Mesenteric Ischemia

Mesenteric ischemia is a condition caused by insufficient blood flow to the small intestine. Poor blood flow is caused by thrombotic or embolic occlusion of the arteries that feed the small intestine, most commonly the proximal superior mesenteric artery (SMA). This lack of perfusion causes bowel ischemia, and subsequent necrosis if left untreated. Hallmark findings are severe abdominal pain that is out of proportion to their physical examination, nausea, vomiting, and bloody stools. Laboratory testing shows metabolic acidosis with elevated lactate, and abdominal x-ray and CT angiography may show bowel wall thickening or edema, signs of obstruction, or air within the bowel wall. Treatment includes fluids, broad spectrum antibiotics, anticoagulation, and emergent surgical exploration in severe cases.

PLAY PICMONIC

Signs and Symptoms

Severe Abdominal Pain

Severed Abdominal Pain-bolt

Patients present with very severe abdominal pain that is excessive and out of proportion to the examination. They may have had previous episodes of pain associated with eating; this is known as “intestinal angina”.

Bloody Diarrhea

Red Toilet

Damage to the small intestine is caused both by tissue hypoxia and reperfusion injury. Hypoxic injury causes tissue ischemia and necrosis, while reperfusion injury is caused by neutrophil activation, the release of free radicals, and buildup of toxic byproducts after periods of ischemia. This damage leads to sloughing of cells and blood into the intestinal lumen, causing occult blood in the stool, and bloody diarrhea in severe cases.

Metabolic Acidosis

Metal-ball Acidic-lemon

Tissue breakdown with subsequent release of lactate, free radicals, and intracellular electrolytes leads to a metabolic acidosis.

Diagnosis

Increased WBC

Up-arrow White-mac-man

Physiologic response to injury leads to a leukocytosis with a predominance of immature white blood cells, which are also known as bands.

Increased Lactate (Lactic Acid)

Up-arrow Lake of Acidic-lemon

Tissue breakdown causes release of lactate into the blood, contributing to the metabolic acidosis. While relatively sensitive, this test has a poor specificity.

X-ray

X-ray

Abdominal x-ray is often the initial test ordered, but it is nonspecific and can be normal in up to 25 percent. Plain films may show signs of obstruction (distended loops of bowel with air-fluid levels), bowel wall thickening, or air within the bowel wall. Free intestinal air on upright abdominal x-ray indicates perforation, and need for immediate surgical intervention.

Air Within Bowel Wall

Air Within Bowel-bowl

Advanced disease can lead to a finding of air within the bowel wall, which is known as pneumatosis intestinalis.

CT Angiography

Cat-scan Angel with angiography

The gold standard for diagnosis of arterial occlusive disease is mesenteric CT angiography without oral contrast (contrast may obscure the mesenteric vessels). Findings may include atherosclerosis and calcification of mesenteric vessels, vasoconstriction with decreased flow, pneumatosis intestinalis, bowel wall thickening, and bowel wall edema.

Bowel Wall Edema

Bowel-bowl Edamame

Tissue injury leads to bowel wall edema, which is seen on plain radiographs and CT as thickened areas of bowel wall with a characteristic "thumbprinting" appearance.

Treatment

Antibiotics

ABX-guy

Treatment for mesenteric ischemia involves rapid volume resuscitation and use of empiric broad spectrum antibiotic therapy. Without proper antibiotic treatment, patients can go into septic shock with risk of multisystem organ failure.

Emergent Surgical Intervention

Emergency Surgeon

Severe cases with evidence of bowel necrosis or perforation with hemodynamic instability warrant immediate surgical intervention. Patients should be made NPO (nothing by mouth) immediately and taken to the OR for exploratory laparotomy with resection of necrotic areas of bowel, thrombectomy or embolectomy, and abdominal cleanout where necessary. Endovascular thrombolysis with angioplasty and stenting may be indicated in patients who are deemed unfit to undergo surgery.