

# Dissection of the Superior Mesenteric Artery which Required Resection of a Large Amount of the Small Intestine and the Colon : A Case Report

Naoyuki Kobayashi,<sup>1</sup> Junichi Saito,<sup>1</sup> Tetsuya Nakamura,<sup>1</sup>  
Santaro Sagae,<sup>1</sup> Kenji Iwata,<sup>1</sup> Eiji Kurihara,<sup>1</sup>  
Toshiaki Ikeda,<sup>2</sup> Yoshito Ueyama,<sup>3</sup> Mitsuhiro Saito,<sup>4</sup>  
Hitomi Horikawa,<sup>4</sup> Hidetomo Muto<sup>4</sup>, Kei Kawagoe,<sup>4</sup>  
Kinsei Kou,<sup>4</sup> Yasuyuki Ohgino,<sup>4</sup> Lisa Okukubo<sup>4</sup>  
and Shinji Takahashi<sup>5</sup>

Superior mesenteric artery (SMA) dissection is rare. We herein report about a case of SMA dissection which required resection of a large amount of the small intestine and the colon. A 59-year-old male with vague lower abdominal pain and diarrhea was admitted to our hospital. An erect abdominal X-ray showed niveau. His condition deteriorated and on the fifth day from the onset, an enhanced computed tomography (CT) revealed the SMA was dissected along 3 cm of its length from its origin, and the blood supply to the small intestine was shuttered in association with false lumen formation. Finally, the patient was necessitated an emergency surgery. A grayish ischemic small intestine and ascending colon were seen along with a moderate amount of ascites. The ischemic part of the intestine was resected. Pathological findings revealed coagulation necrosis with inflammatory cell infiltration, blood congestion, and hemorrhage. This coagulation necrosis was compatible with hemorrhagic necrosis due to intestinal ischemia. In conclusion, enhanced CT was available for detecting SMA dissection. If a patient with acute abdomen of unknown origin is encountered, SMA dissection should be ruled out, because ischemic intestine due to SMA occlusion is time-dependent and life-threatening. Furthermore, in the case of extensive bowel resection, the management of short bowel syndrome is thought to be essential. (Kitakanto Med J 2009 ; 59 : 357~360)

**Key Words** : superior mesenteric artery, dissection, intestinal ischemia, computed tomography, extensive bowel resection

## Introduction

Superior mesenteric artery (SMA) dissection cases have been reported occasionally since Bauersfeld first described the condition. Most of these cases were published within ten years.<sup>1</sup> We present a case of SMA dissection that was difficult to diagnose but was successfully treated by resecting a large amount of the small intestine and the colon. The literature is also reviewed.

## Case

A 59-year-old male with lower abdominal pain and diarrhea was admitted to our hospital. He had a normal body temperature and a maximum white blood cell count of 11,600/mm<sup>3</sup> with vague abdominal pain with no symptoms of peritonitis. The erect abdominal X-ray showed niveau formation, which indicated dilatation of the stomach and the small intestine (Fig. 1). Computed tomography (CT) revealed dilatation

1 Department of Surgery 2 Department of Radiology 3 Department of Pathology 4 Department of Internal Medicine, Inagi Municipal Hospital 5 Department of Surgery and Internal Medicine, Kawasaki Saiwai Hospital Nakahara Branch Hospital

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Address : NAOYUKI KOBAYASHI Department of Surgery, Inagi Municipal Hospital, 1171 Omaru, Inagi, Tokyo 206-0801, Japan



**Fig. 1** The erect abdominal X-ray showed niveau formation which indicated dilatation of the stomach and the small intestine.

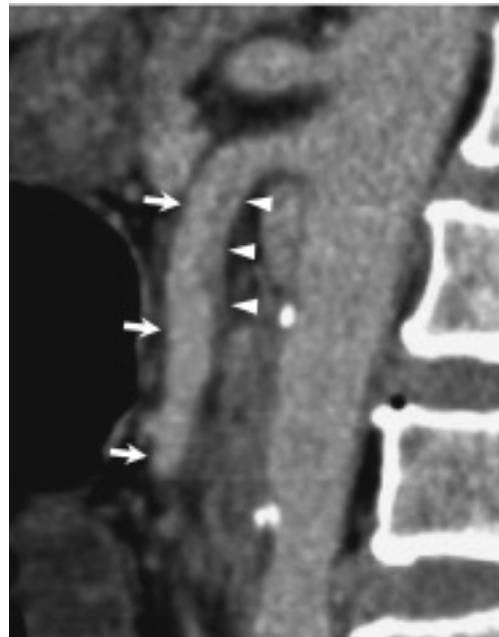


**Fig. 2** Computed tomography (CT) revealed dilatation of the stomach and the small intestine with no remarkable findings of the SMA.

