

## PRACTICE | FIVE THINGS TO KNOW ABOUT ...

# Tracheal intubation in patients with COVID-19

Laura V. Duggan MD, George Mastoras MD, Gregory L. Bryson MD MSc

■ Cite as: *CMAJ* 2020. doi: 10.1503/cmaj.200650; early-released May1, 2020

## 1 Prepare outside the patient's room: assign team roles, check equipment and review the airway strategy

Limit the number of in-room team members depending on the patient's condition and delegate an outside-room "runner" to provide additional outside-room equipment and medications. The airway manager should be experienced enough to achieve greater than 85% first-pass success for endotracheal intubation.<sup>1</sup> The airway strategy includes preoxygenation, positioning, endotracheal intubation and a clear plan for rescue oxygenation.<sup>2</sup> Use a checklist to confirm in-room versus immediately available outside-room equipment and medications. Prepare all in-room materials in an airway box or go bag (Appendix 1, available at [www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.200650/-/DC1](http://www.cmaj.ca/lookup/suppl/doi:10.1503/cmaj.200650/-/DC1)). Patients with coronavirus disease 2019 (COVID-19) are "physiologically difficult."<sup>2</sup> Ensure that the patient's code status is known and the crash cart is available.<sup>2</sup>

## 2 Don personal protective equipment (PPE) and cross-check team members<sup>3</sup>

During the severe acute respiratory syndrome epidemic, clinicians performing endotracheal intubation acquired infection at a 6-fold greater rate than their colleagues.<sup>4</sup> Endotracheal intubation is a high-risk, aerosol-generating medical procedure that requires high-risk PPE, including an N95 respirator or equivalent.<sup>3</sup> Speaking may become muffled and communication more difficult once PPE is donned.<sup>3</sup>

## 3 Videolaryngoscopy may have benefits over direct laryngoscopy

Videolaryngoscopy has a high first-pass success rate for experienced airway managers. A separate large screen allows the airway team to share laryngoscopy imaging and offers a greater team-to-airway distance.<sup>5</sup>

## 4 During intubation: anticipate rapid oxygen desaturation and associated emergencies

Use local protocols to guide intubation. Preoxygenate in a 30° head-up position. Ketamine may maintain cardiovascular stability compared with other induction agents.<sup>2</sup> Have inotropes and vasopressors in line or immediately available. Use high-dose rocuronium (1.2–1.5 mg/kg) and ensure full neuromuscular blockade before attempting endotracheal intubation.<sup>2</sup> Owing to aerosol generation, avoid bag–valve–mask ventilation despite desaturation.<sup>2,4</sup> Use a styleted endotracheal tube and avoid floppy bougies to minimize contamination. After intubation, place a viral filter on the endotracheal tube and inflate the endotracheal tube cuff to ensure no leak occurs with positive-pressure ventilation.<sup>2</sup> Waveform capnography is invaluable for confirmation of endotracheal intubation, return of spontaneous circulation in cardiac arrest and circuit disconnection.<sup>2</sup> Should circuit disconnection occur, clamp the endotracheal tube.<sup>2</sup> Two emergencies may occur: "cannot intubate, cannot oxygenate" and cardiac arrest. Rescue oxygenation includes supraglottic device placement and endotracheal tube cricothyrotomy using a scalpel–bougie 6.0.

## 5 Removing PPE carries a high-risk of self-contamination

It is difficult to detect self-contamination.<sup>3</sup> Use a doffing checklist, read each step aloud and remove PPE as directed by a spotter.<sup>3</sup> Interruptions during this process should be minimized.

## References

1. Park L, Zeng I, Brainard A. Systematic review and meta-analysis of first-pass success rates in emergency department intubation: creating a benchmark for emergency airway care. *Emerg Med Australas* 2017;29:40-7.
2. Cook TM, El-Boghdady K, McGuire B, et al. Consensus guidelines for managing the airway in patients with COVID-19. *Anaesthesia* 2020 Mar. 27 [Epub ahead of print]. doi: 10.1111/anae.15054.
3. Lockhart SL, Duggan LV, Wax RS, et al. Personal protective equipment (PPE) for both anesthesiologists and other airway managers: principles and practice during the COVID-19 pandemic. *Can J Anesth* 2020 Apr. 23 [Epub ahead of print]. doi: 10.1007/s12630-020-01673-w.
4. Tran K, Cimon K, Severn M, et al. Aerosol generating procedures and risk of transmission of acute respiratory infections to healthcare workers: a systematic review. *PLoS One* 2012;7:e35797.
5. Hall D, Steel A, Heij R, et al. Videolaryngoscopy increases 'mouth-to-mouth' distance compared with direct laryngoscopy. *Anaesthesia* 2020 Mar. 27 [Epub ahead of print]. doi: 10.1111/anae.15047.

**Competing interests:** Laura Duggan is co-founder of The Airway App ([www.airwaycollaboration.org/](http://www.airwaycollaboration.org/)), a smartphone app for reporting outcomes of airway management, including for COVID-19. Gregory Bryson is the Deputy Editor-in-Chief of the *Canadian Journal of Anesthesia* for which he receives support from the Canadian Anesthesiologists' Society. No other competing interests were declared.

This article has been peer reviewed.

**Affiliations:** Departments of Anesthesiology and Pain Medicine (Duggan, Bryson), and Emergency Medicine (Mastoras), University of Ottawa; Clinical Epidemiology Program (Bryson), Ottawa Hospital Research Institute, Ottawa, Ont.

**Correspondence to:** Laura Duggan, [laduggan@toh.ca](mailto:laduggan@toh.ca)