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Case Report

Sequential Multiple Visceral Artery Dissection within a Short Time, without Aortic Dissection

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A 65-year-old Japanese man without medical history presented with sudden onset lower abdominal pain to our emergency department. Contrast-enhanced computed tomography (CT) revealed dissections of the inferior mesenteric artery and left renal artery with false lumen thrombosis without aortic dissection. He was immediately hospitalized, and conservative treatment was administered. However, on the third-day post-onset, the patient reported severe upper abdominal pain and contrast-enhanced CT showed a new superior mesenteric artery dissection. He continued to receive conservative treatment, and his symptoms improved. He was discharged after ten days of hospitalization.

Keywords: inferior mesenteric artery dissection, multiple visceral artery dissection, superior mesenteric artery dissection

Introduction

Spontaneous isolated dissection of visceral arteries without aortic involvement was first described by Bauersfeld in 1947, and it is uncommon.[1)] Particularly, the inferior mesenteric artery (IMA) dissection is rare.[2)] We encountered a patient in whom superior mesenteric artery (SMA) dissection was observed shortly after he exhibited IMA dissection. We provide the case details and a brief literature review.

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Case Report

A 65-year-old Japanese man presented to our emergency department with a sudden onset of lower abdominal pain. He had no remarkable medical history and no notable family history. On physical examination, intestinal peristalsis was normal, without abdominal tenderness. The patient's blood pressure was high at 180/88 mmHg. Other vital signs and laboratory data were within the normal limits. Electrocardiography and abdominal ultrasound were performed, with no relevant findings. Laboratory tests revealed white blood cell, platelet, and hemoglobin counts at 8,260/μL, 207,000/μL, and 14.5 g/dL, respectively. The patient's liver and kidney functions were normal; his aspartate aminotransferase level was 27 U/L, alanine aminotransferase was 26 U/L, and serum creatinine was 0.69 mg/dL. The C-reactive protein value was 0.09 mg/dL and lactate dehydrogenase (LDH) was 207 U/L.

Contrast-enhanced computed tomography (CT) revealed dissections of the patient's IMA and left renal artery with false lumen thrombosis, without aortic dissection (**Figs. 1A** and **1B**). The contrast enhancement on the intestinal wall was good, but the patient had an associated left renal infarction (**Fig. 1C**). A celiac artery aneurysm accompanied these findings but was unrelated to the patient's present symptoms (**Fig. 1D**).

The patient was admitted to our hospital's department of cardiovascular medicine and treated with a continuous intravenous infusion of heparin, maintaining an activated partial thromboplastin time value from 45 to 70 sec. Antihypertensive therapy with amlodipine and carvedilol was also initiated to maintain his systolic blood pressure at <120 mmHg. Food intake was temporarily stopped, and the patient was placed on bed rest. On the day after admission, his lower abdominal pain gradually improved. The abnormalities in the IMA and left renal artery were thought to be due to dissection rather than embolization, but an embolic source evaluation was performed initially.

Regarding the patient's electrocardiography results, echocardiography showed no abnormalities, and transesophageal echocardiography showed no structural abnormalities that would cause an embolism. Blood samples

