


# Shedding Light on Dysphagia Associated With COVID-19: The What and Why

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## Abstract

The most common symptom of COVID-19 in critically ill patients is ARDS (acute respiratory distress syndrome), with many patients requiring invasive or noninvasive respiratory support in the intensive care unit. Oropharyngeal dysphagia may be a consequence of the respiratory-swallowing incoordination common in ARDS or may occur following the respiratory support interventions. In this commentary, we highlight the risk and complications of oropharyngeal dysphagia in patients with COVID-19 and urge medical and rehabilitation professionals to consider dysphagia a prognostic complication, provide appropriate referrals, and initiate early interventions as appropriate.

## Keywords

dysphagia, COVID-19, ventilation, screening

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Coronavirus disease 2019 (COVID-19), declared a pandemic by the World Health Organization on March 11, 2020, has currently overwhelmed the global health sector. This infectious disease, caused by severe acute respiratory syndrome-associated coronavirus 2 (SARS-CoV-2), uses a receptor, ACE2, to gain entry into human cells with the help of an enzyme,<sup>1</sup> TMPRSS2, and likely interferes with the body's normal protective response resulting in infection. Depending on the course of the illness, patients may experience a range of problems that can manifest as physical, psychological, and/or cognitive impairments. The most common symptom of COVID-19 in critically ill patients is acute respiratory distress syndrome (ARDS). The majority of patients admitted to the hospital report symptoms of shortness of breath and cough, and many of them end up with invasive or noninvasive respiratory support in the intensive care unit (ICU). Among patients in the ICU, a frequent complication following intubation and extubation is oropharyngeal dysphagia: a type of swallowing disorder that arises due to  $\geq 1$  dysfunctions of the oral cavity, pharynx, larynx, or upper esophageal sphincter and is caused by certain health conditions

associated with anatomic, respiratory, or neurologic conditions. It may be characterized by difficulty initiating a swallow, nasal regurgitation, aspiration into the airway, and/or presence of pharyngeal residue. In this commentary, we highlight the risk and complications of oropharyngeal dysphagia in patients with COVID-19. Since dysphagia in patients with ARDS affects the overall rehabilitation and recovery of the patient, we urge medical and rehabilitation professionals to understand the relationship between ARDS and dysphagia so that appropriate referrals may be provided and early interventions initiated.

One of the primary causes of dysphagia in persons with compromised respiratory systems, including those with COVID-19, stems from the incoordination between swallowing and respiration. Respiration and swallowing display an intricate relationship, with both systems sharing neurologic, physiologic, structural, and functional interdependence. The precise timing and coordination between the breathing and swallowing cycles is one of the most important airway defense mechanisms. Most often, swallowing occurs in an expiration-swallow-expiration pattern that helps keep pharyngeal contents away from the larynx and trachea. However, incoordination, such as an increase in inspiration-swallowing or swallowing-inspiration patterns, have been found to exacerbate the symptoms in chronic obstructive pulmonary disease.<sup>2</sup> Incoordination between these systems can lead to aspiration pneumonia, malnutrition, and dehydration and consequently compromise the prognosis of the patient and reduce quality of life. At least 15% to 20% of patients with chronic obstructive pulmonary disease report some form of oropharyngeal dysphagia, which includes oropharyngeal food residue, penetration of food or liquid into

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the larynx, and/or aspiration into the trachea.<sup>2</sup> This interrelationship between respiration and swallowing makes patients with COVID-19 and ARDS vulnerable to dysphagia, leading to further deterioration in ventilatory functions.<sup>3</sup>

The commonly recommended management of ARDS in patients with COVID-19 is early intubation that can often result in dysphagia. Patients with severe illness may require oxygen therapy or noninvasive ventilation, but in instances of poor response to this management, they may need to be intubated. Endotracheal intubation may result in laryngeal trauma that manifests as vocal fold and arytenoid edema, granuloma, and vocal fold paresis. The duration of intubation can increase the incidence of dysphagia. The intubation may also result in incoordination between swallowing and respiration, making the patient susceptible to aspiration of saliva and secretions.

Along with endotracheal intubation, extubation poses significant challenges with swallowing. Unfortunately, extubation does not necessarily restore laryngeal function and can lead to postextubation dysphagia. Postextubation dysphagia has been associated with health complications such as aspiration pneumonia, transient hypoxemia, and malnutrition, besides extended hospitalization and increased mortality rates.<sup>4</sup> The laryngeal and respiratory damage from extubation also has long-term consequences, with many patients who recover from ARDS having persistent dysphagia symptoms 6 months after discharge.<sup>5</sup>

Another recommended intervention for patients with COVID-19 is prone positioning.<sup>6</sup> Mechanically ventilated patients who have trouble maintaining oxygen saturation levels are recommended 12 to 18 hours of prone positioning to improve saturation levels.<sup>7</sup> However, we speculate that prolonged prone positioning may increase the chances of aspiration of saliva and secretions. In addition, this position will hinder the practice of oral hygiene in the ICU, which may lead to aspiration of microorganisms present in the oral secretions. Colonization of bacteria in the oral cavity and dental plaque is a primary risk factor for ventilator-associated pneumonia, greater length of ICU stay, and death in mechanically ventilated patients.<sup>8</sup>

While management of the respiratory complications in patients with COVID-19 via invasive or noninvasive ventilation is essential to the patients' survival, those who survive are at a high risk for oropharyngeal dysphagia. Dysphagia is associated with adverse health outcomes, such as poor nutritional intake, dehydration, aspiration pneumonia, and death, and can negatively affect a person's social, psychological, and quality of life. Given the link among ARDS, the associated interventions, and dysphagia, taking proactive measures in identifying dysphagia as a complicating prognostic factor and managing dysphagia is key to the

complete recovery of the patient. We recommend that best practice guidelines in patients with COVID-19 include a mandatory postextubation screening for dysphagia at the bedside by a speech-language pathologist. This should be followed by appropriate instrumental evaluations and behavioral interventions to improve swallowing and minimize the long-term effects of dysphagia.

### Author Contributions

**Ranjini Mohan**, contributed to the conception of the work, drafted the manuscript, revised the manuscript for intellectual content, and approved the final version; **Bijoyaa Mohapatra**, contributed to the conception of the work, drafted the manuscript, revised the manuscript for intellectual content and approved the final version.

### Disclosures

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