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Case Series

Novel Endoscopic Therapy for Gastric Varices Using Direct Forward-Viewing Endoscopic Ultrasonography

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Keywords

Endoscopic treatment · Endoscopic ultrasonography · Liver cirrhosis · Portal hypertension · Gastric varices

Abstract

Gastric varices (GV) carry a high risk of massive hemorrhage because of potential rupture. To reduce the risk associated with GV, patients need to undergo hemostatic and preventive treatment. The objective of this retrospective study was to evaluate the usefulness of a new method, direct forward-viewing endoscopic ultrasonography (DFV-EUS) for the treatment of GV. We performed endoscopic injection sclerotherapy with histoacryl (EIS-HA) using DFV-EUS for GV in four patients. The paracentesis success rate was 75% (3/4). DFV-EUS has a significant advantage for the treatment of GV in that it can show physicians endoscopic and ultrasound views in real time during the delivery of the sclerosant into the GV. However, the proper use of the ultrasound view must be elucidated through further

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research for safer and more effective therapy. In the presence of distance between the mucosal surface and vascular lumen or when the blood flow site requires puncture as an additional treatment, DFV-EUS might be a good candidate for the treatment of GV. Altogether, EIS-HA with DFV-EUS might be a new therapeutic option for patients with GV.

Introduction

Gastric varices (GV) occur in approximately 20% of patients with portal hypertension and require hemostatic and preventive treatments due to GV rupture-associated hemorrhaging or liver failure [1]. In our department, endoscopic injection sclerotherapy with N-butyl-2-cyanoacrylate (histoacryl) (EIS-HA) is performed for GV cases with bleeding and difficult cases in which balloon-occluded retrograde transvenous obliteration (BRTO) is contraindicated.

It has been proven that endoscopic ultrasonography (EUS) is useful for accurately evaluating the treatment in varices [2–6]. Moreover, the use of EUS for actual treatment has also been reported [7–13]. However, direct forward-viewing EUS (DFV-EUS) for treating GV is less known than oblique viewing therapy.

This report describes the usefulness of DFV-EUS as a new method for treating GV.

Case Report

Methods

The present study was a retrospective analysis using past medical information. This study protocol was approved by the Ethics Committee of Fukuoka University Hospital (approval No. H19-10-001).

Between January 2016 and June 2019 in the data collection period, four patients diagnosed with GV (F3, RC0) had unacceptable hemodynamics to undergo BRTO in our hospital. Therefore, we performed EIS-HA using DFV-EUS (scanning angle 90°, viewing angle 120°; TGF-UC260J, Olympus). The concentration of histacryl used in EIS-HA was 75% in all four cases. EIS-HA with DFV-EUS was able to puncture needle in real time while simultaneously observing the endoscopic and ultrasonic fields. When it was difficult to puncture, it was possible to immediately switch to conventional endoscopic treatment and complete the treatment. We analyzed the therapeutic effect and safety of these 4 cases in this study. The shape of the EUS tip is shown in Fig. 1a and the treatment schema is shown in Fig. 1b.

This study was conducted in compliance with the Declaration of Helsinki and the Ethical Guidelines for Medical Research of the Ministry of Health, Labor and Welfare. Information obtained in this study was kept strictly anonymous. This study was a retrospective study using past medical information, and it was impossible to obtain the consent of this study from the target patients in advance. Therefore, we announced the outline of this clinical study on our website.

Results

The background information and the summary of the four patients' treatment outcomes are shown in Table 1. Case 1 with isolated GV1 (IGV1) could not undergo BRTO because of unacceptable hemodynamics, so we performed EIS-HA using the conventional endoscopic view. However, the treatment was unsuccessful because there was distance between the mucosal surface and vascular lumen. Therefore, we performed EIS-HA using DFV-EUS and we successfully punctured and treated the GV with DFV-EUS (shown in Fig. 2a–c). We successfully punctured the GV in the endoscopic view using DFV-EUS in three of four cases (cases 1–3). As aforementioned, case 1 was a typical patient in whom we were able to successfully treat GV with DFV-EUS, although it was difficult to treat the patient with only the conventional endoscopic view. Comparative images before and after therapy for case 3 are shown in Fig. 3a–d. In case 4, however, securing the visual field under EUS was not easy. Therefore, the treatment was completed after changing the method to paracentesis under the visual field of only the conventional endoscopic view. All four cases had no complications and achieved a good therapeutic effect of EIS-HA for GV. The paracentesis success rate using DFV-EUS was 75% (3/4) in this study.

