SPONTANEOUS ISOLATED SUPERIOR MESENTERIC ARTERY DISSECTION

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- ISMAD was first reported in 1947 by Bauersfeld. It is an uncommon cause of abdominal pain, and it represents the most common type of mesenteric artery dissection.
Isolated spontaneous superior mesenteric artery (SMA) dissection is a rarely reported and potentially fatal cause of acute abdominal pain. In a MEDLINE literature search in 2011 only 168 cases were reported with an estimated incidence of 0.06% in post-mortem studies [1, 2].

Clinical presentation of SMA spontaneous dissection has been found to most commonly occur in males in their mid-50s presenting with acute epigastric pain usually after overeating and drinking [1, 3].

Of the cases reported, uncontrolled hypertension accounts for 30% of coexisting medical conditions followed by smoking, intraabdominal cancer and hypercholesterolemia [1, 2].

Most patients with IMAD are symptomatic (74%), with abdominal pain reported as the most common symptom (91%).

Although most cases of symptomatic IMAD resolve completely with conservative management, cases progressing to aneurysmal rupture, intestinal necrosis, and even patient death have been reported.


There is a low correlation with atherosclerosis and atherosclerotic heart disease

SMA is the second most frequent peripheral artery to be affected by dissection following the internal carotid artery

there has been a positive correlation found between pain severity and the length of dissection on imaging

Reported risk factors include cystic medial degeneration, atherosclerosis, fibromuscular dysplasia, pregnancy, connective tissue disorders and trauma.

The SMA dissection typically begins 1.5 to 3.0 cm from the ostium. Some have postulated the SMA is more susceptible to shearing stress at this point due its relationship to the pancreas, analogous to what is seen at the ligamentum arteriosum during rapid deceleration injuries such as aortic dissection.
Classification of CT findings

Sakamoto classification

Type I: dissection with entry and re-entry tears;
Type II: dissection without re-entry tear;
Type III: thrombosed false lumen with an ulcer like projection;
Type IV: occlusion of false lumen without ulcer like projection.

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CT scan of the abdomen showing the area of SMA dissection and false lumen (arrow).
Initial CT scan showing patent false lumen with both entry and re-entry (black arrows) Hyung-Kee Kim et al. 2014
Treatment Algorithm for SIDSMA

Symptomatic Isolated SMA Dissection

Grade I (peritonitis absent)
- Medical Treatment for 5 days
  - Relieved
    - Continued Medical Treatment
  - Unrelieved/Aggravated
    - Endovascular Stent Placement
      - Successful
        - Laparoscopic Exploration
        - Surgical Repair & Exploration
      - Unsuccessful
        - Laparotomy If Positive
          - Medical Treatment for Another 7 days
            - Relieved
              - Continued Medical Treatment
            - Unrelieved/Aggravated
              - Exploratory Laparotomy & Surgical Repair

Grade II (peritonitis present)
- Endovascular Stent placement
  - Successful
  - Unsuccessful
(CTA) showed (A) the true lumen (slightly compressed by the thrombosed false lumen (long arrow) at the proximal portion of superior mesenteric artery (SMA) and (B) the true lumen (short arrow) highly compressed by the patent false lumen (long arrow) at the middle segment of SMA.

Intraoperatively, (D) the exploration found the pallor of the distal ileum (left side of the arrow) and (H) after the middle segment of SMA was transected, two lumens were disclosed, the small true lumen (short arrow) and the big false lumen (long arrow). The follow-up CTA at 1 month much more branches visualized and the distal perfusion markedly improved.
A) Riolan’s arch (three long arrows) was perfused from the inferior mesenteric artery (IMA, short arrow). B) The primary entry site (arrow) was located 30 mm distal to the origin of superior mesenteric artery (SMA) with the true lumen highly compressed by the false one and impaired perfusion of distal SMA and its main branches. C) A stent (Maris 6 80 mm; Invatec, Brescia, Italy) was placed via the brachial artery after failure in the attempted femoral approach. However, the stent had foreshortened during deployment, causing inadequate proximal landing and endoleak (short arrow). Meanwhile, it was noted that the Riolan’s arch disappeared with only IMA (long arrow) opacified. D) An additional stent (Maris 6 40 mm) was then deployed more proximally with its proximal end (short arrow) a little bit protruding into the abdominal aorta, and endoleak vanished. The IMA (long arrow) could still be visualized, whereas Riolan’s arch could not. E and F, The follow-up computed tomographic angiography (CTA) at 16 months revealed patent stent and satisfactory perfusion of SMA and its main branches.
A, A magnetic resonance angiogram demonstrates a severe focal dissection of the proximal superior mesenteric artery (arrow). B, A computed tomography angiogram shows patency of the Herculink stent (arrow) 11 months postoperatively.
Example of failed conservative management of an isolated mesenteric artery dissection with development of a dissecting aneurysm (Sakamoto type III). A 47-year-old man presented with acute abdominal pain that had lasted for 12 h.

Cross-sectional CT performed one month later showed a dissecting aneurysm (white arrow head) and the true lumen (black arrow head).

(F) Multiplanar reconstructions showed a dilated dissecting aneurysm (arrow head) with severe stenosed true lumen (?90%). The dissecting aneurysm was dilated to distal branches of the superior mesenteric artery three days later (not shown), and endovascular stenting was performed. (G) Complete resolution of the dissecting aneurysm had occurred six months after the procedure. Zhongzhi Jia et al, 2019
Although invasive treatment including endovascular treatment and surgery has been described with favourable outcome in SISMAD, recent reports suggest that invasive treatment may not be essential. Proposed conservative treatment mainly consists of anticoagulation or use of antiplatelet agents.


Medical treatment

- (1) antiplatelet (daily oral administration of 75-mg clopidogrel) during the hospitalization and for 6 months after discharge;
- (2) anticoagulation (subcutaneous injection of low molecular weight heparin) every 12 hours throughout the hospitalization;
- (3) daily intravenous administration of 20-mg prostaglandin E1 during the hospitalization;
- (4) bowel rest;
- (5) antihypertension in cases with hypertension, including β-blockers, angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, or calcium antagonists administrated either alone or in combination to maintain the systolic blood pressure below 140 mm Hg.
Conservative management was successfully used in a patient with type II symptomatic isolated superior mesenteric artery dissection aneurysm. A 53 year old man presented with acute abdominal pain that had lasted for three days. (A,B) A dissecting aneurysm was observed on contrast enhanced computed tomography (CT) images (arrowhead). (CeE) Complete remodelling of the superior mesenteric artery occurred after conservative management, as shown on a contrast enhanced CT scan performed six months later. Zhongzhi Jia et al. 2019
ESVS Mesenteric Guidelines-2019 recommendations

- Rec. 61: In patients with asymptomatic IMAD, conservative treatment with antiplatelet therapy and control of hypertension should be considered (Class IIa, Level C).

- Rec. 62: Patients with symptomatic IMAD should be considered for treatment with antiplatelet therapy or low molecular weight heparin or unfractionated heparin until symptoms resolve (Class IIa, Level C).

- Rec. 63: Patients with a symptomatic IMAD not responding to medical management and with a suspicion of bowel ischaemia should be considered for endovascular revascularisation (Class IIa, Level C).

- Rec. 64: Follow up with imaging should be considered after IMAD to detect aneurysm formation, occlusion, or stenosis (Class IIa, Level C).
THANK YOU