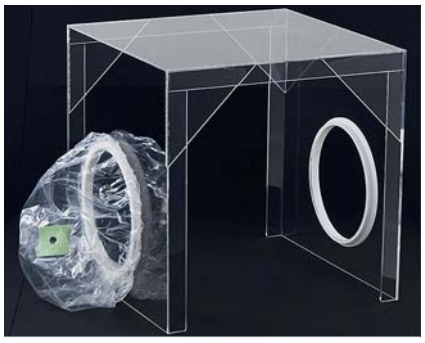
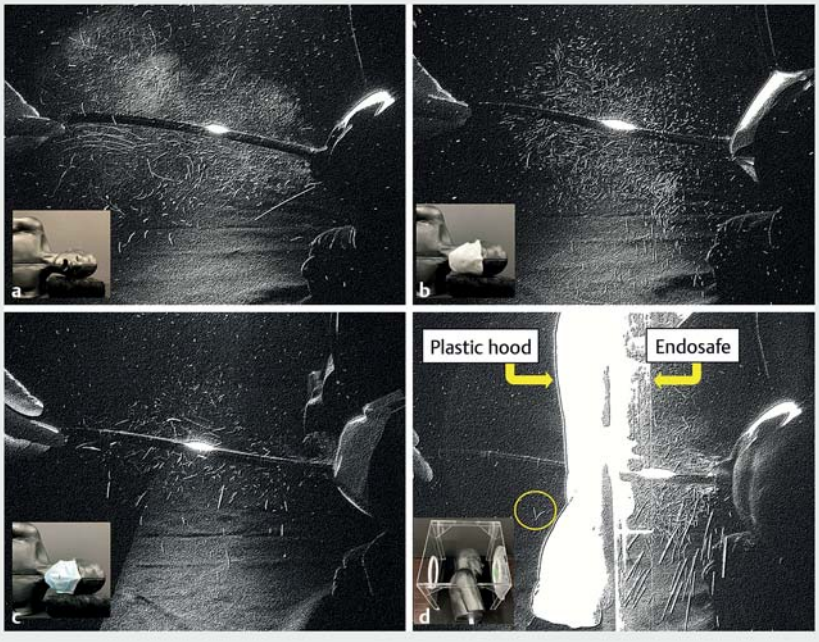
A novel endoscopic shield: a barrier device to minimize virus transmission during endoscopy



▶ **Fig. 1** Photograph of the endoscopic shield (Endosafe) with its plastic hood. The Endosafe is made of 3-mm acrylic plates (heat resistant to 80 °C, cold resistant to −30 °C) and is 420 mm in width, depth, and height, with holes of 200 mm in diameter in the plates on the facial and back sides. The plastic hood is made of a 0.05-mm vinyl sheet with an elastic band, the diameters of the vinyl hood when spread out flat being 300 mm and of the opening with the elastic band applied being 100 mm. A green plastic tape of 50 × 50 mm with a hole of 14 mm in diameter is applied to the plastic hood.

Video 1 Video of the Endosafe, a new endoscopy shield, being tested with a simulated patient model with a sneeze generator. Source for photo of particle viewer: Kato Koken.



▶ **Fig. 2** Images showing the diffusion of aerosol droplets generated by the sneeze generator in the simulated patient model (SPM), taken by the particle visualization system, when the SPM: **a** is wearing no protective equipment; **b** is wearing an Endomask; **c** is wearing a surgical mask with a 15-mm hole; **d** has their head within the novel endoscopic shield (Endosafe).

In this era, where medical staff are at risk of contracting an emerging infectious disease from patients, such as with the current COVID-19 pandemic situation, it has been strongly recommended that effective infection prevention measures are established within an endoscopy unit to protect both patients and medical staff [1]. However, only a few barrier devices have been reported and determining which device is effective remains a notable issue [2–5].

Here, we describe a novel endoscopic shield that we have devised (Endosafe; 808 Co. Ltd., Japan), which is an acrylic plate cube with a length, width, and height of 42 cm each, to be used in patients undergoing esophagogastroduodenoscopy (EGD) (▶ **Fig. 1**). The materials and blueprint of the endoscopic shield and accompanying plastic hood with re-

gards to endoscope maneuverability are shown in ▶ **Fig. 1** and ▶ **Video 1**. Simulated endoscopies using a simulated patient model (SPM) with a sneeze generator were performed where the SPM was: (a) wearing no protective equipment (▶ **Fig. 2 a**); (b) wearing a commercially available mask for endoscopy (Endomask: TOP Corporation, Tokyo, Japan) (▶ **Fig. 2 b**); (c) wearing a surgical mask with a hole of 15 mm in diameter (▶ **Fig. 2 c**); or (d) lying in the left lateral position with the endoscopic shield placed over the SPM's head (▶ **Fig. 2 d**). The diffusion of aerosol droplets from the sneeze generator in the SPM was recorded by a video recorder with a particle visualization system (Particle Viewer PV2 series; Kato Koken Co. Ltd., Japan). The degree of diffusion of aerosol droplets at the hand position of the endoscopist produced by the SPM with the sneeze generator decreased in the following order: a>b>c>d (▶ **Fig. 2**; ▶ **Video 1**).

In summary, the endoscopic shield is expected to capture aerosol droplets from patients undergoing EGD and to reduce the diffusion of aerosol droplets compared with other devices.

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Competing interests

The authors declare that they have no conflict of interest.

The authors

Hiroya Ueyama[1], Yoichi Akazawa[1], Toshio Fujisawa[2], Hiroyuki Isayama[2], Akihito Nagahara[1]

1 Department of Gastroenterology, Juntendo University School of Medicine, Tokyo, Japan
2 Department of Gastroenterology, Graduate School of Medicine, Juntendo University, Tokyo, Japan

Corresponding author

Hiroya Ueyama, MD, PhD
Department of Gastroenterology, Juntendo University School of Medicine, 2-1-1 Hongo, Bunkyo-Ku, Tokyo 113-8421, Japan
psyro@juntendo.ac.jp

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Bibliography

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