Aerosol extractor for airway management of COVID-19 patients

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To the Editor:

Airway management in patients with COVID-19 would increase the risk of spreading viral aerosol from the patient's airway, exposing healthcare workers to virus infection [1–3]. Personal protective equipment (PPE) is recommended during airway management, but it may not fully prevent viral infection [2, 3]. A protective barrier enclosure with negative pressure may minimize the spread of aerosols [2, 3], but it may paradoxically increase the risk of infection, by damaging the PPE [2]. We have started to use a transportable compact high-flow extractor (Free-100M[®], Forest-one, Tokyo, Japan), which consists of a suction port, a length-variable swing arm, and directed high flow suction (with a 12-phase power vacuum) with ultra-efficiency particulate (ULPA) filter that removes 99.99% of all airborne pathogens (ESM Fig. 1).

To see the efficacy of the suction system, simulated aerosols (particle sizes: 2–4 μm) were produced using a small-volume nebulizer (Teleflex, PN; 6 ml saline at 6 l min⁻¹) which was placed in the manikin's mouth, and a suction port placed approximately 20 cm above of the manikin's chest. We have found that Free-100M[®] effectively suctioned aerosols coming out from the mouth (ESM Fig. 1; Supplementary movie 1).

As the speed of spreading droplets and aerosols during coughing would be faster than the simulated aerosols in this study, the efficacy of this air extractor needs to be assessed

during coughing, but the extractor would be useful in removing aerosols coming out from the patient while not coughing.

Because patients without apparent symptoms and without diagnosis of COVID-19 may also be infectious, we believe that Free-100M[®] may be routinely used, to minimize the risk of infection to healthcare worker during airway management in patients with and without diagnosis of COVID-19.

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Declarations

Conflict of interest The author declares that they have no competing interest.

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