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Case Report

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Acute Superior Mesenteric Artery Embolism Secondary to Left Ventricular Thrombus in a Young Male with Ischemic Cardiomyopathy: A Case Report

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HIGHLIGHTS

- Rare AMI due to LV thrombus
- SMA embolism caused bowel ischemia
- Mild lactate despite gangrene
- Early CTA enabled diagnosis
- Prompt surgery improved outcome

Key Words:

Acute mesenteric ischemia
Superior mesenteric artery embolism
Left ventricular thrombus
Ischemic cardiomyopathy
Cardioembolism
Exploratory laparotomy.

ABSTRACT

Introduction: Acute mesenteric ischemia (AMI) is a rare but life-threatening vascular emergency associated with high mortality due to delayed diagnosis and rapid progression to bowel infarction. Superior mesenteric artery (SMA) embolism secondary to left ventricular (LV) thrombus is an uncommon cause, particularly in young adults. **Aim & Objective:** To highlight an uncommon case of AMI caused by SMA embolism secondary to LV thrombus in a young patient with ischemic cardiomyopathy and emphasize the importance of early diagnosis and prompt surgical intervention. **Case Presentation:** A 31-year-old male with ischemic cardiomyopathy, previous antero-septal myocardial infarction, severe LV systolic dysfunction (ejection fraction 35%), and documented LV thrombus presented with severe diffuse abdominal pain, distension, and obstipation for three days. Examination revealed generalized peritonitis. Investigations showed marked leukocytosis ($22.46 \times 10^3/\mu\text{L}$) with mildly elevated serum lactate (2.2 mmol/L). Echocardiography demonstrated a large LV thrombus measuring 4.5×0.9 cm. Contrast-enhanced CT revealed complete SMA occlusion, small bowel ischemia, chronic celiac trunk occlusion, and splenic infarction, suggesting systemic thromboembolism. Emergency laparotomy revealed approximately 30 cm of gangrenous jejunoileal bowel, which was resected with double-barrel stoma formation. Histopathology confirmed transmural ischemic necrosis with hemorrhagic congestion. Postoperatively, an enterocutaneous fistula developed and was managed conservatively with nutritional support and wound care. **Result:** The patient recovered and was discharged in a hemodynamically stable condition on guideline-directed heart failure therapy and long-term anticoagulation. **Conclusion:** LV thrombus is an uncommon but important cause of acute SMA embolism in young patients with ischemic cardiomyopathy. Mildly elevated serum lactate does not exclude advanced bowel ischemia. Early CTA, prompt surgical intervention, and multidisciplinary management are essential for improving outcomes in patients with acute mesenteric ischemia.



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INTRODUCTION

Acute mesenteric ischemia (AMI) is a life-threatening vascular emergency resulting from an abrupt reduction in intestinal blood flow, leading to bowel ischemia, transmural necrosis, sepsis, and death if left untreated. AMI may result from arterial embolism, arterial thrombosis, mesenteric venous thrombosis, or non-occlusive mesenteric ischemia, with superior mesenteric artery (SMA) embolism accounting for a significant proportion of acute arterial mesenteric ischemia. Despite advances in imaging and surgical management, mortality remains as high as 60–80%, largely because diagnosis is often delayed owing to nonspecific early clinical manifestations [1,2].

Cardioembolic disease is a major cause of SMA embolism, with emboli commonly originating from atrial fibrillation, recent myocardial infarction, left ventricular thrombus, valvular heart disease, or dilated cardiomyopathy. Other risk factors include atherosclerosis, hypercoagulable states, and poor compliance with anticoagulant therapy [1,3]. Contrast-enhanced computed tomography angiography (CTA) is currently considered the diagnostic modality of choice because of its high sensitivity for detecting mesenteric vascular occlusion, assessing bowel viability, and identifying associated vascular abnormalities. Early diagnosis followed by prompt surgical or endovascular intervention remains the cornerstone of successful management [2,4]. Patients presenting with bowel infarction or generalized peritonitis require emergency exploratory laparotomy with resection of non-viable bowel, whereas selected patients without established bowel necrosis may benefit from endovascular revascularization. Delay in treatment remains the strongest predictor of adverse outcomes [2,5]. **Figure 1.** The diagram depicts a large thrombus within the left ventricle of a heart affected by ischemic cardiomyopathy. An embolus is shown migrating from the heart to the SMA, resulting in acute vascular occlusion, extensive small bowel ischemia, and splenic infarction.