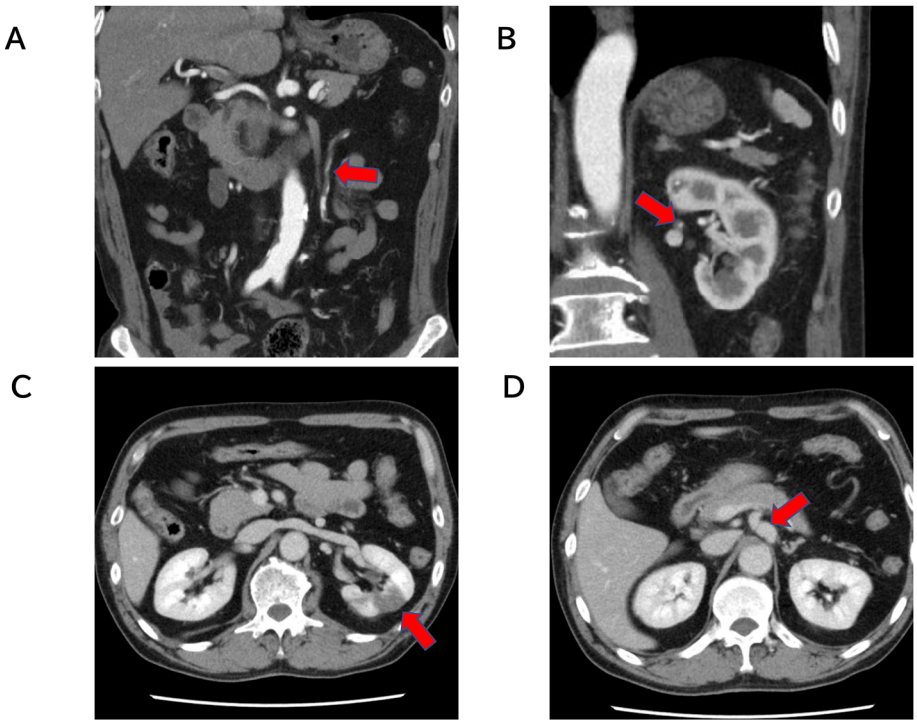

Fig. 1 (**A**) Coronal contrast-enhanced computed tomography (CT) revealed a dissection of the inferior mesenteric artery (IMA) with thrombosis of the false lumen (red arrow) and mild calcification and atherosclerotic changes in the abdominal aorta. (**B**) Coronal contrast-enhanced CT showing the dissection of the left renal artery with thrombosis of the false lumen (red arrow). (**C**) The patient had an associated left renal infarction with left renal artery dissection on axial CT (red arrow). (**D**) Unrelated to the present symptoms, a celiac artery aneurysm was observed on axial contrast-enhanced CT (red arrow). No stenosis was found at the origin of the celiac artery.

were obtained, but no specific findings were identified, such as collagen disease or coagulation abnormalities. On day two after the onset of the patient's symptoms, he reported severe upper (but not lower) abdominal pain. There were no vital signs or laboratory findings of abnormalities, including hepatic and renal parameters, creatine kinase, LDH, and others. Emergent contrast-enhanced CT scanning was performed, and it revealed a newly dissected superior mesenteric artery (SMA) without aortic involvement (**Figs. 2A** and **2B**). The appearance of the IMA at this CT examination was not markedly different from that on the CT performed two days earlier (**Fig. 2C**), and the left renal artery dissection and left renal infarction improved (**Fig. 2D**).

Analgesia with fentanyl was started for the patient's abdominal pain, and abdominal angiography was performed; it revealed that the SMA's proximal portion had a slit-like dissection, and its distal portion had a dissection with a false lumen partial closure (**Figs. 3A** and **3B**). Since blood flow to the intestinal tract appeared good on contrast, conservative treatment was chosen, and the patient was switched from heparin to warfarin for long-term anticoagulation therapy. Since the patient began to have mucous and bloody stools the next day, a colonoscopy was performed. It revealed mild scattered erythema and edema in the rectum and sigmoid colon on the fifth day of hospitalization (**Fig. 3C**). This finding was consistent with ischemic enteritis.

By the fourth day of hospitalization (on the day after the onset of upper abdominal pain), the patient's abdominal pain was resolved, and there were no findings of intestinal necrosis on colonoscopy. Perforation of the gastrointestinal tract and necrotizing intestinal ischemia were thus ruled out, and conservative treatment was performed. The mucous and bloody stools soon disappeared. Warfarin and oral antihypertensive medications were adjusted, and the patient was discharged after ten days of hospitalization.

Discussion

The pathogenesis of spontaneous isolated dissection of visceral arteries without aortic involvement has not been established, although necrosis of the tunica media, arteriosclerosis, fibromuscular dysplasia, and vasculitis are suspected to be involved.[3] SMA dissection is more common

