

# Mesenteric Ischemia



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## KEYWORDS

- Acute mesenteric ischemia • Nonocclusive mesenteric ischemia
- Arterial thrombosis • Mesenteric venous thrombosis • Mesenteric artery occlusion

## KEY POINTS

- Acute mesenteric ischemia is rare and the symptoms are vague, leading to high mortality caused by delayed diagnosis.
- There are 4 causes of acute mesenteric ischemia: arterial embolism, arterial thrombosis, mesenteric venous thrombosis, and nonocclusive mesenteric ischemia.
- History, physical examination, and laboratory findings lack the sensitivity and specificity to exclude acute mesenteric ischemia. Only computed tomography angiography can rapidly and accurately confirm the diagnosis.
- Survival is associated with rapid diagnosis and surgical treatment involving restoration of perfusion and assessment of the bowel.
- Advances in imaging, operative techniques, and critical care have led to a steady decline in overall mortality.

## INTRODUCTION

Acute mesenteric ischemia (AMI) continues to challenge even the most astute clinicians.<sup>1</sup> Its vague, nonspecific symptoms overlap with common illnesses, resulting in delayed diagnosis and historically dismal survival rates.<sup>2-4</sup> In addition, advanced age and comorbidities in patients with AMI mean that, despite timely identification, mortality exceeds 50% in recent series.<sup>5-7</sup> The aging of society portends an inevitable increase in the incidence of AMI; therefore, physicians must maintain a thorough understanding of this disease.<sup>8</sup> This article reviews the presentation, diagnosis, and treatment of the 4 most common causes of AMI: arterial embolism (AE), arterial thrombosis (AT), mesenteric venous thrombosis (MVT), and nonocclusive mesenteric ischemia (NOMI).

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## EPIDEMIOLOGY AND COMORBIDITIES ASSOCIATED WITH ACUTE MESENTERIC ISCHEMIA

The rates of AMI range from 0.1 to 1 per 1000 hospital admissions, depending on the origin of the report.<sup>8,9</sup> AMI is a disease of the elderly with a median age of 74 years,<sup>10</sup> and is more common than appendicitis in patients greater than 75 years of age.<sup>11</sup> The frequency of each cause varies greatly across studies,<sup>4–6,12,13</sup> but AE is no longer the most common cause.<sup>14</sup> Rates of AT and AE seem to be almost equal using data provided in the comprehensive review by Schoots and colleagues<sup>10</sup> (**Table 1**). AMI affects slightly more women (51.4%), but the gender ratio differs depending on the cause.<sup>10</sup>

As expected given the age of the cohort, comorbidities associated with AMI are common. Dahlke and colleagues<sup>6</sup> reported that 27% of patients had peripheral arterial disease and 46% had coronary artery disease. Hypertension, hyperlipidemia, diabetes, and obesity are also typically present.<sup>6,15,16</sup> Beaulieu and colleagues<sup>16</sup> found a Charlson Comorbidity Index of 1.13 to 1.53 in 2000 patients with AMI, scores that are associated with a 25% 1-year mortality, further emphasizing the impact of disease burden on the AMI population.

## CLINICAL PRESENTATION OF ACUTE MESENTERIC ISCHEMIA

The typical presentation is an elderly person with multiple comorbidities, complaining of severe abdominal pain out of proportion to the examination. Although pain is the most consistent symptom, clinicians must appreciate that the presentation varies significantly depending on the cause of AMI (**Table 2**).<sup>12</sup> Vomiting, diarrhea, distention, and blood in the stool occur frequently but not universally.<sup>17–19</sup> Altered mental status is common, complicating the evaluation of patients with AMI.<sup>17</sup>

The progression of symptoms from superior mesenteric artery (SMA) occlusion is well described.<sup>20</sup> Small bowel ischemia causes crampy, periumbilical pain, but tenderness on examination is minimal until transmural ischemia develops, at which point peritoneal signs become evident. Intestinal necrosis eventually develops, leading to diffuse peritonitis, a rigid abdomen, and sepsis. Note that peritonitis on examination is reported in as few as 16% of patients with necrotic bowel.<sup>12</sup> Bowel sounds do not reliably indicate disorder and may be present until late in the course.<sup>21</sup> The diagnosis remains challenging, illustrated by AMI being clinically suspected in only 22% of patients who died of the disease.<sup>19</sup>

## LABORATORY TESTS IN ACUTE MESENTERIC ISCHEMIA

White blood cell count, lactate, D-dimer, and metabolic acidosis are classic serum markers for AMI.<sup>19</sup> Leukocytosis is one of the most common laboratory abnormalities in AMI, with

Cause	Incidence (%)	Median Age (y)	Female/Male	Mortality (%)
AT	34 (13–68)	72 (59–78)	1.46	70 (27–100)
AE	34 (17–64)	69 (60–75)	1.23	66 (18–88)
Venous thrombosis	13 (2–26)	70 (43–74)	0.78	44 (25–69)
NOMI	19 (5–52)	69 (57–76)	1.17	70 (50–83)

Data from Schoots IG, Koffeman GI, Legemate DA, et al. Systematic review of survival after acute mesenteric ischaemia according to disease aetiology. *Br J Surg* 2004;91:17–27.

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