

Intermittent Bleeding from Minute to Minute in Acute Massive Gastrointestinal Hemorrhage: Arteriographic Demonstration

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Acute massive gastrointestinal hemorrhage can be intermittent from minute to minute. This phenomenon is documented by arteriography in three patients. Failure to demonstrate active bleeding by angiography therefore may not prove cessation of bleeding or indicate an inadequate examination.

Arteriography occupies an important role in the localization [1] and treatment [2, 3] of gastrointestinal hemorrhage. The pioneering work of Baum and others demonstrated that temporary and occasionally permanent control of gastrointestinal hemorrhage may be achieved by transcatheter infusion [2] or embolization [3] techniques. High risk emergency surgical procedures can thus be deferred until the patient's medical condition improves. It is thus especially frustrating when, in patients clinically documented to have massive active gastrointestinal hemorrhage, a site of extravasation cannot be demonstrated by visceral panangiography. An explanation not previously demonstrated angiographically is the intermittency of even massive active gastrointestinal bleeding. We recently studied three patients in whom clinically documented acute gastrointestinal hemorrhage was demonstrated by only one of two or three identical selective arteriograms performed within a few minutes.

Case Reports

Case 1

A 61-year-old white male was admitted after 24 hr of episodic bright red and melanotic stools. He denied a previous history of gastrointestinal bleeding and had no abdominal pain. The only significant finding on physical examination was orthostatic hypotension (180/100 mm Hg supine and 140/100 mm Hg sitting). Hematocrit was 25% and the hemoglobin 8.0 gm/dl. Nasogastric aspirate was free of blood. Sigmoidoscopy to 20 cm demonstrated melanotic stools from above. On the day of admission the patient continued to have melena mixed with bright red blood and received two units of packed cells and one unit of whole blood.

Emergency arteriography was performed. Superior mesenteric arteriography demonstrated no bleeding. Selective inferior mesenteric arteriography was then performed (fig. 1). The first angiographic series was centered to include the sigmoid colon (fig. 1A); no bleeding was seen. For complete coverage of the entire inferior mesenteric artery distribution, a second angiographic series covered the splenic flexure at an identical injection rate and volume (fig. 1B). Active bleeding into a proximal sigmoid diverticulum was demonstrated at the lower margin of

the field, which overlapped the midzone of the first arteriographic series. A few minutes later, a third angiographic series was performed at the same injection rate and volume in the right posterior oblique projection for better localization of the bleeding site (fig. 1C); no bleeding was demonstrated.

The patient was treated by conservative medical therapy; after receiving nine more units of blood, he stabilized. Barium enema examination showed diffuse diverticulosis of the entire colon. Surgery was not performed and the patient was discharged without further episodes of bleeding.

Case 2

A 66-year-old white man was admitted for evaluation of an upper gastrointestinal hemorrhage. A week before admission he developed acute gastrointestinal bleeding which was successfully treated medically, but before diagnostic studies could be completed he left the hospital against medical advice. On the day of the present admission, the patient vomited coffee ground materials, passed five black tarry stools, and had a syncopal episode. He had a long history of heavy alcohol consumption and, 5 years earlier, a bleeding ulcer was controlled with medical management and multiple transfusions. Because of a cerebral vascular accident 1 year earlier, he received coumadin anticoagulation until the onset of the present illness. On admission, hemoglobin was 9.6 gm/dl and there was clinical evidence of moderate bleeding.

After a transfusion of several units of whole blood, visceral angiography was performed (figs. 2A and 2B). Celiac arteriography demonstrated extravasation of contrast material in the second portion of the duodenum (fig. 2A). Right posterior oblique celiac angiography performed immediately afterward at identical injection rate and volume revealed no bleeding (fig. 2B). Injection of the superior mesenteric artery to rule out bleeding through the inferior pancreaticoduodenal artery was also negative (fig. 2C). Vasopressin infusion was ineffective in controlling the hemorrhage and the patient was taken to surgery. An acute actively bleeding ulcer was found on the posterior wall of the second portion of the duodenum.

Case 3

A 76-year-old man was admitted with a severe gastrointestinal hemorrhage evidenced by multiple tarry stools. On admission, hemoglobin was 8 gm/dl. History included diverticulitis and Anacin ingestion. Physical examination demonstrated orthostatic hypotension. A nasogastric tube did not return bloody aspirate. After transfusion of eight units of whole blood, the patient continued to bleed briskly.

