Clinical and radiologic course of symptomatic spontaneous isolated dissection of the superior mesenteric artery treated with conservative management

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Objective: **To determine the clinical and radiological outcomes of patients with symptomatic spontaneous isolated dissection of the superior mesenteric artery (SIDSMA) who were treated with conservative management.**

Methods: **This retrospective study included 27 consecutive patients who were diagnosed with symptomatic SIDSMA and managed conservatively from April 2007 to April 2013. Twenty-six patients were treated using anticoagulation therapy, and one patient with chronic liver disease underwent observation only. For evaluation, patients were divided into two groups, those with a patent false lumen with both entry and re-entry (group I), and those with partial or complete thrombosis of the false lumen (group II). In general, the patients underwent follow-up computed tomography angiography (CTA) 1 week, 1 month, and 6 months after admission. Thereafter, they underwent annual CTAs.**

Results: **There were five group I and 22 group II patients. During hospitalization, none of the patients needed additional endovascular or surgical intervention, and after conservative management, every patient was asymptomatic upon discharge. The mean duration of clinical follow-up was 27.3 months. There was no recurrent abdominal pain associated with SIDSMA, and no invasive procedures due to SIDSMA were needed. During a mean of 17.1 months of CTA follow-up in group I patients, serial CTAs found sustained patent false lumen and no angiographic changes in all patients. Among 22 group II patients, despite anticoagulation and symptomatic relief, CTA 1 week after admission revealed increased stenosis of the true lumen in 84.2% (16/19) of patients including six cases of progressive SMA occlusion. Five patients, including the three patients initially presenting with SMA occlusion, had no interval changes, and only one patient had improved compression of the true lumen. During a mean of 18.0 months of CTA follow-up in group II patients, serial CTAs revealed improvement in the occlusion or stenosis of the true lumen in 89% (16/18) of patients and progressive resolution of false lumen thrombosis in all patients. Aneurysmal dilatation greater than 2 cm was not detected in either group of patients during follow-up.**

Conclusions: **During the acute stage of SIDSMA, we found a discrepancy between the clinical and angiographic findings. The therapeutic regimen should be based on clinical symptoms, and conservative management is feasible in most cases. SMA stenosis could not be an indication for invasive treatment, because stenosis of the true lumen has been seen to improve after the acute stage of dissection. (J Vasc Surg 2014;59:465-72.)**

In most patients, dissection of the superior mesenteric artery (SMA) is associated with aortic dissection and is considered to be an extension of aortic dissection. However, there have been a small number of reports of patients with spontaneous isolated dissection of the SMA (SIDSMA) without involvement of the aorta.[1,2] In addition, there have been an increasing number of reports since improvements in the technology and the widespread use of computed tomography (CT) imaging for abdominal pain.[2,3]

The major complications of SIDSMA during the acute stage have been reported to be arterial rupture with bleeding and bowel infarction because of mesenteric ischemia.[3-5] The major concern during the chronic stage is progressive dilatation of the SMA, with the formation of a dissecting aneurysm to a critical size.[6] However, because of the rarity of this condition, the clinical and angiographic courses of SIDSMA are not well defined, and there is no consensus on optimal treatment. Treatment options range from observation to anticoagulation to open surgery, based on symptoms, anatomic suitability, patient comorbidities, and physician preference. Recently, endovascular stenting has been proposed as a primary treatment option for symptomatic patients with severe stenosis or patients with failed conservative management.[1,7-9]

The purpose of our study was to analyze the clinical outcomes of patients with SIDSMA who were treated

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using conservative management. In addition, we describe the radiologic courses and discuss the optimal treatment by referring to the features of serial angiographic studies.

METHODS

Between April 2007 and April 2013, 36 patients were diagnosed with isolated dissection of the SMA. After exclusion of asymptomatic or incidentally discovered cases (n = 8) and a trauma-related case (n = 1), this study consisted of 27 consecutive symptomatic patients with SIDSMA at the Kyungpook National University Hospital, Daegu, South Korea. We have had a standard protocol of management since 2007, and two vascular surgeons managed the patients with the same protocol.

We evaluated the demographics and clinical manifestations of the patients on admission, and their in-hospital and outpatient clinical follow-up outcomes and angiographic changes retrospectively.

