



Sub-glottic stenosis and tracheal ring fracture following intubation in a COVID-19 patient

Spencer Deleveaux, MD, Sheraz Hussain, MD, Essam Mekhaie, MD, Fadi Aldaas, MD
UIC/Advocate Christ Medical Center Department of Internal Medicine
Advocate Christ Medical Center Department of Pulmonology and Critical Care



Background

- The COVID-19 pandemic has led to a worldwide increased burden on healthcare facilities. Rising incidence of respiratory failure secondary to COVID-19 has led to increased utilization of mechanical ventilation in the treatment of critically ill patients.
- Intubation, despite best practices, still carries a risk of adverse events. We present a case of subglottic stenosis and tracheal ring fracture complicating recovery of a patient who underwent intubation for acute hypoxemic respiratory failure secondary to COVID-19 infection.

Case Presentation

- A 45-year-old male with medical history of hypertension presented to the hospital with complaints of progressively worsening shortness of breath and cough for eight days. This was associated with headache, fever, and fatigue. Nasopharyngeal PCR for COVID-19 was positive. Chest X-ray showed bilateral ground glass opacities in the lower lobes. He was admitted for COVID-19 pneumonia with associated hypoxemic respiratory failure, placed on supplemental oxygen via nasal cannula, and given remdesivir and dexamethasone.
- His hypoxia worsened leading to implementation of BiPAP, but he eventually required endotracheal intubation and mechanical ventilation with epoprostenol therapy. He was transferred to Advocate Christ Medical Center for evaluation for extracorporeal membrane oxygenation.
- Over time, his oxygenation and clinical status improved, and he was extubated on day 8 of mechanical ventilation. He developed stridor post extubation and was managed medically without need for re-intubation. The patient was discharged on day 27 of hospitalization with plans for outpatient follow-up.
- Five days later, he re-presented with symptoms of shortness of breath and associated stridor. Racemic epinephrine and intravenous dexamethasone led to mild improvement of symptoms.
- Computed tomography of the neck revealed concerns for subglottic stenosis. Laryngoscopy showed bilateral vocal cord ulceration. Bronchoscopy revealed a narrowed subglottic space and fractured cartilage in first tracheal ring. Balloon dilatation performed for subglottic stenosis did not alleviate his symptoms. Thereafter, the patient underwent a tracheostomy to prevent respiratory compromise and allow for mucosal healing.

Discussion

- Subglottic stenosis is an uncommon complication of intubation, with rates ranging from 6-21%. When the pressure exerted by endotracheal balloon cuff exceeds mucosal capillary pressure in the trachea, ischemia occurs and the successive fibrotic healing can lead to stenosis. Our case showed concurrent tracheal ring fracture which is a rare complication. We believe this complication is an intubation-related tracheal trauma.
- During the COVID-19 pandemic, there has been a significant increase in intubations. Therefore, laryngotracheal pathology should be highly suspected in patients who have been recently extubated, and have new onset shortness of breath or stridor.
- COVID-19 brought a new challenge to critical care field especially when it comes to establish airways in an ill population. A careful and systemic approach should be implemented for individuals with difficult airways to avoid increased morbidity and mortality after recovery from COVID-19.



Figure 1
Bronchoscopy imaging demonstrating tracheal stenosis

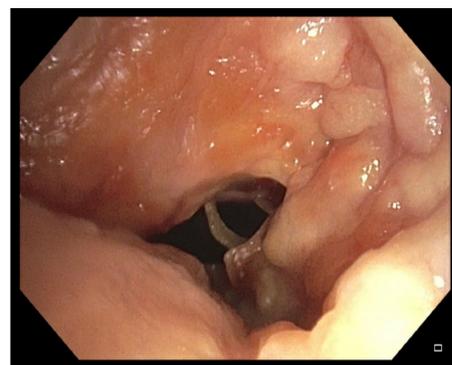


Figure 2
Bronchoscopy imaging demonstrating tracheal ring fracture with tracheal stenosis



Figure 3
Bronchoscopy imaging demonstrating complete tracheal ring fracture.

References

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