

reduce the morbidity of translaryngeal intubation or lessen cognitive and emotional impairment. We congratulate the authors on their valuable contribution and look forward to longer term outcomes.

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REFERENCES

1. Angel LF, Amoroso NE, Rafeq S, et al: Percutaneous Dilational Tracheostomy for Coronavirus Disease 2019 Patients Requiring Mechanical Ventilation. *Crit Care Med* 2021; 49:1058–1067
2. Rosano A, Martinelli E, Fusina F, et al: Early percutaneous tracheostomy in coronavirus disease 2019: Association with hospital mortality and factors associated with removal of tracheostomy tube at ICU discharge. A cohort study on 121 patients. *Crit Care Med* 2021; 49:261–270
3. Mahmood K, Cheng GZ, Van Nostrand K, et al: Tracheostomy for COVID-19 respiratory failure: Multidisciplinary, multicenter data on timing, technique, and outcomes. *Ann Surg* 2021; 274:234–239
4. Hernandez G, Ramos FJ, Anon JM, et al: Early tracheostomy for managing ICU capacity during the COVID-19 outbreak: A propensity-matched cohort study. *Chest* 2021; S0012–3692:01125–01129
5. Battaglini D, Missale F, Schiavetti I, et al: Tracheostomy timing and outcome in severe COVID-19: The WeanTrach multicenter study. *J Clin Med* 2021; 10:2651
6. Appavu SK: Tracheostomy for coronavirus disease 2019 patients on mechanical ventilation should not be arbitrarily delayed. *Crit Care Med* 2021; 49:1194–1197
7. Mart MF, Pun BT, Pandharipande P, et al: ICU survivorship—the relationship of delirium, sedation, dementia, and acquired weakness. *Crit Care Med* 2021; 49:1227–1240

The authors reply:

We read the letter to the editor by Brenner et al (1) in response to our article (2) with great interest published in *Critical Care Medicine*. We appreciate the comments made by the letter's authors, and we would like to address their main points:

- 1) We agree that clinical bias was present in the selection of candidates for this procedure given the overall circumstances and the inability to conduct a large randomized study; therefore, the propensity score matching was the best available option to minimize bias as much as possible.
- 2) We acknowledge that long-term effects of critical illness and ICU care including mechanical ventilation, neuromuscular blockade, sedation...etc and their effects on quality of life in coronavirus disease 2019 (COVID-19) survivors are the most major endpoints to be followed. These data continue to be tracked, and we are planning on following with a long-term survivorship outcome study in the near future to answer these questions.
- 3) We hope that our novel percutaneous tracheostomy approach along with further cumulative data from other centers will help guide current practices in early tracheostomy for COVID-19 respiratory failure and provide a blueprint for potential future pandemics given the demonstrated safety to staff and reduced risk for apnea-induced de-recruitment for patients.

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REFERENCES

1. Brenner MJ, Feller-Kopman DJ, Pelosi P: Coronavirus Disease 2019 Tracheostomy Candidacy, Ceteris Paribus Assumptions, and Tracking Survivorship Data. *Crit Care Med* 2022; 50:e320–e321
2. Angel L, Amoroso NE, Rafeq S, et al: Percutaneous dilational tracheostomy for coronavirus disease 2019 patients requiring mechanical ventilation. *Crit Care Med* 2021; 49:1058–1067

Concerns With Association Between Incident Delirium Treatment With Haloperidol and Mortality in Critically Ill Adults

To the Editor:

Duprey et al (1) used a time-varying cox regression model to suggest that haloperidol treatment for incident delirium and its symptoms may be associated with a dose-dependent improvement in survival. Although we believe that this conclusion is important, we would like to point out three concerns with this association with regard to mortality in critically ill adults.

First, variables that adjust haloperidol dose other than age were not used in this model. The protocol described that the dose of haloperidol was adjusted by age, liver failure, and body weight (2). However, low body weight and liver failure are risk factors for mortality in the ICU (3, 4). Thus, statistical analysis should have included them in the model, or a stratified analysis should have been performed for these variables. Furthermore, multicollinearity was not considered in the selection of variables to be included in the model. Appropriate variable selection and analysis would have controlled confounding factors and aided the reader's understanding.

Second, although per-protocol analysis was performed to exclude cases of protocol deviations, the analysis may overestimate results. Thus, it is important to show the results of the intention-to-treat analysis and to present the background differences between the groups administered with haloperidol or not. If the intention-to-treat analysis shows similar results to the per-protocol analysis, it would confirm its robustness and lead to hypothesis formation with stronger evidence.

Finally, the type of delirium may have also affected the results. Patients with hyperactive delirium are suggested to have a better prognosis than those with hypoactive delirium (5). The protocol of this study would affect the results, as patients with hyperactive delirium were administered high-dose haloperidol (2). We suggest that the type of delirium be discussed in more detail. Specifically, a supplemental analysis and discussion may be needed to properly explain the association between haloperidol and mortality for the readers.

Although Duprey et al (1) conducted the analysis for hypothesis formation and identified certain limitations of the study, we believe that careful consideration of the variables of the model and careful explanation of the confounding factors in the discussion would assist in developing methods for further studies of this interesting result.

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