

The Value of Endoscopic Color Doppler Ultrasonography for Detection of the Bleeding Site of Gastric Varices Secondary to Splenic Occlusion

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Abstract

A 71-year-old woman was admitted to our hospital for treatment of cancer in the body and tail of the pancreas. After admission, she had tarry stool and esophagogastroduodenoscopy (EGD) was performed. EGD revealed enlarged tortuous, red color sign negative gastric varices between the cardiac orifice, fundus and the curvature ventriculi major of the gastric body. Computed tomography showed gastric varices due to splenic vein occlusion with advanced pancreatic cancer (left-sided portal hypertension). However, endoscopic observation was not sufficient to identify the bleeding site of the gastric varices. Consecutively, endoscopic color Doppler ultrasonography (ECDUS) was performed to evaluate the gastric varices in detail. ECDUS showed the velocity of gastric varices in the cardiac orifice and fundus to be 11.7 cm/sec, the thickness of the gastric wall to the submucosal gastric varices being 1.0 mm, and the gastric varices in the cardiac orifice and fundus were diagnosed as the likely bleeding site. Subsequently, we performed endoscopic obliterative therapy with 70% n-butyl-2-cyanoacrylate diluted with 5% Lipiodol at the possible bleeding site of these varices. The patient experienced no further episodes of bleeding during the three months following treatment.

Keywords: Gastric Varices; Splenic Vein Occlusion; Endoscopic Ultrasonography; Color Doppler; Left-Sided Portal Hypertension

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Introduction

Splenic vein occlusion results in left-sided portal hypertension (characterized by gastric varices, splenomegaly and normal liver function) that may be secondary to various diseases. There is a strong association between pancreatic diseases and splenic vein occlusion. This condition, which often is silent clinically, can lead to gastrointestinal hemorrhage due to gastric varices [1-2].

Esophagogastroduodenoscopy (EGD) has a very sensitive predictive value for variceal hemorrhage. However, there are few cases of red color positive gastric varices and it is difficult to diagnose a high risk of bleeding from gastric varices. In a previously case, endoscopic color Doppler ultrasonography (ECDUS) analysis of gastric varices due to splenic vein occlusion clearly revealed a round fundal region at the center, with varices that expanded to the curvature ventriculi major of the gastric body [3]. Here, we present a case with gastric varices secondary to splenic vein occlusion which were diagnosed by ECDUS, with detection of the bleeding site.

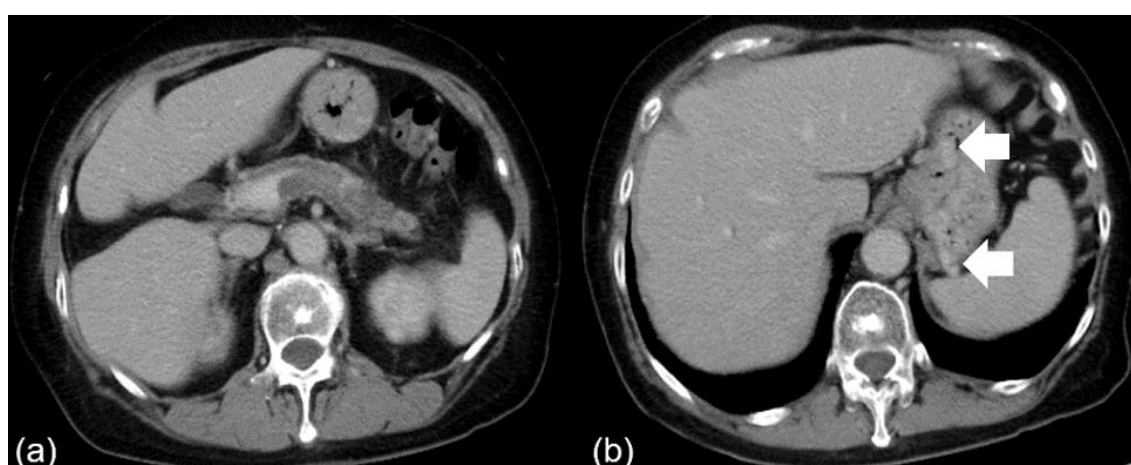
Case Report

A 71-year-old woman was admitted to our hospital in February 2016 for treatment of cancer in the body and tail of the pancreas. At the age of 52, she had been diagnosed with hepatitis B cirrhosis and followed up. At the age of 69, she had been diagnosed with a lung cancer and received chemotherapy and subsequently radiation therapy.

