Isolated Superior Mesenteric Artery Dissection with Small Intestine Ischemia

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Abstract
Superior mesenteric artery (SMA) dissection without aortic dissection is a rare condition, and its diagnosis is considered to be difficult. Intestinal infarction is a severe complication of the disease, which may require resection of the intestine. We present a case of isolated SMA dissection. A 53-year-old man experienced sudden pain in the abdomen while playing Japanese pinball and was admitted to our hospital due to acute abdominal symptoms of uncertain cause. Enhanced CT revealed a defect of the root of the SMA, while angiography and intravascular ultrasound findings showed dissection of the SMA wall. Conservative treatment was chosen at the time, while a part of the small intestine was eventually resected because of progressive ischemia. Although SMA dissection is a rare occurrence in cases with acute abdominal symptoms, awareness of the condition is important for differential diagnosis.

Introduction
Isolated superior mesenteric artery (SMA) dissection was first reported by Bauersfeld [1] in 1947 and was defined as SMA wall dissection not accompanied by aortic dissection. Recently, reports concerning this rare disease have been increasing due to the widespread use of CT for the assessment of abdominal pain [2].
SMA dissection was reported in middle-aged men with hypertension and a smoking habit [3]. The presence of arteriosclerosis, fibromuscular dysplasia, and elastic tissue degeneration of the arterial wall were described as causes of SMA dissection by some investigators [4]. Enhanced CT is useful as initial imaging study for the patients presenting with severe abdominal pain since it can detect various pathological conditions including arterial dissection, although arteriography provides more specific information [4]. Various types of treatments such as conservative, endovascular, and surgical treatments have been reported with some success. However, a widely accepted treatment strategy has not been established because of the rarity of the disease.

SMA dissection is an uncommon condition and may cause gut ischemia as well as deteriorate the clinical course of affected patients. Therefore, it is considered to be one of the most important diseases for a differential diagnosis in the case of acute abdominal pain. We report a case of SMA dissection that was difficult to diagnose, but was later successfully treated by resection of the small intestine.

Case

A 53-year-old man had a sudden onset of abdominal pain and vomiting while playing Japanese pinball. He visited a nearby clinic and received a subcutaneous injection of butylscopolamine 20 mg; however, the abdominal symptoms did not improve, and he visited our hospital 2 h after the initial onset. Vital signs were stable on arrival (body temperature 36.0°C, blood pressure 125/70 mm Hg, and pulse rate 70 beats/min), though the patient had a cold sweat and reported nausea. Laboratory studies showed elevated levels of leukocytes (14,720/μl) and lactate dehydrogenase (306 U/l). Aspartate transaminase and alanine aminotransferase values were 32 and 38 U/l, respectively. His abdomen was flat and soft, and there was tenderness around the navel without peritoneal signs. Bowel sounds were normal and not metallic. He could not lie in a supine position because of his pain and remained in a right lateral position. No niveau was seen on X-ray findings of the abdomen. CT revealed wall thickness in the upper small intestine, suggesting the possibility of ileitis. He was admitted to the emergency unit with acute abdominal pain of uncertain cause in order to observe the clinical course.

The patient was subcutaneously administered metoclopramide and pentazocine 15 mg for the abdominal symptoms. Despite our recommendation to stay in the hospital, he was discharged the next day due to family problems, though the peripheral leukocyte count and C-reactive protein level were elevated to 20,010/μl and 4.7 mg/dl, respectively. After returning home, vomiting and abdominal pain continued, and the patient visited the gastroenterology unit of our hospital on the third day after onset. An examination at that time showed that the abdomen was flat and soft without peritoneal irritation signs, but the patient was admitted again to the gastroenterology ward due to continuous inflammatory response (leukocyte count 10,780/μl, C-reactive protein 10.66 mg/dl). Other laboratory findings were within normal ranges (aspartate transaminase 22 U/l, alanine aminotransferase 29 U/l, and lactate dehydrogenase 172 U/l).

Following admission, an abdominal CT with contrast enhancement was performed, which revealed wall thickness of the small intestine and a contrast filling defect in the root of the SMA (fig. 1). We made a diagnosis of SMA thrombosis and considered emergency treatment, as a portion of the small intestine was not enhanced. As a result, abdominal angiography was performed on the same day. Digital subtraction angiography showed a false lumen at the proximal SMA and stenosis of the secondary jejunal branch, which was consid-
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cases necessarily have an intimal flap, and some show only an enlarged SMA diameter and increased attenuation of the fat around the SMA [8]. Morris et al. [9] reported that angiography following a CT examination clearly showed SMA dissection. In the present case, we were not able to make a definitive diagnosis based on the first enhanced CT examination and only reached our final decision based on subsequent SMA angiography. Thus, enhanced CT followed by abdominal angiography should be done for patients with unexplained severe abdominal pain, as appropriate. Others recently reported that CT angiography is useful for the diagnosis of SMA dissection, because dissection can be more readily diagnosed compared with conventional angiography [3, 10]. We recommend that conventional angiography be performed only for patients who may require endovascular treatment in the future.

In conclusion, partial ischemia of the small intestine in cases with explained abdominal pain indicates the possibility of SMA dissection. Contrast-enhanced CT should be considered in the early stage for an accurate diagnosis. Although SMA dissection is relatively rare in cases with acute abdominal symptoms, awareness of the condition is important for differential diagnosis.

Statement of Ethics

The authors have no ethical conflicts to disclose.

Disclosure Statement

There are no potential conflicts of interest to disclose in association with this study.

References

**Fig. 1.** Contrast-enhanced CT imaging. Partial narrowing of the proximal portion of the SMA is shown (arrow).

**Fig. 2.** Digital subtraction angiography. 
- **a** Contrast enhancement suggesting a false lumen in the trunk of the SMA (arrows).
- **b** Severe stenosis of the secondary jejunal branch (arrows).
Fig. 3. During laparoscopic surgery, the ileal loop had a dark violet appearance (arrowheads), and poor peristalsis was also found.