

# Modified aerosol box for endotracheal intubation: A safeguard for the frontline healthcare workers during COVID pandemic

Dear Sir,

In the present pandemic of COVID-19, the healthcare worker is the frontline caretaker and has to undertake many aerosol-generating procedures when needed, which included endotracheal intubation, extubation, suction, and bag-mask ventilation. An aerosol is an important route of transmission of COVID-19.

Approximately, 3.2% of patients with COVID-19 required intubation and invasive ventilation.<sup>[1]</sup> For healthcare workers performing aerosol-generating procedures, the use of fitted respirator masks (N95) is recommended in addition to other personal protective equipment (PPE).<sup>[2]</sup> However, there is always a shortage of PPE, causing a risk to the frontline healthcare worker. However, the recent development of a low-cost intubation box can reduce the escape of aerosol to the ambience, thus indirectly safeguarding the health care providers dealing with these procedures.

There are many designs available now, but in our emergency room, we initially tried with the aerosol box designed by Tseng and Lai.<sup>[3,4]</sup> We had found difficulty in the visualization of the glottic opening through the vertical wall. Also, there was no opening through which an assistant can provide backward-upward-right pressure (BURP) or equipment like bougie, suction catheter. After trials on mannequin and patients,

we planned for modification and changed the design accordingly to overcome the above-described difficulties.

The horizontal roof and the vertical wall at the head end were meeting at the right angle in the aerosol box designed by Lai. The right-angled joint was interfering with the visualization of the glottic opening. We reduced the length of the horizontal roof and height of the vertical wall at the head end and added a slanting roof in between these [Figure 1]. This modification improved our visualization of the glottic opening.

Further, we have created a round opening of a diameter of 10 cm at 25 cm height on the right side wall of the aerosol box. This side opening is for providing BURP maneuver and introduction of bougie, or a suction. The suction tube can be attached to the 1% hypochlorite solution by which there is less risk of aerosol transmission.

This side opening is provisioned with a displaceable transparent rigid acrylic screen with a loose screw and bolt system. This makes the aperture remain closed, but at need, the assisting person can easily swivel it laterally to open and provide aid as per requirements. Further, as this opening remains closed, there is a restriction of aerosol spread in this design. However, to overcome unfamiliarity and limitation of hand movements, one needs to practice over mannequin before applying it to patients. During the intubation process, this box can be used as a barrier to reduce the escape of aerosolization. Good knowledge of infection prevention, vigilance in the protective measure, and preparedness for the care of infected patients are of utmost importance. We believe that this modified aerosol box will be useful in the current COVID pandemic to protect the frontline healthcare worker from the highly contagious infection and can provide extra protection when performing high-risk procedures.

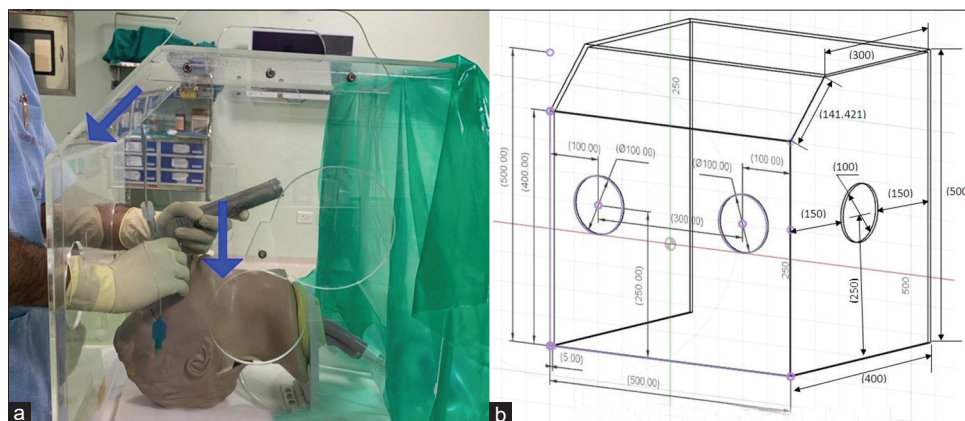


Figure 1: (a) Aerosol box. (b) Dimension of aerosol box

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

# Sangeeta Sahoo<sup>1</sup>, Upendra Hansda<sup>1</sup>, Chitta Ranjan Mohanty<sup>1</sup>, Nitasha Mishra<sup>2</sup>

<sup>1</sup>Department of Trauma and Emergency, AIIMS Bhubaneswar, <sup>2</sup>Department of Anaesthesiology and Intensive Care, AIIMS Bhubaneswar, Odisha, India

**Address for correspondence:** Dr. Sangeeta Sahoo,  
Department of Trauma and Emergency, AIIMS Bhubaneswar,  
Odisha, India.

E-mail: drsangeeta.asth@gmail.com

## References

1. Meng L, Qiu H, Wan L, Ai Y, Xue Z, Guo Q, *et al.* Intubation and ventilation amid the COVID-19 outbreak: Wuhan's experience. *Anesthesiology* 2020;132:1317-32.
2. Poston JT, Patel BK, Davis AM. Management of critically ill adults with COVID-19. *JAMA* 2020;323:1839-41.
3. Tseng JY, Lai HY. Protecting against COVID-19

aerosol infection during intubation [published online ahead of print, 2020 Apr 15]. *J Chin Med Assoc* 2020;10.1097/JCMA.0000000000000324. doi: 10.1097/JCMA.0000000000000324.

4. Canelli R, Connor CW, Gonzalez M, Nozari A, Ortega R. Barrier Enclosure during endotracheal intubation. *N Engl J Med* 2020;382:1957-8.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Received: 22-06-2020

Accepted: 08-09-2020

Published: 30-11-2020

### Access this article online

#### Quick Response Code:



#### Website:

www.jfmipc.com

#### DOI:

10.4103/jfmipc.jfmipc\_1235\_20

**How to cite this article:** Sahoo S, Hansda U, Mohanty CR, Mishra N. Modified aerosol box for endotracheal intubation: A safeguard for the frontline healthcare workers during COVID pandemic. *J Family Med Prim Care* 2020;9:5802-3.

© 2020 Journal of Family Medicine and Primary Care | Published by Wolters Kluwer - Medknow