

Acute right colonic ischemia due to traumatic segmental occlusion of a superior mesenteric artery branch: CT findings and case report

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Abstract

Acute mesenteric ischemia is a life-threatening condition associated with high mortality, particularly in cases of delayed diagnosis. In polytrauma patients, diagnosis is especially challenging due to nonspecific clinical presentation and the presence of associated injuries that may mask digestive symptoms.

We report a case of right colonic ischemia secondary to segmental occlusion of a branch of the superior mesenteric artery in a polytraumatized patient. Contrast-enhanced computed tomography revealed a segmental arterial filling defect associated with decreased bowel wall enhancement, mural thickening, and mesenteric fat stranding, consistent with early ischemic changes.

This case highlights the importance of systematic evaluation of mesenteric vessels during trauma CT assessment. Early recognition of vascular and bowel perfusion abnormalities allows prompt management and improves patient outcomes.

Keywords: Acute mesenteric ischemia; Superior mesenteric artery; Right colon ischemia; CT imaging; Polytrauma; Vascular occlusion

1. Introduction

Acute mesenteric ischemia (AMI) is characterized by a sudden reduction in intestinal blood flow that may rapidly progress to bowel necrosis. It remains a life-threatening condition with high mortality rates, largely dependent on early diagnosis and timely management [1].

In polytrauma patients, the diagnosis of AMI is particularly challenging due to nonspecific clinical manifestations and the presence of concomitant injuries that may overshadow abdominal symptoms. In this setting, contrast-enhanced computed tomography (CT) has become the imaging modality of choice, allowing rapid and comprehensive evaluation of both mesenteric vasculature and bowel wall perfusion [2].

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2. Case Report

A 34-year-old male with no significant past medical history was admitted to the emergency department following a high-energy road traffic accident. On admission, he presented with diffuse abdominal pain and moderate hemodynamic instability. Initial laboratory findings were non-specific.

A whole-body contrast-enhanced CT scan was performed as part of the trauma assessment. Arterial phase imaging demonstrated a filling defect in a segmental branch of the superior mesenteric artery. Bowel findings included decreased enhancement of the right colon wall, associated with stratified mural thickening and mesenteric fat stranding. A small amount of intraperitoneal fluid was also noted, without evidence of pneumatosis intestinalis or portal venous gas.

Additional findings included extensive hepatic contusions and lacerations involving more than 75% of the liver parenchyma, associated with portal vein thrombosis and moderate hemoperitoneum, consistent with hemorrhagic shock.

Given the strong suspicion of occlusive mesenteric ischemia, an emergency exploratory laparotomy was performed. Intraoperative findings confirmed transmural ischemia involving the cecum, ascending colon, and hepatic flexure, extending to the proximal third of the transverse colon. The small bowel and remaining colon were viable.

An extended right hemicolectomy was performed. Due to the polytrauma context and hemodynamic instability, a damage control strategy was adopted, and bowel continuity was not restored. A double end stoma (Bouilly-Volkman type) was created to allow postoperative monitoring of bowel viability.

