Use of Multidetector-row CT with Multiplanar Reconstruction to Diagnose Isolated Dissection of the Superior Mesenteric Artery

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Dissection of the superior mesenteric artery not associated with aortic dissection is rare. We describe our experience of multidetector-row computed tomography with multiplanar reconstruction in two cases. Axial and oblique sagittal reconstructed images clearly illustrate the intimal flap in the proximal superior mesenteric artery. In both cases, the involved portions of the arteries are concomitantly enlarged in diameter. These appearances suggest that this imaging technique is useful for the diagnosis of isolated dissection of the superior mesenteric artery.

Isolated dissection of the superior mesenteric artery (SMA) is rare. Bauersfeld first described this phenomenon in 1947 [1]. Since then, about 70 cases have been reported in the literatures, more than half in the last 10 years [2-9]. Computed tomography (CT) is considered to be a good method for diagnosing this condition. However, few articles have included reformatted or three-dimensional images obtained with multidetector-row CT (MDCT) [7, 8]. MDCT offers the advantages of thin spiral sections, fast scanning time, and multiplanar reconstruction (MPR). We describe our excellent experience of MDCT with MPR in two cases of isolated dissection of the SMA.

CASE REPORTS

Case 1

A 66-year-old man presented to our emergency department with abdominal pain. Abdominal CT scan obtained with a single-detector CT scanner showed acute pancreatitis of Balthazar grade D. The proximal SMA appeared only slightly enlarged in diameter and there was no visible intimal flap (Fig. 1a). The patient was discharged home after medical treatment for acute pancreatitis.

The patient visited the emergency department again because of abdominal pain 5 months later. He underwent CT examination with an MDCT scanner (Somatom Sensation 16; Siemens Medical Solutions, Forchheim, Germany). The images showed acute pancreatitis of grade C. In addition, the proximal SMA had a focal dilatation in diameter. A suspected intimal flap was noted on a contrast-enhanced axial image (Fig. 1b). However, the SMA lesion was observed on only one axial image, and no further MPR images were focused on the SMA at that time. After medical treatment for acute pancreatitis, he was discharged uneventfully.

Two months later, the patient was admitted to
the hospital for the management of herniated discs of the lumbar spine. He received CT examination with another MDCT scanner (Lightspeed 16; GE Medical Systems, Milwaukee, WI) for the evaluation of herniated discs. The images revealed resolution of his previous acute pancreatitis. Contrast-enhanced axial images still depicted the intimal flap in the proximal SMA, as well as an enlarged diameter of the involved SMA (Fig. 1c). Sagittal reformatted images demonstrated that the dissection began 5.2 cm from the orifice of the SMA spanning 2.0 cm long (Fig. 1d). He did not receive further treatment for isolated dissection of the SMA, and no known complication occurred during a 1-year follow-up after the third CT examination.

Case 2

A 72-year-old man had chronic obstructive pulmonary disease and received CT examination of the chest because of dyspnea. CT performed with an MDCT scanner (Somatom Sensation 16; Siemens Medical Solutions) revealed no clinically significant problem of the chest. However, an intimal flap separating two lumina was incidentally found in the proximal SMA on contrast-enhanced axial images, and the diameter of the involved SMA was enlarged (Fig. 2a). Oblique sagittal reformatted images showed that the dissection starting 2.3 cm from the orifice of the SMA (Fig. 2b). The patient denied having abdominal symptoms, and he did not receive further treatment for isolated dissection of the SMA. Complication did not occur during a 1-year follow-up after the CT examination.

DISCUSSION

Isolated dissection of the SMA without aortic involvement is rare. The presumed etiology includes arteriosclerosis, fibromuscular dysplasia, cystic media necrosis, congenital connective tissue disorders, and trauma [10]. However, the definite pathogenesis is still unclear. The majority of these patients

![Figure 1. Case 1. a. First contrast-enhanced axial CT image (section thickness, 10 mm) shows no definite intimal flap of the SMA (arrow). Increased stranding around the proximal SMA is considered due to acute pancreatitis. b. Second enhanced axial CT image 5 months later (section thickness, 5 mm) reveals an enlarged diameter of the proximal SMA with a suspected intimal flap (arrow). c. Third enhanced axial CT image two more months later (section thickness, 5 mm) reveals an intimal flap (arrow) separating two lumina in the proximal SMA. d. Sagittal reformatted image depicts the intimal flap (arrow) and an enlarged diameter of the involved SMA segment.](image-url)
MDCT with MPR of isolated dissection of the superior mesenteric artery

are male, with a mean age in the 6th decade [3-8]. The prognosis for such patients was poor before 1972, and all reported patients died [7]. However, the prognosis had substantially improved since 1975, whether patients received surgical or conservative treatment, and to our knowledge, all patients survived except one case died from massive gastrointestinal bleeding [5]. Early diagnosis with CT or ultrasonography is thought to contribute to good outcomes.

