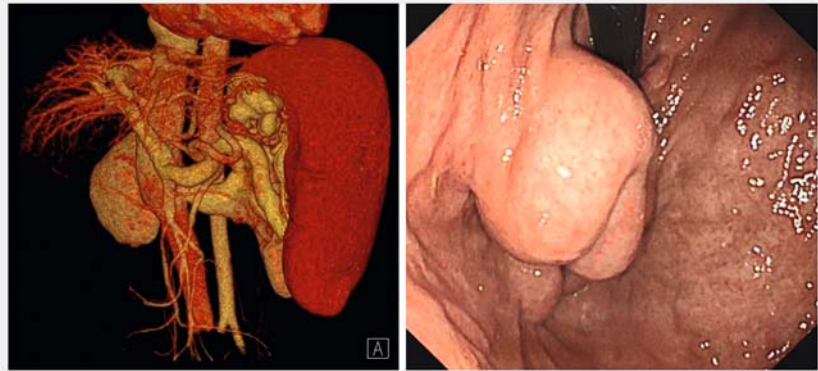


Nylon ring with titanium clip assists endoscopic cyanoacrylate injection for the treatment of GOV1-type gastric varices

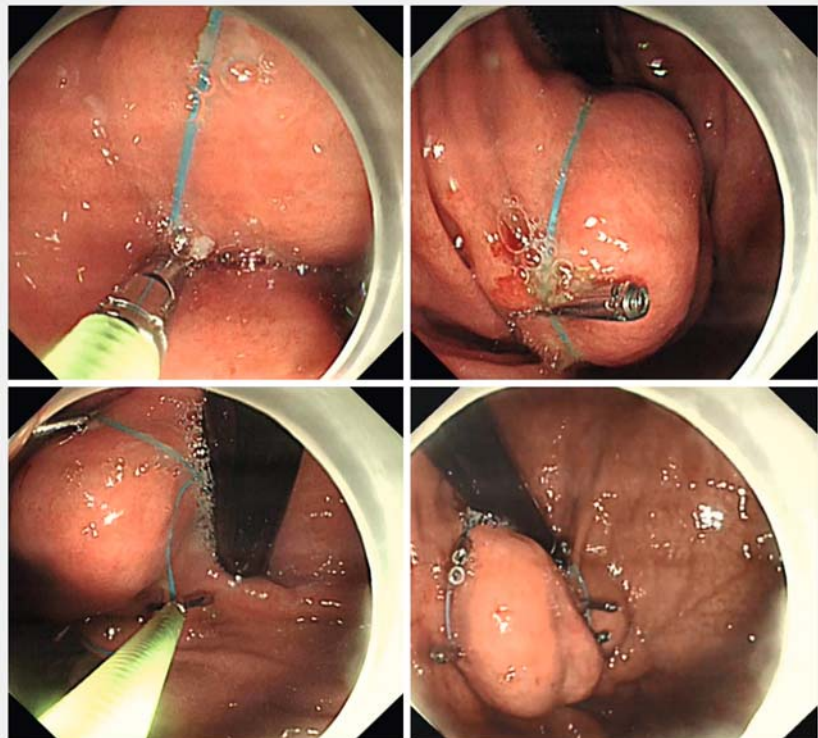
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There is an estimated approximately 20 % chance of having gastric varices in patients with portal hypertension [1]. Gastric varices bleed less frequently than esophageal varices but are much more severe when they do occur. Therefore, effective treatment of such bleeding or prevention of rebleeding is vital. According to the Baveno VI Consensus Symposium, endoscopic injection of cyanoacrylate is the recommended treatment for hemostasis and prevention of rebleeding from gastric varices [2] (de Franchis and Baveno 2015). However, a number of serious adverse events has been reported including ectopic embolism, especially in bleeding patients with gastric varices and gastorenal shunts (GOV2 or IGV1 varices) [3–4]. As an alternative to endoscopic therapy guided by endoscopic ultrasound (EUS) and balloon-occluded retrograde transvenous obliteration, we hope to provide a new simple and effective method for the treatment of GOV1 gastric varices. By using nylon rings and clips we attempted to completely block blood flow to the gastric varices before injecting cyanoacrylate into the gastric varices. This method can effectively reduce the risk of ectopic embolism in GOV1 gastric varices and reduce the dosage of cyanoacrylate.