Superior mesenteric arteriography was performed; this included two separate identical injections covering first the upper and then the lower abdomen (fig. 3). On the first injection there

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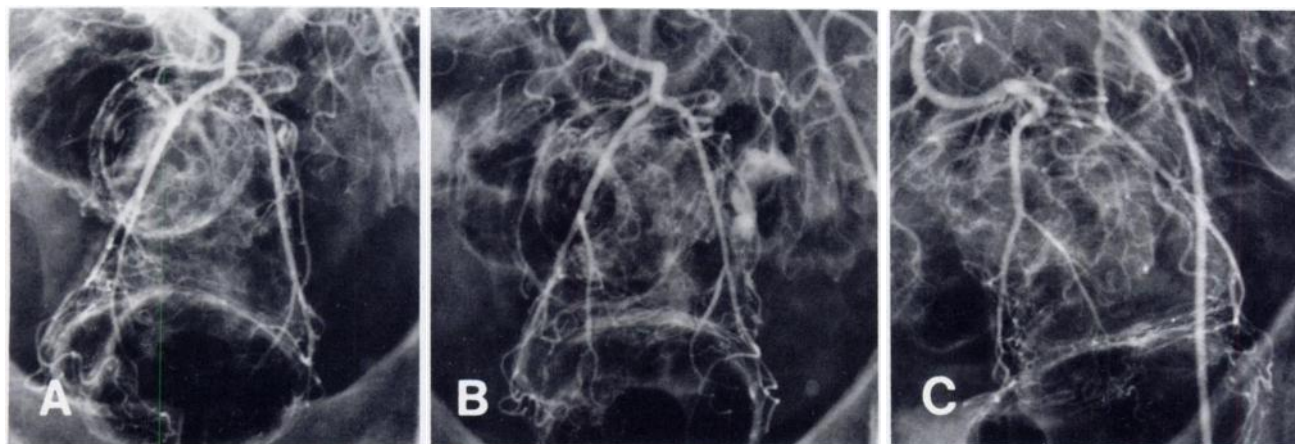


Fig. 1.—Case 1: inferior mesenteric arteriograms of 61-year-old man with active lower gastrointestinal bleeding. *A*, Anteroposterior view showing normal rectosigmoid colon. *B*, Anteroposterior view a few minutes later showing bleeding in proximal sigmoid colon. *C*, Right posterior oblique view a few minutes after *B*. No bleeding is seen.

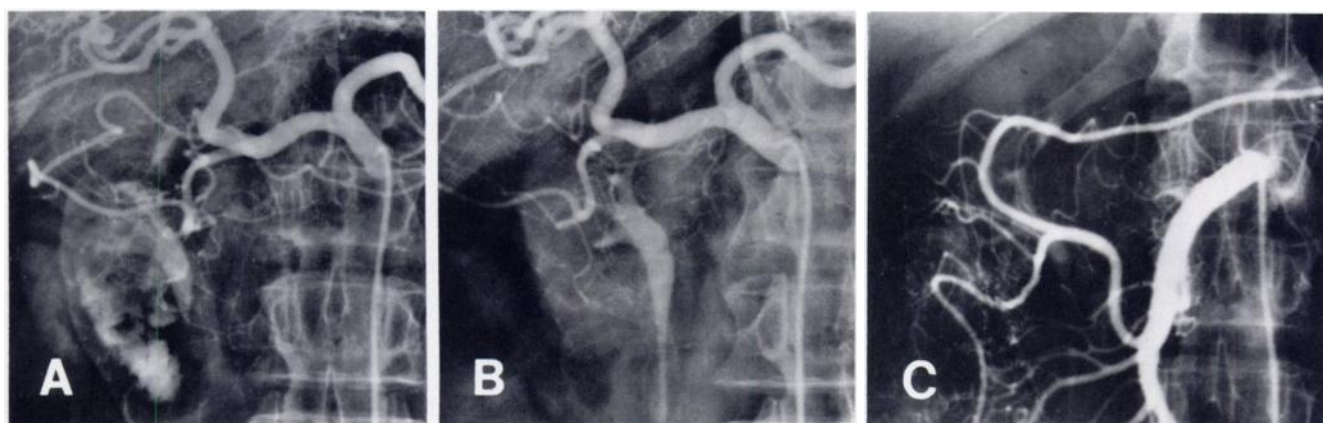


Fig. 2.—Case 2: 66-year-old man with acute upper gastrointestinal hemorrhage. *A*, Celiac arteriogram, Anteroposterior view, showing massive extravasation from superior pancreaticoduodenal artery into duodenum. *B*, Celiac arteriogram, right posterior oblique view soon after *A*. No evidence of bleeding. *C*, Superior mesenteric arteriogram, Anteroposterior view soon after *B*, showing filled inferior pancreaticoduodenal artery. No bleeding is seen.

