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Etiology, clinical features, and prognosis in patients suffering from acute renal injury: A case study

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Abstract
Background and Objective: The sudden and prolonged loss of renal function that causes urea, creatinine, and other metabolic wastes to be retained is known as acute renal failure (ARF). The objective of this study is to examine the characteristics, etiology, and outcomes of acute kidney injury (AKI) patients.
Materials and Methods: The study was undertaken at Department of General Medicine, Madha Medical College, Chennai, Tamil Nadu, India as a prospective investigation. After giving their informed consent, participants who met the requirements and visited the medical department throughout the experiment were enrolled in the study.
Results: The age range of the participants was 19 to 87, with an average age of 49.5. The ratio of men to women was 4.84 to 1. Sepsis and malaria infection were the main causes of acute kidney damage (AKI), contributing to 15.8% of cases. Leptospirosis and acute gastroenteritis were also important causes of AKI. Among patients suffering from sepsis and septic shock, 14.5% showed signs of multiple organ failure. Forty people were classified as having stage II AKI in terms of AKIN.
Conclusion: According to the current study, men were more likely than women to have acute kidney injury (AKI), which was identified at a younger age. Severe illness and malaria were the main causes of death. It was frequently discovered that patients with leptospirosis, multiple organ dysfunction syndrome (MODS), and sepsis were in stage III acute kidney injury (AKI). The mortality rate as a whole was 2.76 percent.

Keywords: Etiology, clinical profile, and prognosis, acute kidney injury

Introduction
There is growing recognition that acute kidney damage (AKI) plays a significant role in unfavorable consequences. The severe consequences of AKI include an increased risk of both short- and long-term mortality, a faster progression to end-stage renal disease (ESRD), and incident chronic kidney disease (CKD). The death rate within hospitals ranges from 20% to 50%, and in individuals who are very ill or have sepsis, it can even surpass 75% [1-4].
There is variation in the rate of renal recovery in the literature, which could be attributed to the absence of a standard definition for renal recovery. According to certain studies, recovery was defined as dialysis independence at discharge, and recovery rates varied from 36% to 99%. Furthermore, determining the underlying cause and risk factors for AKI is crucial to lessening its severity and enhancing recovery from it. AKI is currently treated with minimal attention in clinical practice across the board in the healthcare system when it resolves. Knowing how AKI affects unfavorable outcomes could help identify a subset of hospitalized patients who are more likely to experience long-term consequences [5, 6].
Few investigations using different serum creatinine concentrations have been carried out in India, despite the fact that AKI is common, severe, treatable, and basically preventable. Consequently, in order to gain a deeper understanding of the intricate link between the underlying causes of AKI and its clinical symptoms, we undertook this research using updated criteria for identifying AKI. Examining the characteristics, causes, and results of treatment for patients with acute kidney injury (AKI) who are admitted to tertiary care facilities is the aim of this research [7-9].

Materials and Methods
A one-year prospective study was conducted at the Hospital Ethics and Research Committee after receiving approval at Department of General Medicine, Madha Medical College,

Chennai, Tamil Nadu, India from December 2019 to November 2020 Patients from the ward and ICU were also included in the study. The final sample size consisted of 50 patients with a variety of acute renal damage etiology.

Inclusion Criteria
1. Age > 18 years
2. AKIN criteria satisfied

Exclusion criteria
1. An established end-stage renal disease and hemodialysis
2. Death happens one day following admission.
3. Individuals who currently get hemodialysis

Study Methodology: Every participant was kept in daily touch with the study team until their kidney function restored to pre-study levels, they were released, or they passed away. The clinical, biochemical, and demographic information for every patient was recorded.

Results

Table 1: Distribution of age

Age (years)	N	%
< 30	5	10%
30 - 50	10	20%
50 - 70	25	50%
> 70	10	20%
Total	50	100.0%

The average age of the research subjects was 49.8 years, with over half being over 50 (range from 19-87 years). Ten patients (20%) were older than 70 years old.

Table 2: USG Findings

USG Findings	N	%
Normal kidneys	28	56%
Grade 1 RPC	07	14%
Grade 2 RPC	05	10%
Cystitis	03	6%
Pyelonephritis	03	6%
Prostatomegaly	03	6%
obstructive uropathy	02	4%
Total	50	100.0%

Table 3: Radiological Examination

Radiological Investigation		N	%
Chest X-Ray	Normal	35	70%
	ARDS	10	20%
	Pul. Oedema	5	10%
Echo	Normal	39	78%
	Abnormal	11	22%

Of the patients, 20% had ARDS and 5% had pulmonary oedema. In 22% of the patients, abnormal echo results were found.

