

Running Title: Decreasing aerosol generation in a Covid-19 patient

Keywords: Covid-19, airway extubation, aerosols, laryngeal masks, occupational health

Title: Reducing coughs in weaning from mechanical ventilation using the supraglottic airway device i-gel in a patient with COVID-19

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Abstract - word count: 50 words

We report smooth weaning from mechanical ventilation in a patient with COVID-19. The use of the supraglottic airway device can cause fewer coughs in weaning from mechanical ventilation. This procedure avoids the aerosol-generating procedure, tracheal extubation, and is beneficial in terms of occupational health for health care workers.

Text – word count: 617 words

An outbreak of 2019 novel coronavirus disease (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has emerged in Japan (1). Patients with severe respiratory failure are treated primarily with mechanical ventilation (2). The timing of intubation has been recognized as a critical factor because of the risk of exposure to the virus (3), as is the timing of extubation (4). At the time of extubation, straining and bucking usually occur and may cause spread of droplets or even aerosols containing the SARS-CoV-2 virus (4, 5). However, documented procedures for decreasing coughs at the time of extubation in the intensive care unit are limited. This is important for reducing the risk of virus transmission in this phase. We conducted a safer weaning procedure from mechanical ventilation in a patient with COVID-19 by exchanging the tracheal tube to the i-gel supraglottic airway, which causes fewer coughs, in advance of emergence from sedation (6, 7). We describe a patient with COVID-19 who was mechanically ventilated and weaned from the ventilator with no incidence of coughing. We consider this procedure beneficial in terms of occupational health for health care workers because it enables to avoid straining at extubation, one of the aerosol-generating procedures. The patient provided written, informed consent to share his clinical details.

A 70-year-old Japanese man had a fever 4 days before admission to a community hospital. A week after admission, his respiratory status deteriorated, and he was transferred to our university hospital. He was intubated with an 8.0-mm tracheal tube with rapid sequence induction 2 days later and had 10 days of mechanical ventilation under sedation. On the day

of weaning, the ventilator settings were continuous positive airway pressure of 6 cm H₂O with pressure support 6 cm H₂O, FiO₂ of 0.25. The tracheal tube was replaced with the i-gel with no coughing under transient deep sedation (fentanyl 150 mcg IV and propofol 80 mg IV) and a small amount of muscle relaxant (rocuronium 20 mg IV). Adequate ventilation was confirmed, and infusion of sedatives were discontinued. The patient continued to be ventilated with continuous positive airway pressure with pressure support. At the timing of emergence from sedation, the ventilator was disconnected and the i-gel was removed. The patient was fully awake and had no straining or coughing during the entire weaning procedure from mechanical ventilation.

Safety for health care workers is crucial for maintaining continued care for patients with COVID-19. We have learned from the experience of SARS-CoV health care workers who became infected following the intubation of infected patients (3). Hospitals should be cautious to not only ascertain the use of protective equipment like masks with face shields during extubation but also limit the number of staff members at the procedure to reduce the risk of unnecessary exposure. Reducing patients' coughing by avoiding the aerosol-generating procedure like tracheal extubation with straining may contribute to a further reduction in the risk of infection.

Supraglottic airways are often used in airway management for general anesthesia and in prehospital settings. The i-gel is a second-generation supraglottic airway device known to exhibit proper sealing of the glottic aperture (8). Supraglottic airway devices do not have

direct contact with the surface of the inner trachea, thus avoiding the induction of coughs and straining (9). This feature of i-gel is favorable in emergence from sedation.

An increasing number of patients with COVID-19 are mechanically ventilated, thus increasing the number of expected extubations. To reduce the risk of occupational infection of SARS-CoV-2 at the time of weaning from mechanical ventilation, we propose replacing the tracheal tube with the supraglottic airway such as i-gel in advance of emergence from sedation for reducing the environmental distribution of the virus in a hospital setting.

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