Late-onset Colonic Occlusion after Emergent Selective Embolization of Sigmoid Artery with N-butyl Cyanoacrylate for Life-threatening Traumatic Bleeding

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A 30-year-old man who had life-threatening traumatic bleeding from the sigmoid colon was successfully treated with emergent selective embolization of the sigmoid artery with N-butyl cyanoacrylate without ischemia. However, the patient developed colonic occlusion that became clinically apparent 6 months after the embolization and required surgical treatment. Interventional radiologists should be aware of the possibility of late-onset intestinal stricture. Because complications of mesenteric artery embolization may be delayed for months, an extended follow-up period is prudent to monitor the embolization site even in the absence of clinical symptoms.

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Abbreviation: NBCA = N-butyl cyanoacrylate

SELECTIVE arterial embolization is currently one of the accepted treatment options for lower gastrointestinal bleeding (1,2). The use of microcatheters for superselective embolization has resulted in a low rate of acute symptomatic gastrointestinal ischemia and infarction after embolization (1–4). There have been some reports that have documented ischemic stricture of the colon that developed within a few days after embolization, which was mild and self-limiting (2,5,6). In contrast, we describe the development of an ischemic stricture resulting in occlusion of the sigmoid colon that became clinically evident 6 months after embolization of the sigmoid artery.

Institutional review board approval is not required at the authors' institution for a case report such as this.

CASE REPORT

A 30-year-old man was admitted to the emergency room of our hospital after a traffic accident. On admission, he was in a state of shock; he had tachycardia with a systolic blood pressure of less than 60 mm Hg. Laboratory data showed anemia with a hemoglobin value of 6.9 g/dL. Abdominal computed tomography (CT) revealed pooling of contrast medium in the pelvis.

The patient received a blood transfusion and underwent emergency angiography. The arteriography from the inferior mesenteric artery showed extravasation of contrast medium from a branch of the sigmoid artery (**Fig 1a**). Although surgical resection of the sigmoid colon, including the bleeding site, was considered to manage the bleeding, the surgeons determined that surgery was inadvisable because of the unstable vital signs caused by massive intraperitoneal bleeding. Based on this opinion, we decided to embolize the bleeding artery. A microcatheter was advanced into the bleeding mural sigmoid branch (**Fig 1b**), and superselective embolization was performed by injecting a liquid embolic agent, N-butyl cyanoacrylate (NBCA). NBCA was mixed with Lipiodol (Laboratoire Andre Guerbet, Aulnay-sous-Bois, France) at a ratio of 1 part glue per 1.5 parts oil and was injected through the microcatheter. Embolization was confined to the mural branch, avoiding the marginal artery. The vital signs stabilized after the embolization, with an increase in systolic blood pressure to 110 mm Hg. After the stabilization of the patient's vital signs by the embolization, surgical resection of the embolized sigmoid colon was again considered because of concern for ischemic injury caused by the embolization at this site. However, the patient showed no symptoms of colonic ischemia; he had no abdominal pain, fever, or hematochezia. Colonoscopy performed the next day revealed no findings indicating ischemia of the sigmoid colon. We therefore decided not to perform surgery. The general status of the patient improved and he was discharged 12

