COVID aerosol barrier intubation box – Boon or bane?

The reports of health care workers (HCW) getting infected with Corona Virus in this COVID-19 pandemic are disheartening. Extensive studies and reports have found that the greatest risk of infection is during aerosol generating procedures such as intubation, bronchoscopy etc.[1] With the growing number of cases, and increased infection of HCWs, the need for personal protective equipment (PPE) takes prominence more than ever before. The misfortune of non-availability of PPE has led to innovations like barrier protection from aerosols, using the Aerosol Box [Figure 1].[2] The original aerosol box was created by Dr. Hsien Yung Lai in Taiwan. Literature is replete with evidence that the aerosol box is effective in preventing cough dispersion of infective particles on the care providers.[3] However, in our experience, things were different; the benefits of the ‘box’ were far less than the demerits. We encountered some challenges at our institution over the last two months, both during patient care (10 patients) and during simulation (5 attempts on mannequins) that we would like to share. The following were our observations:

1. User discomfort is a major disqualifier. Both the laryngoscopist and the assistant were finding it difficult to adjust to the limited space available. The laryngoscopist gets very little space to manoeuvre his arms through the entry space for the arms and the assistant feels cramped inside the box
2. There were additional issues in some of the patients. Manoeuvrability inside the aerosol box becomes further compromised in patients with short neck making intubation even more challenging. Patients who are short statured need to be distanced away with respect to the laryngoscopist and it adds to the effort. Airway management and intubation is nearly impossible through...
the aerosol box in those obese patients who require a steep ramping

3. Not only is the box bulky, it adds another contaminated object after an aerosol dispersing procedure, which requires decontamination before reuse

4. We used C-Mac® and AirTraq® in our patients and mannequins. Time taken for intubation through the box was much higher than usual. On an average, it took a trained anesthesiologist 121 seconds to intubate a patient through the box (defined as the time from removing the facemask until the 1st breath was delivered by a correctly placed endotracheal tube with an inflated cuff). This is much more than the routine time taken for intubation (Mean (SD); 14 (6) seconds for intubation with C-MAC® as compared to 22 (14) seconds with the AirTraq® in a difficult airway scenario in a mannequin[4]). This amount of time delay could be disastrous in a critically ill patient

5. The box redirects the aerosols to the foot end of the patient through its distal open end, and thus the surface area with contamination on the patient linen/drapes still remains high.

Some investigators have also reported damage to the PPEs of the laryngoscopists due to the rough edges of the openings on the box. This exposed their clothes and/or skin to the virus.[5]

Due to the above observations, we strongly feel that the need of the hour is good PPE, donned properly as per guidelines and not the aerosol box. The amount of aerosol dispersion in a fully paralysed patient is minimal compared to a patient who is not.[6] Hence the benefit of the box in the presence of a PPE is weak. Stability of SARS-CoV-2 in different environmental conditions can be diverse. It is known to remain alive on paper, plastic and clothes for as long as 6 hours.[7] So it is imperative to doff the PPE and discard it, as per guidelines.

To summarise:

• PPE is indisputably the main barrier to protect the HCWs from aerosol and the box should not be used as a replacement
• The aerosol box should especially be removed whenever the patient safety seems compromised and an immediate intubation is required
• Whenever the box is removed after use, appropriate decontamination has to be ensured
• Most importantly, one should not rely solely on a box, for it cannot guarantee complete safety. It was an admirable innovation at the beginning of this pandemic but the authors would like to emphasise on good quality PPE over this method of contagion prevention.

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Conflicts of interest
There are no conflicts of interest.

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Dear Editor,

The coronavirus disease (COVID‑19) pandemic has changed the way we function on a daily basis and practice medicine. As the safety of health care workers (HCWs) is paramount when handling COVID‑19‑infected patients, there has been considerable discussion about the use of patient isolation pods (pods) during the evacuation of these patients.

Therefore, we analyzed if pods are the ultimate solution to the problem. An isolation pod is a collapsible personnel isolation apparatus with a base used for avoiding unwanted contamination of harmful biological and chemical materials. The cover is connected to the base by a zipper. Several glove box ports are provided to permit rapid and expedient treatment of the patient.

In June 2020, literature searches were performed on PubMed, Ovid, Embase, and the Cochrane Database to identify studies about the aeromedical transfer of patients with COVID‑19 or other highly infectious diseases. Our search strategy is outlined in Appendix A.

There has been a consensus that there was little advantage to be gained in moving patients with COVID‑19 in isolation pods and patients are best managed in a sitting position, with supplementary oxygen if required, or on stretchers for those who can be best managed lying down. Only the Norwegians (Norwegian Air Ambulance Service) had experience in using patient isolation pods, and they reported mixed results. Some patients who may have been managed best in a sitting position, were required to lay flat or semi‑recumbent, and this had potentially compromised oxygen perfusion.

The United Kingdom Royal Air Force and Australian Defence Force experts emphasized the difficulty in managing ventilated patients in isolation pods and believed that the risks imposed outweighed any benefit.

The consensus for COVID‑19 management was as follows.

General
1. A risk assessment by a clinician expert in an aeromedical evacuation should be conducted before any decision to move the patient, especially those with evident symptoms of respiratory distress
2. An air transport isolator or negative pressure isolation chamber to move COVID‑19 patients is not required
3. Social distancing (2 m) should be enforced strictly, where possible, during the move