We report a rare case of acute SMA embolism secondary to a large left ventricular thrombus in a young male with ischemic cardiomyopathy and poor medication compliance, presenting with acute abdomen, splenic infarction, and extensive bowel ischemia requiring emergency bowel resection.

CASE PRESENTATION

A 31-year-old male with a known history of ischemic cardiomyopathy, previous antero-septal myocardial infarction, severe left ventricular systolic dysfunction (left ventricular ejection fraction 35%), and documented left ventricular thrombus presented to the emergency department with severe diffuse abdominal pain of three days' duration. The pain was continuous, progressively worsening, and associated with progressive abdominal distension and failure to pass flatus for three days. The patient had a history of poor adherence to prescribed cardiovascular medications and irregular follow-up.

On presentation, he appeared toxic, dehydrated, and hemodynamically stable. Abdominal examination revealed generalized distension, diffuse tenderness with board-like rigidity, absent bowel sounds, and signs of generalized peritonitis, raising suspicion of bowel ischemia.

Investigations

Initial laboratory evaluation demonstrated marked leukocytosis ($22.46 \times 10^3/\mu\text{L}$), indicating an acute inflammatory response. Serum lactate was only mildly elevated (2.2 mmol/L), despite advanced bowel ischemia. Coagulation profile showed a mildly prolonged prothrombin time (15.9 s) with an INR of 1.38 (**Table 1**). Transthoracic two-dimensional echocardiography revealed severe left ventricular systolic dysfunction (ejection fraction 35%) with a large mobile left ventricular thrombus measuring 4.5×0.9 cm, suggesting a potential cardioembolic source.

Contrast-enhanced computed tomography (CECT) of the

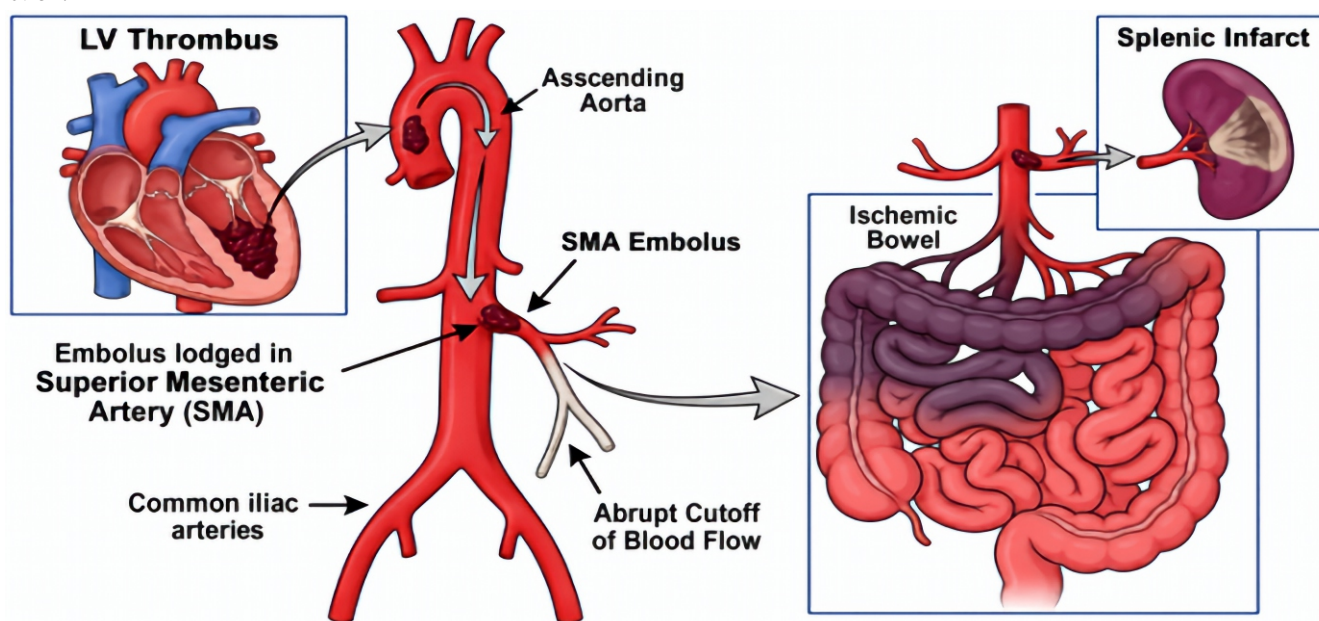


Figure 1: Pathophysiological Illustration of Acute Superior Mesenteric Artery (SMA) Embolism.

