

Extensive Intestinal Necrosis Secondary to Acute Mesenteric Infarction: A Case Report

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DOI: <https://doi.org/10.36347/sasjm.2026.v12i08.004>

| Received: 05.06.2026 | Accepted: 13.07.2026 | Published: 04.08.2026

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Abstract

Case Report

We report the case of a 54-year-old patient admitted for severe acute abdominal pain. Abdominal CT angiography rapidly demonstrated occlusion of the superior mesenteric artery (SMA) with signs of bowel ischemia. Despite resuscitative management, emergency laparotomy revealed extensive necrosis of both the small intestine and the colon. The patient died two hours after surgery. This case highlights the extreme severity of acute mesenteric infarction (AMI) when not diagnosed and managed early. Current recommendations emphasize the importance of early CT angiography in any patient presenting with severe acute abdominal pain, particularly in the presence of cardiovascular risk factors. Management relies on prompt restoration of mesenteric perfusion and resection of non-viable bowel segments. Mortality remains extremely high in advanced acute mesenteric ischemia [1,2].

Keywords: Acute mesenteric ischemia; intestinal necrosis; abdominal CT angiography.

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INTRODUCTION

Acute mesenteric ischemia (AMI) results from a sudden interruption of blood flow to the intestinal tract, leading to cellular injury and necrosis of the affected segment [1]. It is rare (0.09–0.2% of emergency surgical admissions [1]) but carries an extremely high severity, with reported mortality rates of 50–80% in acute forms [1,2].

The clinical presentation is often misleading: sudden, severe abdominal pain typically occurs in the early phase, while physical examination findings may remain relatively unremarkable. The superior mesenteric artery is most commonly involved, with embolic occlusion accounting for more than 40–50% of cases and thrombosis on underlying atherosclerosis for 20–35% [2]. Venous obstruction (5–15%) and non-occlusive ischemia (associated with low-flow states) account for the remaining etiologies [1,2].

Acute mesenteric ischemia is a surgical emergency: without treatment, mortality approaches 100% [1]. The main diagnostic objective is early identification of the reversible ischemic phase before the onset of necrosis. In this report, we discuss the

pathophysiology, the key role of imaging, and therapeutic options in acute mesenteric infarction.

CASE REPORT

An 80-year-old male patient presented with sudden-onset, severe abdominal pain that began 24 hours prior to admission, without associated bowel transit disturbances. His medical history included a previously surgically treated inguinal hernia. On physical examination, the abdomen was soft, with no clear signs of peritoneal irritation. Initial laboratory tests were not specified; however, elevated lactate levels and D-dimers are known to be late and non-specific markers in early intestinal ischemia.

An emergency CT angiography was performed, revealing an abrupt cutoff of contrast enhancement in the superior mesenteric artery (Figure 1), associated with a lack of enhancement in multiple small bowel segments (Figure 2), highly suggestive of impending intestinal necrosis. These findings were consistent with acute occlusion of the SMA, most likely of embolic origin. No signs of hemorrhage or peritoneal effusion were observed.

The patient initially received standard resuscitative management, including fluid resuscitation, oxygen therapy, and analgesia, along with intravenous anticoagulation (heparin) in an attempt to limit thromboembolic progression. However, given the severity of the clinical presentation, an emergency exploratory laparotomy was performed. Intraoperatively, extensive necrosis of the entire small intestine was observed, along with ischemic changes involving the

entire colon (Figure 3), and a moderate amount of peritoneal fluid consistent with ischemic exudate. The abdomen was closed in layers after correct surgical count of instruments and sponges.

Postoperatively, the patient was transferred to the intensive care unit. The clinical course was unfavorable, with persistent multiple organ failure, and the patient died two hours after surgery.

