

Gastric Ulcer Bleeding from a Variant Left Gastric Artery Accompanied by Congenital Absence of the Splenic Artery Successfully Treated With Coil Embolization: a Case Report and Review of the Literature

Masashi Namikawa^{1,2,3}, Satoru Kakizaki^{3*}, Satoshi Takakusaki¹, Shuichi Saito¹, Yutaka Yata², Masatomo Mori³

1) Department of Internal Medicine, Kiryu Kosei General Hospital, Kiryu; 2) Department of Gastroenterology and Hepatology, Saiseikai Maebashi Hospital, Maebashi; 3) Department of Medicine and Molecular Science, Gunma University Graduate School of Medicine, Maebashi, Gunma, Japan

Abstract

Endoscopic hemostasis is a useful treatment modality for gastric ulcer bleeding. However, it is sometimes difficult to achieve hemostasis in cases with arterial bleeding, especially those complicated with vascular abnormalities. We describe a case with gastric ulcer bleeding from a variant left gastric artery accompanied by congenital absence of the splenic artery. A 50-year-old female was admitted to our hospital with dizziness and tarry stools. Upper gastrointestinal endoscopy revealed bleeding from a gastric ulcer, and endoscopic hemostasis by endoscopic clipping was carried out. Computed tomography and abdominal angiography revealed the variant left gastric artery running below the gastric ulcer. In spite of endoscopic hemostasis and medication, re-bleeding from the gastric ulcer occurred. A transcatheter coil embolization for the variant left gastric artery was performed and successfully achieved hemostasis. This case was accompanied by congenital absence of the splenic artery, which is an extremely rare condition. We herein describe this rare case and review previously reported cases.

Key words

Gastric ulcer bleeding – interventional radiology – coil embolization – congenital absence of the splenic artery.

Introduction

Gastric ulcer bleeding from visible vessels is usually treated by endoscopic hemostasis [1, 2]. However, it is sometimes difficult to achieve endoscopic hemostasis in cases of gastric ulcer bleeding with vascular abnormalities, such as aneurysms. Occasionally, interventional radiology

(IVR) or surgical treatment is carried out in such cases [3, 4]. We experienced a patient with gastric ulcer bleeding where hemostasis by transcatheter coil embolization for a variant left gastric artery was successfully achieved. This case was accompanied by congenital absence of the splenic artery, which is an extremely rare condition. We report the details of this rare case and review previously reported cases.

Case report

A 50-year-old Japanese female was admitted to our hospital with dizziness and tarry stools. She had osteoarthritis of the knee, and sometimes used nonsteroidal anti-inflammatory drugs, such as loxoprofen. She did not have a past history of surgery or any specific family history of disease. She had no history of alcohol intake or tobacco use. On admission, her face was pale and her blood pressure was 85/62 mmHg. The laboratory data at admission were as follows: hemoglobin 7.6 g/dl, platelets 269,000/mm³, total protein 5.2 g/dl, blood urea nitrogen 66 mg/dl, creatinine 0.6 mg/dl, total bilirubin 0.3 mg/dl, aspartate aminotransferase 10 IU/l, alanine aminotransferase 8 IU/l, lactate dehydrogenase 138 IU/l, alkaline phosphatase 167 IU/l, gamma-glutamyltranspeptidase 7 IU/l, prothrombin time 78.8%. The hepatitis B and hepatitis C viral markers were negative. An emergency upper gastrointestinal endoscopy (GIE) revealed a bleeding vessel in the gastric mucosa located on the greater curvature of the upper gastric body (Fig. 1a), and endoscopic hemostasis by clipping was carried out, based on the diagnosis of “Dieulafoy’s lesion”. A blood transfusion was given, and the intravenous administration of proton pump inhibitor (omeprazole) was initiated. Follow-up endoscopy the next day revealed a meandering vessel running on the greater curvature of the stomach, just below the clipped ulcer (Fig. 1b). Computed tomography revealed the absence of the splenic artery and presence of a variant artery, which seemed to be running through the gastric wall (Fig. 2).

