Enteroclysis in the Evaluation of Obscure Gastrointestinal Bleeding

OBJECTIVE. The diagnostic yield of enteroclysis was retrospectively evaluated for patients with obscure bleeding from the gastrointestinal tract.

MATERIALS AND METHODS. A total of 128 patients with obscure gastrointestinal bleeding were referred to our department for enteroclysis between 1988 and 1993. The original radiologic reports were reviewed to determine the radiographic findings in these patients. The radiographic findings then were correlated with medical, surgical, and pathologic findings.

RESULTS. Thirty-two patients had lesions found at enteroclysis. Nineteen of those patients had confirmation of the radiographic diagnosis, primarily by pathologic examination of the surgical specimen. Five other patients were found at surgery to have had false-positive diagnoses at enteroclysis. Eight patients ceased to bleed without pathologic corroboration, but their clinical presentation and course supported the radiographic diagnosis. Thus, 27 (21%) of the 128 patients had confirmed or highly probable lesions seen at enteroclysis as the cause of obscure gastrointestinal bleeding. Seventeen patients (13%) had tumors involving the small bowel, and three (2%) had arteriovenous malformations in the jejunum.

CONCLUSION. This study corroborates earlier reports that enteroclysis is a useful diagnostic test for examining the small intestine in patients with obscure gastrointestinal bleeding.

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Gastrointestinal bleeding, usually chronic or intermittent, is defined as obscure, or unexplained, if diagnostic examinations of the upper gastrointestinal tract and the colon (including barium studies, endoscopy, or both) fail to reveal the cause of the bleeding [1]. Angiography, scintigraphy, enteroclysis, and enteroscopy are additional diagnostic procedures that may be used in these patients in an attempt to identify a source of bleeding in the small intestine. Two earlier studies found enteroclysis to be a useful test for detecting lesions in the small intestine as the cause of obscure bleeding [2, 3].

Unexplained bleeding from the gastrointestinal tract accounted for 17% of all referrals for enteroclysis at our hospital and was the third most common indication for this procedure (after small-bowel obstruction and inflammatory disease). As a result, we have had the opportunity to use enteroclysis on a significant number of patients with this vexing clinical problem. The purpose of our study was to determine the diagnostic yield of enteroclysis in patients with obscure gastrointestinal bleeding.

Materials and Methods

A total of 758 patients had enteroclysis examinations at our hospital between September 1988 and July 1993. In 128 (17%) of those 758 patients, the indication for enteroclysis was unexplained gastrointestinal bleeding, manifested by rectal bleeding, melena, and/or hemoccult-positive stool. These 128 patients (74 men, 54 women) constituted our study group. Their average age was 62 years (range, 20–87 years).
Enteroclysis with barium and methylcellulose was performed on those 128 patients, applying the technique as previously described [4]. Because of the history of gastrointestinal bleeding, however, the examination was modified in several ways [5]. The catheter was advanced only a short distance into the jejunum, with the balloon inflated near the ligament of Treitz, so that even the most proximal loops of jejunum could be included in the study. Because arteriovenous malformations, a relatively common cause of gastrointestinal bleeding, often are located in the proximal jejunum [6], these loops were carefully assessed by graded compression during both the single-contrast and the double-contrast phases of the examination. If rapid flow of barium or methylcellulose into the colon precluded adequate visualization of the ileum, 0.5 mg of glucagon was given IV to increase ileal distention. Finally, the balloon on the catheter was deflated, and the catheter was withdrawn into the descending duodenum, where the balloon was reinflated. High-density barium, followed by air or methylcellulose, then was injected rapidly through the catheter to outline the third and fourth portions of the duodenum and the duodenojejunal flexure in order to detect potential bleeding sites that might not have been seen at upper endoscopy or routine upper gastrointestinal series.

The original radiologic reports of these 128 patients were reviewed to determine the findings at enteroclysis. In all but three patients, whose radiographs were missing, the radiographs were reviewed to further characterize the findings at enteroclysis. Thirty-two patients (25%) had radiographic evidence for sources of bleeding in the small intestine. The medical, surgical, and pathologic records of these patients were reviewed to determine if the clinical and/or pathologic findings confirmed the radiographic findings. Pathologic records of the remaining 96 patients were also reviewed to determine if any of these patients had lesions in the small intestine that could have been missed at enteroclysis. However, as only one of the patients with no lesions seen on enteroclysis examinations underwent surgery, it was impossible to determine the sensitivity of enteroclysis in detecting lesions in the small intestine in this group of patients.

