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Obscure Gastrointestinal Hemorrhage from Mesenteric Varices Diagnosed by Video Capsule Endoscopy

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Gastrointestinal hemorrhage due to esophageal varices is a frequent complication of portal hypertension, whereas hemorrhage from varices at other sites occurs infrequently (1, 2). We present three cases of obscure gastrointestinal bleeding secondary to isolated mesenteric varices in the small intestine. The diagnosis of bleeding mesenteric varices is difficult, with patients frequently undergoing multiple procedures before the diagnosis is reached. In these three cases, the diagnosis of bleeding mesenteric varices was suggested by video capsule endoscopy (VCE) and confirmed by mesenteric angiography after failure to detect the source of bleeding by conventional means.

CASE 1

A 50-year-old woman with hepatitis C and active alcohol abuse presented with maroon-colored blood per rectum. Esophageal varices had been banded 3 months prior to admission. On presentation, her blood pressure was 72/29 mm Hg and her heart rate was 136 beats/min. She had ascites. The hematocrit was 17.4%; the platelet count, 147,000/mm^3; and the international normalized ratio (INR), 1.45. Esophagogastroduodenoscopy (EGD) revealed nonbleeding grade I esophageal varices without stigmata of recent hemorrhage. Colonoscopy revealed blood from the mid-transverse colon to the ileum, but no bleeding source could be identified. The patient continued to pass maroon-colored stool and required multiple transfusions of packed red blood cells (PRBCs). A technetium-99m-labeled autologous red blood cell scan showed evidence of bleeding on delayed images at 16 hr postinjection, suggesting a small bowel or cecal source. Angiography showed an occluded celiac axis and no extravasation of contrast. Venous phase images were not obtained. Push enteroscopy demonstrated fresh blood in the midjejunum without an identifiable source. She was not felt to be a surgical candidate owing to comorbidities. Repeat push enteroscopy and colonoscopy performed during an episode of recurrent bleeding did not demonstrate a source. At this time the patient had received 25 units of PRBCs.

VCE revealed active bleeding (Figure 1) and multiple flat, blue, venous lakes in the mid- to distal jejunum consistent with varices. Actively bleeding jejunal varices from a branch supplying the superior mesenteric vein were confirmed by a venogram and successfully embolized with coils. Transjugular intrahepatic portosystemic shunt (TIPSS) procedure was performed, with a subsequent decrease in portal venous pressure from 13 to 4 mm Hg and control of bleeding. Although gastrointestinal bleeding ceased, hepatic coma ensued and the patient died 12 days following TIPSS.

CASE 2

A 44-year-old woman with biopsy-proven alcoholic cirrhosis presented with 3 weeks of hematochezia. Initial endoscopy revealed mild portal hypertensive gastropathy. A colonoscopy was normal. A technetium-99m-labeled autologous red blood cell scan and a mesenteric arteriogram were negative.

On referral she had maroon-colored stool in the rectum. Laboratory values were significant for a hematocrit of 22.3%, platelet count of 95,000/mm^3, and INR of 1.6. Push enteroscopy demonstrated portal hypertensive gastropathy and a clot-filled duodenal diverticulum. No active bleeding was seen when the clot was dislodged by irrigation. Colonoscopy and ileoscopy revealed blood throughout the colon and fresh blood in the terminal ileum, but no bleeding site was identified. A repeat push enteroscopy demonstrated an insignificant Mallory-Weiss tear in