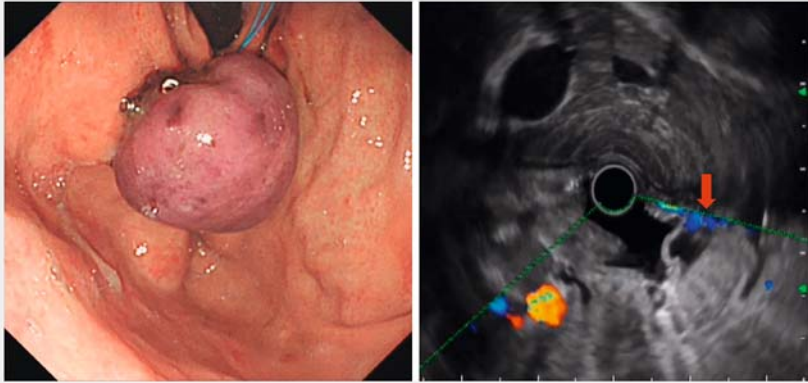
A 45-year-old man presented to our hospital with edema, fatigue, and anemia for 1 year. Contrast-enhanced computed tomography (CT) confirmed liver cirrhosis and gastorenal shunt, which was 18 cm in diameter. Gastroscopy (GIF-Q260J; Olympus, Tokyo, Japan) showed the isolated gastric varices type 1 (IGV1) (► Fig. 1). To ensure that the blood flow at the root of the gastric varices was blocked completely, a metal clip (AGS-5108–1950–135) carrying a nylon ring (HX-400u-30, Olympus) was placed on the normal mucosa around the isolated gastric varices and the nylon ring was slowly tightened.



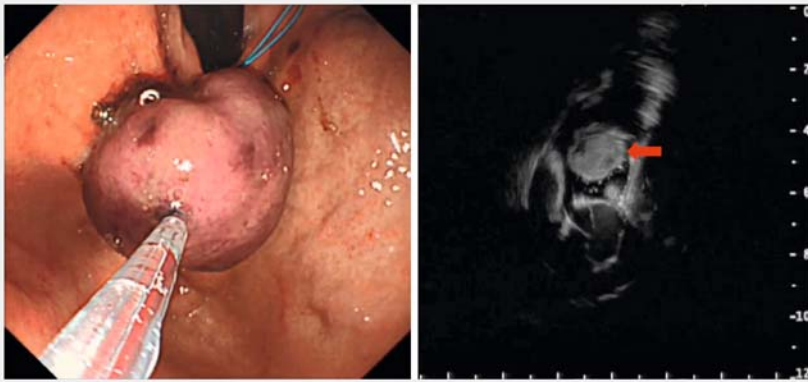
► **Fig. 1** Computed tomography confirmed gastorenal shunt and gastroscopy showed the isolated gastric varices type 1 (IGV1).



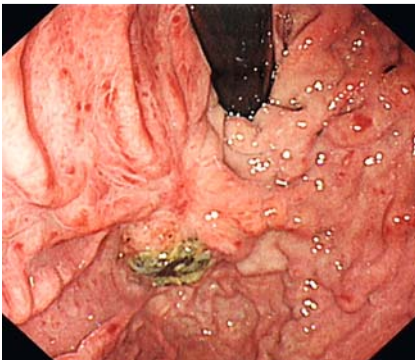
► **Fig. 2** A metal clip carrying a nylon ring was placed on the normal mucosa around the isolated gastric varices, and the nylon ring was slowly tightened.



► **Fig. 3** Gastric varices became smaller and gradually turned cyanotic after tightening. Endoscopic ultrasound (EUS) showed that the gastrorenal shunt was almost completely blocked (red arrow).



► **Fig. 4** The polycyanoacrylate was injected into the gastric varices. EUS showed that cyanoacrylate injected adequately filled the gastric varices (red arrow).



► **Fig. 5** Endoscopy showed regression of gastric fundus varices 3 months after operation.



► **Video 1** Nylon ring with titanium clip assists endoscopic cyanoacrylate injection for the treatment of GOV1-type gastric varices.

gastric varices, and the nylon ring was slowly tightened (► **Fig. 2**). Endoscopic ultrasound (EUS) showed that the gastrorenal shunt was almost completely blocked. The gastric varices became smaller and gradually turned cyanotic (► **Fig. 3**). The polycyanoacrylate was injected into the gastric varices using the “modified sandwich method” (4 ml lauromacrogol, 2 ml polycyanoacrylate (Com-pant, Beijing, China), and 3 ml lauroma-crogol) [5]. EUS showed that cyanoacrylate injected adequately filled the gastric varices (► **Fig. 4**). Endoscopy showed regression of the gastric fundus varices 3 months after the operation (► **Fig. 5**). We thus present a new safe and effective method for the treatment of GOV1-type gastric varices (► **Video 1**).

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Competing interests

The authors declare that they have no conflict of interest.

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