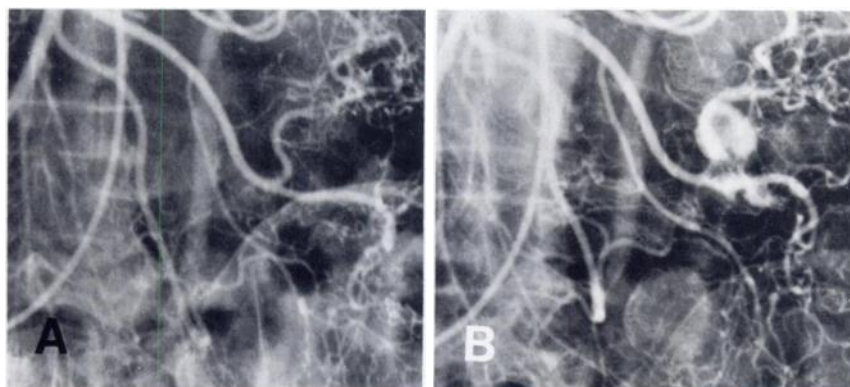


Fig. 3.—Case 3: superior mesenteric arteriograms of 76-year-old man with acute upper gastrointestinal hemorrhage. *A*, Anteroposterior view. No evidence of bleeding is seen. *B*, Anteroposterior view a few minutes later showing extravasation from jejunal artery.

was no demonstrable bleeding (fig. 3A). On the second examination, the upper part of the field overlapped the lower part of the first angiographic field; in this series extravasation of contrast material was seen from a jejunal artery which was not bleeding in the first series (fig. 3B). The patient was immediately taken to surgery and a diverticulum was found about 46 cm from the ligament of Treitz. Pathologic examination of the specimen demonstrated a 1.6 cm acquired diverticulum of the

jejunum and a 0.1 cm ulcer in the tip of the diverticulum immediately overlying and eroding into a small muscular artery.

Discussion

Visceral angiography is a well established technique in detecting and controlling gastrointestinal hemorrhage. Prior to angiography, patients often undergo

endoscopy in an attempt to localize the site of bleeding. Both endoscopists and angiographers have encountered patients with acute massive gastrointestinal hemorrhage in whom they failed to demonstrate the bleeding site. Demonstration of variceal bleeding by angiography is notoriously difficult, but arterial bleeding at rates over 0.5 ml/min is usually well seen [1]. Presently recognized and documented causes for failure to demonstrate gastrointestinal bleeding by arteriography include: (1) hemorrhage at a rate too slow to demonstrate by angiography (<0.5 ml/min); (2) venous (variceal) bleeding; (3) technical problems, including injection into the wrong artery, nonselective injection, inadequate injection rate and/or volume, and failure to include the bleeding site on the angiographic field; (4) permanent cessation of bleeding; and (5) temporary cessation of bleeding due to hypotension (vasovagal reaction or blood loss) or intermittent bleeding (arteriographically documented in this paper).

We believe our three cases document a transient phenomenon—the intermittent minute-to-minute nature of even acute massive gastrointestinal hemorrhage. As documented, such bleeding can occur from branches of all the major arteries to the gastrointestinal tract: the inferior mesenteric artery (case 1), the celiac artery (case 2), and the superior mesenteric artery (case 3).

The mechanism for the intermittency is not clear; localized spasm in arteriolar branches may be responsible. It is probably too transient to be related to blood loss and/or vasovagal reaction. None of our three patients had clinical evidence of changes in their hemodynamic status during the course of angiographic examinations, and the injected major vessels or their branches showed no change in caliber from study to study.

Baum [4] and Casarella et al. [5] suggested that gastrointestinal hemorrhage can be intermittent in nature; Casarella et al. reported two patients with colonic diverticular hemorrhage in whom negative angiographic studies were followed by positive ones within 30 min. They postulated that the bleeding may have been provoked by the vasodilatory action of the contrast medium [6]. In our patients, however, hemorrhage was demonstrated on the first but not the second or third arteriogram in case 2, and in case 3 on the second, but not the first or third arteriogram.

This phenomenon may be more frequent than recognized, because in many patients a repeat injection is not needed to cover the entire distribution of an artery, or because in cases of repeated injections the bleeding site may not be located in overlapping areas of the two angiographic fields. Lack of demonstration of a bleeding point therefore does not necessarily represent either an inadequate examination or cessation of the hemorrhage, but rather a very transient phenomenon. This makes it increasingly important that patients with acute gastrointestinal hemorrhage undergo thorough endoscopy to find the bleeding site(s), and that the status of patients with upper gastrointestinal hemorrhage be monitored during the angiographic study. In patients with upper gastrointestinal hemorrhage, the nasogastric aspirate should be checked frequently; in those with lower gastrointestinal bleeding, accurate monitoring unfortunately is not possible.

We hesitate to recommend repeated contrast injections in patients with acute gastrointestinal hemorrhage and negative arteriography. However, a trial infusion of vasopressin into the appropriate artery may be indicated in clinically continuing gastrointestinal bleeding localized by endoscopy, even if such hemorrhage is not demonstrated by arteriography.

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