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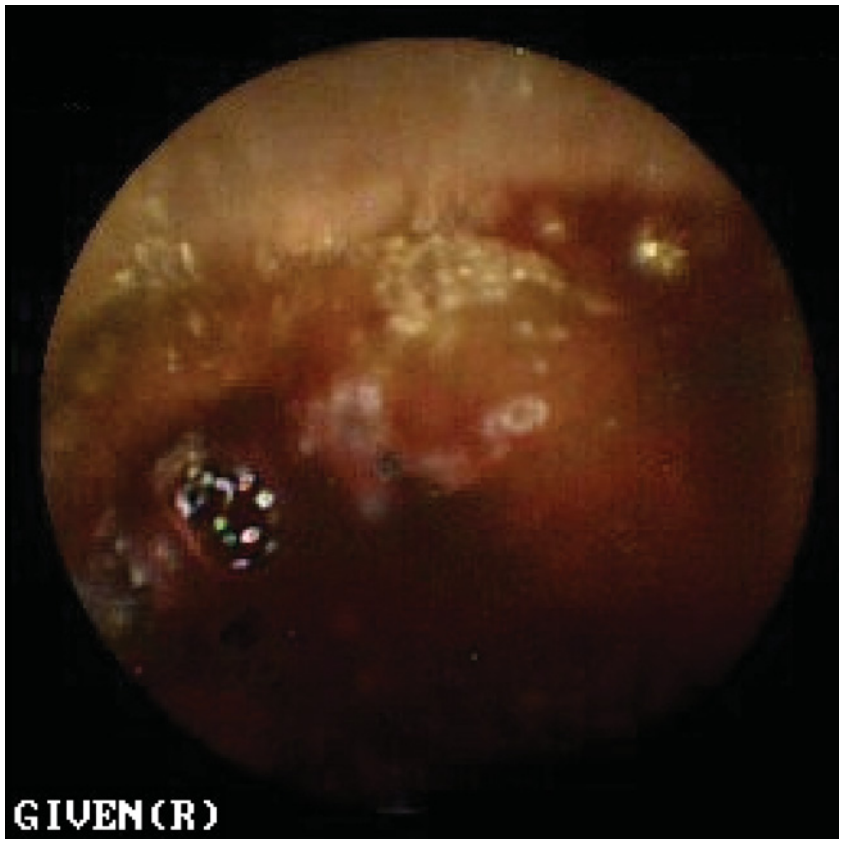

Fig 1. Active jejunal bleeding seen on video capsule endoscopy (VCE).

the distal esophagus. No esophageal varices were noted. Blood was seen in the midjejunum, but the bleeding source could not be identified.

VCE was performed after the patient had received a cumulative 24-unit transfusion of PRBCs. Multiple flat, blue, venous lakes in the small intestine consistent with varices were noted. Subsequent review of the venous phase of the arteriogram, previously done at the referring hospital, confirmed mesenteric varices in the left lower quadrant. Transhepatic pressure measurements were performed, revealing a portal-systemic gradient of 15 mm Hg and hepatofugal flow in the portal vein. Contrast injection confirmed mesenteric varices (Figure 2). Following TIPSS, the direction of flow in the portal vein normalized and the mesenteric varices no longer filled (Figure 3). She has not had recurrent bleeding after 24 months of follow-up.

CASE 3

A 48-year-old man with alcoholic cirrhosis and esophageal varices presented several times over the course of 3 months with gastrointestinal bleeding. He had recently had surgery for a cecal adenoma complicated by anastomotic leakage and abscess formation requiring right hemicolectomy followed by creation of an ileostomy. His bleeding episodes were characterized by the passage of fresh blood and clots into his ostomy bag, orthostasis, and profound anemia (hemoglobin of 3.0 g/dl). Multiple endoscopic procedures did not reveal the source of blood loss.

During one of the episodes of acute bleeding, EGD demonstrated an oozing angioectasia in the gastric fundus that was cauterized. Ileoscopy via the stoma, limited to 25 cm secondary to adhesions, did not demonstrate a source of bleeding. Push enteroscopy to the proximal jejunum was also negative. VCE revealed a moderate-sized angioectasia in the jejunum and scattered, tiny, red spots of uncertain significance in the small intestine. He had multiple large, flat, blue, venous lakes throughout the mid-small intestine suggestive of varices (Figure 4). Mesenteric angiography demonstrated dilated veins in the right midabdomen with a portal-systemic gradient of 14 mm Hg.

Subsequently, at an emergent laparotomy, an actively bleeding varix at the stoma was oversewn. He was discharged from the hospital but returned with further bleeding and a hemoglobin of 5 g/dl. A portacaval shunt was performed. One week following this procedure, he was noted to have blood from his ostomy and a drop in hemoglobin of 2 g/dl. A superficial bleeding vessel at the stoma was ligated. Subsequent venogram demonstrated a patent portacaval shunt and a varix leading to the stoma that was successfully embolized. He has had no recurrent bleeding after 10 months of follow-up.

