



TO DETERMINE THE INCIDENCE OF ACUTE KIDNEY INJURY IN PATIENTS OF COVID -19 ADMITTED IN TERTIARY CARE HOSPITAL AND ITS IMPACT ON OUTCOME, BARABANKI

General Medicine

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ABSTRACT

Aim: To determine the incidence of acute kidney injury in patients of Coronavirus-19 disease admitted in a tertiary care hospital in Barabanki and to assess its impact on outcome. **Method:** A total of 117 COVID-19 patients aged >18 years were enrolled in the study. Clinical severity of the disease was assessed. Assessment of AKI was done using KDIGO AKIWG criteria. Patients were followed-up till their hospital stay. Clinical course and outcome were noted in terms of oxygenation, mechanical ventilation and ICU need and mortality. Chi-square, Independent samples 't'-test and ANOVA were used to compare the data. **Results:** Age of patients ranged from 18 to 90 years. Mean age of patients was 48.19±16.99 years, 65% of them were males. Mild, moderate and severe clinical severity was found in 31.6%, 29.1% and 39.3% patients. Incidence of AKI within 48-hr of admission was 26.5%. A total of 77 (65.8%) patients required oxygenation, mechanical ventilation was required in 52 (44.4%) cases. A total of 78 (66.7%) were admitted to ICU. There were 38 (32.5%) deaths. Incidence of AKI was significantly associated with higher clinical severity, faster mean respiratory rate and lower mean oxygen saturation at the time of admission. AKI patients had significantly higher mean serum creatinine, serum urea and serum potassium levels at admission as compared to non-AKI group patients. AKI patients had significantly higher at admission median LDH and ferritin levels as compared to non-AKI group patients. Mortality rates were significantly higher in AKI (61.3%) as compared to non-AKI group patients (22.1%). **Conclusion:** The findings of the study showed that COVID-19 is associated with a high risk of AKI incidence which was significantly associated with higher clinical severity, inflammation and deranged renal parameters at admission. AKI also seemed to influence the outcome and increased the risk of mortality.

KEYWORDS

COVID-19, ICU stay, Mechanical ventilation need, Acute Kidney Injury (AKI), Mortality.

INTRODUCTION

Apart from effect on respiratory system, COVID-19 is known to affect other organ systems too, among which kidney remains to be the most common. Acute kidney injury has been stated to be the one of the most common complications of COVID-19 apart from respiratory pneumonia¹. Kidney biopsy specimen obtained from COVID-19 patients have been shown to be positive for viral infected renal tissue¹. Development of AKI in COVID-19 patients has been shown to influence the mortality rates and hospital outcomes adversely. It has also been reported to result in a longer duration of hospital stay and relatively poor clinical outcomes too². COVID-19 patients developing AKI are often seen to have other serious complications like acute respiratory distress syndrome (ARDS) and multiorgan failure too². Management of AKI in COVID-19 patients is typical, often resulting in a non-responsive patient and even renal replacement therapy (RRT) does not seem to work³. As kidney disease in its form is associated with a dynamic and eventful clinical course, the clinical course of COVID-19 patients with AKI thus becomes a far more challenging task for the medical fraternity too. The evidence with respect to prevalence of AKI and its association with clinical course and outcomes shows a huge variation across different studies. Moreover, differences in clinical outcome have also been shown to be dependent on the ethnicity and nationality of the patients⁴. In India, there are limited studies evaluating this problem. Amidst the few studies that have been conducted most of the studies have been done in southern part^{5,6,7}, and as such there is lack of any clinical data on this issue from northern part of the country. Hence, the present study was carried out to determine the incidence of acute kidney injury in patients of Coronavirus-19 disease admitted in a tertiary care hospital in Barabanki and to assess its impact on outcome.

AIM AND OBJECTIVES

AIM

To determine the incidence of acute kidney injury in patients of Coronavirus-19 disease admitted in a tertiary care hospital in Barabanki and to assess its impact on outcome.

OBJECTIVES

1. To find out the incidence of Acute Kidney Injury in patients of Covid-19 Disease.
2. To find out the impact of Acute Kidney Injury on the outcome in these patients.

MATERIAL AND METHOD

Study Design: Observational study

Sample Size: 117

Sampling Method: Non-randomized sampling

Inclusion Criteria

1. Inpatient ward admitted both oxygenated as well as non-oxygenated PCR Positive COVID-19 patients
2. Aged >18 years
3. Willing to participate in the study

Exclusion Criteria

1. Known patients with chronic kidney disease
2. Patients not able to survive upto 48 hours.
3. Patients on mechanical ventilation at the time of enrolment

Method Of Data Collection

At enrolment, demographic information was obtained from all the patients and assessment of clinical severity of COVID-19 was done in accordance with the Ministry of Health and Family Welfare (MOHFW), Government of India guidelines. Vital parameters (heart rate, blood pressure, respiratory rate and oxygen saturation) were noted. A 2 ml blood specimen was obtained from all the patients and was subjected to hematological (Hb, TLC, ESR), liver functions (S. Bil, SGPT, SGOT), renal functions (S. creatinine, S. Urea), electrolyte (Na⁺, K⁺), inflammatory markers (LDH, Ferritin, CRP, Procalcitonin, D-Dimer and IL-6) were assessed.

