Protecting against COVID-19 aerosol infection during intubation

Jen-Yu Tseng,[a,b,*] Hsien-Yung Lai[c]

[a]Department of Obstetrics and Gynecology, Taipei Veterans General Hospital, Taipei, Taiwan, ROC; [b]School of Medicine, National Yang-Ming University, Taipei, Taiwan, ROC; [c]Department of Anesthesiology, Mennonite Christian Hospital, Hualien, Taiwan, ROC

DEAR EDITOR,

We read with great interest the review article regarding the outbreak of coronavirus disease 2019 (COVID-19) by Wu et al.[1] According to recent figures posted on worldometer,[2] there are over 1.2 million confirmed cases of coronavirus resulting in over 66 5000 deaths worldwide. The novel coronavirus was first reported in Wuhan, China, in late December of 2019.[3] China issued a lockdown on all major cities to prevent and contain the spread of the virus; unfortunately, it was too late. Sporadic cases began to first appear in Asia, then Europe and the Americas, and finally affecting 208 countries and territories.[2]

This pandemic has caught global healthcare workers off-guard. As human to human transmission[4] became evident, a surge of infected patients needing hospitalization and requiring mechanical ventilation increased exponentially. Recently it has been reported that the virus responsible for COVID-19 can be viable in aerosols for up to 3 hours and remain detectable on plastic and stainless steel surfaces for approximately 72 hours.[5] Personal protective equipment (PPE) including face mask, goggles, gloves, and gown has become a necessity to minimize the exposure to the deadly pathogenic virus. Stringent protection procedures should be conducted for high-risk procedures such as endoscopy, Ambu bagging, and endotracheal tube intubation.[1]

During the intubation process, medical personnel are at the highest risk of being exposed and infected. As a preventive measure, a simple, low-cost device was invented to give physicians extra protection from any aerosol particles that could be released during the intubation procedure. The device consists of a transparent acrylic box with an opening on one side allowing it to fit over the patient's chest and neck, while the opposite side has two small holes where the doctor's hands can be inserted during the intubation. The "aerosol box" has been registered under a Creative Commons license and is free to the public as long as it is properly attributed to the designer and not used for commercial purposes. The schematics is available at https://sites.google.com/view/aerosolbox/home.

This device has already been adopted by some hospitals in Taiwan, Hong Kong, Philippines, Canada, United Kingdom, and the United States. A group from Boston Medical Center developed a prototype with the design and streamed a video showing the effectiveness of using the aerosol box to protect clinicians during the intubation procedure.[6] Changes to the original design may be necessary to fit the respective needs of the physician and/or patient—availability of video-assisted laryngoscope, large hands, and patient body mass index (BMI).

As of now, various medications are being investigated and vaccine trials have been initiated by numerous countries. Before being able to find the most effective treatment, protecting, diminishing exposure, securing, and insulating our healthcare workers from possible infection is the biggest challenge to safeguard the health of our patients. We hope that this innovative "aerosol box" design can provide an extra layer of protection to clinicians performing high-risk procedures.

REFERENCES

1. Wu YC, Chen CS, Chan YJ. The outbreak of COVID-19: an overview. *J Chin Med Assoc* 2020;**83**:217–20.
2. Worldometers Info. April 5, 2020. Dover, DE. Available at https://www.worldometers.info/coronavirus/.
3. Zhu N, Zhang D, Wang W, Li X, Wang B, Song J, et al. A novel coronavirus from patients with pneumonia in China, 2019. *N Engl J Med* 2020;382:727–33.
4. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *N Engl J Med* 2020;382:1199–207.
5. Van Doremalen N, Morris DH, Holborrk MG, Gamble A, Williamson BN, Tamin A, et al. Aerosol and surface stability of SARS-CoV-2 as compared with SARS-CoV-1. *N Engl J Med* 2020;382:1564–7.
6. Canellli R, Connor CW, Gonzalez M, Nozari A, Ortega R. Barrier enclosure during endotracheal intubation. *N Engl J Med* April 3, 2020; 382:1957–8.

*Address correspondence. Dr. Jen-Yu Tseng, Department of Obstetrics and Gynecology, Taipei Veterans General Hospital, 201, Section 2, Shi-Pai Road, Taipei 112, Taiwan, ROC. E-mail address: albertotseng@hotmail.com (J.-Y. Tseng).

Author Contributions: Dr. Jen-Yu Tseng and Dr. Hsien-Yung Lai contributed equally to the article.

Conflicts of interest: The authors declare that they have no conflicts of interest related to the subject matter or materials discussed in this article.

Journal of Chinese Medical Association. (2020) 83: 582.

Received April 5, 2020; accepted April 6, 2020.

doi: 10.1097/JCMA.0000000000000324.