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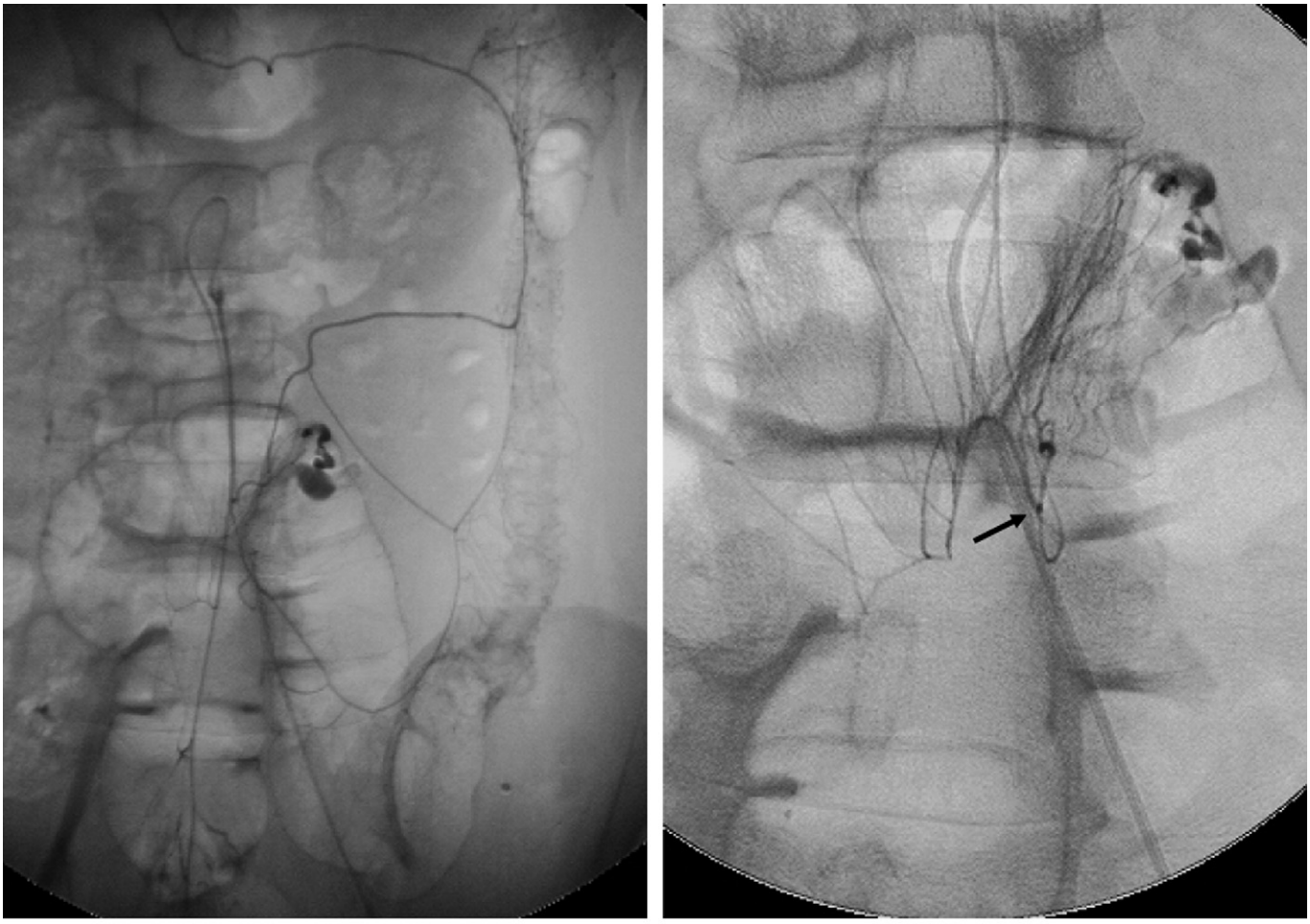

a. b.

Figure 1. **(a)** Arteriography from the inferior mesenteric artery with a 5-F catheter. Extravasation was observed from the branch of the sigmoid artery. **(b)** The branch was selectively embolized with NBCA through a 2.5-F microcatheter (arrow indicates the tip of the microcatheter).

days after the initial hospitalization. Follow-up examination of the colon was not performed because he did not return for follow-up.

The same patient was readmitted to our hospital 6 months after discharge because of severe lower abdominal pain, constipation, and vomiting. He had experienced mild nausea and abdominal fullness approximately 1 week before this readmission. Abdominal radiography and CT examination revealed marked retention of air in the small and large bowel. A colonoscopy on the day of readmission revealed complete occlusion of the sigmoid colon at the site of embolization (**Fig 2a**). The patient underwent emergent surgery. At surgery, severe stenosis of the sigmoid colon with adhesion of the ileum was observed (**Fig 2b**), and the sigmoid colon was resected along with a part of the ileum. Pathologic study of a biopsy specimen from the colonoscopy and the resected specimen of the sigmoid colon showed granulation and severe fibrosis of the colon mucosa at the site of embolization.

DISCUSSION

From the mid-1970s through the early 1990s, embolization for lower gastrointestinal bleeding was largely abandoned because of frequent development of gastrointestinal infarction after the embolization (7,8); embolization of the lower gastrointestinal tract was not recommended for many years. However, the high rate of infarction found in early reports was probably a result of the relatively larger catheters used and more limited embolic agents available. New developments in technology, such as microcatheters and embolic agents that can be delivered through them, have allowed superselective distal arterial embolization and have made embolization acceptable as a treatment of lower gastrointestinal bleeding (1–4).

In the present case, we chose embolization to stop bleeding because of the unstable vital signs, which rendered surgery difficult and also imposed a requirement to stop the bleeding immediately and completely. No observations suggested ischemia at the embolized site, clinically or on endoscopic examination