All the patients were assessed for 48-hr serum creatinine changes. Acute kidney injury was defined as follows:

"An Increase in SCr by ≥ 0.3 mg/dl (>26.5 μ mol/l) observed within 48

hours; or an Increase in SCr to ≥ 1.5 times baseline, which is known or presumed to have occurred within the prior 7 days; or Urine volume <0.5 ml/kg/h for 6 hours". All the patients were followed up till their hospital stay. Outcomes like oxygenation need, mechanical ventilation use, duration of ICU stay, time taken to attain RT-PCR negative status and outcome at discharge (mortality, discharge, referral and left against medical advice) were noted.

Data Analysis

The data so obtained was filled in the master chart using an MS-Excel 2013 worksheet. The data was then analyzed using Statistical Package for Social Sciences (SPSS), version 21.0 (IBM Inc.). Chi-square, Independent samples 't'-test and ANOVA were used to compare the data. 'p' value below 0.05 was considered as significant.

RESULTS

The present study was carried out to study the incidence of acute kidney injury in patients of hospital admitted COVID-19 patients. For this purpose, a total of 117 COVID-19 patients (Age range 18-90 years; mean age 48.19 ± 16.99 years; 65% males).

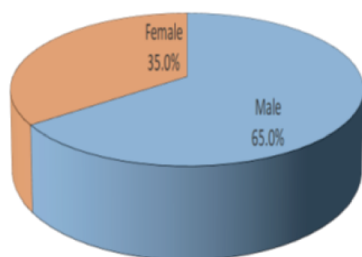


Fig 1- Gender distribution of study population.

With mild, moderate and severe clinical severity in 31.6%, 29.1% and 39.3% patients respectively were enrolled and were followed-up for incidence of AKI.

Table 1: Distribution of Cases according to Clinical Severity

SN	Clinical Severity	No.	%
1.	Mild	37	31.6
2.	Moderate	34	29.1
3.	Severe	46	39.3

Following were the key findings of the study:

1. Incidence of AKI within 48-hr of admission was 26.5%.
2. Incidence of AKI was significantly associated with higher clinical severity, faster mean respiratory rate and lower mean oxygen saturation at the time of admission.
3. AKI patients had significantly higher mean serum creatinine, serum urea and serum potassium levels at admission as compared to non-AKI group patients.
4. AKI patients had significantly higher at admission median LDH and ferritin levels as compared to non-AKI group patients.
5. AKI group patients had significantly higher need for oxygenation, mechanical ventilation and ICU care as compared to non-AKI group patients.

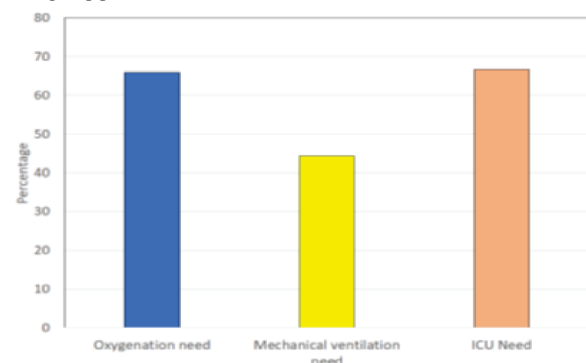


Fig 2-Distribution of patients according to oxygenation need, mechanical ventilation need and ICU requirement

6. Mortality rates were significantly higher in AKI (61.3%) as compared to non-AKI group patients (22.1%).

Table 2: Association of AKI with Clinical Outcome

SN	Variable	AKI (n=31)		No AKI (n=86)	
		No.	%	No.	%
1.	Death	19	61.3	19	22.1
2.	Discharge after recovery	10	32.3	59	68.6
3.	Referral	1	3.2	1	1.2
4.	LAMA/DOPR	1	3.2	7	8.1

Scope of the Study

The present study highlights that AKI is one of the most important non-respiratory complications associated with COVID-19, it also shows the significance of occurrence of AKI in determination of clinical course and outcome. The findings of the study highlight the need to monitor the COVID-19 patients for development of AKI and to formulate appropriate strategies to prevent it.

The present study provided an exhaustive description of incidence of AKI and its impact on clinical course and outcome of COVID-19. It must be understood that in view of the pandemic nature of COVID-19 and need to formulate clinical studies in hurry there might be some shortcomings in detailed description of AKI in COVID-19. Moreover, in view of the absence of a consensus regarding the incidence, clinical course and impact of AKI in COVID-19, it is recommended that pooled data using a meta-analytical approach must be used as an approach to generalize the heterogeneous findings of different studies in order to evolve better preventive and therapeutic strategies.

CONCLUSION

The findings of the study showed that COVID-19 is associated with a high risk of AKI incidence which was significantly associated with higher clinical severity, inflammation and deranged renal parameters at admission. AKI also seemed to influence the outcome and increased the risk of mortality.

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