Clinical Profile of Adult Patients with Acute Kidney Injury (AKI) Presenting to the Emergency Department of a Tertiary Care Hospital in Karachi, Pakistan

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Abstract

Objective: *To assess the clinical profile, therapy, and outcomes of adult patients with acute renal damage who presented to a tertiary care hospital in Karachi, Pakistan's emergency department.*

Material and Methods: *In this Cross sectional study in the emergency department of Aga Khan University Hospital in Karachi, Pakistan for a duration of Six months, from May 13th, 2018 to November 12th, 2018. A total of 153 patients were included. Patients with creatinine levels >1.4 with no previous knowledge of kidney disease were diagnosed with AKI unless their renal ultrasound showed chronicity. The clinical presentations of patients in the emergency department were observed. Glasgow Coma Scale scores and vital signs were also recorded. Descriptive statistics were calculated. A post stratification chi-square analysis was performed. A P-value of <0.05 was considered significant.*

Results: *In our study 52.9% of the subjects were male and 47.1% were female. 76.5% of the patients presented with decreased urine output, 73.9% with fever, 41.2% with drowsiness, 11.8% with chest pain, 22.2% with diarrhea, 5.9% with edema, 40.5% with shortness of breath, 37.9% with fatigue, 60.8% with confusion, 2.6% with nausea, and 17.6% with seizures. 13.7% of the patients experienced weight gain, 77.1% oliguria/anuria, 10.5% back pain, 64.7% anorexia, 55.6% vomiting, and 3.3% seizures.*

Conclusion: *Decreased urine output was the most prevalent complaint. Oliguria / anuria were observed more, followed by back pain. Most of the patients were admitted.*

Keywords: AKI; acid-base balance; renal failure; Karachi; Pakistan.

INTRODUCTION

Acute kidney injury (AKI) has long been recognized as a severe and devastating disorder.[1] Acute renal injury presents itself as a rapid loss of kidney function, losing the

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ability to maintain fluid, electrolyte, and acid–base homeostasis., and acid–base balance i.e. homeostasis.[2] AKI has long been thought to be a victim, reflecting other diseases. It has been shown to be a risk factor for death on its own.[3] In the United Kingdom, fatality rates have been reported to reach as high as 40%.[4] The risk factors identified include advanced age, hospitalization, diabetes, hypertension, liver disease, prior kidney disease, and the use of certain medications. Oliguria (86.1%) was the most prevalent presenting symptom, followed by edoema (58.9%), encephalopathy (49%) and convulsions (11.3%).[5] Hypovolemia (22.5 percent) and GI fluid loss were the common causes of AKI (in the form of loose stool or emesis) or blood loss followed by AGN (21.9%), and pregnancy-related complications (18.5%).[5] AKI has been the focus of extensive clinical research. A consensual definition of acute kidney injury was produced by the Acute Dialysis Quality Initiative (ADQI): the Risk, Injury, Failure, Loss, and End-stage Renal Disease classification (RIFLE).[6] In recent years, the concept of acute renal failure (ARF) has been re-examined extensively.[7] Previously, most acute severe kidney function reductions—as shown by severe azotemia and, frequently, oliguria or anuria—were highlighted.[5] However, new research suggests that even minor injury or compromise of kidney function, as seen by small increases in serum creatinine (sCr) and/or urine output, can result in renal failure [7], predicts serious clinical consequences.[8] RIFLE defines 5 increasing grades of severity of AKI (risk, injury, failure, loss, and end-stage renal disease) based on a relative increase in serum creatinine or a period of decreased urine output.[9]

Asia, the world's largest continent, has a diverse population in terms of ethnicity, socioeconomic status, and developmental stage.[10] Various studies have been conducted in Asia demonstrating the association between AKI and factors such as cardiac surgery and sepsis. However, to date, there has been no reliable study on the prevalence of AKI in patients to the emergency department.[11]

The term acute kidney disease (AKD) was coined by the Acute Disease Quality Initiative Workgroup to facilitate discussion about the harmful aftereffects of AKI. Kidney Disease: Improving Global Outcomes (KDIGO) defines AKD as the presence of stage-1 AKI criteria for longer than 7 days after an AKI-initiating event, highlights critical interventions that can halt or slow the progress of renal disease, and identifies populations at risk of chronic kidney disease (CKD), cardiovascular events, and mortality.[12] Hence this study aims to explore Clinical Profile of Adult Patients with Acute Kidney Injury (AKI) Presenting to the Emergency Department of a Tertiary Care Hospital in Karachi, Pakistan.

