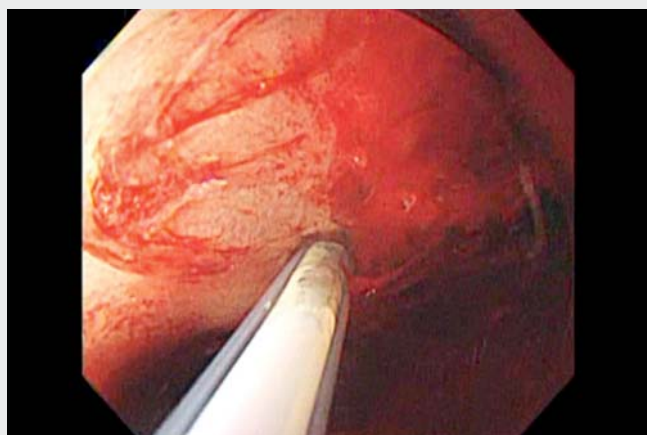


# Endoscopic cyanoacrylate injection with gel immersion method improved the visual field in profuse gastric variceal hemorrhage

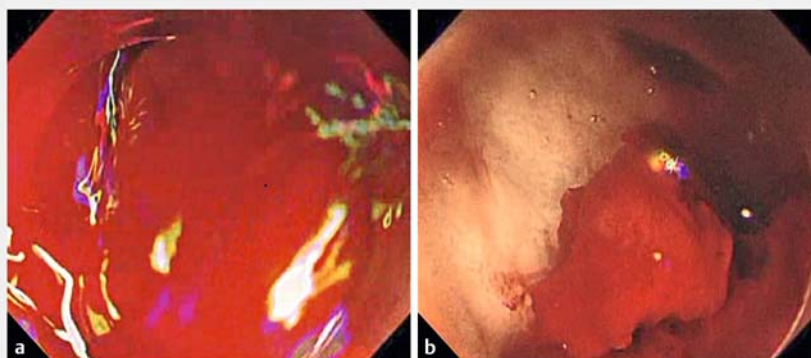
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▶ **Video 1** Endoscopic hemostasis for gastric variceal hemorrhage was achieved by cyanoacrylate injection under gel immersion endoscopy.



▶ **Fig. 1** Active bleeding from gastric varices located in the fundus.



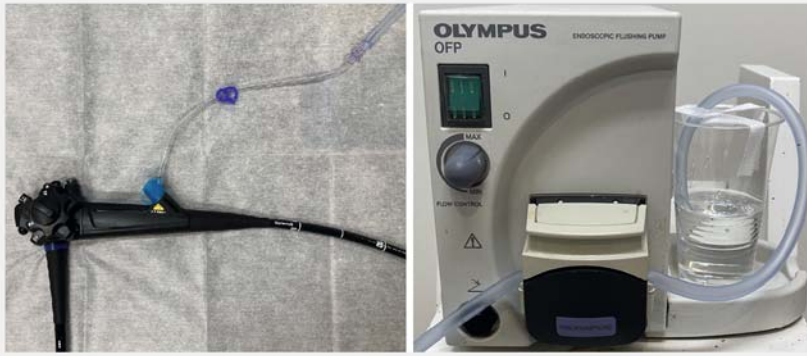
▶ **Fig. 2** The difference in endoscopic visual fields between water and gel immersion methods. **a** The water immersion method was ineffective in improving the visual field. **b** The gel immersion method improved the visual field and the bleeding point could be identified.

