A Case Report of Aneuysmectomy after Thrombo-Intimectomy for Spontaneous Isolated Superior Mesenteric Artery Dissection

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A 53 year-old man was admitted with acute onset of severe abdominal pain, and we performed emergent thrombectomy and intimectomy for acute, complete occlusion of superior mesenteric artery (SMA) due to its spontaneous dissection. However, 4 months later the operated part of the SMA enlarged due to aneurysm and the patient was treated by anuysmectomy and iliac-mesenteric bypass using a saphenous vein. Aggressive treatment such as surgical or endovascular procedure is necessary for severe ischemia due to SMA dissection.

Keywords: dissection, superior mesenteric artery, surgery

INTRODUCTION

Isolated superior mesenteric artery (SMA) dissection without an aortic dissection is a rare disorder. However, which among visceral artery dissections, it is the most common.¹ Early diagnosis of this disease has become relatively easy due to advances in imaging modalities. There is no well-established management protocol for SMA dissection.

Herein we describe a patient who was treated by surgical procedure.

CASE REPORT

A 53 year-old man went to another institute with a 3-hour history of severe epigastric and periumbilical pain. Abdominal CT was performed and then he was transported to our institute with diagnosis of acute abdomen. On examination, he had a temperature of 37.2°C, blood pressure 146/70 mmHg, heart rate of 116/min with regular rhythm. His abdomen was slightly distended with strong epigastric tenderness and slight muscular defense. The laboratory data revealed no anemia, no increase of hepatic transaminase and no acidosis of blood gas. A contrast-enhanced CT scan revealed the dissection of the SMA starting approximately 2 cm from the origin and extending about 4–5 cm, resulting in almost complete obstruction of the arterial lumen (Fig. 1). We diagnosed acute obstruction of SMA due to SMA dissection and judged the necessity of emergent surgery.

A median abdominal incision was made, and laparotomy was done. There were slight serous ascites and the small intestine showed moderate thickening. There was no visible peristalsis. Pulsation of the SMA was not palpable at the branching of middle colic artery. A transverse incision was made. The SMA was filled with fresh thrombus and had a dissection flap. Thrombectomy using a 3 Fr Fogarty catheter and intimectomy were performed. The antegrade pulsatile blood flow was obtained, and the arterectomy was repaired directly by a running suture of 6-0 polypropylene. The arteries of intestines could be confirmed pulsation and those colors improved.
We judged that the ischemia was recovered and did not add other procedures to the intestines. The patient was started oral intake from the 5th post-operative day and discharged without complications.

However, the follow up CT four months later showed that his SMA was dilated, and we made the decision to reoperate. Contrast CT revealed that the SMA was 30 mm in diameter with thickened wall and dissection between about 3 cm from aortic origin and the distal part. We thought that there was a risk of rupture. The reoperation was done by median incision, and careful exfoliation was performed because of severe adhesion. The SMA was exposed from the origin to the whole aneurysm with the branches. The SMA had no communication with the inferior pancreaticoduodenal artery but had branches of a middle colic artery, a right colic artery, an ileocolic artery and two ileal arteries. After heparinization, the ostium of the SMA was doubly ligated, the dilated SMA was opened. The aneurysmal wall was found to be thickened. The middle colic artery, the right colic artery and the ileocolic artery, which were slender and had good back flow, were occluded by suture ligation. The two ileal arteries were bypassed using saphenous vein from the right common iliac artery. The excised aneurysmal wall histologically showed myxomatous change and destruction of the media, which were suspected of cystic medial necrosis (Fig. 2) After the operation the patient suffered from complications of paralytic ileus. However, his condition improved, and he was discharged.

DISCUSSION

Isolated dissection of abdominal visceral artery without an aortic dissection is relatively rare. Among such dissections, SMA dissection is the most frequent and more frequently detected due to the increasing use of CT. The pathogenesis of SMA dissection has been not resolved, but its relationship with hypertension, smoking, trauma, cystic medial necrosis, fibromuscular dysplasia, atherosclerosis, vasculitis, connective tissue disease and segmental mediolytic arteriopathy has been investigated. This patient smoked, and the histopathological findings suggested cystic medial necrosis of the SMA. The natural course of SMA dissection would include limited progress with cessation, progressive involvement of the vessel, reestablishment of flow into the true lumen, or rupture through the adventitia.