METHODOLOGY

This research was carried in the emergency department of Aga Khan University Hospital in Karachi, Pakistan for a duration of Six months, from May 13th, 2018 to November 12th, 2018. The sample size was calculated given a margin of error of 5% and a confidence level of 95% with an 11.3% prevalence of seizure. The total calculated sample size was n=153 patients. Non-probability consecutive sampling was used for the study.

Inclusion Criteria: The following patients were included:
· Adult patients with Cr above 1.4 mg/dl
· Male and female patients

· Patients aged >18 years <65 years

Exclusion Criteria: The following patients were excluded:
· Patients with CKD

RESULTS

In sociodemographic data 52.9% of the patients being males and 47.1% were female. The overall mean patient age was 47.35±14.22 years. The median of which was 51.00, range 45 and minimum age 19 years and maximum 64 years.

It was observed that 43.1% of the patients were housewives. The detailed frequency distribution of patient occupations is presented in Table 1.

Among the study subjects, 56.2% had hypertension, 45.1% had diabetes mellitus, 19.6% had ischemic heart disease, and 8.5% had a history of stroke, as presented in Tables 9–12. In our study, 76.5% of patients presented to the emergency department with decreased urine output, 73.9% with fever, 41.2% with drowsiness, 11.8% with chest pain, 22.2% with diarrhea, 5.9% with edema, 40.5% with shortness of breath, 37.9% with fatigue, 60.8% with confusion, 2.6% with nausea, and 17.6% with seizures, as presented in Table 2.

In terms of signs and symptoms, 13.7% of patients had weight gain, 77.1% had oliguria/anuria, 10.5% had back pain, 64.7% had anorexia, 55.6% had vomiting, and 3.3% had seizures. A detailed frequency distribution of the signs and symptoms is presented in Table 3.

The overall mean symptom duration was 4.28±3.20 days. Most of the patients (41.8%) had history of HTN. Additionally, (28.1%) had DM, (5.9%) Hepatitis-B/CLP/hepatoma, (5.2%) Ischemic heart disease, (3.3%) chronic liver disease, (2.6%) S/P appendicectomy, (10.5%) with miscellaneous conditions and (2.6%) with no medical or surgical history.

The on-arrival overall mean hemoglobin, blood urea nitrogen, creatinine, sodium, potassium, calcium, and estimated glomerular filtration rates were 11.20±2.52 units, 34.56±22.55 units, 2.86±1.88 units, 130.48±8.34 units, 4.34±1.10 units, 8.50±1.73 units, and 28.27±11.70 units, respectively. The detailed descriptive statistics of on-arrival mean blood urea nitrogen,

Among 153 patients, 96.1% were treated with IV fluids and 3.3% with emergency dialysis, and 73.2% were admitted to inpatient services, as presented in Table 5.

Most of the patients were diagnosed with urinary tract infection (28.8%) and acute kidney injury (21.6%). A detailed frequency distribution of the diagnoses is presented in Table 6.

Stratification with respect to gender, age group, diabetes mellitus, hypertension, and ischemic heart disease was conducted to observe the effects of these modifiers on clinical presentation in the emergency department (decreased urine output, fever, drowsiness, chest pain, diarrhea, edema, shortness of breath, fatigue, confusion, nausea, and seizures). P-values ≤0.05 were considered significant. The results show a significant association of decreased urine output with age (p=0.020) and diabetes mellitus (p=0.002); of drowsiness with age (p=0.000), hypertension (p=0.000), and ischemic heart disease (p=0.002); of chest pain with hypertension (p=0.014) and ischemic heart disease (p=0.005); of shortness of breath with age (p=0.000), diabetes

mellitus (p=0.001), hypertension (p=0.002), and ischemic heart disease (p=0.000); of fatigue with diabetes mellitus (p=0.022); and of confusion with age (p=0.004), hypertension (p=0.036), and ischemic heart disease (p=0.009). The detailed results of these associations are presented in Tables 7,8.

