

TABLE 354-1 OVERVIEW OF THE MANAGEMENT OF ACUTE INTESTINAL ISCHEMIA

Condition	Key to Early Diagnosis	Treatment of Underlying Cause	Treatment of Specific Lesion	Treatment of Systemic Consequence
Arterioocclusive mesenteric ischemia	Computed tomography (CT) angiography	Anticoagulation	Laparotomy	Ensure hydration
1. Arterial embolus	Early laparotomy	Cardioversion	Embolectomy	Give antibiotics
		Proximal thrombectomy	Vascular bypass	Reverse acidosis
			Assess viability and resect dead bowel	Optimize oxygen delivery
				Avoid vasoconstrictors
2. Arterial thrombosis	Duplex ultrasound Angiography	Anticoagulation	Endovascular approach: thrombolysis, angioplasty and stenting	Give antibiotics
		Hydration	Endarterectomy/thrombectomy or vascular bypass	Reverse acidosis
			Assess viability and resect dead bowel	Optimize oxygen delivery
				Support cardiac output
				Avoid vasoconstrictors
Mesenteric venous thrombosis	Spiral CT	Anticoagulation	Anticoagulation ± laparotomy/thrombectomy/catheter-directed thrombolysis	Give antibiotics
Venous thrombosis	Angiography with venous phase	Massive hydration	Assess viability and resect dead bowel	Reverse acidosis
				Optimize oxygen delivery
				Support cardiac output
				Avoid vasoconstrictors
Nonocclusive mesenteric ischemia	Vasospasm: Angiography	Ensure hydration	Vasospasm	Ensure hydration
	Hypoperfusion: Spiral CT or colonoscopy	Support cardiac output	Intraarterial vasodilators	Give antibiotics
		Avoid vasoconstrictors	Hypoperfusion	Reverse acidosis
			Delayed laparotomy	Optimize oxygen delivery
			Assess viability and resect dead bowel	Support cardiac output
				Avoid vasoconstrictors

Source: Modified from GB Bulkley, in JL Cameron (ed): *Current Surgical Therapy*, 2nd ed. Toronto, BC Decker, 1986.

flexure is high yield. This is often an excellent diagnostic tool in patients with chronic renal insufficiency who cannot tolerate IV contrast.

The “gold standard” for the diagnosis of acute arterial occlusive disease is angiography, and management is laparotomy. Surgical exploration should not be delayed if suspicion of acute occlusive mesenteric ischemia is high or evidence of clinical deterioration or frank peritonitis is present. The goal of operative exploration is to resect compromised bowel and restore blood supply. The entire length of the small and large bowel beginning at the ligament of Treitz should be evaluated. The pattern of intestinal ischemia may indicate the level of arterial occlusion. In the case of SMA occlusion where the embolus usually lies just proximal to the origin of the middle colic artery, the proximal jejunum is often spared while the remainder of the small bowel to the transverse colon will be ischemic. The surgical management of acute mesenteric ischemia of the small bowel is embolectomy via arteriotomy; a small incision is made in the artery through which the clot is retrieved. Another way to manage acute thrombosis is thrombolysis therapy and angioplasty, with stent placement. However, this approach is more commonly applied to treat chronic mesenteric ischemia. If this is unsuccessful, a bypass from the aorta or iliac artery to the SMA is performed.

Nonocclusive or vasospastic mesenteric ischemia presents with generalized abdominal pain, anorexia, bloody stools, and abdominal distention. Often these patients are obtunded, and physical findings may not assist in the diagnosis. The presence of a leukocytosis, metabolic acidosis, elevated amylase or creatinine phosphokinase levels, and/or lactic acidosis is useful in support of the diagnosis of advanced intestinal ischemia; however, these markers may not be indicative of either reversible ischemia or frank necrosis. Investigational markers for intestinal ischemia include D-dimer, glutathione S-transferase, platelet-activating factor (PAF), and mucosal pH monitoring. Regardless of the need for urgent surgery, emergent admission to a monitored bed or intensive care unit is recommended for resuscitation and further evaluation. Early manifestations of intestinal ischemia include fluid sequestration within the bowel wall leading to a loss of interstitial volume. Aggressive fluid resuscitation may be necessary. To optimize oxygen delivery, nasal O₂ and blood transfusions may be given. Broad-spectrum antibiotics should be given to provide sufficient coverage for

enteric pathogens, including gram-negative and anaerobic organisms. Frequent monitoring of the patient’s vital signs, urine output, blood gases, and lactate levels is paramount, as is frequent abdominal examination. All vasoconstricting agents should be avoided; fluid resuscitation is the intervention of choice to maintain hemodynamics.

If ischemic colitis is a concern, colonoscopy should be performed to assess the integrity of the colon mucosa. Visualization of the rectosigmoid region may demonstrate decreased mucosal integrity, associated more commonly with nonocclusive mesenteric ischemia, or, on occasion, occlusive disease as a result of acute loss of inferior mesenteric arterial flow following aortic surgery. Ischemia of the colonic mucosa is graded as *mild* with minimal mucosal erythema or as *moderate* with pale mucosal ulcerations and evidence of extension to the muscular layer of the bowel wall. *Severe* ischemic colitis presents with severe ulcerations resulting in black or green discoloration of the mucosa, consistent with full-thickness bowel-wall necrosis. The degree of reversibility can be predicted from the mucosal findings: mild erythema is nearly 100% reversible, moderate is approximately 50% reversible, and frank necrosis is simply dead bowel. Follow-up colonoscopy can be performed to rule out progression of ischemic colitis.

Laparotomy for nonocclusive mesenteric ischemia is warranted for signs of peritonitis or worsening endoscopic findings and if the patient’s condition does not improve with aggressive resuscitation. Ischemic colitis is optimally treated with resection of the ischemic bowel and formation of a proximal stoma. Primary anastomosis should not be performed in patients with acute intestinal ischemia.

Patients with mesenteric venous thrombosis may present with a gradual or sudden onset. Symptoms include vague abdominal pain, nausea, and vomiting. Examination findings include abdominal distention with mild to moderate tenderness and signs of dehydration. The diagnosis of mesenteric thrombosis is frequently made on abdominal spiral CT with oral and IV contrast. Findings on CT angiography with venous phase include bowel-wall thickening and ascites. Intravenous contrast will demonstrate a delayed arterial phase and clot within the superior mesenteric vein. The goal of management is to optimize hemodynamics and correct electrolyte abnormalities with massive fluid resuscitation. Intravenous antibiotics as well as