Results

Thirty-two (25%) of the 128 patients had lesions diagnosed at enteroclysis that were considered to be responsible for the gastrointestinal bleeding. Ten patients (8%) had other findings at enteroclysis that may have been incidental and unrelated to gastrointestinal bleeding. The remaining 86 patients (67%) had normal findings on enteroclysis examinations.

Nineteen of the 32 patients with lesions at enteroclysis had pathologic confirmation of the radiographic diagnosis by surgery, angiography, or subsequent enteroclysis. In another five patients, subsequent surgery failed to corroborate the radiographic diagnosis. These five examinations with false-positive results were thought to have shown one ulcerated nodule, one polyp, one annular lesion, one case of ischemia or hemorrhage, and one Meckel's diverticulum. However, these five patients had technically suboptimal examinations. The remaining eight patients had cessation of bleeding without pathologic corroborate of the findings at enteroclysis, but the clinical presentation and course supported the radiographic diagnoses. Thus, 27 (21%) of the 128 patients with obscure gastrointestinal bleeding had a confirmed or highly probable lesion shown by enteroclysis, which could have been the cause of the bleeding. Seventeen patients (13%) had tumors involving the small bowel, and three (2%) had arteriovenous malformations in the jejunum. In 21 (78%) of the 27 patients with lesions shown by enteroclysis, the lesions were in the jejunum or ileum. The remaining six patients (22%) had lesions in the ascending portion of the duodenum.

Of the 96 enteroclysis examinations that showed no lesions, we are aware of only one study with false-negative results in a patient with von Willebrand's disease, who was found to have a small-bowel hematoma at later surgery. This was the only patient with no lesions seen at enteroclysis who had surgery. The remaining 95 patients with normal findings on enteroclysis examinations had no pathologic corroborate (usually because the bleeding stopped with conservative treatment), so it was impossible in this study to determine the sensitivity of enteroclysis in detecting small-bowel disease in these patients.

Confirmed Lesions

Of the 19 patients with confirmed lesions at enteroclysis, 10 had malignant tumors, including three lymphomas (Fig. 1), two adenocarcinomas, two metastases, two carcinoids (Fig. 2), and one leiomyosarcoma. The malignant tumors appeared radiographically as ulcerated, annular, or exoenteric lesions. One patient had a benign leiomyoma that appeared as a smooth submucosal mass in the terminal ileum. Two patients, one of whom was reported previously [6], had arteriovenous malformations in the proximal jejunum, manifested by the relatively subtle finding of slightly lobulated, focal widening of part of an otherwise normal small-bowel fold (Fig. 3). One patient had a Meckel's diverticulum that contained ectopic gastric mucosa. One patient with heme-positive stool was found at enteroclysis to have celiac disease, a condition that may be associated with occult gastrointestinal bleeding and iron malabsorption [7]. One patient had typical findings of radiation enteropathy involving the distal part of the ileum after treatment for cervical carcinoma. The remaining patient had a benign ulcer in the fourth portion of the duodenum that responded to medical treatment.

Highly Probable Lesions

Of the eight patients with unconfirmed lesions at enteroclysis, four were considered to have secondary malignant tumors involving the small bowel, including two with malignant melanoma, one with a leiomyosarcoma, and one with gallbladder carcinoma. Two patients had benign-appearing polypos in the distal part of the duodenum, one of which was pedunculated (Fig. 5). One patient had a probable arteriovenous malformation in the proximal jejunum, manifested at enteroclysis by focal widening and lobulation of part of a small-bowel fold. The remaining patient had thickened folds in an ileal segment of limited distensibility, presumably due to a vasculitis associated with underlying lupus erythematosus.

Incidental Lesions

In 10 patients, enteroclysis revealed abnormalities that were not thought to be a cause of gastrointestinal bleeding, including jejunal diverticula in eight patients, intestinal malrotation in two, a nonulcerated submucosal tumor in one, and a
single small polyp in the distal jejunum in one patient. However, the percentage of patients with jejunal diverticula in the study group (6%) was greater than the percentage of diverticula found among the 630 patients who did not have bleeding (2%). This observation may suggest a causal relationship.

Discussion

In about 95% of all patients with gastrointestinal bleeding, the bleeding site can be detected by barium studies and/or endoscopy of the upper gastrointestinal tract and the colon [8]. In the remaining 5%, these diagnostic procedures fail to establish a cause for the bleeding. Often this obscure bleeding originates in the small intestine, posing a difficult diagnostic problem. Scintigraphy, angiography, enteroclysis, and enteroscopy are all procedures that have been used in an attempt to show these bleeding sites in the small intestine.