abdomen demonstrated complete occlusion of the superior mesenteric artery (SMA) with features of small bowel ischemia. Additional findings included chronic total occlusion of the celiac trunk, splenic infarction, minimal ascites, and mild bilateral pleural effusion, confirming extensive thromboembolic vascular disease.

Management

Considering the clinical evidence of generalized peritonitis and radiological confirmation of acute mesenteric ischemia, the patient underwent emergency exploratory laparotomy. Intraoperatively, approximately 30 cm of gangrenous jejunoileal bowel with absent mesenteric pulsations and transmural ischemic changes was identified. Segmental jejunoileal resection was performed. Primary bowel anastomosis was deferred because of bowel edema, peritoneal contamination, and concerns regarding hemodynamic status. A double-barrel stoma was therefore fashioned. Histopathological examination of the resected specimen demonstrated transmural ischemic necrosis with hemorrhagic congestion, consistent with ischemic enteritis.

bowel with transmural ischemia and absent mesenteric pulsations. **Figure 3.** Resected jejunoileal specimen showing hemorrhagic transmural ischemic necrosis due to acute SMA embolism. **Figure 4.** CECT abdomen showing complete SMA occlusion (arrow) with small bowel ischemia and splenic infarction.

Outcome and Follow-up

The development of an enterocutaneous fistula on postoperative day 7 complicated the postoperative course. The patient was managed conservatively with bowel rest, nutritional optimization including total parenteral nutrition, meticulous wound care, and supportive management. The fistula was managed successfully without the need for re-exploration, and the patient's clinical condition gradually improved.

The patient was discharged in a hemodynamically stable condition on guideline-directed medical therapy for ischemic cardiomyopathy and long-term anticoagulation comprising sacubitril/valsartan, bisoprolol 2.5 mg once daily, dapagliflozin, rivaroxaban 20 mg once daily, and ivabradine 5 mg twice daily. He was advised regular cardiology and surgical follow-up, with future consideration for stoma reversal after complete recovery.

Table 1. Preoperative Investigations

Investigation	Result	Interpretation
White blood cell count	$22.46 \times 10^3/\mu\text{L}$	Marked leukocytosis suggestive of acute inflammatory response and bowel ischemia
Serum lactate	2.2 mmol/L	Mild elevation despite advanced bowel ischemia; does not exclude intestinal infarction
Prothrombin time	15.9 s	Mild prolongation
INR	1.38	Mild coagulation abnormality
2D Echocardiography	LVEF 35%; left ventricular thrombus 4.5×0.9 cm	Severe ischemic cardiomyopathy with probable cardioembolic source
CECT Abdomen	Complete SMA occlusion	Acute mesenteric arterial embolism
	Small bowel ischemia	Established bowel ischemia
	Chronic celiac trunk occlusion	Chronic mesenteric vascular disease
	Splenic infarction	Systemic thromboembolism
	Minimal ascites and mild bilateral pleural effusion	Associated intra -abdominal and systemic changes



Figure 2: Intraoperative photograph demonstrating gangrenous jejunoileal bowel with transmural ischemic changes and absent mesenteric pulsations during emergency exploratory laparotomy.



Figure 3: Resected jejunoileal specimen showing hemorrhagic transmural ischemic necrosis secondary to acute superior mesenteric artery embolism.

