Precautions for Intubating Patients with COVID-19

Fig. 1. An intubation scene from Wuhan, China, the epicenter of the COVID-19 battlefield provided by three of our team members who volunteered to travel from Shanghai and Qingdao to Wuhan to assist with patients there. From left to right: Rundong Tang, M.D. (anesthesiologist), Shumei Cao, M.D. (anesthesiologist), and Shu Hong (nurse). As noted, all the individuals who are involved in the intubation are wearing Level 3 protection. A video laryngoscope is used for rapid intubation and confirmation because the protective gear generates additional difficulty during the intubation.

To the Editor:

The major challenges in managing patients with the novel coronavirus disease (COVID-19) are bilateral pneumonia and acute respiratory distress syndrome. Many patients with COVID-19 will be in critical condition and will need intubation.[1–4] Human-to-human transmission has been confirmed,[5] and the virus has spread across the world. Based on current real-time reports, there are 78,962 confirmed COVID-19 cases, with 7,952 patients still in critical condition as of February 28, 2020.[6] Many have been intubated and many remain to be intubated.[5] The problem is that the viral load in the airway is probably very high and is very contagious.[3,4] This poses significant risks for these who are performing intubation.

Anesthesia providers play a vital role in providing in-hospital intubation. However, they generally do not deal with patients with such highly contagious disease. The safety of the patient and the individuals who are involved in the intubation requires special consideration and precautions. Multiple articles related to the precautions of intubation in the perioperative settings have recently been published.[7–9] Some are empirical recommendations from institutions outside of the epicenter of COVID-19. Here we present our updated first-hand experiences focusing on the safety of the patients and providers performing intubation in an extreme situation from the epicenter of COVID-19, Wuhan, China. As shown in figure 1, three medical providers, who are volunteers from Shanghai and Qingdao, traveled to Wuhan to assist with patients there.

The Safety of the Patient

Patients with COVID-19 may experience myocardial injury and multiple organ failure, which causes hemodynamic instability coinciding with low oxygen saturation. The patient's oxygen reserve is very poor, especially for those who are critically ill. This makes intubation a huge challenge.

Based on our experience, rapid sequence induction is recommended. To avoid virus scattering, assisted mask ventilation should be avoided. If positive mask ventilation is needed based on clinical judgment, we recommended covering the area around the patient's mouth and nose with wet gauze to help prevent virus spreading. We believe that muscle relaxants need to be used in such a situation.

Tracheal intubation should be performed by an experienced anesthesiologist with an experienced assistant (preferably also an anesthesiologist) and a nurse, to maximize patient safety (fig. 1) and to manage the severe hypoxemia and circulatory failure that might occur. Muscle relaxants are highly recommended.[5] The video laryngoscope should be placed as soon as muscle relaxation is achieved, and tracheal intubation should be accomplished and confirmed as soon as possible (less than 15 to 20 s). Confirming the depth of the endotracheal tube is extremely difficult using auscultation while wearing isolation suits. It is recommended instead to observe bilateral chest expansion, ventilator breathing waveform, and respiratory parameters. End-tidal CO_2 is a better indicator of successful tracheal intubation, as oxygen saturation is not always increased immediately after intubation in these patients, because the oxygen exchange is significantly impaired.

Cricoid compression or displacement is needed when exposure of the cord is difficult and the patient's fasting time is unknown; it is critical that suction is readily available. Repeated tracheal intubation attempts could potentially increase virus spread, so a laryngeal mask should be inserted after an intubation failure. Fogging of goggles is a serious problem during rapid intubation, which can make intubation

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and airway management a major challenge for the care provider. Poor visibility also increases the risk for potential injury and infection. One solution to the problem of fogging may be to cover the inner side of the goggles with a layer of antifogging agent, such as transparent hand sanitizer.

The Safety of the Care Providers

In a recent report related to 138 confirmed COVID-19 cases, 41.3% were considered acquired infection from the hospital, and more than 70% of these patients were healthcare providers.[5] A high level of vigilance is necessary to prevent contracting the infection when intubation is performed. Standard Level 3 protection[5] should be worn by individuals performing the intubation, as shown in figure 1. The recommended Level 3 protection process is as follows: hand disinfection → head cap → protective mask N95 1860 → surgical masks → isolation gown → disposable latex gloves → goggles → protective clothing → disposable latex gloves → shoe covers → disposable gown → disposable latex gloves → full head hood. Double masks with N95 1860 filter inside, gowns, and double gloves should be worn by the intubation team. The person who is performing the intubation should wear a third pair of gloves and remove them immediately after intubation.

Goggles and full protective headgear are necessary during intubation, as shown in figure 1. A powered air-purifying respirator system is recommended during the intubation of COVID-19 patients. The outer layer of the protective device is removed after direct patient contact and before touching any equipment or furniture in other areas of the room; hand cleansing with disinfectant-containing alcohol is also necessary. Endotracheal intubation guided by a video laryngoscope with a disposable cover is recommended. Fiber optic intubation is feasible, but disinfection of the fibro bronchoscope system is inconvenient. The disposable cover should be removed and exchanged for a new disposable protective device after each intubation before moving to the next patient who needs intubation. The contaminated instruments must not be taken from the contaminated area to a clean area. They should be discarded or disinfected following strict guidelines. Particular care is necessary for the removal of potentially contaminated gloves, gowns, masks, and head covers; this contaminated clothing is disposed of as infectious materials.

In the nonperioperative area, in the event of a difficult intubation, additional personnel and tools may not be immediately available. A backup plan needs to be established. A multidisciplinary "difficult away team" should be established and readily available. We have a laryngeal mask readily available. In the event of a failed intubation attempt, a laryngeal mask should be used as a temporary bridging method. Under these circumstances a bedside tracheostomy should be considered as early as possible.

In conclusion, special consideration is needed to ensure the highest safety when intubating patients who have COVID-19.

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Competing Interests

The authors declare no competing interests.

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