

Coronavirus disease outbreak: a simple infection prevention measure using a surgical mask during endoscopy



► **Fig. 1** The modified surgical mask.

Coronavirus disease (COVID-19) transmission occurs primarily through direct contact or air droplets [1,2], and endoscopic procedures are high risk. In this era of “with COVID-19,” establishing simple infection prevention measures within an endoscopy department to protect both patients and personnel is strongly recommended. Hence, we proposed a simple method using a modified surgical mask. We made a hole (10 mm diameter) in the center of a surgical mask (► **Fig. 1**). Next, simulated endoscopy was performed with and without the modified surgical mask using a mannequin with the mouthpiece in place (► **Video 1**).

Cough was simulated using a 0.4-MPa pressure accumulation sprayer containing 10 mL of fluorescent dye [3–5]. An endoscopist (height 173 cm) wearing standard personal protective equipment (PPE) performed upper gastrointestinal endoscopy. A nurse (height 163 cm) wearing standard PPE stood on the other side of the “patient.” The scattered dye droplets produced by the simulated cough were visualized using ultraviolet light.

Without the modified surgical mask, contamination of the floor occurred within approximately 1.5 m from the bed, and



► **Video 1** A simple infection prevention measure using a modified surgical mask during endoscopy.



► **Fig. 2** Contamination of the endoscopist by scattered dye droplets, visualized using ultraviolet light, when the modified surgical mask was not used. **a** Contamination of the endoscopist's gloves, right arm, upper chest, and abdomen. **b** The shoe covers.

the dye was clearly identified on the gloves, right arm, upper chest, abdomen, and shoe covers of the endoscopist (► **Fig. 2**). There was no dye on the endos-

copist's eye shield, mask, or cap. The dye was identified on the gloves of the nurse (► **Fig. 3**). When the modified surgical mask was worn by the “patient,” exces-



► **Fig. 3** The dye was identified on the gloves of the nurse when the modified surgical mask was not used.



► **Fig. 4** Excessive amounts of dye were found inside the modified surgical mask when worn by the “patient.”

sive amounts of dye were found inside the mask (► **Fig. 4**). There was no contamination of the floor, and only a minimum amount of dye was found on the endoscopist's upper chest and abdomen (► **Fig. 5**). No dye was found on the nurse. In summary, upper gastrointestinal endoscopy could be performed on a “patient” wearing a modified surgical mask. This method can substantially reduce contamination by splash and aerosol droplets produced by patients during endoscopy, and is simple and cost-effective.



► **Fig. 5** Minimal contamination of the endoscopist by scattered dye droplets, visualized using ultraviolet light, when the modified surgical mask was used.

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Competing interests

The authors declare that they have no conflict of interest.

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