

Fig. 1. Stepwise approach to a closed-circuit, easily disposable bronchoscopy setup for use in high-risk situations, such as coronavirus disease 2019 (COVID-19). (A) Elbow adaptor is first placed inside transesophageal echocardiography sheath. (B) Small holes are cut to allow each arm of adaptor to fit through. (C) Tape is used to secure sheath to adaptor and gauze is placed inside sheath. (D) Bronchoscopy set-up shown. (E) Easy scope disposal after procedure is terminated.

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Low-cost Double Protective Barrier for Intubating Patients amid COVID-19 Crisis

To the Editor:

Amid the actual crisis of coronavirus disease 2019 (COVID-19), anesthesiologists are faced with the necessity to improvise extra protective barriers for

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intubating patients.¹ One such innovation is known as the aerosol box,² consisting of a clear box covering the patient's head with two ports for the physician's hands. Simulations using this box³ have found that without the use of this kind of protection, aerosols could appear in the physician's clothes, neck, hair, and shoes, and even the floor around the patient. Although not without limitations, they found that the use of an extra protective barrier for endotracheal procedures could increase security for the health provider.³ Our goal is to describe a low-cost double protective barrier built with materials easily found around the hospital.

Our box was based on the slanted front variation design⁴ (measurements and design provided in Supplemental Digital Content 1, <http://links.lww.com/ALN/C416>). We found that by using this design physicians had a better view during intubation. Like the other designs, we built a clear acrylic cube using acrylic boards that our maintenance team had on hand; the total cost of the box is about \$100 USD (\$2,500 MX), it takes two days to complete, and it can be sanitized with the hospital's protocol after each use. For an added extra protective measure, we looked for readily available and easy options to cover the hand ports. One option is to use incubator cuffs that can be found in hospitals with maternity wards (\$3 USD per four); another option is using a waterproof surgical drape to make a sleeve-type enclosure (pattern is provided in Supplemental Digital Content 2, <http://links.lww.com/ALN/C417>). Depending on the type of cloth used for making these, they can be either be disposable or reusable (\$10 USD per pair) and can be washed at high temperatures with hospital linen.⁵ Both options fit snugly in the ports and do not limit hand movements or the physicians view, and retrieval is as easy as pulling an arm out of a surgical gown. As for the side ports, we recommend using an incubator cuff or plastic drape to prevent aerosol dissemination while still making it easy to insert and retrieve instruments. The box should remain in place for intubation, the surgical procedure (fig. 1), and extubation.

Although this box is not a substitute for proper personal protective equipment, it is a supplementary low-cost option that can be equipped with basic material found around the hospital for countries with a low supply of personal protective equipment. We are aware of other types of protective barriers, including cardboard boxes, refrigerator drawers, and plastic drapes, but we feel that using a reusable acrylic box with sleeves is more cost efficient.^{6,7} Contrary to previous research, we did not find intubation difficult when using the box (with a video laryngoscope), although we believe that expanding 15 cm more to the depth (now 40 cm) of the box would make larger patients feel more comfortable inside it. Modifications, of course, can be made according to physicians' preferences.

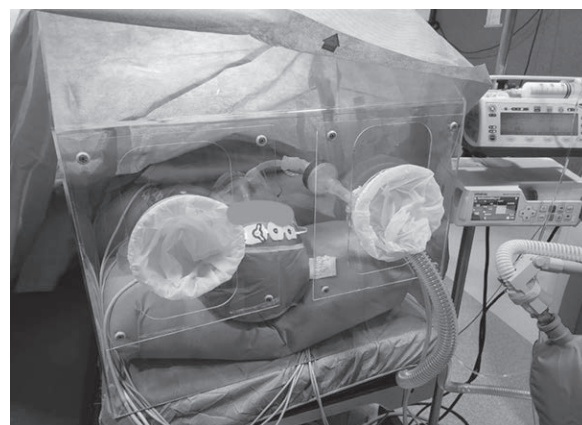


Fig. 1. Protective barrier must remain in place for intubation (with clear plastic covering), surgery, and extubation.

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Competing Interests

The authors declare no competing interests.

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