DISCUSSION

This is the first report to identify mesenteric varices presenting as venous lakes using VCE. Venous lakes (Figure 4) are large, flat, pale, blue, homogeneous

Fig 2. Mesenteric varices seen on venogram prior to TIPSS.

Fig 3. Non-filling of mesenteric varices following stent placement during TIPSS.

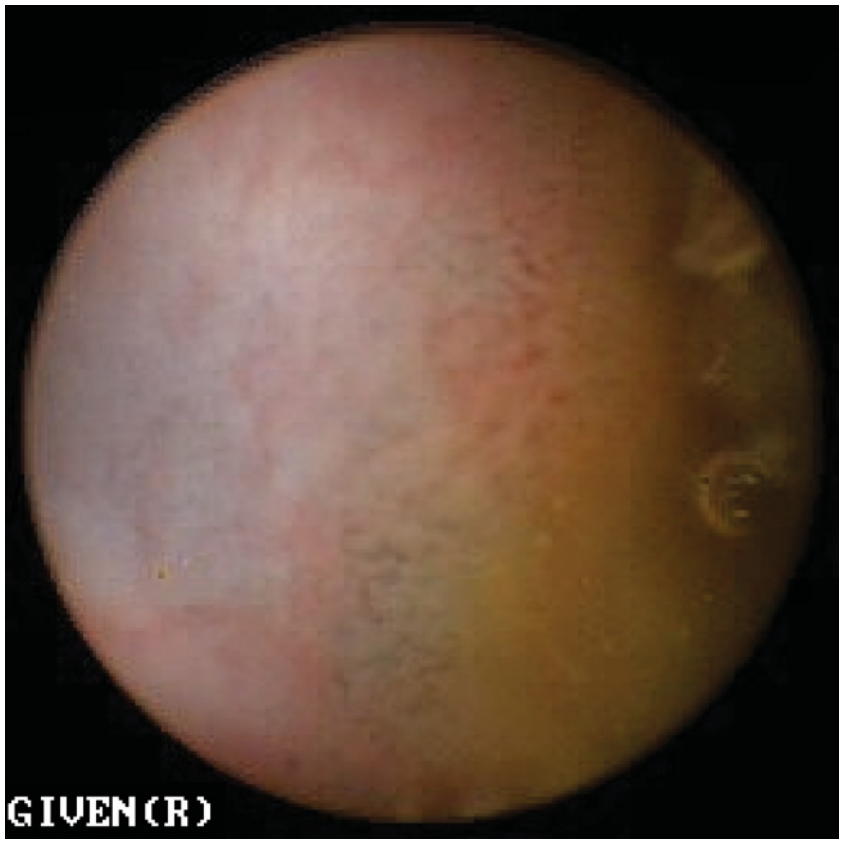

Fig 4. Large, flat, blue, venous lakes consistent with varices seen on VCE.

structures, usually with indistinct margins. They may cover half or more of the circumference of the intestine. They may be seen occasionally in normal individuals during passage of the capsule through the small intestine and probably represent large adjacent venous structures or the close proximity of liver or spleen. However, these three patients had many of these structures seen over long sections of the small intestine. Interestingly, the venous lakes appeared flat, without the typical distended appearance of esophageal varices. This cannot be explained by hypotension, since these patients were normotensive during their video capsule studies. The venous lakes are quite different and distinct from phlebectasias, which are localized, discrete, and appear as vessels with distinct red to dark blue coloration. The precise site of bleeding was not seen in any of these patients during VCE, but bright red blood was seen in the area of the venous lakes in two patients. Thus, the presence of extensive small intestinal venous lakes in the context of obscure gastrointestinal bleeding in a patient with known cirrhosis should suggest the diagnosis of ectopic varices. Angiography, with attention to the venous phase, is required for precise delineation of the varices.

Ectopic varices are large portosystemic venous collaterals occurring anywhere in the abdomen except in the cardioesophageal region (3). In contrast to bleeding esophagogastric varices, bleeding from ectopic varices is rare and accounts for between 1% and 5% of all variceal bleeding (4). These varices are commonly found in the duodenum and at sites of previous bowel surgery but can also be found in the jejunum, ileum, colon, and rectum and at a stoma (2, 3). Bleeding from ectopic varices has a high mortality (2, 5).

