duration, and severity (4), and higher levels of S100B were associated with increased incidence of delirium (5). Nevertheless, we agree with the authors that further studies of the reliability of circulating biomarkers and their relationship with delirium duration and severity in patients undergoing renal replacement therapies are needed.

1 *Division of Pulmonary, Critical Care, Sleep and Occupational Medicine, Department of Medicine, Indiana University School of Medicine, Indianapolis, IN*

2 *IU Center of Aging Research, Regenstrief Institute, Indianapolis, IN*

3 *Department of Biostatistics, Indiana University School of Medicine, Indianapolis, IN*

4 *Indiana University Center of Health Innovation and Implementation Science, Indianapolis, IN*

5 *Division of Geriatrics and General Internal Medicine, Department of Internal Medicine, Indiana University School of Medicine, Indianapolis, IN*

6 *Sandra Eskenazi Center for Brain Care Innovation, Eskenazi Hospital, Indianapolis, IN*

This work was performed at Indiana University School of Medicine.

Drs. B. Khan, Perkins, and Gao are supported through National Institute on Aging (NIA) R01 AG 055391, R01 AG 052493, and National Heart, Lung, and Blood Institute R01 HL131730. Dr. Perkins is also supported by NIA grants 1K23AG062555-01 and R01AG056325. Dr. Gao's institution received funding from the National Institutes of Health (NIH). Drs. Gao and B. Khan received support for article research from the NIH. Dr. B. Khan's institution received funding from the National Institute on Aging.

REFERENCES

1. Honore PM, Redant S, Kaefer K, et al: Higher Levels of S-100β-a Biomarker of Astrocyte and Glial Activation Were Associated With a Greater Delirium Duration in Sepsis and Traumatic Brain Injury Patients: Beware of Some Confounders! *Crit Care Med* 2021; 49:e736–e737
2. Khan BA, Perkins AJ, Prasad NK, et al: Biomarkers of delirium duration and delirium severity in the ICU. *Crit Care Med* 2020; 48:353–361
3. Honore PM, Redant S, De Bels D: Reliability of biomarkers of sepsis during extracorporeal therapies: The clinician needs to know what is eliminated and what is not. *Crit Care* 2020; 24:553
4. Vasunilashorn SM, Dillon ST, Inouye SK, et al: High C-reactive protein predicts delirium incidence, duration, and feature severity after major noncardiac surgery. *J Am Geriatr Soc* 2017; 65:e109–e116
5. van Munster BC, Bisschop PH, Zwinderman AH, et al: Cortisol, interleukins and S100B in delirium in the elderly. *Brain Cogn* 2010; 74:18–23

Is Mortality Rate of Ventilated Patients With Coronavirus Disease 2019 So High?

Bernard Lambermont, MD, PhD[1]

Justine Huart, MD[2,3]

J. Geoffrey Chase, PhD[4]

Pierre Delanaye, MD, PhD[2,5]

To the Editor:

We read with interest the article of Forest et al (1) published in a recent issue of *Critical Care Medicine*. Although patients were followed during in-hospital stay during 30 days, there are other studies of similar duration. In addition, even though the data are from the very beginning of the pandemic, we found the mortality results unnerving.

In the study by Forest et al (1), the mortality rate of ventilated patients with extra-renal therapy (ERT) was as high as 88.8% (71/80) and significantly higher than in ventilated patients without ERT (172/219; 78.5%) ($p = 0.0417$). To calculate this mortality rate, the authors did not include patients who were still in-hospital. This choice artificially increased the mortality rate, especially in patients with ERT, where 21 of 101 (20.1%) were still hospitalized. In contrast, only 4% were still hospitalized in the no-ERT group.

We recently published a multicenter retrospective study of mechanically ventilated coronavirus disease 2019 (COVID-19) patients admitted in 12 ICUs

DOI: 10.1097/CCM.0000000000004986

(ICU) during the first wave of the pandemic (2). In this study (2), 247 ventilated patients from March 1, 2020, to April 25, 2020, contained 69 requiring ERT (27.9%) similar to the study by Forest et al (1) (30.6%). Patients were followed their entire hospital stay or a minimum 42 days in cases of prolonged stay. Global mortality was 111 of 247 (45%), a much lower rate than the present study by Forest et al (1) ($p < 0.0001$).

Like the study by Forest et al (1), and as expected, significantly higher mortality was observed in ventilated patients requiring ERT compared with ventilated patients without ERT ($p < 0.0001$). Again, the mortality rate in patients with ERT was much lower in our cohort (2) than in the study by Forest et al (1) with 47 of 69 (68.1%) versus 71 of 80 (88.8%) ($p = 0.002$). Mortality in non-ERT patients was also lower in our cohort (2) with (63/177 [35.6%]) versus (172/219 [78.5%]) ($p < 0.0001$).

The proportion of patients older than 70 years was similar in the two studies, but our cohort (2) had fewer comorbidities. However, in the absence of Sequential Organ Failure Assessment and/or Simplified Acute Physiology Score score data in the study by Forest et al (1), it is difficult to compare initial severity. In the study by Forest et al (1), patients who died under mechanical ventilation had a median ICU length of stay of 9 days, which is rather short for COVID-19 patients who frequently required prolonged ICU stay under mechanical ventilation. In contrast, our cohort (2) had median ICU length of stay of 21 days and median duration of ventilation of 16 days. Interestingly, in our cohort (2), mortality rate was 34% (20/58) in patients who received methylprednisolone and 48% (91/189) in patients who did not (adjusted p value = 0.01).

We are very interested to understand which factors can explain such a difference in mortality rate between the two studies. In particular, differences in stay and outcome may also reflect ICU demand or "overrun" in the early pandemic and/or patient selection in this situation (3). More information on strains on critical care capacity, therapeutics used, severity at admission, and cause of death could help us to better understand differences between the two cohorts.

1 *Department of Intensive Care, University Hospital of Liege, Liege, Belgium*

2 *Department of Nephrology-Dialysis-Transplantation, University Hospital of Liege, Liege, Belgium*

3 *Groupe Interdisciplinaire de Géno-protéomique Appliquée, Cardiovascular Sciences, University of Liege, Liege, Belgium*

4 *Department of Mechanical Engineering, Centre for Bio-Engineering, University of Canterbury, Christchurch, New Zealand*

5 *Department of Nephrology-Dialysis-Apheresis, Hopital Universitaire Caremeau, Nimes, France.*

Drs. Lambermont, Huart, Chase, and Delanaye have disclosed that they do not have any potential conflicts of interest.

REFERENCES

1. Forest SJ, Michler RE, Skendelas JP, et al: De Novo Renal Failure and Clinical Outcomes of Patients With Critical Coronavirus Disease 2019. *Crit Care Med* 2021; 49:e161–e169
2. Lambermont B, Ernst M, Demaret P, et al: Predictors of mortality and effect of drug therapies in mechanically ventilated patients with coronavirus disease 2019: A multicenter cohort study. *Crit Care Explor* 2020; 2:e0305
3. Shaw GM, Chase JG: Does "treatment failure bias" impact comparisons of ICUs? *Intensive Care Med* 2012; 38:1412