of the stomach and the small intestine (Fig. 2). His condition deteriorated, and the abdominal pain was not controllable with analgesics. On the fifth day from the onset, an enhanced CT revealed that the SMA was dissected along 3 cm of its length from its origin, and the blood supply to the small intestine was shuttered in association with false lumen formation (Fig. 3). Finally, the patient required emergency surgery under a diagnosis of ischemic small intestine due to SMA dissection. During the operation, a grayish ischemic small intestine and ascending colon were seen along with a moderate amount of ascites (Fig. 4). The ischemic part of the small intestine and the colon were resected and reconstructed. Pathological findings



**Fig. 3a** On the fifth day from the onset, an enhanced CT revealed that the SMA with crescentic low (arrow head) and high (arrow) attenuation which were suggestive of dissected SMA with true lumen and thrombosed false lumen, respectively.

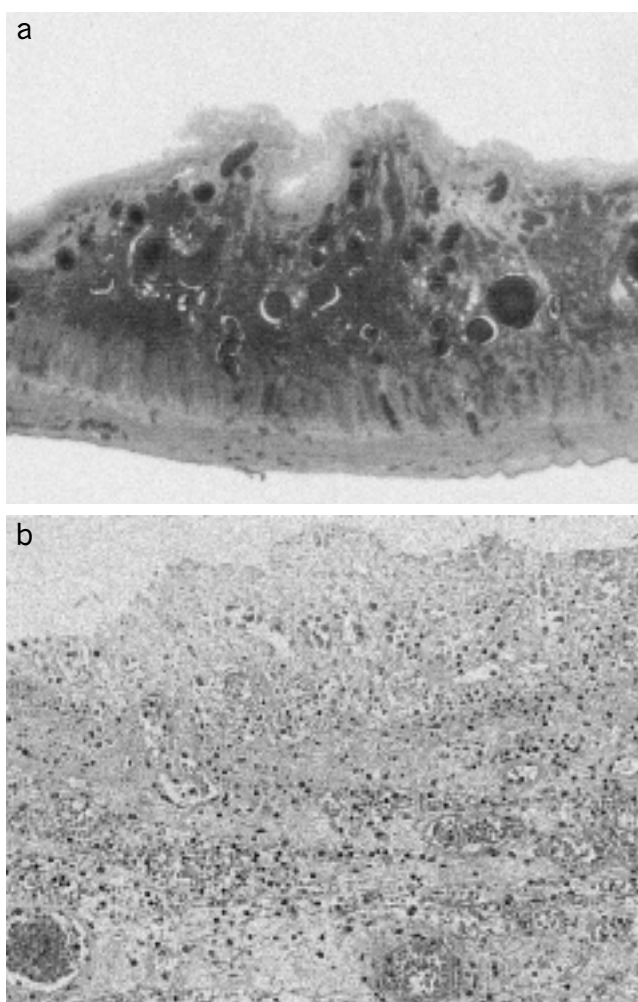


**Fig. 3b** Sagittal image of the enhanced CT showed that the SMA was dissected along 3 cm of its length from its origin (arrow heads), and the blood supply to the small intestine was shuttered in association with false lumen formation (arrows).

revealed coagulation necrosis with inflammatory cell infiltration, blood congestion, and hemorrhage. This coagulation necrosis was compatible with hemorrhagic necrosis due to intestinal ischemia (Fig. 5). Anastomotic leakage occurred on the fifth post-operative day (POD), as well as septic shock by *Escherichia coli* on 33 POD followed by continuous bleeding from an ulcer at the anastomotic site, low albuminemia, diarrhea, and liver dysfunction, but all of these conditions were improved conservatively by nutritional support using total parenteral nutrition followed by a low



**Fig. 4** During the operation, a grayish ischemic small intestine and ascending colon were seen along with a moderate amount of ascites.



