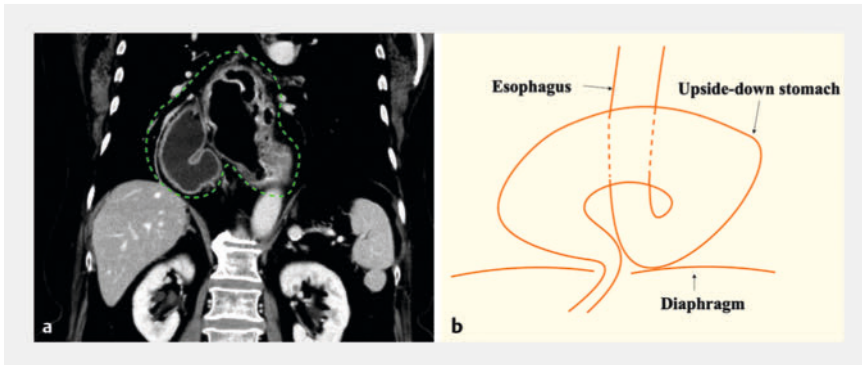
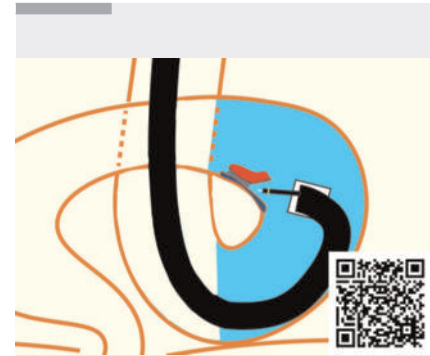


## Successful underwater endoscopic submucosal dissection with gel immersion for early gastric cancer in an upside-down stomach

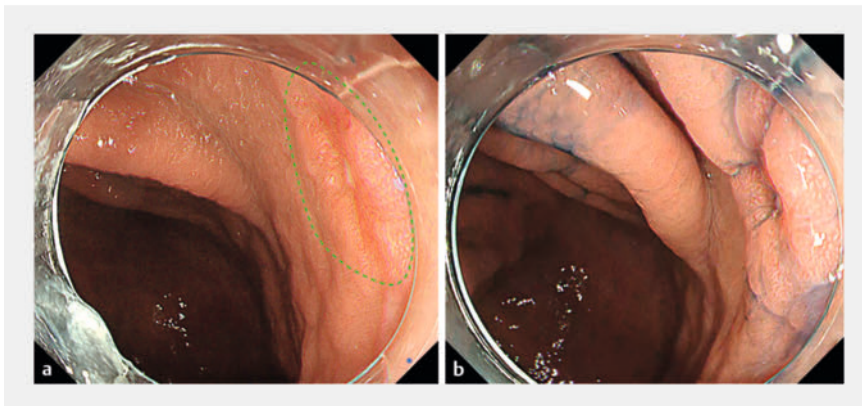
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► **Fig. 1** Computed tomography (CT) image and schema of the upside-down stomach (UDS). **a** CT image shows that the entire stomach has prolapsed into the thoracic cavity through the hiatal hernia **b** Schema of the UDS.



► **Video 1** Successful underwater endoscopic submucosal dissection with gel immersion for early gastric cancer arising in an upside-down stomach.



► **Fig. 2** Endoscopic image **a** White light image. Upper gastrointestinal endoscopy shows a depressed lesion (0-IIc) located on the lesser curvature of the upper body (diameter 10 mm). **b** Indigo carmine dye image.

An upside-down stomach (UDS) is a relatively rare type of esophageal hiatal hernia; almost the entire stomach prolapses into the posterior mediastinum in affected patients [1].

Surgical procedures for gastric cancer arising from a UDS have been reported [2]; however, no reports on endoscopic submucosal dissection (ESD) for early gastric cancer arising in a UDS are available. In patients with a UDS, endoscope maneuverability is poor because their stomachs are inverted. Recently, water or gel immersion has been reported to

be useful for improving the field of view and scope maneuverability [3,4,5]. Herein, we describe underwater ESD with gel immersion performed successfully for early gastric cancer arising from a UDS (► **Video 1**).

An 85-year-old woman with a UDS (► **Fig. 1 a, b**) presented with early gastric cancer (lesion size 10 mm, type 0-IIc) located on the lesser curvature of the upper body (► **Fig. 2 a, b**). Approaching the lesion was difficult due to the UDS; thus, gas was removed from the lumen and replaced with water and gel (Visco-