On admission, she was 150 cm tall and weighed 49.7 kg. Her blood pressure was 103/76 mmHg, pulse 71/min and regular, and body temperature of 36.2°C. She had no anemic conjunctivae or scleral icterus. There were no abdominal masses. Laboratory findings were as follows: red blood cell count, $340 \times 10^4/\text{mm}^3$ (normal: $387-525 \times 10^4/\text{mm}^3$), hemoglobin

10.6 g/dL (12.6-16.5 g/dL), white blood cells 6300/mm³ (3600-9000/mm³), platelet count 12.4×10⁴/mm³ (13.8-30.9×10⁴/mm³), serum albumin 3.5 g/mL (4.0-5.2 g/mL), total bilirubin 0.2 mg/mL (0.2-1.2 mg/mL), aspartate transaminase 18 IU/L (0-30 IU/L), alanine transaminase 12 IU/L (0-30 IU/L), γ -glutamyl transferase 60 IU/L (0-50 IU/L), alkaline phosphatase 452 IU/L (104-338 IU/L), prothrombin time 86% (70-120%), CEA 9.6 ng/mL (0-5.0 ng/mL), CA19-9 18512.1 ng/mL (0-37 ng/mL), Span-1 830 U/mL (0-30 U/mL), DUPAN-2 3500 U/ml (0-150 U/mL). Computed tomography showed gastric varices due to splenic vein occlusion with advanced pancreatic cancer, 30 mm in maximum diameter (Figure 1).

Figure 1: Contrast-enhanced computed tomographic image during late phase. (a) Splenic vein occlusion and a mass in the body and tail of the pancreas which was not contrasted. (b) Gastric varices under mucous membrane (arrow).



After admission, she had tarry stool and EGD was performed, revealing esophageal varices, gastric varices, and duodenal varices. However, the esophageal varices and duodenal varices presented as small, straight and Red Color (RC) negative varices, and these findings suggested a low risk of bleeding. On the other hand, EGD showed enlarged tortuous, RC negative gastric varices between the cardiac orifice, fundus and the curvature ventriculi major of the gastric body (Figure 2). However, endoscopic observation was not sufficient to identify the bleeding site of the gastric varices. Consecutively, hemodynamic evaluation of the gastric varices was performed by ECDUS using a PENTAX EG-3630UR (forward viewing), 10MHz, electronic radial type, which provided 270 degree images (Pentax Optical, Tokyo, Japan). The HITACHI EUB 8500 was used for the display (Hitachi Medical, Tokyo, Japan). Color flow images of gastric varices were visualized and the

blood flow of the gastric varices was a continuous wave, according to Fast-Fourier Transform (FFT) analysis. ECDUS showed the velocity of the blood to be 11.7 cm/sec in the gastric varices in the cardiac orifice and fundus and 10.3cm/s in the gastric body (Figure 3). Next, we measured the thickness of the gastric wall to the submucosal gastric varices. The thickness of the gastric wall was 1.0 mm in the cardiac orifice and fundus and 1.7 mm in the gastric body (Figure 4). From the ECDUS results, we suspected that gastric varices in the cardiac orifice and fundus were the likely bleeding site. Subsequently, we performed endoscopic oblitative therapy with 70% n-butyl-2-cyanoacrylate (Histoacryl®, B.Braun Dexon GmbH Spangenberg, Germany) diluted with 5% Lipiodol®, (Guerbet Asia Pacific, Tsuen Wan, Hong Kong) at the likely bleeding site of these varices.

Figure 2: EGD showing enlarged tortuous, red color-negative gastric varices between the cardiac orifice, fundus and the curvature ventriculi major of the gastric body. (a) Gastric varices at the cardiac orifice and fundus. (b) Gastric varices at the gastric body.

