



ORIGINAL RESEARCH PAPER

General Medicine

ETIOLOGICAL PROFILE OF ACUTE KIDNEY INJURY IN TERTIARY CARE CENTRE

KEY WORDS: Acute Kidney Injury, Cerebrovascular Accident, Chronic Kidney Disease, Hemodialysis, Peritoneal Dialysis, Renal Replacement Therapy

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ABSTRACT

Aim: To study the etiological factors of Acute Kidney Injury in a tertiary care center in order to reduce the incidence and complications.
Materials and Methods: 101 patients of Acute Kidney Injury above 18 years of age group admitted both in General wards and Acute Medical Care unit in Osmania General Hospital, Hyderabad, a Tertiary Care Center in Telangana state were selected for the study.
Results: Among 101 AKI patients 70 were males and 31 females. Maximum AKI occurred between 41 - 60 years in both males and females (49.5 %) with median age of 50 years. In the present study infections were the leading cause of AKI which was observed in 41(40.59 %) patients followed by Prerenal AKI which was observed in 34(33.66 %) patients. Renal cause was observed in 13 (12.87%) patients. Postrenal AKI in the form of Obstructive Uropathy was seen in 12 (11.88%) patients.
Conclusion: The common etiological factors of AKI such as Infections, Volume-Responsive AKI and Obstructive Uropathy can be ameliorated by early intervention in turn can reduce the morbidity and mortality.

INTRODUCTION:

Acute kidney injury (AKI) previously known as Acute Renal Failure is characterized by the sudden impairment of kidney function resulting in the retention of nitrogenous and other waste products normally cleared by the kidneys. AKI is not a single disease but rather a designation for a heterogeneous group of conditions that share common diagnostic features specifically an increase in the Blood Urea Nitrogen (BUN) concentration and increase in the plasma or serum creatinine concentration often associated with a reduction in urine volume. AKI complicates 5–7% of acute care hospital admissions and up to 30% of admissions to the intensive care unit. AKI is also a major medical complication in the developing world particularly in the setting of diarrheal illnesses, infectious diseases like Malaria and Leptospirosis. AKI is associated with a markedly increased risk of death in hospitalized individuals particularly in those admitted to the ICU.¹

AKI may be community acquired or hospital acquired. Common causes of community acquired AKI includes volume depletion, adverse effects of medications and obstruction of urinary tract. Most common clinical settings for hospital acquired AKI are sepsis, major surgical procedures, critical illness involving heart or liver failure, intravenous iodinated contrast administration and nephrotoxic medication administration¹.

The primary causes of AKI include ischemia, hypoxia or nephrotoxicity. An underlying feature is a rapid decline in GFR usually associated with decreases in renal blood flow. Inflammation represents an important additional component of AKI.

To reduce the severity of and improve recovery from AKI it is important to identify the underlying cause of AKI. The etiologies of AKI are commonly categorized into Prerenal, Renal or Postrenal. Prerenal AKI is due to impaired blood flow to the kidneys as a result of decreased blood volume, low circulating volume to the kidneys and agents that reduce renal blood flow. Renal AKI is due to damage to the renal parenchyma such as glomeruli, renal tubules and interstitium. Postrenal AKI is due to the Obstruction of the Urinary tract.

Successful management of AKI requires correction of underlying causes, management of complications including hyperkalemia, acidosis and timely Renal Replacement Therapies.⁽²⁾ Patients with AKI have about a nine times higher risk of CKD and a two times higher risk of premature deaths than do matched patients without AKI.⁽²⁾

MATERIALS AND METHODS:

This study includes 101 patients (70 males and 31 females) of AKI

who were admitted both in general wards and acute medical care unit in Osmania General Hospital, Hyderabad, A tertiary Care Center in Telangana State. We included all patients of AKI except below 18 years. Clinical data such as age, gender, history of Hypertension, Diabetes Mellitus, Coronary artery disease were recorded for all patients and also evaluated other clinical information, including primary diagnosis, etiology, treatment and outcome.

RESULTS:

A total of 101 AKI patients were included in the study who admitted in General wards and Acute Medical care unit. Maximum AKI occurred in between 41 and 60 years in both males and females (49.5 %). The median age was 50 years. The number of patients with history of Hypertension, Diabetes Mellitus and Coronary artery disease were observed in 38 (37.6 %) 24 (23.76 %) and 6 (5.94 %) respectively.

AGE	FEMALE	MALE
18-20	2	1
21-30	1	7
31-40	4	13
41-50	8	17
51-60	8	17
61-70	4	12
71-80	3	2
>80	0	1

ETIOLOGY:

In the present study infections were the leading cause of AKI which is observed in 41(40.59 %) patients followed by Prerenal AKI which observed in 34(33.66 %) patients. Renal cause was observed in 13 (12.87%) patients. Postrenal AKI in the form of Obstructive Uropathy was seen in 12 (11.88%) patients. In one patient cause of AKI was not determined.

ETIOLOGY	OBSERVATIONS	(%)
INFECTIONS	41	(40.59%)
PRERENAL	34	(33.66%)
RENAL	13	(12.87%)
POST RENAL	12	(11.88%)
CAUSE NOT DETERMINED	1	(0.99%)

Among 41(40.59%) patients of infective etiology 19 (18.8%) patients had Urosepsis followed by Sepsis, 7 (6.93%) patients had Febrile AKI in which 6 cases were due to complicated Malaria, and in one patient cause not determined. 4 (3.96 %) patients had Bilateral Pneumonia

Post acute Gastroenteritis was the leading cause of Prerenal AKI which was observed in 22 (21.78 %) patients followed by Heart failure in 9 (8.9 %) patients. Hepatorenal syndrome was seen in 2 (1.98%) patients and Antepartem Hemorrhage in 1(0.99%) patient.