On the twelfth day after admission, re-bleeding occurred, and the patient’s hemoglobin fell to 4.9 g/dl. Hemostasis by hemoclips was performed again, and temporary hemostasis

Received: 23.05.2011 Accepted: 20.06.2011

J Gastrointest Liver Dis

December 2011 Vol. 20 No 4, 435-438

Address for correspondence:

Satoru Kakizaki, MD, PhD
Department of Medicine and Molecular
Science, Gunma University Graduate
School of Medicine, Maebashi
Gunma 371-8511, Japan
Email: kakizaki@showa.gunma-u.ac.jp

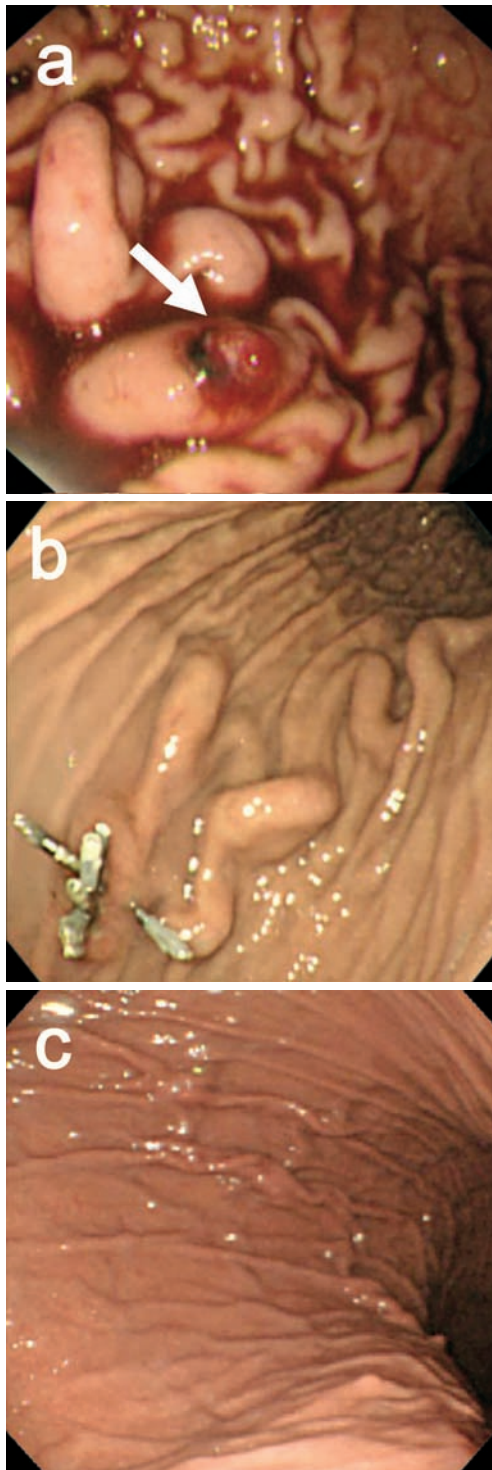


Fig 1. Upper gastrointestinal endoscopic findings. **a)** The emergency endoscopy evidenced a bleeding vessel in the gastric mucosa located on the greater curvature of the upper gastric body; **b)** A second look endoscopy showed a meandering vessel running below the clipped ulcer; **c)** Upper gastrointestinal endoscopy was performed 1 year after discharge, and showed prostration and diminution of the embolized vessel.

was achieved. However, it appeared likely that it would not be sufficient for permanent hemostasis, and re-bleeding was a major concern. Accordingly, abdominal angiography was

performed to better understand the patient's hemodynamics and to treat the bleeding. The angiographic examination showed the splenic artery to be absent, and that the spleen was supplied by the variant left and right gastric arteries. It also revealed that a variant left gastric artery was running below the gastric wall. After marking-clips were placed on both sides of the meandering vessel endoscopically, transcatheter embolization with metallic coils for the variant left gastric artery was performed (Fig. 3). The arteriography of the variant left gastric artery after coil embolization showed the disappearance of the main branch of the artery, with the remaining collateral arteries distributed in the gastric wall. Thereafter, no symptoms such as abdominal pain, gastric ulcer bleeding, or splenic infarction were observed. Upper GIE performed 1 year after the procedure showed both the prostration and diminution of the treated vessel (Fig. 1c).

