

# Acute mesenteric ischemia caused by isolated dissection of the superior mesenteric artery and thrombotic occlusion of its major branches: treatment by systemic thrombolysis with recombinant tissue plasminogen activator (rtPA)

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## ABSTRACT

**Introduction.** Isolated superior mesenteric artery (SMA) dissection, without associated aortic dissection, is relatively uncommon. Therefore, there are insufficient data to support a particular therapeutic option in the specific setting of isolated SMA dissection associated with thrombotic complications.

**Case report.** In this article we describe the diagnosis and treatment of a patient who presented to the Emergency Department with the clinical picture of an acute abdomen and signs suggestive of acute occlusion of the SMA. Diagnostic studies showed an isolated SMA dissection with acute thrombotic occlusion of its main branches. The patient was successfully treated with systemic recombinant tissue plasminogen activator (rtPA) thrombolysis. To the best of our knowledge, this is the first description of a case of isolated SMA dissection associated with thrombotic occlusion of its main branches.

**Conclusion.** In patients presenting with persistent abdominal pain and unspecific clinical findings, rare causes should be considered because of their life threatening complications. Systemic thrombolysis is a feasible technique for the treatment of isolated SMA dissection associated with thrombotic complications in the absence of bowel necrosis.

**Keywords:** acute intestinal ischemia, superior mesenteric artery, dissection, thrombosis, systemic lysis, recombinant tissue plasminogen activator (rtPA)

## Introduction

Isolated superior mesenteric artery (SMA) dissection, without associated aortic dissection, is relatively uncommon form of vascular pathology. Historically there have only been a few

reports in the literature. SMA dissection has been anecdotally reported as an uncommon cause of acute abdominal pain. (1, 2) Before 1972, isolated SMA dissection had a high mortality rate, and the diagnosis was usually made at the time of autopsy. (1, 2) Since 1975, more cases have been reported and survival was achieved in all but one reported case by using a variety of treatment modalities. (3, 4, 5)

In this article we describe the diagnosis and treatment of a patient who presen-

ted to the emergency department with clinical signs of an acute abdomen and signs suggestive of acute occlusion of the SMA. Diagnostic studies showed an isolated SMA dissection with acute thrombotic occlusion of its main branches. The patient was successfully treated with systemic rtPA lysis.

## Case report

A 54-year-old man was admitted to the Emergency Department of the University Hospital in Maribor. He complained

of diffuse abdominal pain. The onset of symptoms had been sudden. His past medical history was unremarkable. On admission, physical examination of the abdomen showed no rebound tenderness. The patient's blood pressure was 170/100, his respiratory rate was 28 breaths/minute and his cardiac rate was 98 beats per minute due to severe abdominal pain. The results of biochemical studies were within normal limits. A plain abdominal film obtained on admission revealed no abnormal gases. Ultrasound examination revealed abnormal blood flow in the proximal segment of the SMA. A computed tomography angiography (CTA) scan showed an intimal flap separating the true and false lumens in the proximal part of the SMA and distal thrombosis of its major branches. Selective angiography confirmed apparent dissection of the SMA but was unable to discriminate between the true and false lumens. The proximal part of the SMA was dilated. Bowel necrosis was excluded by laparoscopy. Caution was expressed by the invasive radiologist because of the fear that any invasive procedure (including placement of a stent or catheter in the proximal part of the SMA) could result in perforation. As the patient was agitated there was fear that he was going to forcefully remove the catheter producing a tear at the puncture site. Therefore, the patient was treated with systemic lysis using rtPA (100mg in three hours). The abdominal pain gradually subsided within hours. Follow up CTA scan showed no spread of the dissection and complete resolution of thrombi in the main branches of the SMA. Low molecular weight heparin, in therapeutic doses, was continued for six days. Afterwards, anticoagulation treatment was continued with a coumarin derivative for six months. The patient recovered well and left hospital 14 days after the onset of clinical symptoms. There was no family history of aortic disease and no clinical manifestations that could be linked with clinical criteria needed to establish a diagnosis of vasculitis. During the first year following discharge the

patient had no lesion progression on spiral CTA scans.

## Discussion

Due to its relative rareness and complex nature, dissection of the SMA remains a poorly established entity in clinical practice. Causes of SMA dissection remain elusive, possibly including cystic medial necrosis, congenital connective tissue disorders, fibromuscular dysplasia, atherosclerosis, and trauma. (1) Although a few case series have described the clinical course of isolated SMA dissection the natural course and a standard diagnostic and therapeutic approach have not yet been firmly established. (4, 5, 6) Treatment options previously described for an isolated SMA dissection include expectant management, (5) anticoagulation, (7) open surgical repair, endovascular repair (8) and a combination of endovascular repair with intra-arterial thrombolysis. (4)

Yun et al. (5) reported successful conservative medical management in 28 patients without anticoagulation. These cases offer insight into the natural history of SMA dissection and show a changing trend in the treatment of isolated SMA dissection, from open surgical treatment, which was favored in earlier days, over SMA stenting or conservative treatment. However, there are only a few cases which describe SMA dissection associated with thrombotic occlusion of the main SMA trunk or its major side branches. (4, 5, 9) Langner et al. (4) described a patient with a compression of the true lumen due to thrombosis of the false lumen of the main trunk of SMA. The patient was successfully treated with intra-arterial thrombolysis with rTPA and stent placement. Unlike most cases of isolated SMA dissection reported in the literature, there was a thrombotic occlusion of all major branches of the SMA in our patient. Angiographic and CTA studies were unable to discriminate between the true and false lumen. Caution was expressed by invasive radiologists because of the fear that invasive manipulation of the main trunk of the SMA may lead to a



Figure 1. Computed tomography angiography – lateral view. Arrow denotes the typical sign of superior mesenteric artery dissection.

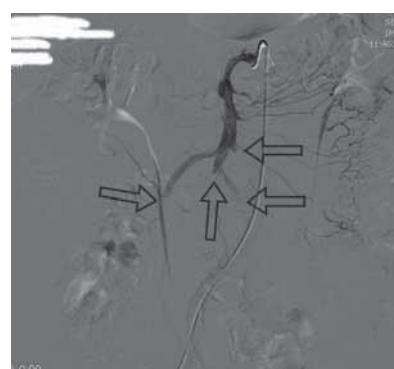


Figure 2. Selective superior mesenteric artery (SMA) angiography. Arrows denote occluded main branches of SMA.

dissection through the adventitia causing fatal hemorrhage. Surgery was not an option due to diffuse thrombotic occlusions. Systemic thrombolysis with rtPA was chosen as it had been shown able to resolve even large thrombotic masses. (10) There were no absolute contraindications for systemic lysis and precautions were taken to prevent complications, including withholding heparin for the first 24 hours.

## Conclusion

In patients presenting with persistent abdominal pain and unspecific clinical findings, rare causes should be considered because of their life threatening complications. Unfortunately, there are no strong data to support a particular therapeutic option in the specific setting of isolated SMA dissection associated with thrombotic complications. To the best of our knowledge, this is the first

description of a case of isolated SMA dissection associated with thrombotic occlusion of its main branches that was thrombolysed with systemic rtPA treatment. Systemic thrombolysis is a feasible technique for the treatment of isolated SMA dissection associated with thrombotic complications in the absence of bowel necrosis.

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