrinsic (due to renal parenchymal pathology), postrenal (due to urinary tract obstruction)[3]. Advanced age, liver disease, underlying renal insufficiency, diabetes, postpartum state are common risk factors for the

How to cite this article: Anil Rathi, Gajanan Gondhali, Sushil Bhattad. Study of clinical profile of patients with acute kidney injury. *MedPulse International Journal of Medicine.* October 2019; 12(1): 06-09. https://www.medpulse.in/Medicine/

development of AKI. Factors influencing patient survival in acute kidney injury are severity of injury and underlying disease and other factors such as age, severity of coexistent illnesses and associated complications like Intravascular overload, hyperkalemia and other metabolic complications and systemic life threatening complications like cardiac arrhythmia, myocardial infarction, pulmonary embolism, gastrointestinal ulcers, seizures, coma, haemolysis, bleeding tendencies and severe infections[6]. Regardless of cause, the management of AKI is mainly supportive, with dialysis being indicated when medical management fails to treat the complications. The duration and severity of AKI is a risk factor for the development of complications such as a 10-fold increase risk of chronic kidney disease and a 3-fold risk of end stage kidney disease. The aim of this study is to describe the clinical profile of adult AKI patients admitted to our hospital.

MATERIAL AND METHODS

This prospective hospital-based observational study was conducted in department of medicine in XXX Hospital, a tertiary care hospital at XXX, India. Study duration was from January 20XX to July 20XX. The study protocol was approved by the Institutional Ethics Committee of XXX Medical College. A written informed consent was obtained from patients/ relatives for participation in present study.

***Inclusion and exclusion criteria*:** all patients more than 18 years with AKI were included. According to a standardized definition from the Acute Kidney Injury Network proposed in 2007, AKI is defined as an abrupt (within 48 h) absolute increase in the serum creatinine concentration of ≥0.3 mg/dl from baseline, a percentage increase in the serum creatinine concentration ≥50 per cent or oliguria of 0.5 ml/kg body wt./h >six hours[7]. Patients with pre-existing renal disease were excluded. Detailed clinical history regarding demographic data, infections, 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. Necessary laboratory investigations like CBC, Serum creatinine and blood urea, USG abdomen, etc were done. Estimated glomerular filtration rate was calculated according to Cockcroft-Gault formula. All details were entered in a pre-designed proforma. Statistical analysis was done using descriptive statistics.

RESULTS

Total 120 patients were included in this study. We noted 41-50 years age group (30 %) as most common age group, followed by age group of 51–60 years (24.17 %). Mean age in our study was 52.17 years. Male patients were 60.83 % and 39.17 % patients were female. Male to female ratio was 1.55:1.

Table 1: Age and gender distribution

Characteristics	No. of patients	Percentage
Age groups (years)		
19–30	4	3.33%
31–40	15	12.50%
41–50	36	30.00%
51–60	29	24.17%
61–70	22	18.33%
71–80	11	9.17%
More than 80	3	2.50%
MEAN AGE	52.17 years	
Gender		
Male	73	60.83%
Female	47	39.17%
MALE : FEMALE	1.55	

Septicemia was most common etiology noted in 40 % patients, followed by acute gastroenteritis in 16.67% patients and 9.17% cases with malaria, 8.33 % patients with obstetric causes.

Table 2: Etiology wise distribution

Etiology	No of patients	percentage
Septicemia	48	40.00%
Acute gastroenteritis	20	16.67%
Malaria	11	9.17%
Obstetric causes	10	8.33%
cardiac failure	9	7.50%
Cirrhosis	6	5.00%
Obstructive Uropathy	5	4.17%
Nephrotoxicity	4	3.33%
Snakebite	4	3.33%
Post-Surgery	3	2.50%

Cause of ARF, when considered pre-renal (67.5 %), renal (26.67 %) and post-renal (5.83%).