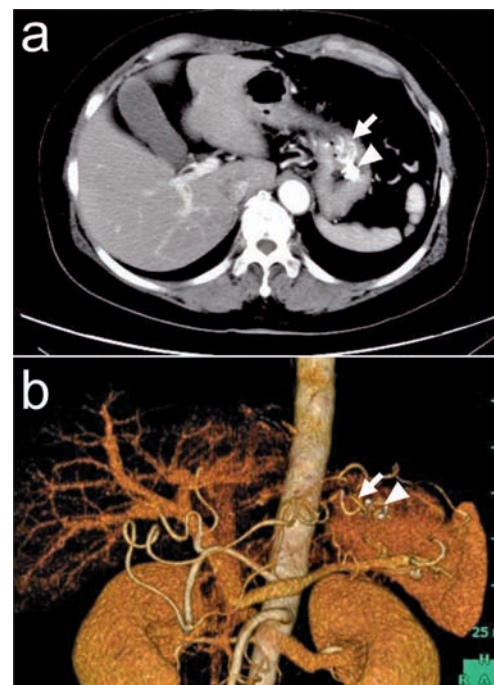


Fig 2. Abdominal computed tomography (CT) findings: **a)** Contrast-enhanced CT evidenced the variant left gastric artery (arrow) and the clips placed on the gastric wall (arrow head); **b)** A three-dimensional CT image showed the absence of the splenic artery. Arrow; variant left gastric artery, arrow head; the clips placed on the gastric wall.

Discussion

Dieulafoy's lesion is described as an abnormally large and tortuous submucosal artery, in which thrombosis and necrosis occur before perforation and massive bleeding, which is occasionally triggered by the habitual use of certain drugs [5]. Endoscopic hemostasis by clipping is generally used for bleeding from Dieulafoy's lesion [6, 7]. In the present case, the bleeding was thought to be caused by oral administration of non-steroidal anti-inflammatory

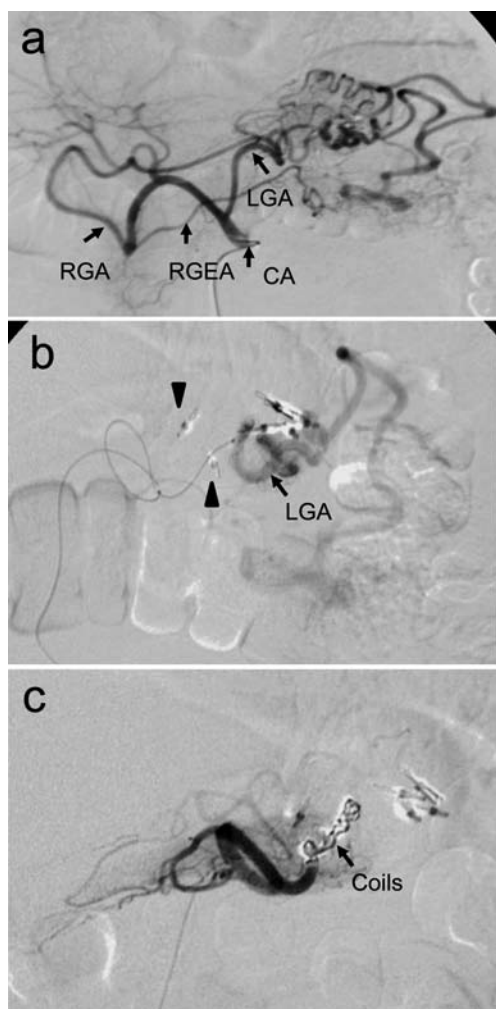


Fig 3. Abdominal angiography findings: **a)** Selective celiac arteriography illustrated the abnormal vasculature around the stomach. LGA, variant left gastric artery; RGA, variant right gastric artery; RGEA, right gastroepiploic artery; CA, celiac artery; **b)** Selective variant left gastric arteriography. Arrow head, marking-clips. LGA, variant left gastric artery; **c)** Selective variant left gastric arteriography after transcatheter embolization with metallic coils showed that the remaining collateral arteries were distributed in the gastric wall.

drugs with the background of a variant left gastric artery, which congenitally ran through the gastric submucosal area. The diameter of the tortuous artery in Dieulafoy's lesion is generally 1-3mm [8]. In the present case, the bleeding variant left gastric artery ranged from 3-4mm in diameter. It was easily surmised that the higher blood pressure of this abnormal artery led to the difficulty in hemostasis by standard endoscopic procedures and medication.