(▶ **Fig. 1**). We immediately attempted endoscopic hemostasis, but the visual field became poor due to the large amount of blood, and gas insufflation and water immersion methods were ineffective in improving the visual field (▶ **Fig. 2 a**). Electrolyte-free gel (Visco-clear; Otsuka Pharmaceutical Factory, Tokushima, Japan) was therefore injected through the accessory channel using a waterjet pump (OFP; Olympus, Tokyo, Japan) with an auxiliary injection cap (BioShield irrigator; US Endoscopy, Mentor, Ohio, USA) (▶ **Fig. 3**). Continuous gel injection gradually improved the visual field (▶ **Fig. 2 b**). Even with active bleeding, it was possible to identify the bleeding point because gel and blood took time to merge. Endoscopic cyanoacrylate injection was completed with gel immersion. A total of 500 mL of this gel was used, and a total of 4 mL of 62.5% cyanoacrylate with lipiodol was injected into the varices over five tries, resulting in complete hemostasis. Cyanoacrylate with lipiodol pooling in varices was confirmed by computed tomography (▶ **Fig. 4**). To our knowledge, this is the first report of the successful use of endoscopic cyanoacrylate injection with GIE for active GVH. GIE was able to maintain a good visual field, even in a case of massive bleeding.

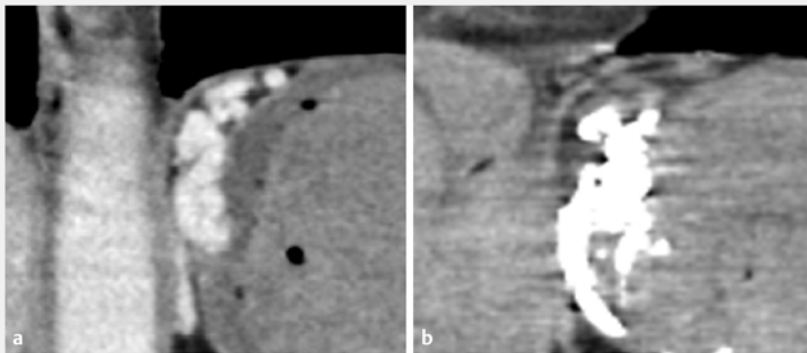
Endoscopic cyanoacrylate injection is recommended for gastric variceal hemorrhage (GVH) as a means of achieving urgent endoscopic hemostasis [1,2]. However, it can sometimes be technically difficult to secure the visual field because GVH produces a large amount of blood and bloody clots immediately fill the fundus. Gel immersion endoscopy (GIE) is useful for identification of the gastro-

intestinal bleeding point as it offers a secure visual field [3–5]. We report a case of successful hemostasis for GVH using cyanoacrylate injection under GIE (▶ **Video 1**).

A 70-year-old man with liver cirrhosis due to nonalcoholic fatty liver disease presented hematemesis. Emergency endoscopy identified active bleeding from ruptured gastric varices located in the fundus



► **Fig. 3** Endoscopic settings for gel immersion endoscopy. Gel immersion endoscopy was by therapeutic endoscope with waterjet function (GIF-290T; Olympus, Tokyo, Japan). A plastic cup containing the viscous gel was connected to the waterjet system via an auxiliary injection cap.



► **Fig. 4** Computed tomography scan evaluation after cyanoacrylate injection. The scan showed good pooling of cyanoacrylate with lipiodol after injection. **a** Before injection. **b** After injection.

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## Competing interests

The authors declare that they have no conflict of interest.

## The authors

**Daisuke Orita<sup>1</sup>, Tsukasa Ishida<sup>2</sup>, Yoshihiro Okabe<sup>1</sup>, Yuichi Hirata<sup>1</sup>, Michitaka Kohashi<sup>1</sup>, Takuya Mimura<sup>1</sup>, Akihiko Nishizawa<sup>1</sup>**

- 1 Department of Gastroenterology, Kakogawa City Central Hospital, Kakogawa, Japan
- 2 Department of Gastroenterology, Akashi Medical Center, Akashi, Japan

## Corresponding author

**Daisuke Orita, MD**

Department of Gastroenterology, Kakogawa City Central Hospital, 439 Honmachi, Kakogawa-cho, Kakogawa, 675-8611, Japan  
d-orita@kakohp.jp

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