Case Report

Arteriovenous Malformation of the Small Bowel Diagnosed with Enteroclysis

Hans Herlinger,[1] Marc S. Levine,[1] Emma E. Furth,[2] and Dilip Moonka[3]

With the increasingly accurate diagnostic workup of gastrointestinal bleeding, a source of bleeding is found in 94–95% of patients who undergo radiologic and/or endoscopic examinations of the upper and lower gastrointestinal tracts [1, 2]. The remaining 5–6% of patients with unexplained bleeding are often found to have lesions in the small bowel. Arteriovenous malformations are thought to be the most common cause of bleeding from the small bowel [1, 3]. In recent years, these lesions have been diagnosed at enteroscopy or at surgery. However, we report a case of a jejunal arteriovenous malformation that was discovered with enteroclysis. To our knowledge, this is the first report of such a lesion demonstrated by this technique.

Case Report

A 60-year-old man was examined by his physician after recent onset of melena. Upper endoscopy was normal, but a ^{99m}Tc-RBC scan was interpreted as showing blood loss into the proximal small bowel. After another episode of gastrointestinal bleeding, the patient was admitted to our institution. Colonoscopy was normal, and angiography did not show a bleeding site or vascular abnormality in the small or large bowel. However, subsequent enteroclysis showed a 4-mm-wide, slightly lobulated filling defect involving a 15-mm-long portion of a single circular fold in a proximal loop of jejunum (Figs. 1A and 1B). This finding was thought to be suggestive of an arteriovenous or venous malformation. Three days later, surgical exploration of the abdomen revealed several dilated vessels on the serosal surface of the proximal jejunum. Intraoperative enteroscopy demonstrated a small, ovoid, erythematous, raised lesion about 40 cm beyond the ligament of Treitz. A small amount of blood was seen oozing from this region. Transillumination revealed a markedly dilated blood vessel. The lesion was thought to represent an arteriovenous malformation. The area was marked by a suture, and a 15-cm long segment of small bowel was resected. Examination of microscopic sections taken from the area of the specimen marked by the suture showed changes consistent with a vascular malformation. Abundant thin-walled, large-caliber vessels in the submucosa had the appearance of veins rather than arteries. These vessels could be seen extending into the submucosal core of a fold (Fig. 1C). The patient tolerated the procedure well, and gastrointestinal bleeding did not recur postoperatively.

Discussion

Arteriovenous malformations are thought to be the most common cause of bleeding from the small bowel. In two series of patients who recently had undergone enteroscopy for obscure gastrointestinal blood loss, arteriovenous malformations accounted for about 80% of all small-bowel lesions seen at enteroscopy [1, 3]. In those same studies, however, enteroscopy showed a possible bleeding site in the small bowel in only 33–44% of patients [1, 3]. Thus, enteroscopy has limitations in the evaluation of obscure gastrointestinal bleeding.

We have reported an arteriovenous malformation of the small bowel that was recognized at enteroclysis by the presence of a slightly lobulated filling defect oriented along a fold

Received May 26, 1992; accepted June 5, 1992.

[1] Department of Radiology, Hospital of the University of Pennsylvania, 3400 Spruce St., Philadelphia, PA 19104. Address reprint requests to H. Herlinger.
[2] Department of Surgical Pathology, Hospital of the University of Pennsylvania, Philadelphia, PA 19104.
[3] Department of Medicine, Hospital of the University of Pennsylvania, Philadelphia, PA 19104.

AJR 159:1225–1226, December 1992 0361–803X/92/1596–1225 © American Roentgen Ray Society

