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References

1. American Society of Anesthesiologists: APSF/ASA Guidance on Purposing Anesthesia Machines as ICU Ventilators, April 9, 2020. Available at: <https://www.asahq.org/in-the-spotlight/coronavirus-covid-19-information/purposing-anesthesia-machines-for-ventilators>. Accessed April 12, 2020.
2. Anesi GL: Coronavirus disease 2019 (COVID-19): Critical care issues. UpToDate (Topic 127419 Version 18.0), April 10, 2020. Available at: <https://www.uptodate.com/contents/coronavirus-disease-2019-covid-19-critical-care-issues>. Accessed April 12, 2020.
3. U.S. Food and Drug Administration: Ventilator supply mitigation strategies: Letter to health care providers. March 22, 2020. Available at: <https://www.fda.gov/medical-devices/letters-health-care-providers/ventilator-supply-mitigation-strategies-letter-health-care-providers>. Accessed April 12, 2020.
4. Datex-Ohmeda (GE Healthcare): Aisys Anesthesia Machine Technical Reference Manual. Part Number M1046983, May 2005. Madison, Wisconsin

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Getting to a New Normal: Mandating That Patients Wear Masks as Hospitals Fully Reopen during the Coronavirus Pandemic

To the Editor:

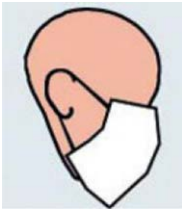
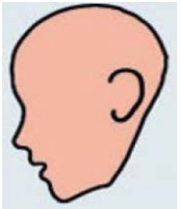
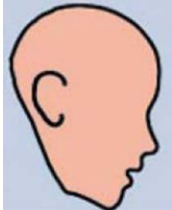
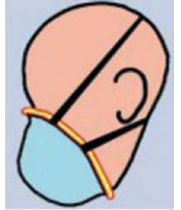
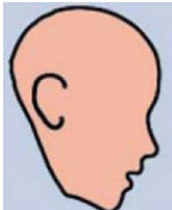
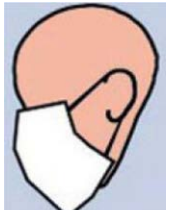
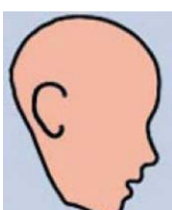
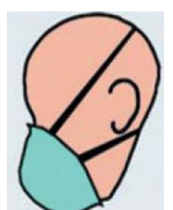
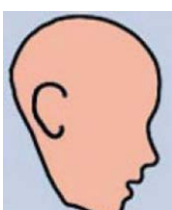
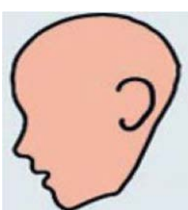
With community spread of coronavirus disease 2019 (COVID-19) infection, a hospital-acquired infection by both patients and medical providers is a major concern. In an early report from China, among 138 confirmed cases with COVID-19 infection, 57 patients (41.3%) were considered a

nosocomial infection from the hospital.¹ More than 70% of suspected nosocomial infection patients were healthcare providers. The authors reported that one of the surgical patients infected 10 healthcare providers. According to an official report on March 6, 2020, more than 3,000 medical professionals have contracted COVID-19 in Hubei province alone, and some have died.² At least 2,629 medical providers in Italy have been infected by this devastating virus.³ In the United States, it was reported on April 14, 2020, that 9,000 health workers contracted COVID-19, and 27 of them have died.⁴ Protection of healthcare providers, particularly those on the front line in the emergency departments, wards, and intensive care units, is an extremely important task during the pandemic due to their limited numbers and the need for them to take care of the surging number of patients. It is also critical to protect other uninfected hospital patients and nonmedical staff.

Hospitals have the highest density of patients with COVID-19; thus, hospital-acquired infection should be a top priority task in our daily clinical practice. Medical providers have priority for protective resources, such as masks, for better protection. All healthcare providers should wear regular surgical masks for all patient encounters, based on the successful experience from Singapore and Hong Kong during the pandemic.⁵ However, to mandate that all patients wear masks may have much greater effectiveness in controlling nosocomial infection. Scientific findings related to the aerosol spreading and deposition pattern from breathing, coughing, sneezing, and speaking clearly indicated that placing a tight surgical mask on the patient resulted in a 288-fold greater protection than the wearing of an N95 respirator mask by a receiver (medical provider or anyone in the hospital), as indicated in table 1.^{6,7} COVID-19 is a highly infectious disease that can be transmitted *via* an aerosol route even when a patient is asymptomatic. Until we can perform high-efficacy screening tests in a short period of time, it is difficult to know who has the disease. A recent clinical study clearly demonstrated that surgical masks reduce coronavirus outward transmission.⁸ To prevent hospital-acquired infection, we initiated and recommend a new hospital policy to mandate that everyone entering the hospital must wear a mask, and the mask cannot be removed unless necessary for a medical intervention or drinking and eating. This policy should apply to everyone in the hospital, including all medical providers, healthcare workers, secretaries, supporting individuals, patients, and patient family members. Ensuring that patients wear a mask could potentially be more critical than masks on the care team. We can protect our staff in a better manner by managing infectious source control. In addition to the new policy, proper education and compliance reinforcement are needed. We have a dedicated entrance in our hospital with trained personnel to check the temperature, ensure mask wearing, and offer a surgical mask for any person who needs one when entering the hospital.