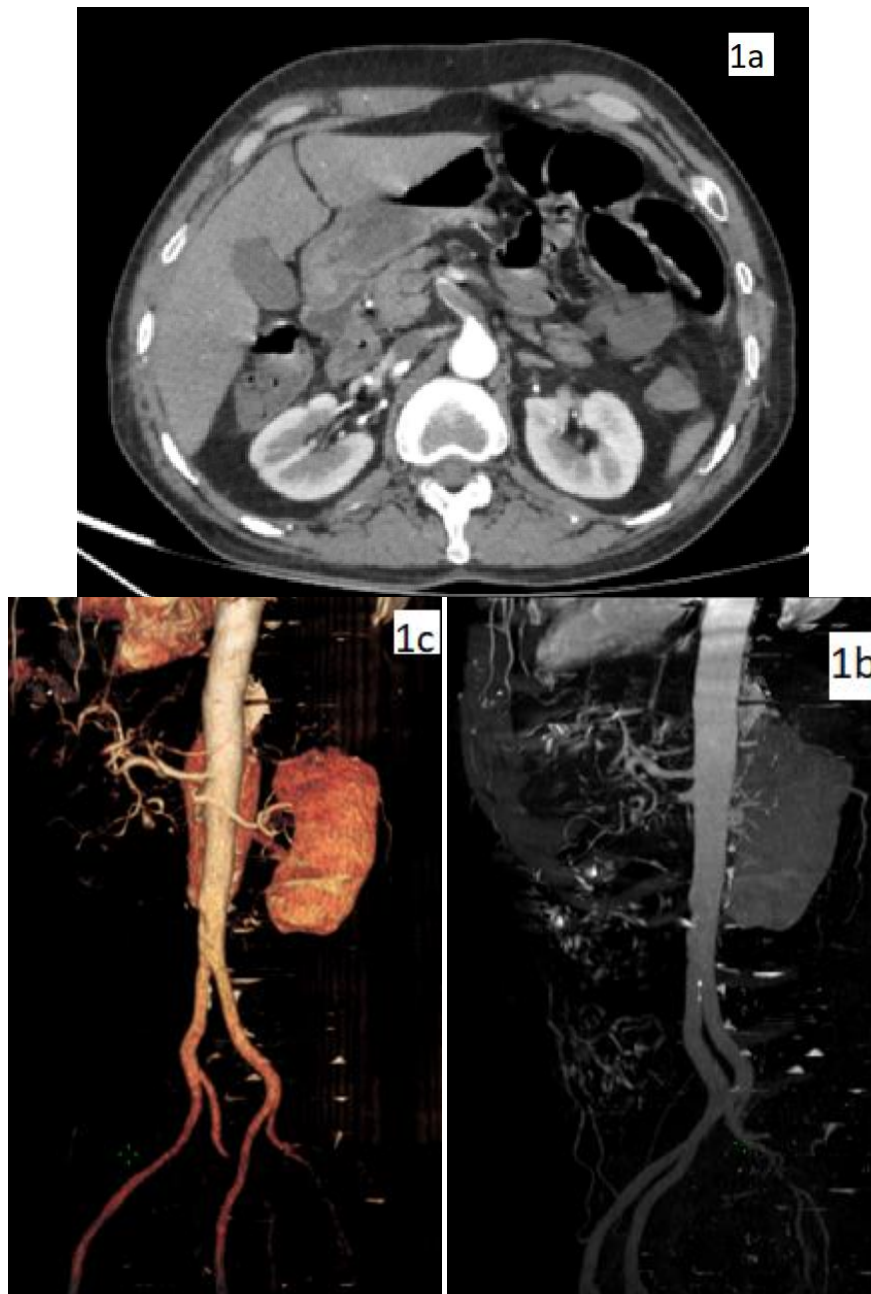


Figure 1: Axial CT angiography scan (1a) demonstrating an intraluminal filling defect in the superior mesenteric artery. Three-dimensional volume-rendered (VR) reconstructions (1b) et (1c) demonstrating occlusion of the superior mesenteric artery

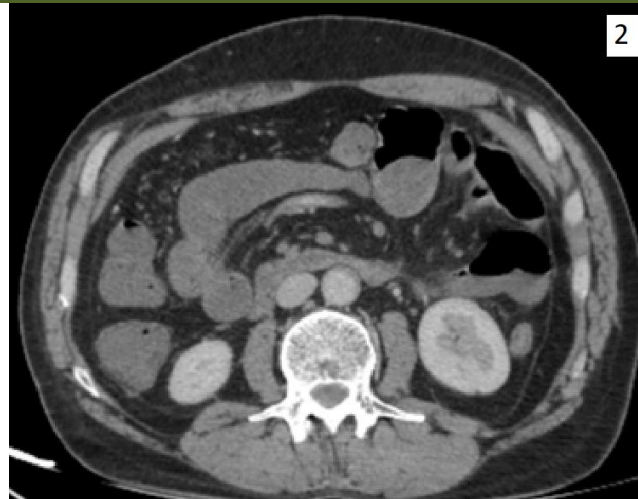


Figure 2: Axial CT angiography scan showing lack of enhancement of the intestinal wall, suggestive of intestinal ischemia