Table 3: Type of ARF

Type of ARF	No of patients	percentage
Pre Renal	81	67.50%
Renal	32	26.67%
Post renal	7	5.83%
Total	120	100.00%

During study period 32 patients required hemodialysis. Hypotension, hyperkalemia were common complications of Acute Kidney Injury. Other complications were metabolic acidosis, encephalopathy, pulmonary edema, anemia, multi organ dysfunction syndrome (MODS), hypokelemia and hyponatremia. The mortality rate in this study was 7.5%. The major (88.89%) mortality was contributed by the medical group as compared to the surgical (11.11%) and no obstetric mortality. 5 patients were referred to higher center for renal replacement therapy.

DISCUSSION

AKI is one of the most serious complications in critically ill patients and additionally is an independent mortality risk factor[8]. Existing medical comorbidities have been shown to be associated with adverse renal outcomes, particularly in the elderly age group[9]. We noted 41-60 years age group (54.17 %) as most common age group in this study. Mean age in our study was 52.17 years. Ravindra L Mehta *et al*[10]. had 41% females and 59% males. Mean age of these patients was 59.5 years. Most of the Indian studies reported the mean age of patients varying from 40 to 60 years[11,12]. The PICARD group[13] reported extensive comorbidities in patients with AKI, with 37% having coronary artery disease, 29% having diabetes mellitus, and 21% having chronic liver disease. In the current study, sepsis was the most important cause of AKI, accounting for 22% of admissions. Sepsis is predominant etiology of AKI in ICU's across the world[14]. It is reported that sepsis accounts for 31% to 86% of AKI in Indian ICU's[15,16]. These variations are due regional differences in epidemiology, different study designs like inclusion of single discipline versus multidiscipline ICU's, and also variations in referral patterns, admission policies in ICU'S, medicine wards. Previous studies from India, which reported lung and abdomen as predominant foci of sepsis-related AKI[17,18]. Pregnancy is also an important cause of AKI in developing countries and is frequently related to suboptimal antenatal care, out-of-hospital delivery in rural areas, and unsafe abortions conducted by unqualified personnel or using insecure medicines. Most cases of AKI occur during the third trimester and postpartum related to preeclampsia, eclampsia, placental abruption, postpartum hemorrhage, disseminated intravascular coagulation, and puerperal sepsis.10 Renal ischemia, caused by hemorrhagic shock or hypotension due to sepsis, is the dominant factor leading to AKI[19]. Major factor in obstetric AKI is timely diagnosis and management, delay in referral often worsens the scenario. In India, improvements in the antenatal medical care and obstetric care have decreased obstetric AKI to 10%–12%[20]. In our study, obstetric AKI was 8.33%, and the puerperal sepsis was the most common cause followed by severe preeclampsia and postpartum hemorrhage. High mortality associated with AKI in developed nations while AKI-associated mortality is lower (10%–40%) in developing countries because AKI affects younger people and caused by a single disease, i.e., less commonly associated with multi-organ failure.Moreover, in developing countries, community-acquired -AKI is commonly due to volume-responsive azotemia, which is rapidly reversible on volume correction. While mortality is high in AKI with specific diseases when associated with multiorgan failure[18,19]. The mortality rate in this study was 7.5%. The major (88.89%) mortality was contributed by the medical group as compared to the surgical (11.11%) and no obstetric mortality. The possible explanation for the lower mortality in the surgical patients and no mortality in obstetric patients is that they did not have multiple organ failure and co-morbidities which was common among the medical group. Recent epidemiological studies described the increased mortality associated with the disease and suggest the relationship to the development of chronic kidney disease (CKD) and progression to dialysis dependency[21].

CONCLUSION

Sepsis remains common cause of AKI in present study. Prevention, early recognition, and treatment of causative factors remains the key to reduce incidence and mortality due to AKI. Treatment of co-morbidities, better treatment strategies are reducing morbidity, mortality and long-term complications of AKI.