DISCUSSION

Acute kidney injury is a common illness that may present with the use of nonsteroidal anti-inflammatory drugs and with multiple comorbidities, including diabetes, hypertension, ischemic heart disease, stroke, infectious causes (e.g.,diarrhea, HIV, malaria, glomerulonephritis, urinary tract infection), rheumatoid arthritis, SLEpregnancy-related conditions, hypovolemia, and contrast-induced nephropathy.

The goal of this study was to assess the objective descriptions of elder subjects who reported to an emergency department with a high blood creatinine level. The patients were between the ages of 20 and 70, with an average age of 48.1 years, which is lower than Bernie B, et al findings.In our study, the mean patient age was 47.35±14.22 years.[1]

The most prevalent clinical symptoms, according to one study, were vomiting (92 percent), oliguria (80 percent), exhaustion (72%) and fever (70%).[13] Hypotension, edoema, and jaundice were found in 30 percent, 28 percent, and 24 percent of patients, respectively, on physical examination. The majority of the findings were in line with earlier research. Fever was found in 70% of patients in one research, which might be due to the greater prevalence of AKI linked with infections such as malaria, leptospirosis, and acute GE[(14)]. In our study, among 153 patients, 76.5% presented to the emergency department with decreased urine output, 73.9% with fever, 41.2% with drowsiness, 11.8% with chest pain, 22.2% with diarrhea, 5.9% with edema, 40.5% with shortness of breath, 37.9% with fatigue, and 60.8% with confusion.

In one study, 12 percent of patients had AKI as a result of medication toxicity. Aminoglycosides and nonsteroidal anti-inflammatory medications (NSAIDs) were the most commonly used offending pharmaceuticals. One patient had lithium-induced AKI, while another had taken herbal medication.[15] Except for the patient who had been using lithium, all of the individuals had normal renal function after stopping the offending medicine. Drug-induced nephrotoxicity was seen in the older age range in this investigation, and all these individuals had pre-morbid problems.

Some studies in southeastern Africa showed a high incidence of 17.2% and mortality rates of up to 44.4% in inpatients with impaired renal function.[16] Multiple studies have shown that acute renal failure causes high morbidity and mortality, prolonged hospital admission, and increased health costs. The exact etiology of AKI remains a core topic for researchers.[17]

According to the World Health Organization (WHO), malaria affects 1–4% of adults depending on some disease-endemic areas.[18] The association between AKI and malaria is well understood; it may be due to insensible fluid losses from pyrexia, fluid loss through vomiting, kidney hypo perfusion from vasodilation, and direct renal injury from antimalarial therapy[19]. Fortunately, kidney injury due to malaria is reversible. Studies from low- and middle-income countries show that pregnancy-associated renal failure often requires renal replacement therapy and is a leading cause of mortality among young women in underdeveloped countries.[18]

CONCLUSION

AKI is of great significance among the clinical syndromes associated with poor clinical outcomes for subjects presented. Our study findings indicate that most of these patients were hypertensive. Decreased urine output was the most prevalent complaint, followed by fever. Oliguria/anuria was observed more, followed by back pain, anorexia, vomiting, and seizures. Most of the patients were admitted.

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Table 1: Frequency distribution of occupation (n=153)

	Frequency (%)
Housewife	66 (43.1)
IT engineer/engineer	6 (3.9)
Outdoor adv	3 (2)
Worker	8 (5.2)
Retired	21 (13.7)
Business	9 (5.9)
Bedbound	1 (0.7)
Shopkeeper	3 (2)
Student	20 (13.1)
Banker	2 (1.3)
Laborer	3 (2)
Employee	7 (4.6)
Driver	2 (1.3)
Medical/doctor	1 (0.7)
Teacher	1 (0.7)
TOTAL	153

Table 2: Frequency distribution of clinical presentations in the emergency department (n=153)

	Frequency (%)	
	Yes	No
Decreased urine output	117 (76.5)	36 (23.5)
Fever	113 (73.9)	40 (26.1)
Drowsiness	63 (41.2)	90 (58.8)
Chest pain	18 (11.8)	135 (88.2)
Diarrhea	34 (22.2)	119 (77.8)
Edema	9 (5.9)	144 (94.1)
Shortness of breath	62 (40.5)	91 (59.5)
Fatigue	58 (37.9)	95 (62.1)
Confusion	93 (60.8)	60 (39.2)
Nausea	4 (2.6)	149 (97.4)
Seizures	27 (17.6)	126 (82.4)

