
Visualized effect of the Frankfurt COVid aErosol pRotEction Dome - COVERED

Sir,

In the context of the current SARS-CoV-2 pandemic, the protection of medical staff taking care of COVID-19 patients is of great importance. The virus is mainly transmitted via droplet infection.^[1] Therefore, measures that expose medical personnel to aerosol formation represent a high risk of infection. In the past, infections among medical personnel have occurred several times.^[2] One of the dangerous measures is managing the airway by the medical staff during elective operations. Especially in emergency situations or in emergency rooms, where the infection status of the patient is unclear doctors and

nursing staff are exposed to particularly high risk situations.^[3] Recommendations for the protection of medical personnel are published worldwide adapted to the relevant local standards.^[4,5] Here, COVERED can offer a useful complementary solution.

The pandemic situation may result in a lack of personal protective equipment due to the high numbers of patients. Pragmatic solutions help to bridge the shortage of resources and still provide the highest possible level of protection for medical staff. The COVid aErosol pRotEction Dome - COVERED was developed in Frankfurt, Germany, for this purpose.

We wanted to build a device that should be easy to manufacture without high costs and what can be disinfected easily. Ideally, the raw material should have no other use and be available in sufficient numbers in the current situation. For this purpose, we

cut the packaging tray used for heart-lung-machine sets into 2 parts and then reconnected them with standard plastic glue. The bond points were then sealed with silicone.

This device has been used at the Frankfurt University Hospital for droplet protection since the beginning of the SARS-CoV-2 pandemic. In the context of an evaluation of personal protection equipment, a mannequin (Laerdal Airway Management Trainer, Laerdal, Stavanger, Norway) was fitted with a mucosal atomization device (MAD) in the throat, connected to a perfusor line and a syringe. The system was filled with a fluorescent dye (Fluorescein, Wark24, Alsdorf, Germany). The used MAD produces a fine aerosol with a drop size of 30-100 microns.^[6] This pragmatic approach seemed to us to be most suitable for the representation of aerosols produced during coughing. However, smaller or larger droplets can also occur *in vivo*. The aerosol formation is visible as a fine fog [Figure 1b]. The mannequin was then placed in

the COVERED [Figure 1a]. The protective effect was evaluated by means of fluorescent residues on one employee. An excellent protective effect by COVERED was shown, as no fluorescent residues could be detected on the personal protective equipment of the airway manager [Figure 2a].

In a second test round, the COVERED was removed and an intubation was performed with a face shield only. Here too, a cough of the patient was simulated with fluorescent dye. This resulted in a clear contamination of the test person. This contamination is shown in Figure 2b and c.

After showing the picture to our medical staff, COVERED is highly accepted and included in our daily routine. Therefore, we would like to share those pictures with the scientific community.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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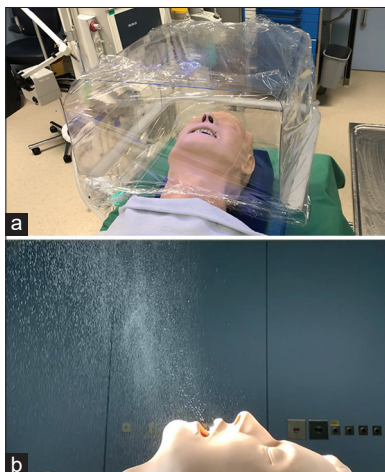


Figure 1: Experimental set-up. Experimental set-up with COVERED to protect the employees (a). Generation of aerosol during coughing without COVERED (b)

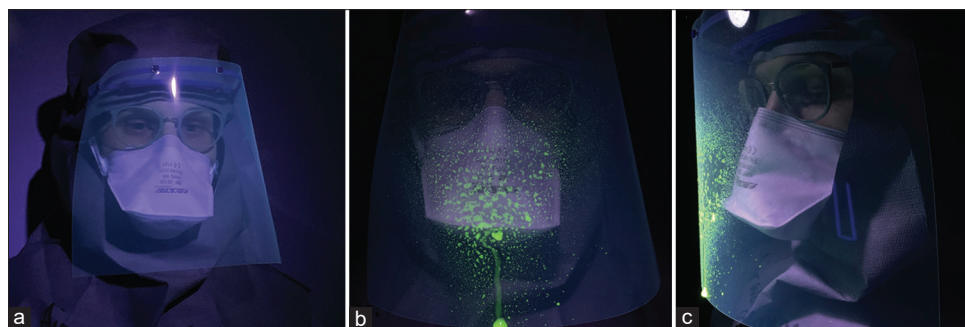


Figure 2: Effect of DOME: Reduced contamination of anesthetist. The protective effect of COVERED against coughing during intubation is made visible with fluorescent dye. No residues on the face shield of the protected airway manager (a). Visible dye on the face shield of the unprotected airway manager (b and c)

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