

# Evaluating Outcomes in COVID-19 Patients with New Onset Renal Failure Requiring Urgent Hemodialysis

Nicolas Chanes, Kelli Summers MD, Malachi Sheahan III MD  
LSUHSC, Department of Vascular Surgery



## Introduction

- According to the Louisiana Department of Health, almost 20% of COVID-19 deaths had underlying chronic kidney disease.
- The progression of the disease and optimal treatment algorithm of COVID-19 has not yet been fully elucidated.
- Renal replacement therapy (RRT) has emerged as a supportive measure for critically ill COVID-19 patients who have previously never been on dialysis<sup>1</sup>.
- Determining the utility and timing of hemodialysis catheter placement and dialysis initiation has great potential to improve management of COVID-19 patients.

## Pathophysiology of AKI in COVID-19

- One potential mechanism of COVID-19 induced acute kidney injury (AKI) proposes that a cardiorenal syndrome develops secondary to COVID-19 pneumonia<sup>2</sup>.
- COVID-19 pneumonia → right ventricular failure (due to increased workload) → venous fluid overload → kidney congestion → AKI

## Objectives

- Identify the group of COVID-19 patients who improved with hemodialysis and split the discharged patients into those who had a short and long length of stay.
- Evaluate if there are commonalities/predictors of the COVID-19 patients who improved with dialysis and those who did not improve with dialysis.
- Use the findings we obtain from this study to construct an algorithm that models ideal catheter use within our patient sample.