Table 3: Signs and symptoms of the subjects (n=153)

		Frequency (%)	
		Yes	No
Weight gain	Have you noticed any changes in your weight recently?	21 (13.7)	132 (86.3)
Edema	Have you notice your hands and feet swelling?	25 (16.3)	128 (83.7)
	Have you noticed puffiness around your eyes?	24 (15.7)	129 (84.3)
Oliguria/anuria	Have you noticed hesitancy with urination in the past month?	118 (77.1)	35 (22.9)
Back pain	Have you experienced back pain in the past 6 months?	16 (10.5)	137 (89.5)
Anorexia	Has your appetite decreased recently?	99 (64.7)	54 (35.3)

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Vomiting	Have you had any episodes of nausea and/or vomiting?	85 (55.6)	68 (44.4)
Seizures	Have you had any seizures recently or in the past?	5 (3.3)	148 (96.7)
Hematuria	Have you noticed any traces of blood when you urinate?	7 (4.6)	146 (95.4)
	Have you passed dark urine in the past month?	6 (3.9)	147 (96.1)

Table 4: Descriptive statistics of BUN, Cr, and estimated glomerular filtration rate on arrival (n=153)

	BUN	Cr	eGFR
Mean	34.56	2.86	28.27
SD	22.55	1.88	11.70
Median	30.00	2.10	32.00
Range	127	11.1	54.9
Minimum	4	1.5	3.4
Maximum	131	12.6	58.3

Table 5: Frequency distribution of management (iv fluid or emergency dialysis) (n=153)

	IV Fluid Frequency (%)	Emergency HD Frequency (%)
Yes	147 (96.1)	5 (3.3)
No	6 (3.9)	148 (96.7)
TOTAL	153	153

Table 6: Frequency distribution of diagnoses (n=153)

	Frequency (%)
Acute kidney injury	33 (21.6)
Fluid overload	9 (5.9)
HTN urgency	15 (9.8)
Metabolic acidosis	10 (6.5)
Pyelonephritis	5 (3.3)
Renal colic	8 (5.2)
Sepsis	25 (16.3)
Urinary tract infection	44 (28.8)
Viral fever	4 (2.6)

Table 7: Frequency of diarrhea according to gender, age, diabetes mellitus, hypertension and ischemic heart disease (n=153)

		DIARRHEA		TOTAL	P-Value
		Yes	No		
Gender	Male	20 (24.7)	61 (75.3)	81	0.436**
	Female	14 (19.4)	58 (80.6)	72	
Age group	≤50 years	21 (27.6)	55 (72.4)	76	0.110**
	>50 years	13 (16.9)	64 (83.1)	77	
Diabetes mellitus	Yes	13 (18.8)	56 (81.2)	69	0.362**
	No	21 (25)	63 (75)	84	
Hypertension	Yes	15 (17.4)	71 (82.6)	86	0.107**
	No	19 (28.4)	48 (71.6)	67	
Ischemic heart disease	Yes	5 (16.7)	25 (83.3)	30	0.414**
	No	29 (23.6)	94 (76.4)	123	

Table 8: Frequency of fever according to gender, age, diabetes mellitus, hypertension, and ischemic heart disease (n=153)

		FEVER		TOTAL	P-Value
		Yes	No		
Gender	Male	58 (71.6)	23 (28.4)	81	0.501**
	Female	55 (76.4)	17 (23.6)	72	
Age group	≤50 years	51 (67.1)	25 (32.9)	76	0.059**
	>50 years	62 (80.5)	15 (19.5)	77	
Diabetes mellitus	Yes	52 (75.4)	17 (24.9)	69	0.701**
	No	61 (72.6)	23 (27.4)	84	
Hypertension	Yes	62 (72.1)	24 (27.9)	86	0.574**
	No	51 (76.1)	16 (23.9)	67	
Ischemic heart disease	Yes	22 (73.3)	8 (26.7)	30	0.942**
	No	91 (74)	32 (26)	123	