Cases of bleeding jejunal varices in the literature are predominately associated with portal hypertension, generally due to cirrhosis (1, 2, 5–13). Frequently, there is a history of abdominal surgery, with varices closely associated with intra-abdominal adhesions (1, 2, 9–15). Causes of small intestinal varices in the absence of portal hypertension include mesenteric vein thrombosis or obstruction (7).

Bleeding from intestinal varices following sclerotherapy of esophageal varices or esophageal transection has been reported (1, 5, 9, 16, 17). It is postulated that obliteration of the coronary-azygous system could increase portal flow through alternative shunts, promote enlargement of

existing varices, and precipitate bleeding (1, 9, 16–18). Banding of varices may have a similar effect, as might have occurred in Case 1.

Bleeding from intestinal varices usually presents with hematochezia or melena of obscure origin (19–21) but rarely with hematemesis (1, 2, 5–15, 22). Moncure, *et al*. (12) described six patients with portal hypertension and actively bleeding small intestinal varices who presented with rectal bleeding or melena. All patients had had previous intra-abdominal surgery. Five of the six patients underwent angiography that demonstrated the varices near the previous surgical site without extravasation of dye. Each patient was managed surgically with resection or shunting.

Angiography with attention to the venous phase is considered the procedure of choice for diagnosing intestinal varices (1, 5–7, 18). Extravasation of dye into the bowel lumen is rarely seen, probably due to dilution of dye in the venous phase and the slower rate of bleeding compared with arterial bleeding (1, 6, 7, 12, 18).

Although it is the most sensitive, angiography is usually not the first diagnostic test in the evaluation of hematochezia, even when bleeding from ectopic varices is suspected (5). Conventionally, the workup of obscure gastrointestinal bleeding begins with EGD and colonoscopy (20). Repeating the EGD before investigation of the small bowel has been shown to frequently identify lesions overlooked at initial endoscopy (23, 24). However, attributing the source of gastrointestinal hemorrhage to the presence of esophageal or gastric varices without obvious stigmata of hemorrhage may be erroneous (1, 9). Tang *et al*. (14) recommend push enteroscopy and consideration of retrograde ileoscopy as the initial diagnostic workup when bleeding from small intestinal varices is suspected.

Most patients with bleeding mesenteric varices in the literature are treated surgically (1, 2, 5–10, 12, 15, 16). Patients with bleeding mesenteric varices often undergo exploratory laparotomy because accurate preoperative diagnosis is difficult (1, 6). Early surgical management has been recommended due to the poor prognosis of medical therapy (1), but this may be complicated because of portal hypertension and adhesions (13).

Portosystemic shunting has been recommended as the most definitive therapy for mesenteric variceal bleeding secondary to portal hypertension (1, 5, 7, 25). Resection of the affected intestinal segment alone is frequently not effective (5, 7). Some authors recommend portosystemic shunting in combination with surgical resection of the involved intestinal segment as the treatment of choice (14, 15), although the choice of surgical procedure depends on the severity of the liver disease and extent of adhesions (1, 22).

Selective infusion of vasopressin via the superior mesenteric artery or systemic vasopressin usually demonstrates only temporary cessation of bleeding (1, 6, 25). Sato *et al*. (13) described the successful embolization of a bleeding jejunal varix with anhydrous ethanol and coils during intraoperative portography. Successful endoscopic treatment of small bowel varices with cyanoacrylate injection has been reported (11, 22).

Bowel resection, embolization, and sclerotherapy each can control bleeding from intestinal varices but do not reduce elevated portal pressures and thus do not prevent recurrent bleeding (13, 18). TIPSS or other shunt procedures should be considered for patients with systemic portal hypertension (14, 18, 25).

Small intestinal bleeding is associated with higher morbidity, longer hospital stays, multiple diagnostic procedures, and higher health care expenditures when compared with upper tract or colonic bleeding (26). In the cirrhotic patient with portal hypertension and obscure gastrointestinal bleeding, the presence of small intestinal venous lakes on VCE should alert the clinician to the possibility of bleeding mesenteric varices. Whether the early introduction of VCE in the sequence of diagnostic procedures would facilitate diagnosis and reduce morbidity and cost is not yet known.

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