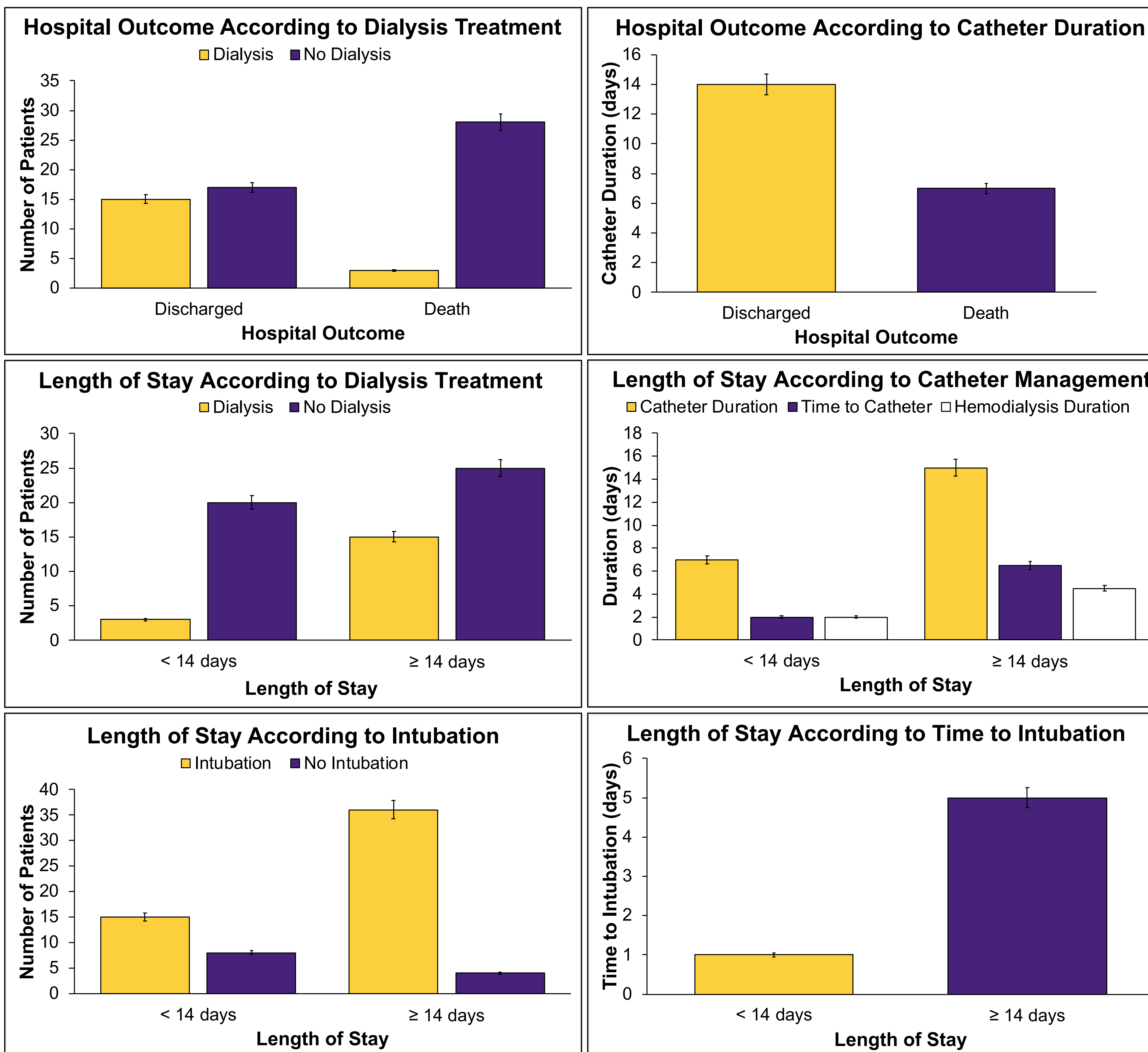
## Methods

- A retrospective analysis was performed on critically ill COVID-19 patients who received a hemodialysis catheter during their stay at University Medical Center (UMC) or West Jefferson Medical Center (WJMC) from 03/09/20 to 07/23/20.
- The patients were identified through the use of the SlicerDicer tool within Epic and a de-identified Excel spreadsheet was created for the data collection.
- The data collection included information regarding hospital outcome and length of stay according to the timing of catheter placement and dialysis initiation, duration of hemodialysis, and intubation status.
- Data analysis was performed on 63 patients using SPSS statistical software according to the objectives of the study. Fisher's exact and Mann Whitney tests were used to compare categorical and continuous variables, respectively.
- A p-value < 0.05 was considered significant.

## Clinical Characteristics

Variables	Overall (n = 63)	Variables	Overall (n = 63)	Variables	Overall (n = 63)
Hospital WJMC UMC	19 (30.2%)	Hospital Outcome Discharged	32 (50.8%)	BMI Lean Overweight Obese	8 (12.7%)
	44 (69.8%)	Death	31 (49.2%)		15 (23.8%)
Age (yr.)	61	Length of stay < 14 days ≥ 14 days	23 (36.5%) 40 (63.5%)		40 (63.5%)
Sex Male Female	40 (63.5%)	Catheter Type Temporary Permanent	55 (87.3%) 8 (12.7%)	Comorbidities Never smoker Past smoker Current smoker Unknown Cardiac disease COPD Asthma Other pulmonary disease Chronic kidney disease Unknown Prior stroke	42 (66.7%)
	23 (36.5%)		Catheter Location Internal jugular Femoral Subclavian		50 (79.4%) 11 (17.5%) 2 (3.2%)
Race Caucasian African American Other	5 (7.9%)	Hemodialysis (HD) Received HD Progressed to long-term HD	18 (28.6%) 14 (22.2%)		4 (6.4%)
	54 (85.7%)		Intubation		51 (81%)
	4 (6.4%)				1 (1.6%)

## Results



## Patient Selection

Patients were selected based on the following criteria:

- Patients were 18 years of age or older and did not have a hemodialysis catheter at the time of admission.
- Patients were hospitalized at UMC or WJMC and tested COVID-19 positive at the time of admission.
- Of the 457 patients identified upon a SlicerDicer search of "COVID-19 and AKI/catheter," 63 patients satisfied the criteria above and qualified for analysis in this study.

## Limitations

- The SlicerDicer search we performed may have not included all of the possible patients that met criteria for our study due to variations in procedural coding by different physicians. Therefore, a broader search would likely augment our patient population and power of the study.

## Conclusions and Future Directions

### Conclusions

- Preliminary results demonstrate that hospital outcome and length of stay are improved in those critically ill COVID-19 patients that received hemodialysis treatment.
- Patients who were catheterized and intubated earlier during their COVID-19 hospitalization had shorter lengths of stay as compared to those who received equivalent therapies later on.

### Future Directions

- We have extended our IRB to continue data collection through the end of the year and will be expanding our SlicerDicer search criteria to capture more patients.
- We will use the findings we obtain from this study to construct an algorithm that models ideal catheter use within our patient sample. The algorithm can inform guidelines for RRT of COVID-19 positive patients and better guide future practice in this patient population.

## References

- Hirsch JS, Ng JH, et. al; Northwell COVID-19 Research Consortium; Northwell Nephrology COVID-19 Research Consortium. Acute kidney injury in patients hospitalized with COVID-19. *Kidney Int.* 2020 Jul;98(1):209-218.
- Ronco C, Reis T, Husain-Syed F. Management of acute kidney injury in patients with COVID-19. *Lancet Respir Med.* 2020 Jul;8(7):738-742.

## Acknowledgments

The authors would like to thank Denise Danos, PhD for assistance in the statistical analysis of our data.