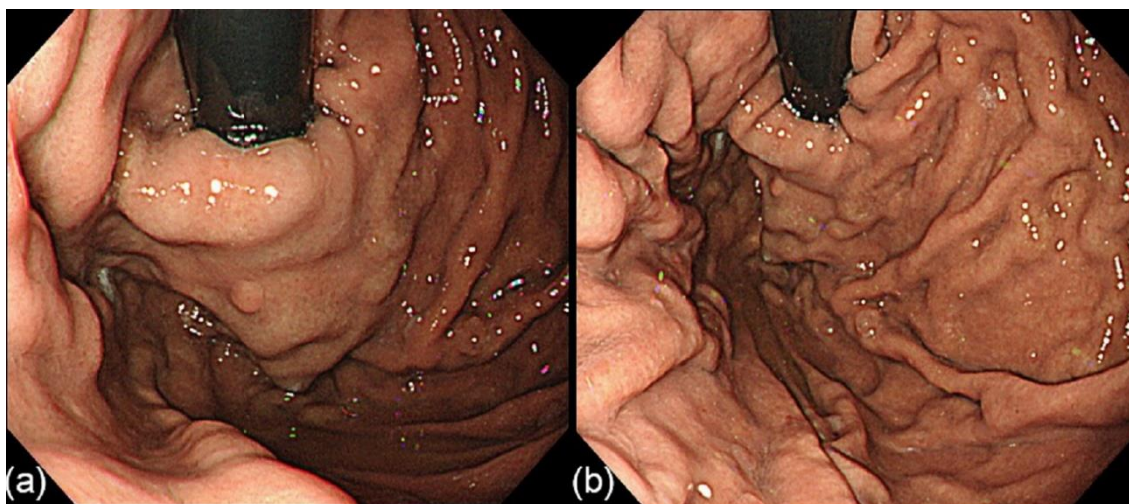


Figure 3: Endoscopic color Doppler ultrasonography showing a color flow image of the gastric varices and a continuous wave of gastric variceal flow. (a) Gastric varices at the cardiac orifice. (b) Gastric varices at the gastric body.

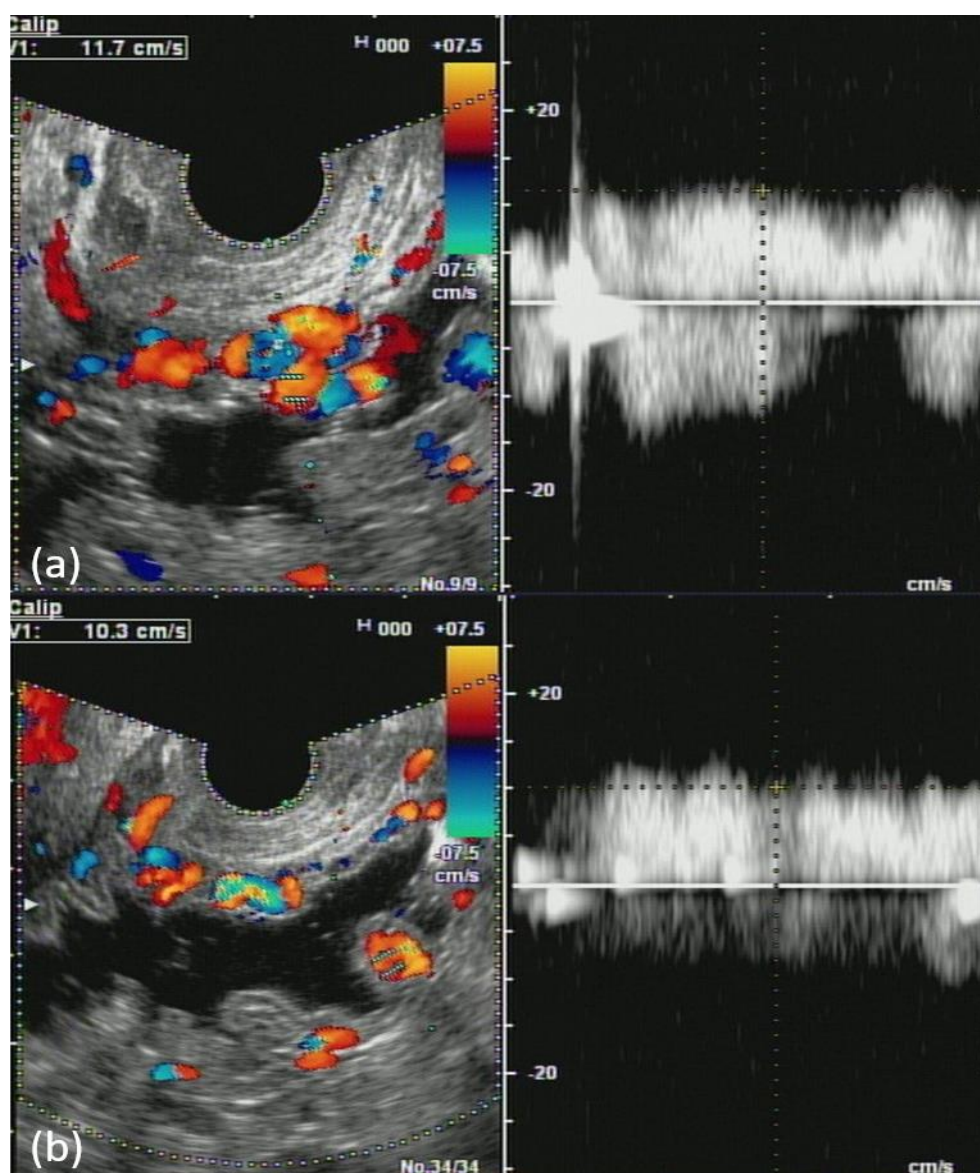
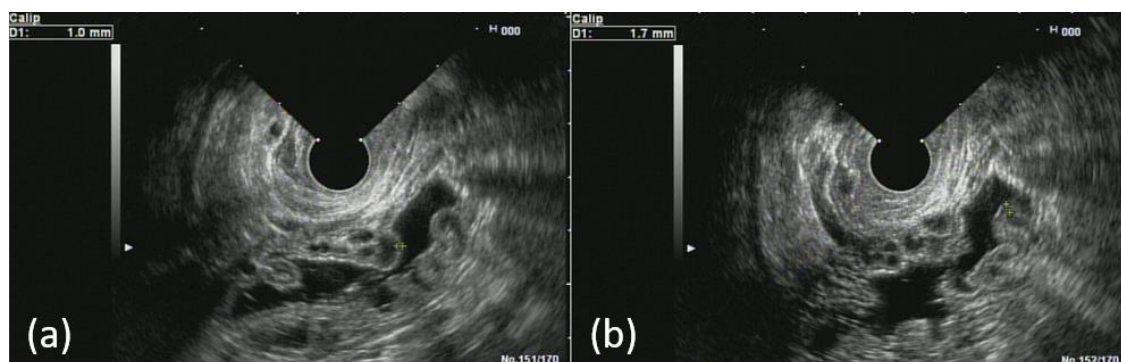


