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## Commentary: Patients first with physicians safe: Controlled apneic tracheostomy in patients with coronavirus disease 2019 (COVID-19)

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Coronavirus disease 2019 (COVID-19) has already infected more than 62 million people worldwide and killed more than 1.46 million people at the time of writing this commentary. The disease poses great risk not only to patients but to their caregivers. As they are involved with airway manipulations during endotracheal intubation and tracheostomy creation, surgeons and anesthesiologists have particularly high risks of exposure to the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus in infected patients.

Even though fraught with controversy, multiple studies have demonstrated the value of early tracheostomy in intubated patients.<sup>1</sup> Not surprisingly, this concept also has been extrapolated—appropriately or not—to intubated patients with COVID-19. However, unlike tracheostomy in patients who are not afflicted with COVID-19, periprocedural disease transmission to members of the surgical team is of substantial concern. The timing and technique of tracheostomy have to address both benefit to the patient and safety to the operative team.

To reduce this risk of disease transmission during aerosol-generating procedures such as tracheostomy, various novel techniques have been tried. These include

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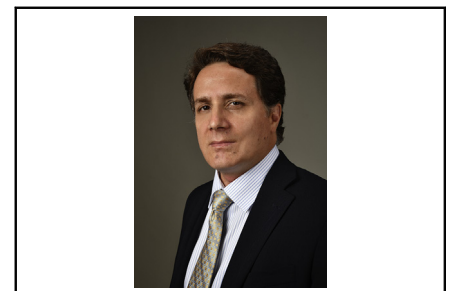
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### CENTRAL MESSAGE

Tracheostomy in patients with COVID-19 must not be just patient-centric but should equally ensure the safety of health care workers.

apneic tracheostomy,<sup>2</sup> use of impermeable drapes, use of the Bookwalter retractor,<sup>3</sup> and even using a novel ventilator system with a triple-lumen endotracheal tube during tracheostomy.<sup>4</sup> The American College of Chest Physicians have recently published an expert panel report on this subject, based on limited data available to date.<sup>5</sup>

In this issue of the *Journal*, Weiss and colleagues<sup>6</sup> have elegantly described their technique of apneic tracheostomy in patients infected with COVID-19. They developed an interdisciplinary task force and performed a single-institution, prospective, nonrandomized cohort study on 28 patients with COVID-19–related respiratory failure and prolonged invasive mechanical ventilation requirements who underwent bedside tracheostomy via an induced apneic technique. The median lowest procedural oxygen saturation was 95%. The median number of ventilated days following tracheostomy was 11. There were 3 mortalities (11%) due to sepsis and multiorgan system failure; of 25 surviving patients, 100% were successfully discharged from the hospital and 76% were decannulated, with a median time of 26 days from tracheostomy to decannulation (range, 12-57). There was no symptomatic disease transmission to health care personnel on the COVID-19 tracheostomy team. Importantly, the apneic period during tracheostomy was a mean of 3 minutes, with no hemodynamic decompensation during the procedure.

The authors should be commended for their methodical approach and excellent results. However, there are some notable limitations of the study.

1. Patients requiring very high positive end-expiratory pressure and fraction of inspired oxygen were excluded. The patients had to be below a fraction of inspired oxygen of 70% to be included in the study. Thus, the results of the study cannot be extrapolated to the much sicker COVID-19 patient cohort.
2. The operators used enhanced personal protective equipment. Even though we should congratulate the authors on having zero symptomatic disease transmission during their procedures, it is entirely possible that the lack of symptomatic disease transmission study could be also attributed to such confounding variables.
3. None of the operators was screened to determine if they might already be immune to SARS-CoV-2, and thus would not have developed symptoms even though they might have been re-exposed during the procedure. Such operators could have been re-exposed without developing symptomatic infection. Lack of symptoms in the caregivers should not be assumed to be lack of viral transmission.
4. Only 75% of patients in the cohort were infectious at the time or within 7 days of the procedure, thereby further confounding the results. Perhaps a better measure of the safety potential of apneic tracheostomy protocol would be viral detection in the immediate surroundings, or change in immune status of the operators.

It is also important to note that the creation of aerosols associated with tracheostomy, the quantity of viable virus material within the aerosols, and the precise mechanism of transmission to the host are not well-understood. Even though a systematic review of 10 studies from the 2003 SARS outbreak suggests that tracheostomy has an odds ratio of 4.2 for risk of transmission to health care workers, these data may not cleanly translate to COVID-19.<sup>7</sup> To that end, in a recent study in mildly symptomatic patients, very little residual risk of

infectivity beyond 10 days after symptom onset was observed.<sup>8,9</sup>

In conclusion, the study is not suitably designed to ascertain the effectiveness of apneic tracheostomy in preventing the transmission of SARS-CoV-2 to health care providers. It does, however, attest to the usefulness of early tracheostomy in a subgroup of critically ill patients afflicted with COVID-19. Moreover, all health care providers should use the utmost care to protect themselves during procedures in patients with COVID-19 infection. This may be achieved by using optimal enhanced personal protective equipment and by decreasing aerosol generation. It is feasible to keep patients first, while also prioritizing members of the care team.

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