We have implemented this policy early on, and started a pilot virus test within 48 h before each surgical procedure, aiming toward a full reopen for "normal" full capacity

Table 1. Relative Protection Factors among Different Patterns of Combinations of Mask Scenarios

Relative Protection Factor	Source Mask Type	Receiver Mask Type
288	Tight surgical mask 	None 
118	None 	N95 + petroleum jelly 
2	None 	Tight surgical mask 
1	None 	N95 only 
1	None 	None 

This table is modified from Diaz KT, Smaldone GC. Quantifying exposure risk: Surgical masks and respirators. Am J Infect Control 2010; 38:501–8.⁶ Copyright 2010, with permission from Elsevier.

surgical operations. A formal study has been initiated along with these novel policies. Patients will need to continue to wear masks even if their virus test is negative. We believe that this will lead to optimal outcomes for patients and providers.

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Competing Interests

The authors declare no competing interests.

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References

1. Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, Wang B, Xiang H, Cheng Z, Xiong Y, Zhao Y, Li Y, Wang X, Peng Z: Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. JAMA 2020. DOI: 10.1001/jama.2020.1585

2. More than 3000 medical providers are infected with COVID-19. Daily Economic News 2020. Available at: <https://finance.sina.cn/2020-03-06/detail-iimxy-qvz8447262.d.html>. Accessed April 17, 2020.
3. Oddone E: Thousands of medical staff infected with coronavirus in Italy. 2020, Available at: <https://www.aljazeera.com/news/2020/03/rising-number-medical-staff-infected-coronavirus-italy-200318183939314.html>. Accessed April 5, 2020.
4. Characteristics of health care personnel with COVID-19 — United States, February 12–April 9, 2020. MMWR Morb Mortal Wkly Rep 2020. DOI: <http://dx.doi.org/10.15585/mmwr.mm6915e6>
5. Gawande A. Keeping the coronavirus from infecting health-care workers: What Singapore's and Hong Kong's success is teaching us about the pandemic. 2020. Available at: <https://www.newyorker.com/news/news-desk/keeping-the-coronavirus-from-infecting-health-care-workers>. Accessed April 8, 2020.
6. Diaz KT, Saldone GC: Quantifying exposure risk: Surgical masks and respirators. Am J Infect Control 2010; 38:501–8
7. O'Riordan TG, Saldone GC: 11 - Aerosol deposition and clearance, Murray and Nadel's Textbook of Respiratory Medicine, 6th edition). Edited by Broaddus VC, Mason RJ, Ernst JD, King TE, Lazarus SC, Murray JF, Nadel JA, Slutsky AS, Gotway MB. Philadelphia, W.B. Saunders, 2016, pp 168–183.e2
8. Leung NHL, Chu DKW, Shiu EYC, Chan K-H, McDevitt JJ, Hau BJP, Yen H-L, Li Y, Ip DKM, Peiris JSM, Seto W-H, Leung GM, Milton DK, Cowling BJ: Respiratory virus shedding in exhaled breath and efficacy of face masks. Nat Med 2020. DOI: <https://doi.org/10.1038/s41591-020-0843-2>

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Videolaryngoscopy Intubation in Patients with COVID-19

How to Minimize Risk of Aerosolization?

To the Editor:

The highest viral load of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is found in the

sputum and upper airway secretions.¹ Therefore, endotracheal intubation, extubation, connection, and disconnection of the ventilatory circuit in patients infected with coronavirus disease 2019 (COVID-19) may cause aerosolization that may contaminate the personal protective equipment, exposed body parts, or even the airway of the person handling the airway.^{2,3} Direct contact and droplet spread of respiratory secretions remain the predominant mode of spread, yet airborne transmission may occur, and taking precautions in aerosol-generating procedures should be done.³

Videolaryngoscopy is ideally recommended in patients infected with COVID-19 to increase the distance between the operator's face and the patient's face to minimize the risk of contamination.³ In addition, videolaryngoscopy offers a better view of the glottic entrance and can facilitate a quick-pass first-attempt tracheal instrumentation.⁴ However, the performance of different videolaryngoscope models in patients infected with COVID-19 remains unknown because no comparative data have been validated. It is well known that some manufacturers of videolaryngoscopy equipment advocate the use of stylets in the endotracheal tube (ETT) to facilitate easy insertion into the trachea, especially in suspected difficult airway.⁴ However, two concerns exist during videolaryngoscopy intubation with a preloaded tube on an introducer^{5,6}: (1) A patient may cough during tracheal instrumentation and expel a virus-containing cloud of particles *via* reverse outflow across an unsealed endotracheal tube facing the operators; (2) Stylet removal after endotracheal intubation may increase the risk of contamination.

We describe using a channeled videolaryngoscope to manage a difficult airway in a 31-yr-old female suspected to be infected with COVID-19 undergoing emergency laparotomy with unstable vital signs. All involved staff wore appropriate personal protective equipment.²

With full monitoring in place and after 5-min preoxygenation with low-flow oxygen at 3 l/min using nasal cannula with surgical mask *in situ* covering the patient's mouth and nose, rapid sequence induction was started using intravenous xylocaine 1 mg/kg, fentanyl 1.5 mcg/kg, propofol 2mg/kg, and rocuronium 1 mg/kg subsequently. The ETT was lubricated and loaded inside the channel of the Airtraq and directly connected to the circuit before induction (fig. 1A). A minute later, with the patient head shielded away from the anesthesiologist by a closed plastic box (fig. 1B), the surgical mask was removed and the channeled-type Airtraq videolaryngoscope with camera-connected C-MAC videolaryngoscopy screen was introduced into the mouth. The glottic opening was visualized and the trachea was successfully intubated from the first attempt with a closed circuit without the need for a stylet, or any maneuver. While removing the videolaryngoscope the ETT cuff was inflated immediately and the second pair of gloves of the operator was used to seal the used Airtraq, which was disposed of into the plastic bag, then volume ventilation mode was initiated (Supplemental Digital Content video, <http://links.lww.com/ALN/C398>). However, dislodging the ETT from the side channel of the