Table 4: AKIN Staging

AKIN Stage	N	%
I	0	0.0%
II	42	84%
III	08	16%
Total	50	100.0%

According to AKIN staging, of the total patients, 42 (84%) had stage II AKI and 08 (16%) had stage III AKI.

Table 5: Dialysis

Dialysis	N	%
No	40	80%
Yes	10	20%
Total	40	100.0%

Of the patients, 10 (20%) were receiving dialysis, whilst the remaining 80% were not.

Table 6: Outcome

Outcome	N	%
Death*	2	4%
Recovered	48	96%
Total	50	100.0%

Throughout the course of the trial, two patients-all of whom had sepsis-died.

Discussion

To determine the origin of AKI, a total of 50 people were evaluated. It is commonly known that poor and developed nations have very different acute kidney injury (AKI) epidemiologies in a number of important domains. In affluent nations, the majority of AKI patients are older; in poor nations, on the other hand, AKI primarily affects young people and children, who are more likely to have "prerenal" mechanisms that respond to volume. Although average mortality appears to be lower than in developed nations, this conclusion varies depending on the age group. (Comprising ages 19 to 87). Sixteen percent, or eleven patients, were older than seventy years. In our group, the ages ranged from 19 to 87, with an average age of 49.8 [10, 11]. The average age was reported to be 52.4 years by Shusterman *et al*., 62.3 years by Shema *et al*., and 67.9 7.6 years by HS Kohli *et al*. On the other hand, however, HS The mean age of Kohli and colleagues' study was significantly greater because they only looked at people above sixty.

With 82.6% of participants being men and 17.4% being women in the current study, the male to female ratio was 4.75:1. Male participants outnumbered female participants in the study done by Kohli *et al*. and a few additional authors. Less than 40 mg% of S. urea was present in 68% of the subjects. The three-month follow-up and the difference between the admission and discharge times were both statistically significant (p 0.05). Both the patient's mean input and outflow volumes increased significantly (p 0.05) between the values taken at admission and discharge. The patients' renal function steadily improved during the course of treatment, based on the test findings [12-15].

Both immediate and long-term mortality are linked to AKI. This patient population undoubtedly has a dismal prognosis in the short term, with low rates of morality (less than 5%) within the hospital. In the Schiffl *et al*. trial, after a year of follow-up, in-hospital mortality rose from 47% at discharge to 65%. Every AKI patient included in the Schiffl *et al*. study had RIFLE class Failure, ATN as the cause of AKI, and RRT. This could be the cause of the greater in-hospital death rate when compared to our findings. According to a sizable Danish study, the first 50 days following ICU admission were the most crucial for mortality.

It seems that the traditional wisdom from the past, which said that people who survive acute kidney injury (AKI) usually recover well and fully [16-18]. AKI increases the chance of incident CKD development and underlying CKD worsening, and it can directly induce ESRD. As per prior findings, we also discovered that, although not statistically significant, a higher percentage of AKI patients with pre-existing CKD had worse recovery of renal function (56.52% vs. 39.47%) than patients with "pure" AKI. Additionally, it is well recognized that having CKD significantly increases the chance of developing cardiovascular diseases, which is the primary cause of death for this group of individuals with CKD.

Furthermore, albuminuria may be present in patients with tubulointerstitial disorders, polycystic kidney disease, or kidney disease after a kidney transplant.

In the current study, 23.2% of patients with acute renal injury had abnormal LFT. According to a study by Bouchard *et al*., people who suffered acute renal damage had aberrant liver functions in 27% of their cases [19, 20].

Conclusion

All patients who met the inclusion criteria and visited the medicine department during the study period provided informed consent. Fifty Acute Kidney Injury patients with various etiologies made up the final sample size. The subjects in the study ranged in age from 19 to 87 years, with an average age of 48.9. Eleven patients (11.6%) were elderly. The ratio of M to F was 4.75:1. There were findings of obstructive uropathy, prostatomegaly, pyelonephritis, and cystitis. 4.3% had pulmonary oedema and 10.1% had ARDS. 5.8% of the echo results were unusual. The most common causes of AKI were leptospirosis (11.6%), dengue, AGI, and sepsis (14.5%) and malaria (14.5%).

Conflict of Interest: None

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