REFERENCES

1. Susantitaphong P, Cruz DN, Cerda J, Abulfaraj M, Alqahtani F, Koulouridis I, *et al.* World incidence of AKI: A meta-analysis. Clin J Am Soc Nephrol2013; 8: 1482-93.
2. Dr Naveen T. M. U. The Study of Spectrum of Acute Renal Failure in Kims Hubli. 2010.
3. Brenner BM, Rector FC (2008), Brenner and Rector's the kidney, 8th Edition. University of Michigan, Saunders Elsevier; ISBN1416031057, 9781416031055 Chawla LS, Amdur RL,
4. Amodeo S, *et al*. The severity of acute kidney injury predicts progression to chronic kidney disease. Kidney Int. 2011;79:1361–1369.
5. Coca SG, Singanamala S, Parikh CR. Chronic kidney disease after acute kidney injury: a systematic review and meta-analysis. Kidney Int. 2012; 81: 442–448.
6. Sean M. Bagshaw .Short- and long-term survival after acute kidney injury Nephrol. Dial. Transplant. 2008; 23:23-29.
7. Mehta RL, Kellum JA, Shah SV, *et al*. Acute kidney injury network: report of an initiative to improve outcomes in acute kidney injury. Crit Care. 2007;11: R31.
8. Brady HR, Brenner BM. Acute renal failure the kidney vol.I. 5th edition. Saunders WB. Philadelphia: 2000.
9. Kidney Disease: Improving Global Outcomes (KDIGO) Acute Kidney Injury Work Group. KDIGO clinical practice guideline for acute kidney injury. Kidney Int Suppl2012; 2:1-138.
10. Ravindra L Mehta, Maria T Pascual, Sharon Soroko, Brandon R Savage, Jonathan Himmelfarb, T Alp Ikizler, Emil P Paganini, Glenn M Chertow and for the program to improve care in Acute Renal Disease (Picard) Kidney International (2004) 66,1613-1621;

11. Gurjar M, Baronia AK, Azim A, Prasad N, Jain S, Singh RK, *et al.* Septic acute kidney injury in critically ill Indian patients. Indian J Crit Care Med 2013;17:49-52.
12. Singh TB, Rathore SS, Choudhury TA, Shukla VK, Singh DK, Prakash J, *et al.* Hospital-acquired acute kidney injury in medical, surgical, and Intensive Care Unit: A comparative study. Indian J Nephrol2013; 23:24-9.
13. Mehta RL, Pascual MT, Soroko S, Savage BR, Himmelfarb J, Ikizler TA, *et al.* Spectrum of acute renal failure in the intensive care unit: The PICARD experience. Kidney Int 2004; 66: 161321.
14. Piccinni P, Cruz DN, Gramaticopolo S, Garzotto F, Dal Santo M, Aneloni G, *et al*. Prospective multicenter study on epidemiology of acute kidney injury in the ICU: A critical care nephrology Italian collaborative effort (NEFROINT). Minerva Anestesiol2011;77: 1072-83.
15. Eswarappa M, Gireesh MS, Ravi V, Kumar D, Dev G. Spectrum of acute kidney injury in critically ill patients: A single center study from South India. Indian J Nephrol2014; 24: 280-5.
16. Korula S, Balakrishnan S, Sundar S, Paul V, Balagopal A. Acute kidney injury-incidence, prognostic factors, and outcome of patients in an Intensive Care Unit in a tertiary center: A prospective observational study. Indian J Crit Care Med 2016; 20: 332-6.
17. Kaul A, Sharma RK, Tripathi R, *et al*. Spectrum of community-acquired acute kidney injury in India: A retrospective study. Saudi J Kidney Dis Transpl2012; 23: 619-28.
18. Kellum JA, Lameire N, KDIGO AKI Guideline Work Group. Diagnosis, evaluation, and management of acute kidney injury: A KDIGO summary (Part 1). Crit Care 2013; 17: 204.
19. Yang L. Acute kidney injury in Asia. Kidney Dis (Basel) 2016; 2: 95-102.
20. Prakash J, Singh TB, Ghosh B, *et al*. Changing epidemiology of community-acquired acute kidney injury in developing countries: Analysis of 2405 cases in 26 years from eastern India. Clin Kidney J 2013; 6: 150-5.
21. Liangos O, Wald R, O'Bell JW, Price L, Pereira BJ, Jaber BL, *et al.* Epidemiology and outcomes of acute renal failure in hospitalized patients: A national survey. Clin J Am Soc Nephrol2006; 1: 43-51.

Source of Support: None Declared
Conflict of Interest: None Declared