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## Fighting COVID-19 Hypoxia With One Hand Tied Behind Our Back: Blanket Prohibition of High-Flow Oxygen and Noninvasive Positive End-Expiratory Pressure in US Hospitals



*To the Editor:*

Before the coronavirus disease 2019 (COVID-19) pandemic, patients with hypoxia who were failing low-flow oxygen through nasal cannula were treated with noninvasive positive-pressure ventilation or high-flow nasal cannula oxygen, aimed at delivering higher concentration and flow of oxygen to match patient demand, decreasing anatomic dead space by preventing rebreathing, and recruiting alveoli by using positive end-expiratory pressure. Many emergency physicians began their fight against COVID-19 with neither of these options because of concerns about virus aerosolization exposure to staff and other patients. Instead, early intubation has been the suggested option for a patient failing nasal cannula. Often this is the correct answer, but not always.

There is a cost to staff and patients from overuse of intubation. It is an extremely high-aerosol-generating event. A systematic review of aerosol-generating procedures and their risk of transmission of severe acute respiratory syndrome to health care workers found intubation to have an odds ratio of 6.6 compared with 2.2 for noninvasive positive-pressure ventilation.<sup>1</sup> Also, many hospitals face the risk of running out of ventilators and ICU beds. Once intubated, COVID-19 patients tend to continue receiving mechanical ventilation for greater than 1 week, with poor outcomes. In vitro studies have demonstrated less airflow dispersal from high-flow nasal

cannula or continuous positive airway pressure (CPAP) using sealed masks than from nasal cannula.<sup>2</sup>

Furthermore, data coming from overseas indicate an important role for noninvasive positive-pressure ventilation and high-flow nasal cannula in managing COVID-19 patients. Retrospective data from China demonstrate that approximately 21% of patients required high-flow nasal cannula and 14% required noninvasive positive-pressure ventilation.<sup>3</sup> Among admitted patients in Italy, approximately 30% required ventilation support beyond oxygen therapy. Of patients given ventilation support, 89% were assisted with noninvasive positive-pressure ventilation compared with 12% receiving invasive ventilation.<sup>4</sup> The *Handbook of COVID-19 Prevention and Treatment* recommends the use of high-flow nasal cannula for hypoxic patients not tolerating nasal cannula.<sup>5</sup>

We advocate early planning with colleagues from critical care, respiratory therapy, and nursing to develop protocols that mitigate risk associated with high-flow nasal cannula and noninvasive positive-pressure ventilation rather than prohibiting the use of these critical alternatives to intubation. Ideally, these interventions should be performed in negative-airflow rooms, but most emergency departments have a limited number of these. We are recommending use of these interventions in closed isolation rooms with staff in full airborne personal protective equipment. High-flow nasal cannula should be provided with a surgical mask over the patient's mouth, or high-flow oxygen could be provided with a nonvented sealed CPAP mask attached to a self-inflating bag plus viral filter with dual oxygen source (see <https://emcrit.org/emcrit/covid-airway-management/>). CPAP should be provided through a helmeted setup or nonvented CPAP masks with viral filter attached to the expiratory port. Policies can be rapidly adapted as more data emerge in regard to COVID-19, but it is already clear that we must find safe and creative ways to expand, not limit, our armamentarium during this pandemic.

*Joseph Colla, MD*

*Adam Rodos, MD*

*University of Illinois Department of Emergency Medicine  
Chicago, IL*

*Hannah Seyller, BS*

*University of Illinois at Chicago College of Medicine  
Chicago, IL*

*Scott Weingart, MD*

*Emergency Critical Care*

*Department of Emergency Medicine*

*Stony Brook Medicine*  
*Stony Brook, NY*

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