Suzuki et al. described CT findings of isolated dissection of the SMA, which included an intimal flap, thrombosis of the false lumen or intramural hematoma, an enlarged diameter of the SMA, hematoma in the mesentery with hemorrhagic ascites, and increased stranding of the fat around the SMA [4]. They suggested that this increased stranding of the fat around the SMA is the key to the diagnosis, especially during the early stage of this disease. However, this finding is nonspecific and can be also seen on other conditions such as malignancy, inflammation, or other vascular disorders [11]. In both of our cases, the diagnoses were made incidentally. Intimal flaps in the proximal SMAs and enlarged diameters of the involved SMAs were noted on contrast-enhanced axial CT images. The oblique sagittal reformatted images depicted the findings more clearly than did the axial images. However, there was no increased stranding of the fat around the SMA, except on the first CT examination in our case 1, which was considered due to acute pancreatitis but not to the dissection itself.

Solis et al. found that the dissection usually begins 1.5 to 3 cm from the orifice of the SMA [9]. They hypothesized that this segment of the SMA is prone to sheering stress at the inferior edge of the pancreas, similar to that resulting in aortic dissection at the ligamentum arteriosum. In our cases, the distance between the dissection and the orifice of the SMA was well demonstrated on oblique sagittal reformatted images. In our case 2, the location of the dissection was typical (i.e., 2.3 cm from the orifice of the SMA). However, the patient had no abdominal symptom, and the etiology of the dissection was unknown. In our case 1, the dissection began 5.2 cm from the orifice of the SMA, an unusual location. The patient had a history of repeated pancreatitis. Because he did not receive surgery, we could not confirm that the pancreatitis resulted in dissection of the SMA or that dissection of the SMA compromised the arterial supply to the pancreas. The definite etiology of the dissection was also uncertain.

Figure 2. Case 2. a. Contrast-enhanced axial CT image (section thickness, 5 mm) reveals an intimal flap (arrow) separating two lumina in the proximal SMA. b. Oblique sagittal reformatted image reveals the intimal flap (arrow) and the enlarged diameter of the involved SMA segment more clearly than does the axial image.
Clinical manifestations of isolated dissection of the SMA vary individually. Common symptoms are acute abdominal pain and intestinal angina associated with nausea and vomiting, which may be due to the dissection itself or to sudden intestinal ischemia [6]. Some patients present with chronic abdominal pain, continuous diarrhea or malabsorption syndrome due to chronic intestinal ischemia [4]. Sometimes, an asymptomatic course may be noted, as in our case 2.

Therapeutic options include a surgical approach, an endovascular procedure such as stent placement, or a conservative treatment with or without anticoagulation medication. Froment et al divided the patients into three groups [2]. Those complicated by hypovolemic shock or peritonitis were indicated for surgery. Conservative treatment was suggested for those without any abdominal symptom. In patients with abdominal pain without hypovolemic shock or peritonitis, endovascular stent placement was believed to be an effective method to relieve pain and to prevent extension or recurrence of the dissection. When a nonoperative approach is chosen, close follow-ups are necessary. Sparks et al. suggested that indications for surgery include increasing aneurysmal dilatation, thrombosis of the true lumen of the SMA, and symptoms that persist despite anticoagulation therapy [8]. In our case 1, the patient’s abdominal pain was probably due to pancreatitis but not to the dissection itself, and his abdominal symptoms resolved after medical treatment for pancreatitis. For asymptomatic patients, isolated dissection of the SMA is often found incidentally, as in our case 2. Conservative treatment with close follow-ups is considered suitable for patients without symptoms or for those whose symptoms are not aggravated [3]. Our two patients received conservative treatment without anticoagulation, and no known morbidity associated with the dissection occurred during short-term (1-year) follow-ups. However, long-term follow-up with adequate imaging modalities, such as CT scan, are also necessary [12].

In conclusion, MDCT with MPR is more useful for the diagnosis of isolated dissection of the SMA than conventional CT with only axial imaging. If MDCT with MPR was used, additional cases would be identified, even when no abdominal symptom is present. In patients without abdominal symptoms or in those whose symptoms are not aggravated, the prognosis is considered good even if no further treatment was given. However, long-term follow-up with adequate imaging modalities, such as CT scan, are still necessary.

**REFERENCES**

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多層切電腦斷層合併多平面重組之使用於診斷單獨上腸系膜動脈剝離：病例報告

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與主動脈剝離無相關之上腸系膜動脈剝離是少見的。我們描述了兩個病例於多層切電腦斷層合併多平面重組之經驗，其軸狀切面及斜矢狀重組影像清楚描繪了內膜裂片於近端上腸系膜動脈，且兩個病例其被侵犯部位之動脈直徑亦隨之膨大。這些表現說明了此種影像技術對於診斷單獨上腸系膜動脈剝離是有幫助的。