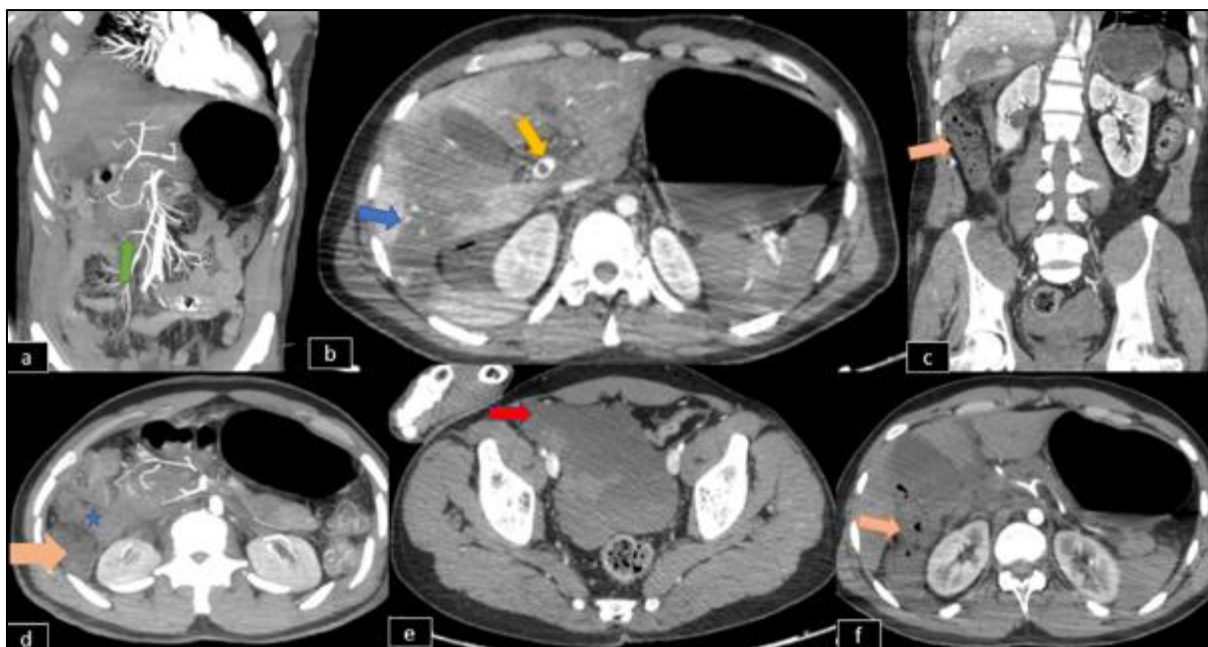


Figure 1 Contrast-enhanced CT images demonstrating a filling defect involving a proximal branch of the superior mesenteric artery, most likely the right colic artery (green arrow, image A). This vascular occlusion is associated with decreased enhancement of the bowel wall of the ascending colon and the hepatic flexure (orange arrows, images C, D, and F), along with surrounding mesenteric fat stranding (blue asterisk, image D)

Associated traumatic findings include linear hepatic lacerations extending up to 3 cm in depth and multiple areas of hepatic contusion and laceration involving more than 75% of the liver parenchyma (blue arrow, image B). Portal vein thrombosis is also noted (yellow arrow, image B), along with a moderate hemoperitoneum (red arrow).

3. Discussion

Acute mesenteric ischemia is a critical condition due to its rapid progression toward irreversible bowel injury. Despite advances in imaging and management, it remains associated with high mortality, particularly when diagnosis is delayed [1].

In the setting of polytrauma, AMI is frequently underdiagnosed. Clinical signs are often subtle or absent and may be masked by other life-threatening injuries, leading to delayed recognition and treatment [4].

The pathophysiology of post-traumatic mesenteric ischemia is multifactorial. Blunt abdominal trauma may result in intimal injury leading to thrombosis, arterial dissection, or embolization. Additionally, systemic factors such as hypovolemia and shock contribute to decreased mesenteric perfusion and exacerbate ischemic injury [5].

Segmental occlusion of branches of the superior mesenteric artery is less common than proximal occlusion but may still result in severe localized ischemia. The right colon is particularly vulnerable due to relatively limited collateral circulation, making it prone to ischemic injury even in cases of distal arterial involvement [6].

Contrast-enhanced CT is the cornerstone of diagnosis in suspected AMI. It enables simultaneous evaluation of vascular structures and bowel wall, with high diagnostic accuracy, especially when arterial phase imaging and multiplanar reconstructions are performed [2].

The most specific early CT finding of bowel ischemia is decreased or absent bowel wall enhancement, reflecting impaired perfusion. This sign should be actively sought, particularly in high-risk patients [7].

Bowel wall thickening with a stratified pattern is another common finding, corresponding to submucosal edema and vascular congestion. Mesenteric fat stranding reflects the associated inflammatory response [7].

In advanced stages, signs such as pneumatosis intestinalis and portal venous gas may appear, indicating severe ischemic injury and often bowel necrosis, and are associated with poor prognosis [8].

A major diagnostic pitfall is the subtlety of vascular abnormalities, particularly in segmental occlusions. Careful analysis of mesenteric arteries during the arterial phase is essential to avoid missed diagnoses [2].

Differential diagnoses include infectious and inflammatory colitis, as well as non-occlusive mesenteric ischemia. However, the association of arterial filling defects with bowel perfusion abnormalities strongly suggests a vascular etiology [9].

Management requires a multidisciplinary approach involving resuscitation, imaging, and surgery. In cases of bowel necrosis, surgical resection remains the definitive treatment, often performed within a damage control strategy in unstable patients [1].

Prognosis is directly related to the timing of diagnosis and the extent of bowel involvement. Early detection significantly improves survival, highlighting the crucial role of the radiologist in identifying early imaging signs of ischemia [10].

4. Conclusion

Right colonic ischemia secondary to segmental occlusion of the superior mesenteric artery is a rare but severe complication in polytrauma patients.

Contrast-enhanced CT plays a pivotal role in early diagnosis. A systematic and meticulous evaluation of mesenteric vessels should be performed in all trauma CT examinations.

Early recognition of bowel ischemia significantly improves patient management and clinical outcomes.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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