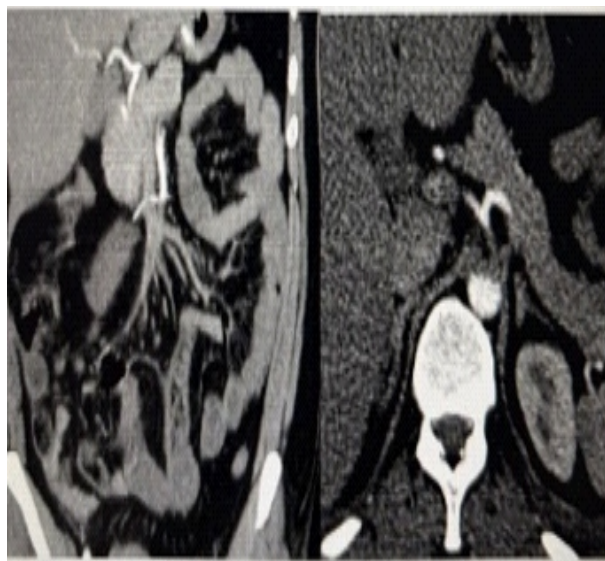


Figure 4: Contrast-enhanced computed tomography of the abdomen showing complete occlusion of the superior mesenteric artery (arrow), associated small bowel ischemia, and splenic infarction.

RESULTS

The patient presented severe diffuse abdominal pain, progressive abdominal distension, obstipation, and generalized peritonitis. Laboratory investigations revealed marked leukocytosis ($22.46 \times 10^3/\mu\text{L}$) with only mildly elevated serum lactate (2.2 mmol/L), despite advanced intestinal ischemia. Echocardiography demonstrated severe left ventricular systolic dysfunction (LVEF 35%) with a large mobile left ventricular thrombus measuring 4.5×0.9 cm, establishing a potential cardioembolic source. CECT abdomen confirmed complete SMA occlusion with associated small bowel ischemia, chronic total occlusion of the celiac trunk, and splenic infarction. Emergency exploratory laparotomy demonstrated approximately 30 cm of gangrenous jejunoileal bowel with transmural ischemic changes and absent mesenteric pulsations. Segmental jejunoileal resection was performed. Because of marked bowel edema, peritoneal contamination, and concern regarding the patient's physiological status, primary anastomosis was deferred and a double-barrel stoma was fashioned. Histopathological examination confirmed transmural

ischemic necrosis with hemorrhagic congestion, consistent with ischemic enteritis. The development of an enterocutaneous fistula on postoperative day 7 complicated the postoperative period. The fistula was managed successfully using conservative measures, including bowel rest, total parenteral nutrition, nutritional optimization, meticulous wound care, and supportive management. Re-exploration was not required, and the patient's clinical condition gradually improved. Following stabilization, the patient was discharged in a hemodynamically stable condition on guideline-directed therapy for ischemic cardiomyopathy and long-term anticoagulation. His discharge medications included sacubitril/ valsartan, bisoprolol 2.5 mg once daily, dapagliflozin, rivaroxaban 20 mg once daily, and ivabradine 5 mg twice daily. Regular cardiology and surgical follow-up was advised, with consideration of future stoma reversal after complete recovery. Overall, the clinical, radiological, operative, & histopathological findings established acute SMA embolism associated with left ventricular thrombus, resulting in extensive bowel infarction & concomitant splenic

infarction. Despite delayed presentation, extensive bowel necrosis, and a postoperative enterocutaneous fistula, timely surgical intervention & conservative postoperative management resulted in successful clinical recovery and discharge.

DISCUSSION

Acute mesenteric ischemia remains one of the most devastating abdominal vascular emergencies, with survival primarily dependent on early diagnosis and timely restoration of mesenteric blood flow. **Clair and Beach et al.** described arterial embolism as a major cause of AMI and emphasized that delayed diagnosis is associated with rapid progression to bowel infarction and high mortality [1]. Similarly, **Bala et al.** highlighted that prompt diagnosis using CTA followed by early revascularization or surgical intervention significantly improves patient outcomes [2]. In the present case, delayed presentation resulted in transmural bowel necrosis requiring emergency bowel resection.

Our patient had previous anterior wall myocardial infarction, severe left ventricular systolic dysfunction (ejection fraction 35%), and a large left ventricular thrombus, all of which strongly suggested a cardioembolic source for SMA embolism. **Oldenburg et al.** identified cardiac embolism as one of the commonest etiologies of acute arterial mesenteric ischemia, while **Acosta and Björck** emphasized that intracardiac thrombi following myocardial infarction remain important sources of systemic embolization requiring urgent recognition and treatment [3,4]. The concomitant splenic infarction in our patient further supported a systemic thromboembolic event rather than isolated mesenteric vascular disease.