**Fig. 5** Pathological findings revealed coagulation necrosis with inflammatory cell infiltration, blood congestion, and hemorrhage. This coagulation necrosis was compatible with hemorrhagic necrosis due to ischemia of the intestine.

a : H&E,  $\times 40$   
b : H&E,  $\times 100$

-residue diet and binding medicine, and the patient was discharged six months after the operation. At this point, follow-up enhanced CT has revealed no progression of coagulation in the SMA.

### Discussion

In recent years, an increasing number of case reports have been published as a result of the progress that has been made in imaging technology such as the CT scan with intravenous contrast administration. As of 2009, according to PubMed and the reference lists from the respective publications, some 80 cases of SMA dissection have been reported, including our case. SMA dissection occurs predominantly in males in their fifth decade, but little was reported in light of ethnicity. One-third of the cases have coexisting conditions of smoking and hypertension. The latter was observed in our case. Also, in most reported cases, the patient exhibits severe abdominal pain upon acute onset.<sup>2</sup> Some investigators have pointed out the relationships of SMA dissection with aneurysm, atherosclerosis, cystic medial necrosis, fibromuscular dysplasia, and segmental mediolytic arteriopathy.

Enhanced CT has been reported to be useful for the diagnosis of SMA dissection. Based on CT findings, our case can be categorized as type IV in the Sakamoto classification of spontaneous dissection of SMA: a completely thrombosed false lumen without an ulcer-like projection. In this classification, the thrombosed false lumen spontaneously absorbs within a relatively short time and does not recur.<sup>3</sup> According to Suzuki et al, increased attenuation of the fat around the SMA in CT is considered to be the key to the diagnosis when no definite findings are evident; however, these findings were not significant in our case.<sup>4</sup> Arteriography is considered the gold standard for the diagnosis of SMA dissection, and it provides useful information.<sup>5</sup> Recent progress in radiology has made the detection of SMA dissection possible at an early stage so that operative therapy can be avoided.<sup>6</sup> Limited progression of the dissection, stable aneurysmal dilatation of less than 2 cm in diameter, and SMA stenosis well compensated by collateral flow are good indications for medical treatment such as anticoagulation agents.<sup>7</sup> In case of increasing size of the aneurysmal dilatation, thrombosis of the true lumen of the SMA, and persistent abdominal symptoms, surgery should be considered, including resection of the affected segment with graft interposition, reimplantation of the SMA on the aorta, intimestomy, repair of the artery, or bypass using the right gastroepiploic artery or splenic artery-to-superior mesenteric artery.<sup>8-10</sup> Several reports have been published regarding the effectiveness of percutaneous endovas-

cular stent placement.<sup>11-13</sup> Recently, conservative therapy using anticoagulation or anti-platelet agents has been reported with favorable outcomes.<sup>2</sup> On the other hand, some authors have not advocated the use of such therapy since anticoagulation can prevent false lumen thrombosis at the dissected SMA, and thus promote further propagation of the dissection.<sup>14</sup> In our case, heparin sodium was administered postoperatively to prevent progression of the false lumen thrombosis but was discontinued as a result of bleeding from an ulcer at the anastomotic site. In addition, as in our case, short bowel syndrome including abdominal pain, diarrhea, anemia, fluid retention, malabsorption of vitamins and minerals, weight loss, and fatigue as a result of the resection of a large amount of intestine should be treated by total parenteral nutrition followed by a low-residue diet and binding medicine. The prognosis of SMA dissection has improved significantly in recent years. Early diagnosis made possible by the improvement of imaging techniques and proper treatment using various procedures are thought to have contributed to the improvement in outcomes.

Our case is unusual in several respects. Initially, abdominal symptoms were slight, and CT scan findings revealed that the SMA was intact, a finding that might have been due to the lack of intravenous contrast. Finally, the diagnosis of SMA dissection was made by enhanced CT, and the patient was rescued by the resection of a large amount of the small intestine and the colon in-length-of-three-meter, which is fairly rare as an option of surgery. Furthermore, even though the patient suffered from anastomotic leakage, bleeding from ulceration at the anastomosis, and short bowel syndrome, these conditions were treated conservatively with success.

In conclusion, SMA dissection is rare, and it is not easy to diagnose, although enhanced CT was available for detecting it in our case. If a patient with acute abdomen of unknown origin is encountered, SMA dissection should be ruled out, because ischemic intestine due to SMA occlusion is time-dependent and life-threatening. Furthermore, in the case of extensive bowel resection, the management of short bowel syndrome is thought to be essential.

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