Discussion

Evaluation of gastroesophageal varices using EUS has been conducted since the 1980s [2], and various considerations have been made. Iwase et al. [3] reported that there was a significant positive correlation between the blood vessel diameter and blood flow velocity with the average diameter being 10.2 ± 2.6 mm and the average velocity being 5.3 ± 3.7 cm/s in GV. Ramond et al. [4] reported that there was a high risk of developing varices within 6 months in patients in whom blood flow was observed on Doppler EUS after endoscopic therapy and that some additional treatment should be considered in such patients.

Other studies have reported intermittently on the usefulness of EUS as the method of evaluation, early recurrence, and rebleeding of blockages in GV after treatment [5, 6]. In a pilot study of five patients in whom cyanoacrylate was injected in real time under EUS guidance using oblique viewing (indirect forward-viewing) model unlike the model used in the present study, successful treatment outcome was achieved by using only EUS and fluoroscopy in cases complicated by hemorrhaging wherein it is difficult to secure the visual field of the endoscope [7]. Recently, coil embolization under EUS guidance has been reported [8–10], and various methods have been devised to improve treatment results [11, 12]. Previous report had compared DFV-EUS and oblique-viewing EUS for drainage of pancreatic fluid collections [13]; however, this is the first report to use DFV-EUS for the treatment of GV.

This DFV-EUS method has a great advantage for treating GV in that it can show both the endoscopic and ultrasound views in real time during treatment. However, we noted two limitations of this method. First, the endoscopic view is limited because the stomach lumen is filled with degassed water. Second, it is difficult to ensure stabilization of the entire revolver needle in the view of the ultrasound field. Some authors have warned against the use of unnecessarily

complicated procedures [14]. Thus, proper use of the ultrasound view needs to be considered in order to ensure safer and more effective therapy. From our view of experience, we recommend that if treatment with the conventional endoscopic view is possible, then the conventional approach should be used. However, when there is distance between the mucosal surface and vascular lumen or when the blood flow site requires puncture as an additional treatment, DFV-EUS method could serve as a good option.

In conclusion, EIS-HA with DFV-EUS may be one of the new therapeutic options for treating GV which is more difficult to treat only with the conventional endoscopic view.

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Statement of Ethics

These patients have given written informed consent to publish the case, including publication of images.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

All authors participated in data collection and Keiji Yokoyama contributed to writing the manuscript. All authors read and approved the final manuscript.

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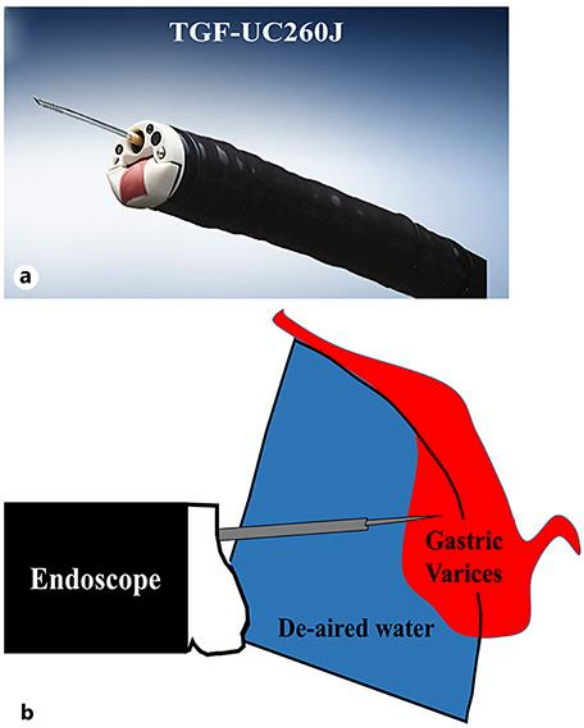

Fig. 1. **a** Shape of the direct forward-viewing endoscopic ultrasound tip (TGF-UC260J, Olympus). **b** The treatment schema of endoscopic injection sclerotherapy with histoacryl (EIS-HA) using direct forward-viewing endoscopic ultrasonography (scanning angle 90°, viewing angle 120°).