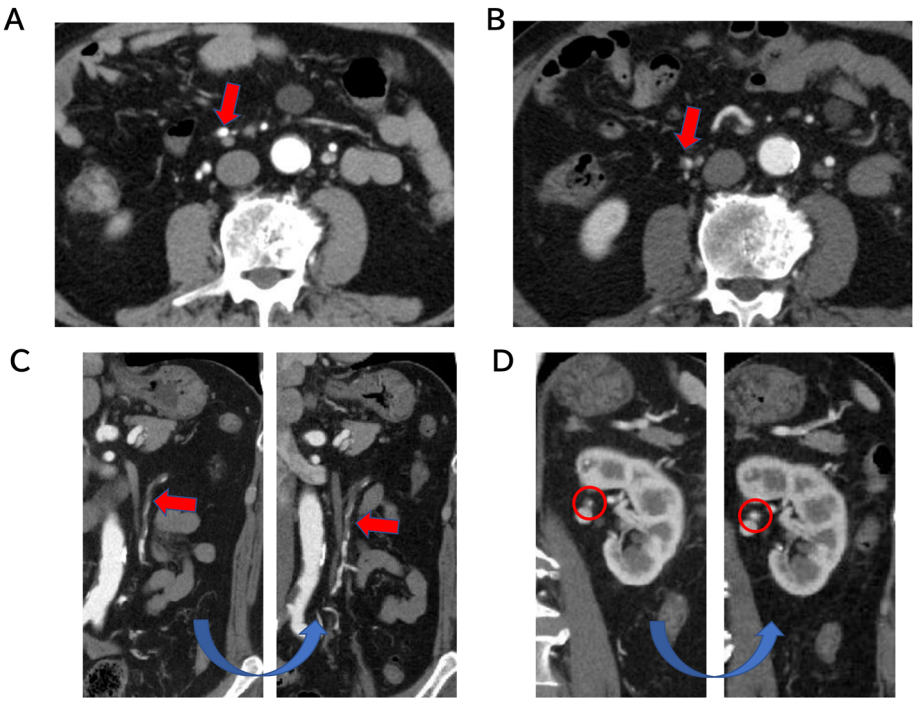

Fig. 2 (**A**) Axial enhanced computed tomography (CT) on admission showed no dissection of the superior mesenteric artery (SMA) (red arrow). (**B**) Axial enhanced CT at three days post-admission after admission showed dissection of the SMA (red arrow). (**C**) The appearance of the IMA was not markedly different from that on the coronal CT performed two days earlier (red arrows). (**D**) The left renal artery's dissection had improved from the 2-days-prior coronal CT (red circles).

in men (4 : 1 ratio with women), and the average age of the patients is 56 years. In our patient's case, no risk factors for atherosclerosis were identified, such as hypertension, diabetes, or dyslipidemia, and vasculitis was considered negative based on the blood sample results. When the patient was admitted to the hospital, his blood pressure was transiently high due to pain but later improved. Since his systolic blood pressure was about 100 mmHg at discharge with only a small dose of beta-blockers, hypertension was thought to be less likely to be involved. However, since calcification and atherosclerotic changes were observed in the patient's aorta, atherosclerosis was suspected to be involved with this visceral artery dissection.

The symptoms are typically abdominal or back pain but can be severe if a dissecting aneurysm ruptures or organ ischemia develops. Reported indications for surgery include the rupture of an aneurysm (including an imminent rupture), the progression of organ ischemia in the acute stage, the enlargement of an aneurysm's diameter to >20 mm in the chronic stage, and abdominal angina.[4]

In our patient's case, the IMA dissection first caused lower abdominal pain, and the SMA dissection that developed later was thought to have caused the patient's upper abdominal pain. The left renal artery dissection was considered acute because it was asymptomatic but tended to show improvement on the immediate CT retest. We suspected that the mucous and bloody stools that developed 3–4 days after the patient's admission resulted from ischemic enteritis due to the IMA dissection.

Regarding surgical treatment in the acute stage, graft interposition and SMA re-anastomosis, right gastric aortic bypass, and other approaches have been reported, and the effectiveness of endovascular stenting has been described.[5] Suzuki et al. summarized the cases of 173 isolated abdominal visceral artery dissections in Japanese patients,[6] and according to their report, approx. three-quarters of the patients (74.4%) opted for conservative treatment, with the remaining patients receiving some form of invasive treatment. Only one patient died due to the dissection, suggesting that this disease has a relatively good prognosis.

Two important points exist about our patient's case. First, the onset of his pain was due to the IMA dissection instead of SMA dissection. SMA dissection is rare but has been described, whereas IMA dissection is rarely reported. Second, our patient's IMA dissection, renal artery dissection, and SMA dissection were not contiguous, and the IMA and SMA dissections occurred in isolation during the acute phase. Multiple and anatomically discontinuous visceral artery dissections are rare; we have found only

