



## A STUDY ON INCIDENCE AND MORTALITY OUTCOMES OF ACUTE KIDNEY INJURY IN PATIENTS ADMITTED WITH COVID 19 PNEUMONIA.

### General Medicine

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### ABSTRACT

**INTRODUCTION:** Covid-19 has taken the Indian population by storm. As of July, 2021 more than 30 million people tested positive for covid-19 related disease and more than 400,000 of people scrambled to death because of disease.[1] There are reports saying that SARS-COV-2 virus is involved in the kidney. Kidney involvement in covid-19 is from asymptomatic proteinuria to patients requiring renal replacement therapy. Incidence of AKI is even more in patients requiring ICU admission.

**METHODOLOGY:** This retrospective study was done in our hospital among patients admitted with Covid pneumonia. Data of 317 patients is analysed for CT-severity, S. creatinine and mortality outcome. AKI is classified in 3 stages according to KIDGO classification and data is compared with mortality outcome with appropriate statistical test.

**RESULT:** 82 out of 317 patients developed AKI in the patient admitted with Covid pneumonia Among AKI group KIDGO class I,II,III developed in 41%, 35%, 24% and mortality among classes is 28%, 35%, 63% respectively. Mortality among dialysis patients is high (70%).

**CONCLUSION:** Incidence of AKI in COVID pneumonia is 25% and mortality among AKI group is 40% with mortality is higher among KIDGO stage 2 and 3 (35% and 65% respectively). Any patients developing AKI should be treated appropriately and prognosis should be explained properly to bystanders.

### KEYWORDS

Aki, Dialysis, Icu, Covid Pneumonia

### INTRODUCTION

Covid-19 has taken the Indian population by storm. As of July, 2021 more than 30 million people tested positive for covid-19 related disease and more than 400,000 of people scrambled to death because of disease.[1] There are reports saying that SARS-COV-2 virus is also involved in the kidney also. Kidney involvement in covid-19 is from asymptomatic proteinuria to patients requiring renal replacement therapy.[2][3] Incidence of AKI is even more in patients requiring ICU admission[2][3].

A Chinese study showing autopsy 26 patients who died due to COVID-19 in China shown that invasion of SARS-CoV-2 into kidney tissue has significant acute tubular injury, endothelial damage, as well as glomerular and vascular changes indicative of underlying diabetic or hypertensive disease. Basic mechanism can be as following[4]

1. Covid-19 virus is acting on ACE-2 receptors and mediates inflammatory response. It is mostly present in the lungs. But it is also present in the beta cell of pancreas and kidney. An interaction between angiotensin II (AngII) overactivity, innate/adaptive immune and complement pathways, and the coagulation system could influence AKI severity and outcomes.[5]
2. Patients who need critical care admission are having more complications of coagulopathy may lead to microvascular injury to kidneys, and hematuria.

Data of previous studies done in USA, EUROPE and CHINA showing incidence of the AKI in the covid patient ranging from 10% to 34% and mortality among the AKI group is around 30% to 40%. That data also variable among the patients with different ethnicity as it is low in the white race and higher among the African people. So this is done to

Check the incidence and mortality outcome of AKI in the Indian population.

### METHODOLOGY:-

The study was done in VMKV medical college and hospital, Salem, Tamil nadu by department of general medicine for period of 3 months during February 2021 to May 2021.

### Sample Size:-

All those patients who have given consent for study and fulfilling inclusion criteria have been taken.

### INCLUSION CRITERIA

All the patients who are admitted with positive real time polymerase chain reaction for Covid-19 through nasopharyngeal swab.

### EXCLUSION CRITERIAS:

Non covid pneumonia  
Known case of Chronic kidney disease.  
Pediatric cases

### Laboratory and imaging methods:

Serum creatinine and blood urea level was checked on the day of admission, after 48 hours and on the 7th day of admission and divided in AKI and Non AKI groups according to KIDGO guidelines.

CT scan was taken on the day of admission and ct severity score was given out of 25.

### Data Collection:

After obtaining Institutional Ethical Committee Clearance, data was

collected like their baseline characteristics like Name, Age, Sex, Comorbid status, Saturation and CT scoring was taken from their patient information sheet.

**STATISTICAL ANALYSIS:**

Once the data was collected, it was entered in MS excel Windows 10. Statistical analysis was done by SPSS 26. Continuous variable was expressed in terms of Mean and Standard deviation. Categorical variables were expressed in terms of numbers (percentages). Association between continuous variables was done by Pearson correlation. p value <0.05 will be considered as statistically significant.

