

## Aerosol box for protection during airway manipulation in covid-19 patients

Sir,

Novel coronavirus (COVID-19) is a highly infectious disease. Human-to-human transmission occurs by droplet, contact and fomites.<sup>[1]</sup> There is an increased risk of nosocomial transmission during manual ventilation, intubation and extubation.<sup>[2]</sup> Precautions have to be taken to contain aerosolization during airway procedures. We wish to suggest the use of the aerosol box to reduce contamination during airway manipulation to protect healthcare workers from contracting SARS-CoV-2 infection.

Our box is a modification of an aerosol box described by Lai Hsein-Yung.<sup>[3]</sup> An aerosol box is a transparent box, designed to cover the patient's head during airway related procedures where the patient is likely to cough. We have also used acrylic, as it is cheap, strong and easily available in resource poor country like India. The dimensions used to make this box are given in Figure 1. Our box is ergonomically designed with asymmetrical placement of the openings for the hand. The circular opening has been changed to elliptical, and the left side opening is larger and higher than right. The shape of the openings is elliptical as the hands come from lateral to medial and require some maneuvering while intubation. A base of 51 cm (50 cm in original design) was selected so that it just fits on our OT table

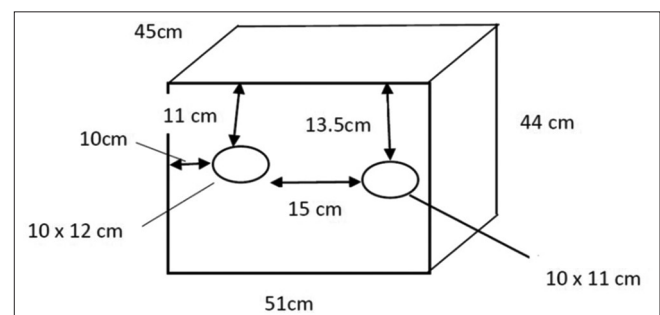


**Figure 1:** Aerosol box

cushion. These specific dimensions were decided after multiple attempts of intubation by various consultants on mannequin. There still could be a slight restriction in hand movements, which could be corrected by practice.

Healthcare workers are at risk of corona virus infection. Personal protection is of utmost importance to avoid getting infected.<sup>[4]</sup> The risk of transmission from aerosol-generating procedures is high. Hence, it is recommended to strictly follow infection control measures during aerosol-generating procedures performed on patients with corona infection. Hence this box was designed and made in our hospital with available resources as commercially available devices are not yet available or are difficult to obtain due to the ongoing lockdown and also due to the high demand for these devices in the market these days. Not only did we make a few for our institutional use, but we could also supply them to many of the neighboring hospitals at an affordable rate of Rs 2500. This box could be made in every city and distributed as great expertise is not required, resulting in the minimization of COVID-19's spread among anesthetists and intensivists.

After explaining to the patient, aerosol box is kept at the head end as shown in Figure 2. In ICU intubation and extubation foot end of the aerosol box could be covered with polythene covers fixed with simple clips or double sided tapes. Since our hospital is not a primary COVID treating center, we have not worn any protective devices. But it is essential that aerosol box should always be used in conjunction with WHO-recommended safety kits. Appropriate N95 masks, gloves, goggles, head covers, and Hazmat suits are to be used.<sup>[5]</sup> Protocols for safe intubation and extubation have to be made prior and discussed with the team members. The team has to be trained in donning and doffing. It is better to limit the number of healthcare providers in the room where the patient



**Figure 2:** Dimensions of aerosol box

is to be intubated. Experienced anesthetist should perform the intubation to avoid failures. Rapid sequence induction is preferred to avoid ventilation with facemask and the potential aerosolization of the virus.<sup>[6]</sup> HME filters are to be used between facemask and breathing circuits. After intubation and confirmation of the correct position of the tracheal tube, mechanical ventilation could be performed. All airway equipment must be decontaminated and disinfected according to hospital policies.<sup>[7]</sup> If surgical site permits, aerosol box is taken off only after extubation and is decontaminated using 70% alcohol or 1% sodium hypochlorite spray. Proper discarding of gloves, hand hygiene and doffing has to be performed after the procedure.

In difficult intubation, aerosol box use is limited, but such occurrence is rare as seniors do most of the COVID intubation. It is also not useful for nasal intubation and LMA insertion. But we still recommend that this device be used for all other patients so that the learning curve can be reached before one has to perform actual COVID intubation in patients who are sick and critical.

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#### Conflicts of interest

There are no conflicts of interest.

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