Review of Inova COVID-19 Cases Lends Insight into Ventilator Mortality Risks

By **Inova Newsroom** | December 28, 2020

Falls Church, VA – An Inova study of COVID-19 patients sheds light on how patients have responded to advanced ICU interventions. Researchers sought to paint a realistic picture of survival expectations within a single, well-resourced healthcare system, over the patient's entire length of stay.

Christopher King, MD, transplant pulmonologist and critical care physician at Inova Fairfax Hospital, was principal investigator on the study of 164 patients who were mechanically ventilated at any of the five Inova hospitals in Northern Virginia. His findings were recently published on PLOS One.

Data was extracted from electronic medical records of patients admitted for SARS-CoV-2 infection between March 5 and April 26, 2020. This study offers a rare perspective as a single-center study of patients who were followed all the way from admission through death or discharge.

"Reported mortality rates have shown huge variations – from 16 to 97 percent. These rates are based on data from centers around the world, with varying standards of care and diverse patient populations, and including regions where surges have overwhelmed healthcare resources," Dr. King said.

"We wanted to investigate survival under more stable conditions where there was a more consistent approach to both the use of invasive mechanical ventilation (IMV) and the range of other treatments available."

Dr. King and his colleagues' study delineated the association of age with survival. Overall, half survived to discharge. Survival rates were 15.7 percent for those over 70, 67.4 percent for those under 70 and 78 percent for those under age 50. The average age of survivors was 55, versus 66 among patients who died.

The data showed no difference in survival rate by gender. Surprisingly, neither BMI nor assessed comorbidities were seen to influence mortality outcomes. The data indicated higher survival among non-Caucasians, but Dr. King cautions this was confounded by age and other variables not controlled for in this study.

Patients receiving extracorporeal membrane oxygenation (ECMO), a heart-lung bypass machine used during life-threatening, reversible conditions, had lower mortality rates. "Our data showed that ECMO can have a tremendous positive impact on survival in carefully selected patients," Dr. King said. "We have a robust and experienced, high-volume ECMO program at our tertiary care hospital. Our survival rates among patients referred there helped bolster the overall survival for the system."

The average number of days on IMV was 24.5 for survivors and 14.6 for the deceased; data that Dr. King says may be helpful to hospital leaders as they plan their response to the winter season's upsurge.

Even in the early months of COVID-19, Inova was intent on avoiding the potential damage from IMV by managing patients with less invasive approaches such as having them lie on their stomachs, and using high-flow oxygen and inhaled pulmonary vasodilators. "We feel it is particularly reassuring that the death rate in our cohort was not higher, given our system strategy of reserving intubation as a last resort," Dr. King said.

"The big message that jumps out from our findings is that even with this aggressive approach to delaying intubation, patients who end up moving onto IMV still have a reasonable shot at survival. This can be useful in counseling patients prior to intubation."

These aggressive delay strategies themselves are also heralding encouraging news. In a recent study of the impact of noninvasive strategies, Dr. King and his colleagues found that management with high-flow nasal cannula enabled 70 percent of patients to avoid intubation altogether.

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