**RESULTS AND DISCUSSION:**

**Table 1: Demographic Features of Study Participants (N=317)**

Demographic Features		Nub.
Age	< 20	2
	21 - 40	86
	41 - 60	148
	61 - 80	75
	>80	6
	Total	317
Gender	Male	198
	Female	119
	Total	317
CT severity score	1 - 5	45
	6 - 10	119
	11 - 15	110
	16 - 20	36
	21 - 25	7
	Total	317
S. Creatinine on admission	-	0.9±0.3
S. Creatinine on Day 3	-	1.3±0.3
S. Creatinine on Day 7	-	1.4±0.4
Outcome (Death)	-	53
Dialysis Required	-	7

In our study the mean age was 50.6±14.1 with minimum age 18 years and maximum age 92 years. Male preponderance (62.7%) was noticed in our study. Most of the patients belonged to 6 to 15 of CT severity score. There was change in creatinine level over time.

**Table-2 Demographics, imaging and outcome between AKI and NonAKI Group.**

Features	AKI (N=82)	Non - AKI (N=235)	P VALUE
AGE	56±8	49±13	>0.05
SEX	52	146	>0.05
	Male	30	89
Female			
CT severity score	12±2	10±3	>0.05
S. Creatinine on admission	0.9±0.3	0.9±0.3	>0.05
S. Creatinine on Day 3	1.6±0.8	1.0±0.3	<0.05
S. Creatinine on Day 7	3.6±2.6	1.0±0.4	<0.05
Outcome (Death)	33(40%)	20(8%)	<0.05
Death among dialysis patients	5(70%)	0	<0.05

In our study total 88(27%) subjects developed AKI. There is no statistical significance in the Age, sex, CT severity score and s.creatinine on day 1 in the subjects who developed AKI and who didn't develop AKI.

There was statistical significance on s. Creatinine on day 3 and day 7 between two groups. Mortality is very high (40%) in AKI group vs Non-AKI group (8%). Mortality was high among patients who required dialysis (70%).

**Table-3 Demographics, imaging and outcome in AKI group according to KDIGO staging.**

Features	KDIGO Stage 1 (N=32 (41%))	KDIGO Stage 2 (N=28 (35%))	KDIGO Stage 3 (N=22 (26%))
AGE	56±6	58±4	61±6
SEX	20	17	14
	Male	13	9
Female			8

CT severity score	12±2	13±4	18±3
S. Creatinine on admission	0.9±0.3	1.0±0.3	1.0±0.3
S. Creatinine on Day 3	1.6±0.8	2.1±1.6	3.8±1.5
S. Creatinine on Day 7	1.8±0.6	2.6±1.9	5.8±2.0
Outcome (Death)	9 (28%)	10 (35%)	14 (63%)
Dialysis Required	0	0	7

In our study mortality is higher among the KIDGO stage 3 compared to stage 1.

**Table-4 Demographics, imaging and outcome between patients who died due to AKI in COVID and survived AKI in COVID 19**

Features	AKI(Death) N=33	AKI (Survived) N=20	P VALUE
AGE	56±8	58±8	>0.05
SEX	20	13	>0.05
	Male	13	7
Female			
CT severity score	12±2	12±4	>0.05
S. Creatinine on admission	0.9±0.3	1.0±0.3	>0.05
S. Creatinine on Day 3	1.6±0.8	1.3±0.3	<0.05
S. Creatinine on Day 7	3.6±1.5	2.6±1.2	<0.05
Dialysis Required	5	2	<0.05

In our study 33 patients died in the AKI group. There was no statistical significance among Age, Sex, CT severity scores in Survival vs Death group. There was significant difference between s.creatinine on day 3 and Day 7 in Survival vs Death group. Mortality was higher in patients requiring dialysis.

**Limitation:**

Our study is a single centre study and excluded pregnancy, children so generalizability of our study is not possible. It's retrospective study. In future we can plan cohort study and identify specific risk factors for developing AKI in COVID 19 pneumonia.

**Conclusion and Recommendations:**

Incidence of AKI in COVID pneumonia is 25% and mortality among AKI group is 40% with mortality is higher among KIDGO stage 2 and 3 (35% and 65% respectively). Any patients developing AKI should be treated appropriately and prognosis should be explained properly to bystanders.

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No funding was received. None of the authors have disclosure relevant to this manuscript.

**Conflict of Interest:**

None

**Authors contribution:**

All authors in this study contributed to the data collection of the patients.

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