Various treatments have been applied to SMA dissection. Therapeutic procedures include conservative, medical, endovascular and surgical treatments. Original conservative treatment consisted of bowel rest and observation. One review found that conservative treatment was successful in 31 of 56 patients (55%). Medical treatment includes antiplatelets, anticoagulant, antihypertensive drugs, anti-inflammatory drugs and steroid. At first, medical treatment with or without anticoagulation agent is recommended for SMA dissection where there is no evidence of bowel ischemia. Successful recovery by medical treatment was reported at 55%–63%. However,
medical treatment will fail in over one third of the cases of SMA dissection and require further intervention.\textsuperscript{6)} Physicians should consider that treatment may fail to prevent the progression of bowel ischemia and aneurysmal dilatation (\textbf{Fig. 3}). It is not easy to diagnose the bowel ischemia which needs revascularization. Subhas et al.\textsuperscript{2)} advocated the management algorithm and recommended diagnostic laparoscopy. In a severe case, closed observation is necessary and intensive care including surgical treatment with laparotomy should be considered without hesitation. In such cases, a less invasive treatment is preferred, and endovascular management of stent placement...
or balloon angioplasty is selected for SMA dissection. Most of reported patients with endovascular treatment showed good results, although the follow-up periods have been short. Surgical procedures have been variously reported, including thrombectomy, endoaneurysmorrhaphy, intimectomy, ligation, resection, and bypass surgery. Operative revascularization is indicated when there are signs and symptoms of intestinal ischemia, progression of dissection or aneurysm, narrowing of the true lumen/thrombosis of true lumen or saccular aneurysm formation that is likely to rupture or embolize. Absolute surgical indications are arterial rupture and intestinal infarction. Intestinal resection may be required if ischemic necrosis is present. At the first operation we performed emergent thrombectomy and intimectomy because of severe symptoms and abdominal findings. Subsequently, the SMA enlarged and changed into an aneurysm due to the wall weakness or due to the surgical effect of thrombectomy.

Because the reported surgical cases of SMA dissection were few, the long-term results of surgical techniques and the complications are not clear. We should select the surgical procedures and should follow up the clinical course in consideration of such complications.

Sakamoto et al. categorized SMA dissection into four types: type I, patent false lumen with both entry and re-entry; type II, ‘cul-de-sac’ shaped false lumen without re-entry; type III, thrombosed false lumen with ulcer-like projection (ULP); and type IV, completely thrombosed false lumen without ULP. Sakamoto reported that one patient with type II needed urgent surgery because of small bowel ischemia and 11 other patients were treated conservatively. Zerbib et al. proposed a modified classification: type I – IV of Sakamoto’s classification; type V, aneurysmal dissection with stenosis of the distal part of the SMA; and type VI, total VIa or partial VIb thrombosis of the SMA. Most patients of type I respond to conservative treatment but need long time follow-up. Zerbib recommended that intervention should be considered in types II, III, V, and VI, when there are dissecting aneurysms at least 2 cm in diameter, or stenosis over than 70%. And some algorithms for management of SMA dissection are advocated. Our patient belonged to type VIa and the CT revealed long segment obstruction at the onset.

Because of an increasing trend to use CT scanning due to improvement of CT resolution, most of the cases reported are within the last ten years. We experienced ten patients with SMA dissection during the past 7 years. Among the ten there was no intervention due to risk of rupture at acute or subacute onset periods. There was another one patient received endovascular treatment due to the SMA occlusion except this case. The treatment should be decided according to the symptoms, signs and the dissection configuration.

**CONCLUSION**

We report a rare case of isolated SMA dissection, which was treated by surgical procedure. Thrombectomy with intimectomy were first performed. Four months later anerysmectomy and mesenteric bypass were done for the dilated SMA. Surgery or endovascular treatments are indicated when symptoms are acute and there is suspicion of mesenteric ischemia.

**REFERENCES**

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