In the present case, the splenic artery was congenitally absent, and the spleen was supplied by the variant left and right gastric arteries. In general, the left gastric artery runs below the gastric serosa, supplying a narrow gastric branch called the mucosal artery [9, 10]. In our case, the left gastric artery arose from the celiac trunk and ran through the gastric submucosal area to the splenic hilum. From these findings,

we considered this artery as a "variant" left gastric artery. The right gastric artery usually arises from the proper hepatic artery, and supplies the antrum or pyloric lesion of the stomach [9, 11]. In our case, the right gastric artery was comparably large, arose with the right gastroepiploic artery from the gastroduodenal artery, and formed a vascular arcade with the variant left gastric artery at the splenic hilum. From these findings, we considered this artery to be a "variant" right gastric artery. Owing to this vascular arcade, it was therefore concluded that there was no increase in the risk of complications after coil embolization of the variant left gastric artery.

To our knowledge, only three cases of congenital absence of the splenic artery have been reported to date (Table I). Two of these cases were diagnosed after hematemesis, and were treated surgically [12, 13]. The other case was accompanied by congenital absence of the splenic vein, with symptoms of epigastric discomfort, and the patient was treated with oral rabeprazole [14]. The present case is the first case which was able to be minutely evaluated endoscopically at the bleeding point, and where hemostasis by transcatheter coil embolization was achieved.

In the process of transcatheter embolization, the "sandwich" technique, with the placement of embolic material on either side of the bleeding vessel, is recommended to minimize the risk of recurrent bleeding due to collaterals [15]. In our case, because the bleeding vessel was comparably large, we ventured to place the metallic coils only on the proximal side of the variant left gastric artery to avoid possible complications. Furthermore, we placed marking-clips on both sides of the bleeding vessel during the pre-embolization endoscopy, as previously reported and recommended [16]. This pre-marking was very useful to estimate the location of the bleeding artery during the arteriography.

In cases treated with transcatheter arterial embolization for bleeding from gastroduodenal ulcers, embolization-related complications are reported to develop in 4% of patients, and include access-site complications, dissection of the target vessel, and hepatic or splenic infarction [15]. To avoid these complications, it is necessary to fully comprehend the hemodynamics based on pre-embolization examinations. Before the process of transcatheter embolization, it is desirable to identify contrast medium extravasation. However, Padia et al [17] indicated that arterial embolization was equally effective in patients who demonstrated active contrast medium extravasation as in those who did not show contrast medium extravasation. In the present case, abdominal angiography did not show any contrast medium extravasation, but the patient successfully and safely achieved hemostasis after undergoing transcatheter coil embolization for the variant left gastric artery.

In conclusion, arterial embolization is therefore considered to be useful for treating massive bleeding from gastroduodenal ulcers when the detailed hemodynamics is evaluated by various examinations prior to the procedure. The therapeutic value of this procedure is expected to be

Table I. The clinical and laboratory features of patients with congenital absence of the splenic artery.

Case	Author	Sex/Age	Symptoms	Emergent upper GIE findings	Findings of angiography	Treatment	Complications
1.	Springgs [12]	M/31	Hematemesis	Diffuse bleeding in the stomach	Absence of the splenic artery	Drug therapy, Surgery	Hemophilia, Administration of aspirin due to headache
2.	Durrans et al [13]	M/13	Hematemesis	Normal	Absence of the distal half of the splenic artery	Surgery	Not listed
3.	Shin et al [14]	F/61	Epigastric discomfort	Meandering vessel in the fundus, Stenosis with an ulcer in the duodenum	Not performed (CT findings; absence of the splenic artery and splenic vein)	Drug therapy	Nothing in particular
4.	Present case	F/50	Dizziness, tarry stool, hematemesis	Bleeding vessel in the stomach	Absence of the splenic artery	Endoscopic hemostasis, Drug therapy, Coil embolization	Administration of loxoprofen due to osteoarthritis

high, as was observed in the present case. This case was also accompanied by the congenital absence of the splenic artery, which is an extremely rare condition.