The most frequent cause for renal AKI was acute on CKD which was observed in 7 (6.93%) patients. Contrast induced Nephropathy was seen in 2(1.98%) patients. Rhabdomyolysis, Acute Tubulo Interstitial Nephritis, Paraquat poisoning and Herbal medicine induced AKI observed in 1(0.99%) patient each.

13 (12.87%) patients had Postrenal AKI due to Obstructive Uropathy.

ETIOLOGY	OBSERVATIONS	(%)
INFECTIONS:		
UROSEPSIS	19	18.80%
SEPSIS	11	10.89%
FEBRILE AKI	7	6.93%
BIL LRTI	4	3.96%
PRERENAL:		
POST ACUTE GASTROENTERITIS	22	21.78%
HEART FAILURE	9	8.90%
HEPATORENAL FAILURE	2	1.98%
APH	1	0.99%
RENAL:		
ACUTE ON CKD	7	6.93%
CONTRAST INDUCED NEPHROPATHY	2	1.98%
RABDOMYOLYSIS	1	0.99%
ACUTE TUBULO INTERSTITIAL NEPHRITIS	1	0.99%
PARAQUAT POISONING	1	0.99%
HERBAL MEDICINE INDUCED	1	0.99%
POSTRENAL:		
OBSTRUCTIVE UROPATHY	12	11.88%
CAUSE NOT DETERMINED	1	0.99%

TREATMENT	OBSERVATIONS	(%)
RRT	57	(56.43%)
CONSERVATIVE	44	(43.56%)
SURGICAL	4	(3.96%)

OUTCOME	OBSERVATIONS	(%)
DISCHARGED	88	(87.12%)
DEATH	8	(7.92%)
LAMA	5	(4.95%)

DISCUSSION:

It was recognized that the epidemiology of AKI in developing countries differs from that of the developed world in many important ways. In developed regions elderly patients predominate² whereas in developing countries AKI was a disease of the young⁴.

More than 77% of our patients were less than 60 years. Maximum AKI occurred in between 41 and 60 years in both males and females with the mean age of 49.8. The male to female ratio of 2.25: 1 with male predominance was found.

In developed countries AKI is often hospital-acquired due to complications of diagnostic procedures, therapies of multiple cardiovascular disease and malignancies which are more frequent in the elderly. AKI in rural developing world is mainly a community-acquired condition affecting relatively younger population. Infections including Malaria, Volume Depletion and Nephrotoxic agents are the main etiologic factors⁵. In the present study infections were the predominant cause of AKI amounting to 40.6%⁶. Urinary tract infections were the most common infections that caused AKI. Post acute gastroenteritis volume depletion (21.78%) and obstructive uropathy (11.88%) are the next predominant causes depicting the same⁵.

Among the 41 patients of AKI Urosepsis was observed in 19 (18.8%), Sepsis^{7,8} in 11 (10.89%), 4 (3.86%) patients were having bilateral LRTI⁹. Among these 34 patients 13 patents were having Diabetes Mellitus. Detection of infections early and well control of diabetes will prevent AKI. In 7 patients of Febrile AKI 6 patients were having Malaria¹⁰ which also needs early treatment to prevent the complications like AKI.

In Prerenal AKI 22 patients of AKI were due to Post Gastroenteritis Volume depletion¹¹ which can be decreased by early volume replacement. There is a need to create awareness in the doctors in the Primary Health Care level who will come in contact with the patient earlier and also among the general population. In 9 patients heart failure was the cause of Prerenal AKI. Two patients were having Hepatorenal syndrome due to cirrhosis of liver. Pregnancy related AKI was observed in only one patient depicting the decreased obstetrics complications due to improved obstetric care.

Acute on CKD observed in 7 (6.93%) patients. In contrast to the developing countries contrast induced nephropathy was observed in only in 2(1.98%) patients. Rhabdomyolysis, acute Interstitial Nephritis, Paraquat poisoning and Herbal medicine induced AKI was observed in one patient (0.99%) each.

Among 12 patients of Obstructive Uropathy, Renal calculi observed in 6 patients, remaining patients were having Pelvic malignancies.

Of the 101 AKI patients 57 (56.43%) received Renal Replacement therapy, 53 had Hemodialysis and 4 patients had Peritoneal Dialysis. 44 (43.56%) patients received conservative treatment. 3 patients underwent surgical treatment along with HD, 1 patient treated conservatively and underwent surgery. After treatment 88 (87.12 %) patients achieved good recovery and discharged. Death occurred only in 8 (7.92 %) patients and 5(4.95%) patients left against medical advice. Early management and timely RRT resulted in 87.12% survival rate.

CONCLUSION:

AKI was frequently associated with Infections, Volume-Responsive AKI and Obstructive Uropathy. Simple interventions such as education on oral rehydration, management of infection may result in a dramatic reduction in the incidence and severity of AKI. As the cost of Renal Replacement Therapies is prohibitively high prevention is often the realistic way to decrease its severe impact on morbidity and mortality.

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