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Treatment Guidelines for Isolated Dissection of the Superior Mesenteric Artery Based on Follow-up CT Findings

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Abstract *Objectives:* The treatment guidelines for isolated superior mesenteric artery dissection (SMAD) are not well established. The purpose of this study was to report a single-centre series of SMAD and propose treatment guidelines.
Materials and Methods: Between November 2004 and December 2009, 30 patients were diagnosed with SMAD. We retrospectively reviewed their medical records.
Results: The subjects included 26 men and four women, with a mean age of 55.1 years. The chief complaint was abdominal pain in 17 patients, whereas 13 patients were asymptomatic. The mean follow-up was 38.3 months. The radiographic findings included intimal flap with a false lumen in 20 patients and intramural haematoma in 10 patients. The treatments included observation in 18 patients, anticoagulation in five patients, stenting in six patients and surgery in one patient. During follow-up (mean 15.6 months), there was no change in the computed tomography scans of seven patients, improvement was observed in four patients and complete resolution was observed in four patients. All patients, including the symptomatic patients, remained asymptomatic during follow-up.
Conclusions: Most patients with SMAD can be successfully managed with conservative treatment. Surgical treatment or percutaneous intervention can be reserved for patients with severe mesenteric ischaemia and those for whom the initial conservative treatment fails.

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Isolated superior mesenteric artery dissection (SMAD) is a rare disorder, and only 106 cases were detected with a MEDLINE literature search.[1] The aetiology, pathophysiology and proper treatment of SMAD are not yet clear. The current proposed treatment guidelines provide an algorithm based on the indication for surgery, the abdominal symptoms, the presence of an intimal flap and the length of a stenosis.[2–4] Because there are no definite treatment guidelines, patients with SMAD have been treated according to their anatomical status, their co-morbidities and the preferences of their physicians.

We undertook this study to devise appropriate treatment guidelines for the treatment of isolated SMAD based on follow-up computed tomography (CT) findings and the clinical course of the disease.

Patients and Methods

This study included 30 patients who were diagnosed with isolated SMAD at our hospital between November 2004 and December 2009. Patients with isolated SMAD were identified by searching the medical records for SMAD, acute or chronic vascular disorder of intestines and aortic dissection at our Department of Health Information Management. Their medical and imaging records were reviewed retrospectively. The changes in the patients' images on CT scans and their responses to different treatment modalities were analysed. If a patient had another artery involvement, such as an aortic dissection, that patient was excluded from the study.

When isolated SMAD was detected incidentally during the work-up for another treatment, we simply observed the patient because these patients had no SMAD-associated abdominal pain or luminal stenosis on a CT scan. When isolated SMAD was detected during the investigation of abdominal pain and there was no indication for surgical repair, such as bowel necrosis or arterial rupture, then we selectively performed observational, anticoagulation or endovascular treatment, according to the severity of the pain, the degree of leucocytosis and the results of a physical examination of the patient and the CT findings, such as the degree of luminal stenosis.

The statistical analysis was performed with SPSS version 13.0 (SPSS Inc., Chicago, IL, USA). The association between abdominal pain and intravascular stenosis was confirmed with a χ^2 test. A p value of <0.05 was considered statistically significant.

Results

Thirty patients (26 men and four women) were diagnosed with SMAD during the study period. Their mean age was 55 $\pm$ 11 years (range, 38–74 years). Thirteen cases were detected incidentally, without symptoms, and 17 cases were detected because of abdominal pain. The mean follow-up period was 38 $\pm$ 14 months (range, 4–62 months). Hypertension was detected in nine patients, diabetes mellitus in one patient and angina in one patient (Table 1). The dissection started at a mean distance of 22 $\pm$ 11 mm (range, 5–46 mm) from the origin of the SMA and had a mean length of 48 $\pm$ 30 mm (range, 10–150 mm), as measured on CT scans.

Table 1 Patients characteristics.

Male:female	26:4
Mean age (years)	55±11 (38–74)
Mean follow-up Period (months)	38±14 (4–62)
Chief complaints (numbers)	
Diagnosed incidentally	13
Symptomatic	17
Comorbidity	
Hypertension	9
DM	1
Angina	1

A CT scan was performed on the first, third and sixth month after the first presentation and every six months thereafter. The indications for the termination of follow-up were no recurrence of abdominal pain, no increase in the size of the aneurysmal sac and less than 50% stenosis. The CT findings could be categorised into two types: (1) double lumen with an intimal flap, with a patent or closed false lumen and (2) intramural haematoma based on the imaging features, and this was further subcategorised according to the presence/absence of stenosis (Figs. 1–3). Among the asymptomatic patients detected incidentally, a patent false lumen with an intimal flap was detected in 12 patients, and an intramural haematoma was detected in one patient. There was no stenosis in any asymptomatic patient. Among the symptomatic group, a patent false lumen with an intimal flap was found in two patients, a closed false lumen with an intimal flap was found in six patients and an intramural haematoma was found in nine patients. Among the 17 symptomatic patients, vascular stenosis was observed in 15 patients, and there was no stenosis in two patients. The correlation between stenosis and abdominal pain was statistically significant ($p = 0.002$; Table 2).

Fifteen of 23 patients underwent follow-up CT scanning. Seven of the original 30 patients who underwent stenting or surgery were excluded from follow-up because their underlying problems had been corrected. The purpose of this follow-up CT scanning was to determine the natural process of SMAD and to examine the changes that occurred in the CT images. Five asymptomatic patients and 10 symptomatic patients underwent CT scans. The mean follow-up period was 16 $\pm$ 16 months (range, 2–45 months). There were no changes on the CT scans of seven patients, improved stenosis or reduced aneurysm size on those of four patients and complete resolution on those of four patients. Interestingly, no change during the follow-up was detected in seven of the 11 patients with a double lumen combined with an intimal flap, and complete resolution was detected in only those patients with an intramural haematoma (Table 3; Fig. 4). Aneurysmal change on a CT scan was detected in 17 of the 20 patients with a double lumen, and in two of the 10 patients with an intramural haematoma. There was no increase in the aneurysm size or aneurysm rupture in any patient who underwent CT scanning during follow-up.