An important feature of the present case was the relatively young age of the patient and only mildly elevated serum lactate despite extensive bowel gangrene. **Kärkkäinen et al.** demonstrated that serum lactate has limited sensitivity during the early stages of AMI and may remain normal or only mildly elevated despite significant intestinal ischemia [5]. Likewise, the **World Society of Emergency Surgery guidelines by Bala et al.** recommend maintaining a high index of clinical suspicion and performing early CTA whenever AMI is suspected, irrespective of initial laboratory findings [2]. These observations are consistent with our patient's presentation, in whom imaging rather than biochemical markers established the diagnosis.

Emergency exploratory laparotomy with resection of non-viable bowel remains the treatment of choice in patients presenting with bowel infarction or generalized peritonitis. **Tilsed et al.** recommended immediate surgical exploration in patients with clinical evidence of bowel necrosis, whereas **Endean et al.** reported improved survival following prompt operative intervention before irreversible intestinal damage develops [6,7]. In our patient, bowel edema, contamination, and hemodynamic concerns precluded primary anastomosis; therefore, jejunioileal resection with double-barrel stoma formation was appropriately performed. Histopathological examination confirmed transmural ischemic necrosis with

hemorrhagic congestion consistent with ischemic enteritis. The postoperative course was complicated by enterocutaneous fistula formation, which was successfully managed conservatively with nutritional support, wound care, and close clinical monitoring. **Steele SR** reported that postoperative complications following bowel resection are common in ischemic bowel disease because of impaired tissue perfusion and delayed healing [8]. Furthermore, **Park et al.** demonstrated that early diagnosis, timely surgery, and aggressive postoperative critical care remain the strongest predictors of survival in patients with AMI [9]. This case highlights that acute SMA embolism should be considered even in relatively young patients presenting with severe abdominal pain in the presence of ischemic cardiomyopathy or left ventricular thrombus. Early CTA, prompt surgical intervention, and multidisciplinary postoperative care remain essential for improving survival, consistent with the recommendations of **Bala et al.** and **Eltarawy et al.** [2,10].

CONCLUSION

Acute mesenteric ischemia should be considered in young patients presenting with severe abdominal pain and underlying cardiac disease. Left ventricular thrombus may serve as a source of systemic embolization leading to catastrophic mesenteric ischemia. Normal or mildly elevated lactate levels do not exclude advanced bowel ischemia. Early CTA and prompt surgical intervention remain crucial for survival.

CLINICAL SIGNIFICANCE

The clinical significance of this study lies in its potential to bridge the gap between research findings and practical healthcare, diagnosis, and treatment outcomes. By highlighting real-care applications. It emphasizes the importance of translating scientific observations into meaningful improvements in patient world relevance, the study contributes to evidence based medical practice and supports informed clinical decision making. Ultimately, the findings aim to enhance patient quality of life, optimize therapeutic strategies, and promote better disease management in clinical settings.

ABBREVIATIONS

AMI: Acute Mesenteric Ischemia

SMA: Superior Mesenteric Artery

LV: Left Ventricle / Left Ventricular

CTA: Computed Tomography Angiography

CT: Computed Tomography

MI: Myocardial Infarction

EF: Ejection Fraction

ECF: Enterocutaneous Fistula

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AUTHOR CONTRIBUTIONS

All authors significantly contributed to the study conception and design, data acquisition, or data analysis and interpretation. They participated in drafting the manuscript or critically revising it for important intellectual content, consented to its submission to the current journal, provided final approval for the version to be published, and accepted responsibility for all aspects of the work. Additionally, all authors meet the authorship criteria outlined by the International Committee of Medical Journal Editors (ICMJE) guidelines.

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CONFLICT OF INTEREST

Authors declared that there is no conflict of interest.

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All necessary consent & approval was obtained by authors.

CONSENT FOR PUBLICATION

All necessary consent for publication was obtained by authors.

DATA AVAILABILITY

All data generated and analyzed are included within this research article. The datasets utilized and/or analyzed in this study can be obtained from the corresponding author upon a reasonable request.

USE OF ARTIFICIAL INTELLIGENCE (AI) & LARGE LANGUAGE MODEL (LLM)

The authors confirm that no AI & LLM tools were used in the writing or editing of the manuscript, and no images were altered or manipulated using AI & LLM.

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This article serves as an important educational tool for the scientific community, offering insights that may inspire future research directions. However, they should not be relied upon independently when making treatment decisions or developing public health policies.

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