All study patients were admitted from the emergency department because of the acute onset of abdominal pain within 2 weeks and characteristic contrast-enhanced CT findings. Initially, all patients underwent conservative management based on our protocol consisting of bowel rest with fasting, control of blood pressure, and short-term anticoagulation. Fasting was continued until the pain subsided. Anticoagulation therapy consisted of low-molecular-weight heparin (enoxaparin, 1 mg/kg twice daily) while the patient was in the hospital, and after discharge, therapy was changed to an antiplatelet agent (eg, 100 mg aspirin daily) without anticoagulant given for 3 to 6 months. Twenty-six patients were treated using anticoagulation therapy, and one patient with chronic liver disease underwent observation only. Blood pressure was controlled in patients with hypertension, and they also underwent close clinical and hemodynamic monitoring. In patients with sustained symptoms around 1 week, conservative management with fasting and anticoagulation was continued if there were no signs of clinical and hemodynamic deterioration suggesting peritonitis.

Follow-up CT angiography (CTA) was usually performed at 1 week, 1 month, and 6 months after admission, and annually thereafter according to protocol. SMA occlusion was defined as an occlusion of the main trunk of the SMA, between the origin of the SMA and the origin of the ileocolic branch. As it is the straightest line, we thought the occlusion of intestinal branches arising from this segment could induce small bowel ischemia. Aneurysmal dilatation was defined as a greater than 50% increase in the diameter the SMA relative to the normal diameter of the SMA of each patient, as measured by CTA. The percent compression of the true lumen in patients with thrombosis of the false lumen was determined by CT based on the diameter of the region of the SMA with maximal stenosis occurring between the origin of the SMA and the origin of the ileocolic artery, and the luminal diameter of unaffected SMA orifice. In SIDSMA, the dissection can be extended distally or proximally from the point of entry; therefore, the diameter of previous normal SMA was difficult to determine. We, therefore, used the luminal diameter of the SMA origin as a reference value of stenosis and aneurysmal dilatation because the dissection does not usually extend to the aorta. These measurements were also determined using serial follow-up CTAs. Measurements were performed by a vascular surgeon (H.K.) and a radiologist (J.L.) separately, and then, consensus was made after discussion.

Because the follow-up serial CTA findings after conservative management were different in relationship to the initial CT findings and because the main concern in SIDSMA is blood supply to the bowel, the patients were divided into two groups retrospectively. Group I patients were those with a patent false lumen with both entry and re-entry on initial CT (Fig 1), and group II patients were those with a partially or completely thrombosed false lumen with stenosis or occlusion of the true lumen (Fig 2). The major distinction between group I and II patients was the patency of the false lumen.

The χ^2 test was used to compare the categorical variables and the *t*-test was used to compare the differences of continuous variables. All statistical analyses were performed using statistical software SPSS (v. 20.0; IBM, Armonk, NY). A P value of $< .05$ was considered to indicate a statistically significant difference.

RESULTS

Patient characteristics. There were 23 men and four women in the study, with a mean age of 51.4 years (range, 34-67 years). The median duration of abdominal pain before admission was 48 hours (range, 2-312 hours). Concomitant symptoms included diarrhea in five patients, vomiting in three patients, and hematochezia in two patients. Periumbical tenderness was found in nine patients, and no patients showed rebound tenderness. Atherosclerotic risk factors included hypertension in 12 patients, hyperlipidemia in 11 patients, smoking in 10 patients, and diabetes in one patient. Celiac artery was patent in all patients and inferior mesenteric artery was occluded in one patient. There was no evidence of aortoiliac occlusive disease in our series (Table I).

Initial CT findings. The initial diagnostic modality included contrast-enhanced CT for every patient. Five patients had a patent false lumen with both entry and re-entry (group I), and 22 patients had partial or complete thrombosis of a false lumen and a steno-occlusive lesion in the true lumen (group II). Among group II patients, 15 patients were found on initial CT to have a partially thrombosed false lumen with an ulcer-like projection or a cul-de-sac-shaped false lumen without re-entry, and seven patients had a completely thrombosed false lumen without projection. Among group II patients, the mean diameter of the SMA at the region of maximal stenosis between the origin and ileocolic branch was 2.8 mm (range, 0-5.1 mm), and mean percent compression of true lumen was 62.2%; three patients were found by initial CT to have SMA occlusion (Table II). Other combined dissection included short segment dissection of right external iliac artery in one patient, and there were no patients with celiac artery