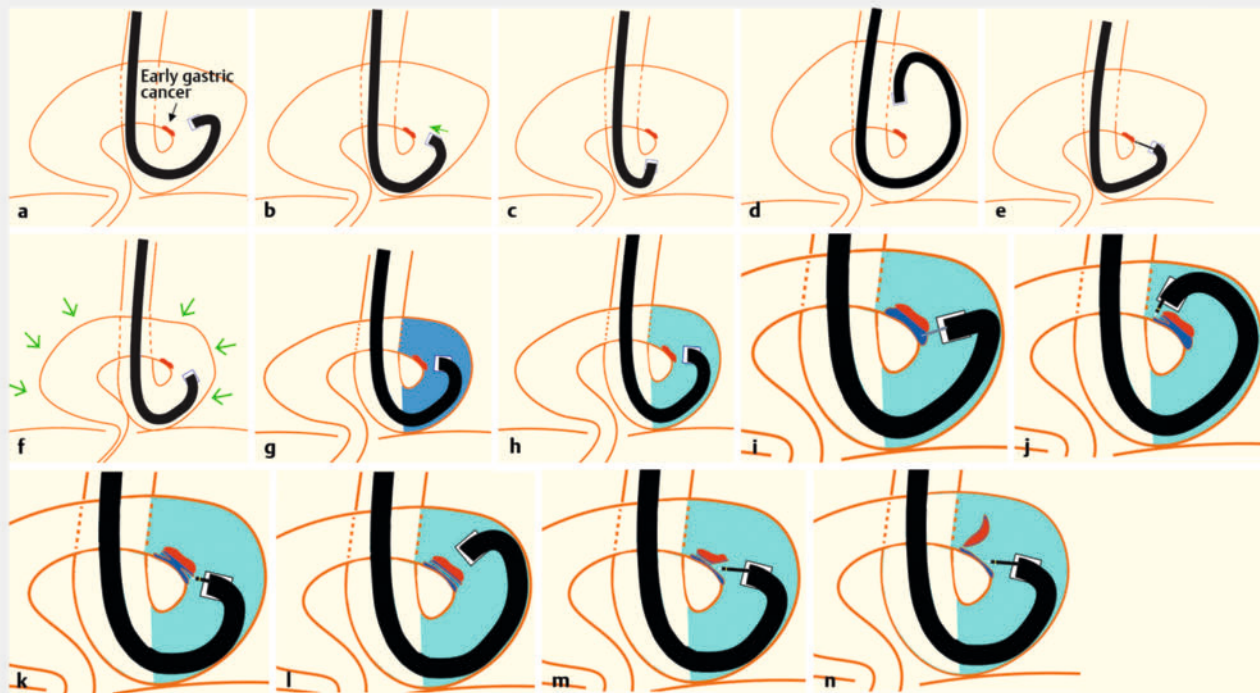
clear; Otsuka Pharmaceutical, Tokushima, Japan) to establish an underwater condition. The water–gel mixture maintained a lower intraluminal pressure and allowed us to approach the lesion, even from its distal side, under a clearer view (► **Fig. 3 a–h**).

A mucosal incision was made on the distal side to mark the incision limit. This was followed by a proximal mucosal incision and a complete circumferential incision. Finally, submucosal dissection was continued, and a complete en bloc resection was performed (► **Fig. 3 i–n**). Additional gel was injected as needed to obtain a clear view of the submucosal layer. In conclusion, low-pressure endoscopy with water and gel immersion may help endoscopists overcome poor endoscope operability in procedures involving a UDS. This approach may further reduce the patient's suffering, stabilize their condition, and enable safe resection of UDS lesions.

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► **Fig. 3** Schema of underwater endoscopic submucosal dissection (ESD) with gel immersion in an upside-down stomach (UDS). **a** View under gas. **b** Attempts to approach the lesion. **c** The endoscope is pulled back. **d** Pushing the endoscope fails to achieve access to the lesion. **e** Markings around the lesion. **f** Removal of the gas from the lumen. **g** Underwater view. **h** View under combined water and gel (Viscoclear; Otsuka Pharmaceutical, Tokushima, Japan) immersion; the conditions established allow access to the lesion. **i** Local injection. **j** Initial mucosal incision is made on the distal edge of the lesion. **k** The mucosal incision is widened to the right and left. **l** A whole circumferential incision is made. **m** Submucosal dissection is performed. **n** En bloc resection is achieved.

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## Conflict of Interest

The authors declare that they have no conflict of interest.

## The authors

**Takahiro Muramatsu**<sup>1</sup>, **Tomoaki Tashima**<sup>1</sup>, **Tsubasa Ishikawa**<sup>1</sup>, **Tomonori Kawasaki**<sup>2</sup>, **Yumi Mashimo**<sup>1</sup>, **Takao Itoi**<sup>3</sup>, **Shomei Ryozaawa**<sup>1</sup>

- 1 Gastroenterology, Saitama Medical University International Medical Center, Hidaka, Japan
- 2 Pathology, Saitama Medical University International Medical Center, Hidaka, Japan
- 3 Gastroenterology and Hepatology, Tokyo Medical University Hospital, Shinjuku-ku, Japan

## Corresponding author

**Tomoaki Tashima, MD, PhD**  
Department of Gastroenterology, Saitama Medical University International Medical Center, 1397-1 Yamane, Hidaka City, Saitama 350-1298, Japan  
t.tashima1981@gmail.com

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