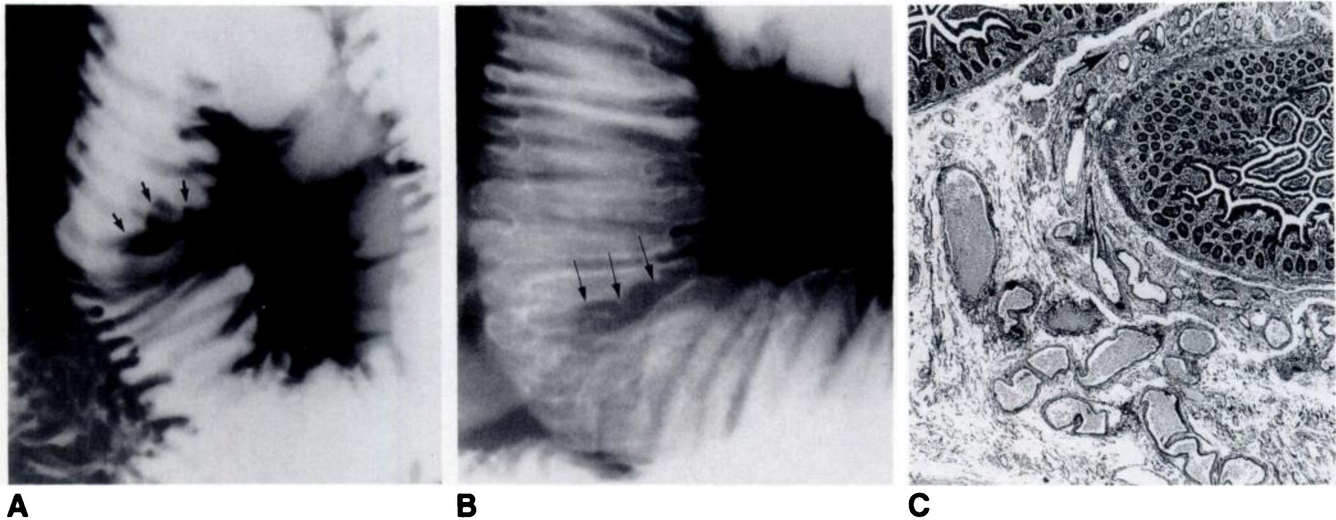

Fig. 1.—Arteriovenous malformation of jejunum.

***A*, Single-contrast radiograph of proximal jejunum during early phase of enteroclysis shows a 15-mm-long lobulated filling defect (*arrows*) in bowel.**

***B*, Additional radiograph of same loop from later double-contrast phase of examination again reveals a lobulated expansion of a 15-mm-long portion of a single fold (*arrows*) in proximal jejunum.**

***C*, Low-power photomicrograph of resected specimen shows numerous dilated vessels in submucosa with extension of these vessels into submucosal core (*arrow*) of a small-bowel fold. Final pathologic diagnosis was arteriovenous malformation.**

in the proximal jejunum (Figs. 1A and 1B). Arteriovenous malformations should be differentiated from hemangiomas, which are benign hamartomatous tumors occasionally seen radiographically as polypoid masses in the jejunum or ileum [4]. In any case, our experience suggests that an optimally performed enteroclysis examination is capable of demonstrating relatively subtle lesions in the small bowel, such as arteriovenous malformations. Enteroclysis may be performed prior to enteroscopy or when enteroscopic findings are normal in order to detect lesions that are beyond the range of the endoscope [2].

Arteriovenous malformations represent alterations of normally occurring vessels in the gastrointestinal tract. In the classification system for arteriovenous malformations used by Moore et al. [5], type I lesions are acquired areas of angiodysplasia, found most frequently in the colon of older patients. Type II lesions usually are found in the stomach or jejunum and are congenital lesions, so that they tend to occur in somewhat younger patients. Although type I lesions can be demonstrated with endoscopy or angiography, type II lesions are less reliably shown by angiography because of their predominantly venous composition [6]. When type II lesions are located in the small bowel, however, they can be demonstrated with enteroscopy or, as in our case, with enteroclysis.

In summary, we have reported a case of obscure gastrointestinal blood loss in which the diagnosis of a small-bowel arteriovenous malformation was first suggested by findings with enteroclysis. Radiologists should be aware of the potential role of enteroclysis in the detection of arteriovenous malformations or other small lesions in the small bowel of patients with unexplained gastrointestinal bleeding. Further experience will be necessary to determine how often these lesions can be diagnosed with the use of enteroclysis.

REFERENCES

1. Lewis BS, Waye JD. Chronic gastrointestinal bleeding of obscure origin: role of small bowel enteroscopy. *Gastroenterology* **1988**;84:1117–1120
2. Vu H, Adams CZ, Hoover EL. Jejunal angiodysplasia presenting as acute lower gastrointestinal bleeding. *Am Surg* **1990**;56:302–304
3. Foutch PG, Sawyer R, Sanowski RA. Push enteroscopy for diagnosis of patients with gastrointestinal bleeding of obscure origin. *Gastrointest Endosc* **1990**;36:337–341
4. Herlinger H, Maglinte DDT. Tumors of the small intestine. In Herlinger H, Maglinte DDT, eds. *Clinical radiology of the small intestine.* Philadelphia: Saunders, **1989**:402–403
5. Moore JD, Thompson NM, Appleman HD, Foley D. Arteriovenous malformations of the gastrointestinal tract. *Arch Surg* **1976**;111:381–389
6. Thompson JN, Hemingway AP, McPherson GAD, Rees HC, Allison DJ, Spencer J. Obscure gastrointestinal hemorrhage of small-bowel origin. *BMJ* **1984**;288:1663–1665