Figure 4: Gastric varices were identified as low echoic vessel images by B mode scan. (a) The minimal gastric wall thickness of 1.0 mm at the cardiac orifice. (b) The minimal gastric wall thickness of 1.7 mm at the gastric body.



The patient experienced no further episodes of bleeding during the three months following treatment.

Discussion

Splenic vein occlusion results from compression of the vein by mass lesions, thrombosis and so on. Madson et al., [2] reported that 65% of patients experienced pancreatitis (33% of these patients had a pancreatic pseudocyst) and benign or malignant pancreatic tumors were the cause of splenic vein occlusion in 18% of patients.

Splenic vein occlusion results in the splenic venous flow draining into collateral veins (the short gastric vein and left gastroepiploic vein) and the increased blood flow in the stomach dilates the submucosal vein, causing gastric veins. EGD is usually the initial investigation in patients with portal hypertension, and has a sensitive predictive value for variceal hemorrhage. However, cases of RC-positive gastric varices are quite rare and it is difficult to diagnose a high risk of bleeding [4]. In particular, it is difficult to distinguish between gastric varices and gastric folds in the condition of left-sided portal hypertension. Sato [5] discussed the value of ECDUS in patients with gastric varices secondary to splenic occlusion. Endoscopic Ultrasonography (EUS) is a useful modality for the diagnosis for esophagogastric varices [6-7]. With the provision of Doppler capabilities, ECDUS allows the sonographic visualization of the vessels, as well as evaluation of vascular blood flow and morphology [8-9]. ECDUS measurements of blood flow velocity and wall thickness in cases with gastric varices may be useful for determining the risks of variceal bleeding [4].

In this case, EGD was not sufficient to identify the bleeding site of the RC- negative gastric varices. On the other hand, gastric varices in the cardiac orifice and fundus were diagnosed as the likely bleeding site using ECDUS. Subsequently, we performed successfully endoscopic obliterative therapy with 70% n-butyl-2-cyanoacrylate diluted with 5% Lipiodol at the likely bleeding site of these varices.

Conclusion

ECDUS is a useful modality for diagnosis of the bleeding site in gastric varices secondary to splenic vein occlusion.

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