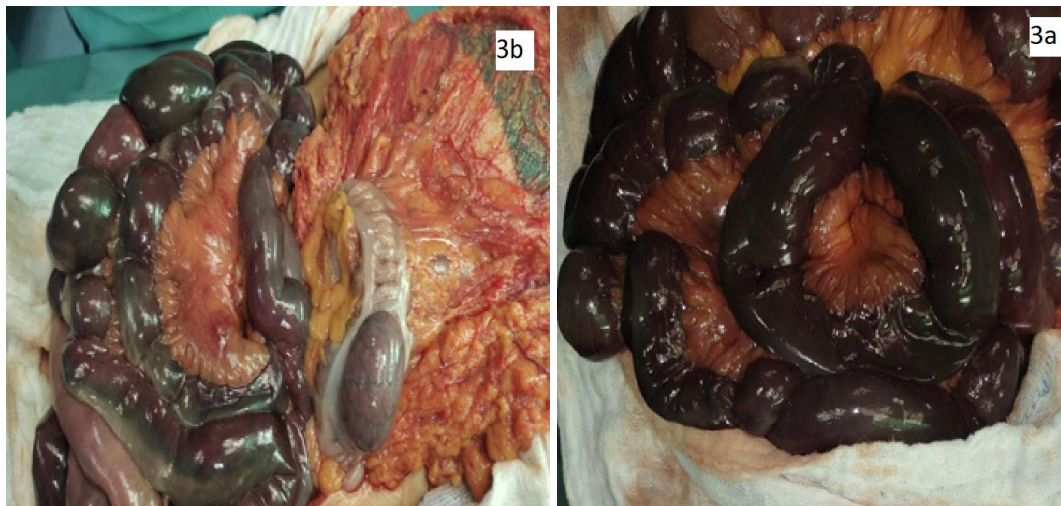


Figure 3: Intraoperative images (3a–3b) demonstrating extensive necrosis of the entire small intestine

DISCUSSION

The pathophysiology of acute mesenteric ischemia is based on the loss of arterial or venous perfusion to the intestine. In arterial forms (the most frequent), a blood clot—most often of cardiac embolic origin—or thrombosis superimposed on an atherosclerotic plaque occludes the superior mesenteric artery (SMA). The resulting ischemia leads to tissue hypoxia and increased capillary permeability, causing bowel wall edema followed by transmural necrosis.

Splanchnic collateral circulation (including pancreaticoduodenal arcades and distal SMA branches) may partially limit ischemia; however, once approximately one-third to one-half of mesenteric blood flow is compromised, the small bowel rapidly becomes highly vulnerable [1]. Venous ischemia (mesenteric venous thrombosis) leads to infarction through congestion, while non-occlusive forms (occurring in the context of shock or vasoconstriction) result from critically reduced perfusion pressure.

The role of imaging is crucial. Abdominal computed tomography with CT angiography (CTA protocol) has become the reference standard for confirming the diagnosis of acute mesenteric ischemia (AMI) [1]. The examination should include an arterial phase (to assess the SMA and its branches) and a portal venous phase (to evaluate venous patency and detect portal venous gas).

Lack of bowel wall enhancement (reduced or absent parietal enhancement) is the most specific imaging sign of intestinal infarction (necrosis) [3]. Other CT findings of advanced ischemia include pneumatosis intestinalis (air within the bowel wall) and portal venous gas [3]. Typical CT angiographic findings may also show an arterial filling defect consistent with occlusion, as well as dilated bowel loops, sometimes with a paralytic ileus pattern. These features are consistent with those described in acute mesenteric ischemia [3].

CT angiography is more sensitive and specific than Doppler ultrasound for this diagnosis; although

ultrasound may occasionally detect proximal arterial occlusion, it is limited in assessing distal small bowel involvement. MRI can identify proximal vascular occlusions, but it is rarely used in the emergency setting due to longer acquisition times and limited availability.

In summary, in cases of suspected mesenteric ischemia—characterized by acute severe abdominal pain, often in patients with cardiovascular risk factors—CT angiography should be performed without delay [1].

Therapeutic management combines early resuscitation with prompt vascular and/or surgical intervention. In the initial phase, hemodynamic stabilization and correction of metabolic disturbances are essential. In parallel, the possibility of revascularization must be rapidly assessed. Two main approaches are available: open surgical revascularization and endovascular treatment.

The WSES guidelines recommend considering diagnostic angiography in equivocal cases and performing percutaneous angioplasty or thrombectomy whenever feasible [1]. Endovascular revascularization offers the advantage of being less invasive. Series have reported high technical success rates (approximately 87%) and lower postoperative mortality compared with open surgery (36% vs 50%) [3], particularly in more fragile patients. However, this strategy is only suitable when ischemia is not yet advanced. In cases where extensive necrosis is suspected, laparotomy remains the treatment of choice. Surgical exploration allows direct assessment of bowel viability, resection of necrotic segments, and debridement. A “second-look” procedure within 24–48 hours (planned reoperation) is frequently required (up to 57% of cases [1]) to resect bowel segments that were initially borderline ischemic.

Poor prognostic factors are well established: advanced age, delayed management, pre-existing renal failure, severe metabolic acidosis, and extensive bowel necrosis are associated with increased mortality [2]. In

our case, delayed diagnosis led to extensive necrosis of both the small bowel and colon. Practical recommendations emphasize maintaining a high index of suspicion in any patient presenting with severe acute abdominal pain and cardiovascular risk factors, performing urgent CT angiography without delay [1], and proceeding to exploratory surgery when there is significant clinical doubt.

CONCLUSION

Acute mesenteric infarction leading to extensive intestinal necrosis is a rare but highly severe condition. Prognosis is essentially dependent on the speed of diagnosis and intervention. Contrast-enhanced CT angiography remains the key diagnostic modality and should be performed promptly in any clinical suspicion [1].

Management combines intensive resuscitation, possible revascularization (endovascular or surgical), and resection of non-viable bowel segments. Despite therapeutic advances, mortality remains high, and survivors often experience major long-term consequences, including short bowel syndrome. Clinical vigilance and early diagnostic algorithms remain the most effective strategies to reduce mortality.

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