Conflicts of interest

None to declare.

References

1. Gralnek IM, Barkun AN, Bardou M. Management of acute bleeding from a peptic ulcer. *N Engl J Med* 2008; 359: 928-937.
2. ASGE Standards of Practice Committee, Banerjee S, Cash BD, et al. The role of endoscopy in the management of patients with peptic ulcer disease. *Gastrointest Endosc* 2010; 71: 663-668.
3. Aabakken L. Nonvariceal upper gastrointestinal bleeding. *Endoscopy* 2005; 37: 195-200.
4. Loffroy R, Rao P, Ota S, De Lin M, Kwak BK, Geschwind JF. Embolization of acute nonvariceal upper gastrointestinal hemorrhage resistant to endoscopic treatment: results and predictors of recurrent bleeding. *Cardiovasc Intervent Radiol* 2010; 33: 1088-1100.
5. Juler GL, Labitzke HG, Lamb R, Allen R. The pathogenesis of Dieulafoy's gastric erosion. *Am J Gastroenterol* 1984; 79: 195-200.
6. Cui J, Huang LY, Liu YX, et al. Efficacy of endoscopic therapy for gastrointestinal bleeding from Dieulafoy's lesion. *World J Gastroenterol* 2011; 17: 1368-1372.
7. Ding YJ, Zhao L, Liu J, Luo HS. Clinical and endoscopic analysis of gastric Dieulafoy's lesion. *World J Gastroenterol* 2010; 16: 631-635.
8. Veldhuyzen van Zanten SJ, Bartelsman JF, Schipper ME, Tytgat GN. Recurrent massive haematemesis from Dieulafoy vascular malformations – a review of 101 cases. *Gut* 1986; 27: 213-222.
9. Barlow TE, Bentley FH, Walder DN. Arteries, veins, and arteriovenous anastomoses in the human stomach. *Surg Gynecol Obstet* 1951; 93: 657-671.
10. Sundgren R. Selective angiography of the left gastric artery. *Acta Radiol Diagn (Stockh)* 1970; 299: 11-100.
11. Chuang VP, Wallace S, Stroehlein J, Yap HY, Patt YZ. Hepatic artery infusion chemotherapy: gastroduodenal complications. *AJR Am J Roentgenol* 1981; 137: 347-350.
12. Spriggs DW. Congenital absence of the splenic artery. *Cardiovasc Intervent Radiol* 1984; 7: 303-305.
13. Durrans D, Fawcitt RA, Taylor TV. Congenital absence of the splenic artery associated with major gastric bleeding in adolescence. *Br J Surg* 1985; 72: 456-457.
14. Shin EK, Moon W, Park SJ, et al. Congenital absence of the splenic artery and splenic vein accompanied with a duodenal ulcer and deformity. *World J Gastroenterol* 2009; 15: 1401-1403.
15. Loffroy R, Guiu B. Role of transcatheter arterial embolization for massive bleeding from gastroduodenal ulcers. *World J Gastroenterol* 2009; 15: 5889-5897.
16. Eriksson LG, Sundbom M, Gustavsson S, Nyman R. Endoscopic marking with a metallic clip facilitates transcatheter arterial embolization in upper peptic ulcer bleeding. *J Vasc Interv Radiol* 2006; 17: 959-964.
17. Padia SA, Geisinger MA, Newman JS, Pierce G, Obuchowski NA, Sands MJ. Effectiveness of coil embolization in angiographically detectable versus non-detectable sources of upper gastrointestinal hemorrhage. *J Vasc Interv Radiol* 2009; 20: 461-466.