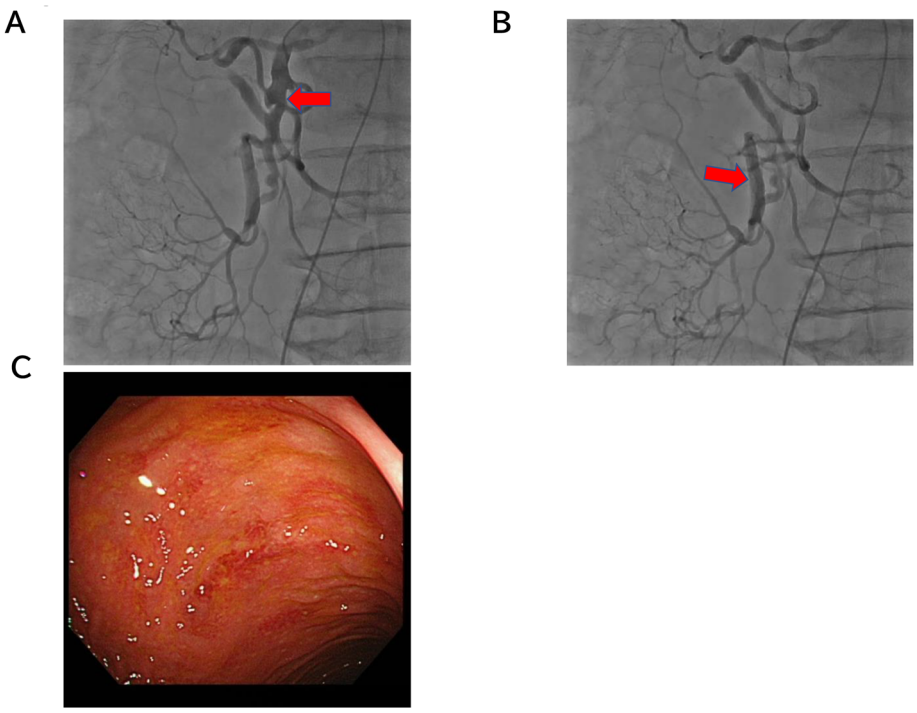

Fig. 3 (**A**) Angiography revealed that superior mesenteric artery (SMA)'s proximal portion had a slit-like dissection (red arrow). (**B**) The SMA's distal portion had a dissection with a false lumen partial closure (red arrow). (**C**) Colonoscopy was performed, revealing mild mucosal erythema and edema.

two published cases. Bonardelli et al. reported that 10 days after the patient's SMA dissection, she developed a dissection of the celiac artery and bilateral renal arteries in addition to an exacerbation of the SMA dissection.[7] In her case, conservative treatment was initially chosen, but stenting was eventually performed for the progression of the SMA dissection. Hata et al. reported a new onset of dissection of the common hepatic artery, gastroduodenal artery, and left renal artery along with the worsening of an SMA dissection at four days after the SMA dissection.[8]

Both of these prior cases developed from a dissection of the SMA and exhibited exacerbation of the SMA dissection. It is possible that when an SMA dissection worsens, factors other than the progression of the vascular dissection may trigger the next dissection. Meanwhile, in our patient, no worsening of the first (i.e., IMA) dissection occurred at the second dissection. In any case, it is not yet understood why proximal abdominal visceral arteries continue to dissect without vascular continuity. The present patient's case was complicated by a celiac artery aneurysm, which may have resulted from a previous arterial dissection.

Conclusion

A 65-year-old man experienced a rare IMA dissection and sequential multiple visceral artery dissection. When clinicians observe an abdominal visceral artery dissection, careful follow-up is necessary to ensure no intestinal ischemia and additional serial dissection.

Acknowledgments

None.

Statement of Patient Consent

The patient's identity has been protected, and the patient's informed consent for the publication of this report and figures was obtained.

Disclosure Statement

None of the authors have any potential conflicts of interest associated with this research.

Author Contributions

Study conception: HU
Data collection: HU
Writing: HU
Critical review and revision: all authors
Final approval of the article: all authors
Accountability for all aspects of the work: all authors

References

1) Bauerfeld SR. Dissecting aneurysm of the aorta: a presentation of fifteen cases and a review of the recent literature. Ann Intern Med 1947; **26**: 873-89.
2) Neychev V, Krol E, Dietzek A. Unusual presentation and treatment of spontaneous celiac artery dissection. J Vasc Surg 2013; **58**: 491-5.
3) Nagai T, Torishima R, Uchida A, et al. Spontaneous dissection of the superior mesenteric artery in four cases treated with anticoagulation therapy. Intern Med 2004; **43**: 473-8.
4) Akiyama Y, Omagari K, Matsubara K, et al. A case of spontaneous isolated dissection of the superior mesenteric artery. Jpn J Gastroenterol Surg 2008; **41**: 1619-24.
5) Sugiyama K, Kume M, Omoto T, et al. Clinical study of dissection of the visceral artery. J Jpn Coll Angiol 2005; **45**: 541-6.
6) Suzuki T, Makuuchi H, Kobayashi T, et al. Consideration and analysis of spontaneous isolated dissection of the splanchnic arteries: 7 case reports and review of 165 in the Japanese paper. Jpn J Vasc Surg 2012; **21**: 773-80.
7) Bonardelli S, Battaglia G, Zanotti C, et al. Sequential multiple visceral arteries dissections without aortic involvement. Ann Vasc Surg 2013; **27**: 497.e9-13.
8) Hata M, Ichiba T, Kobayashi Y, et al. Multiple visceral artery dissection without aortic dissection. Am J Emerg Med 2017; **35**: 373.e1-2.