Scintigraphy can be done when a Meckel’s diverticulum is suspected on clinical grounds. In adults, this abnormality often goes undetected on scintigrams [8], but can be shown by care-
fully performed enteroclysis [9]. However, a Meckel's diverticulum is an unlikely cause of gastrointestinal bleeding in patients more than 40 years old [10]. Angiography also may be used to show bleeding sites in the small intestine [11], but this invasive procedure usually is not part of the routine workup of patients with low-grade or intermittent gastrointestinal bleeding.

The role of enteroclysis in evaluating obscure gastrointestinal bleeding was first reported by Maglinte et al. in 1985 [2]. Rex et al. [3] subsequently showed that the diagnostic yield of enteroclysis in these patients was about 10%. In a subgroup of their patients with normal findings on barium studies and/or endoscopy of the upper gastrointestinal tract and the colon, however, the diagnostic yield of enteroclysis was reported to have approached 20%. The authors concluded that enteroclysis was a valuable diagnostic test in patients with unexplained gastrointestinal bleeding.

In our study, lesions were found at enteroclysis in 27 of 128 patients (21%) with obscure gastrointestinal bleeding. Tumors were found in 17 patients, comprising 63% of the patients with lesions shown by enteroclysis. Fourteen of those patients had malignant tumors. Three patients had arteriovenous malformations, which made up 11% of the lesions seen at enteroclysis. Our study corroborates the findings of earlier investigators [2, 3], and shows that enteroclysis is a useful diagnostic technique in patients with unexplained gastrointestinal bleeding. However, about 22% of the bleeding lesions were located in the fourth portion of the duodenum near the ligament of Treitz. This indicates the importance of modifying the technique of enteroclysis in patients with obscure bleeding to evaluate the distal part of the duodenum and the duodenojejunal flexure, areas that may not be visualized fully during routine endoscopy or barium studies of the upper gastrointestinal tract.

In recent years, peroral enteroscopy has become a technique used increasingly for examining patients with obscure gastrointestinal bleeding. Numerous publications describe the instruments and techniques used [12-20]. The sonde-type enteroscope requires 6-8 hr to reach the ileum and has been largely replaced by the newer push-type enteroscope, which has high-resolution video capability and a channel for forceps biopsy or cautereization [20]. This type of instrument is now routinely in use at our institution.

Currently, no consensus exists among gastroenterologists and radiologists about the respective roles of enteroclysis and enteroscopy in the evaluation of patients with obscure gastrointestinal bleeding. Some authors favor enteroclysis, if it is available, as the next diagnostic test when barium studies and/or endoscopy of the upper gastrointestinal tract and the colon have failed to show a potential source of bleeding [2, 3, 16-18]. Others prefer enteroscopy as the first diagnostic procedure and do not even mention enteroclysis as a practical alternative [12, 14, 15].

Recently published data and our own experience suggest that enteroclysis and enteroscopy are complementary techniques for examining patients with obscure gastrointestinal bleeding. Three recent publications [17, 19, 20] have together reported a total of 98 push-type enteroscopies carried out for the investigation of obscure gastrointestinal bleeding. Lesions were demonstrated in 55 of those 98 examinations (56%). Arteriovenous malformations were found in 39 of the 98 examinations (40%), tumors in four (4%), and other lesions in 12 (12%). In our study, lesions were shown by enteroclysis in 27 of 128 patients (21%). Although arteriovenous malformations were found in only three of those 128 patients (2%), tumors were found in 17 (13%). Enteroscopy is therefore a considerably more sensitive technique than enteroclysis for detecting arteriovenous malformations in the small intestine. In contrast, enteroclysis is capable of detecting about three times as many tumors involving the small bowel as enteroscopy. This is probably related to the limited length of the small bowel traversed by the push-type enteroscope, whereas the entire small bowel can be visualized at enteroscopy.

In conclusion, carefully performed enteroclysis allows detection of many lesions in the small intestine that cause gastrointestinal bleeding. If enteroclysis fails to demonstrate a lesion as a likely source of bleeding, an arteriovenous malformation is the probable cause, and enteroscopy may be required for diagnosis and treatment of these vascular malformations. Thus, we believe that enteroclysis is a valuable diagnostic modality and that it should precede enteroscopy in the examination of patients with obscure gastrointestinal bleeding.

REFERENCES