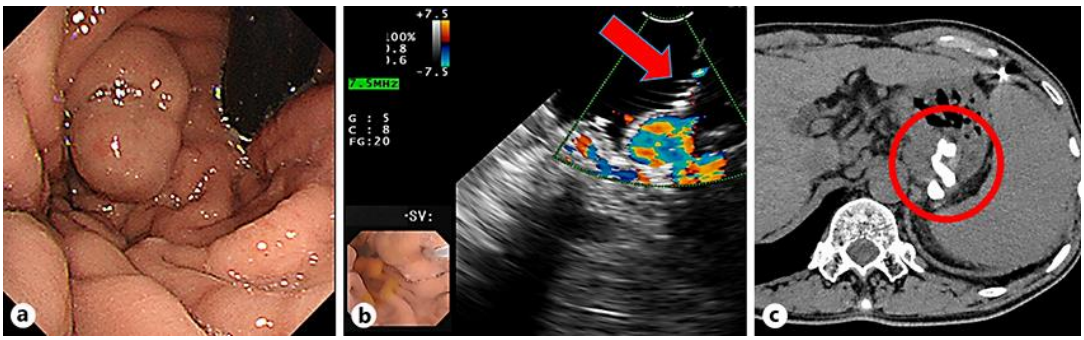

Fig. 2. **a** Endoscopic findings before treatment of case 1. **b** Endoscopic ultrasound findings during treatment of case 1 (the arrow shows the needle puncture). **c** Abdominal computed tomography findings after treatment of case 1 (the circle indicates the site of successful treatment).

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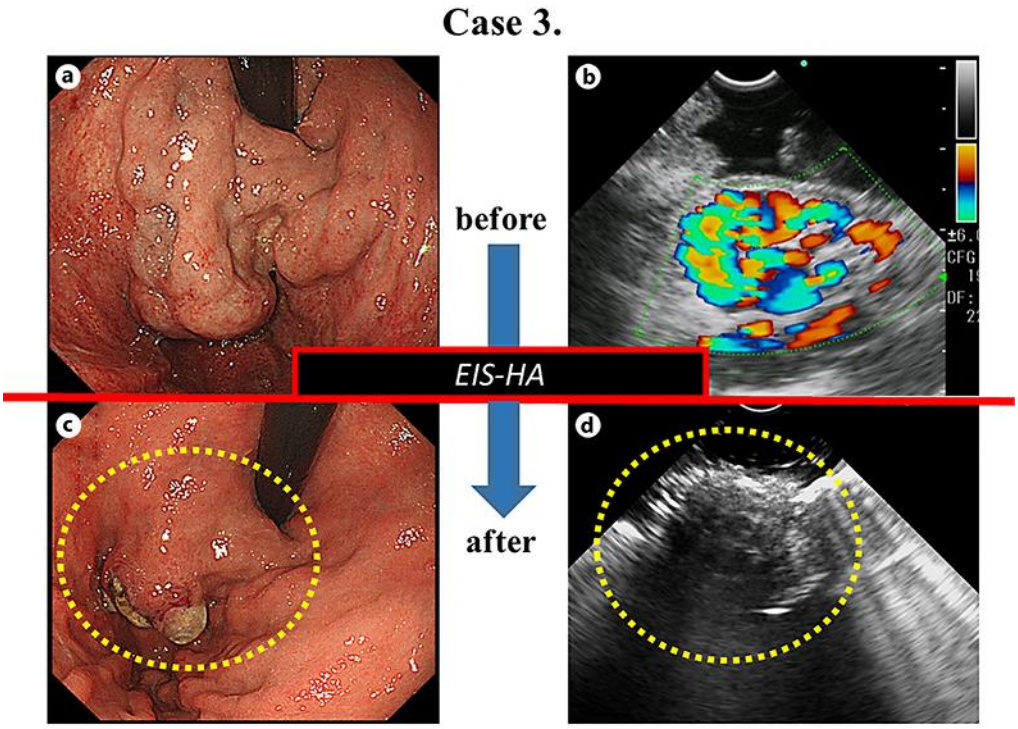

Fig. 3. **a** Endoscopic findings before treatment of case 3. **b** Endoscopic ultrasound findings before treatment of case 3. **c** Endoscopic findings after treatment of case 3 (the dotted circle indicates the site of successful treatment). **d** Endoscopic ultrasound findings after treatment of case 3 (the dotted circle indicates the site of successful treatment).

Table 1. Background information and summary of the four patients' treatment outcomes

Case	Age	Sex	Etiology	Location	Form, RC	Timing of treatment	Effect of treatment
1	59	M	LC-B	Lg-cf	F3, RC0	Prevention	Good
2	75	M	LC-NBNC	Lg-f	F3, RC1	Prevention	Good
3	63	M	LC-Alcohol	Lg-cf	F3, RC1	Prevention	Good
4	58	M	LC-Alcohol	Lg-f	F3, RC0	Prevention	Switch to conventional treatment

LC, liver cirrhosis; RC, red color sign.