UPDATES IN MANAGEMENT OF MESENTERIC ISCHEMIA

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Abstract

Mesenteric ischemia, a spectrum of disorders with multiple etiologies still carries significant morbidity and mortality. **D**espite advances in both diagnosis and treatment, prompt diagnosis and supportive care remain critical for successful outcome. **N**ew imaging techniques, endovascular therapy and emerging research may improve our approach to this deadly condition.

Although mesenteric ischemia is one of the least common causes of abdominal pain, it is associated with extremely high risk. **D**espite the variety of presentations and causes of mesenteric ischemia, it always presents a diagnostic challenge and it has the potential for catastrophic, life threatening consequences. **E**arly consideration and evaluation of this disease and its underlying causes in patients with abdominal pain are critical to timely diagnosis and improved outcomes.

Key words

Mesenteric ischemia

Superior mesenteric artery

Acute mesenteric artery embolism

Acute mesenteric artery thrombosis

Non-occlusive mesenteric ischemia

Mesenteric venous thrombosis

Chronic Mesenteric ischemia

Intestinal angina

Computerized tomography Angiography

Magnetic resonance angiography

Human α-Defensins

Endovascular revascularization

SMA embolectomy

Transaortic endarterectomy

Antegrade mesenteric bypass

Retrograde mesenteric bypass

List of Abbreviations

CT	**Computed Tomography**
AMAE	**Acute Mesenteric Artery Embolism**
AMAT	**Acute Mesenteric Artery Thrombosis**
AMI	**Acute Mesenteric ischemia**
CMI	**Chronic Mesenteric ischemia**
CTA	**Computerized tomography Angiography**
HD	**Human α-Defensins**
I-FABP	**Fatty Acid Binding Proteins**
MI	**Mesenteric ischemia**
MRA	**Magnetic Resonance Angiography**
MRI	**Magnetic Resonance Imaging**
MVT	**Mesenteric Venous Thrombosis**
NOMI	**Non-Occlusive Mesenteric ischemia**
NSAIDs	**Non-Steroids Anti-inflammatory Drugs**
SMA	**Superior Mesenteric Artery**
US	**Ultrasonography**
VKA	**Vitamin K antagonists**

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INTRODUCTION &RATIONALE

The overall incidence rate of acute mesenteric ischaemia diagnosed in the population was estimated at 12.9/100,000 person-years. Acute superior mesenteric artery (SMA) occlusion (embolus/thrombus ratio = 1.4), mesenteric venous thrombosis (MVT), and nonocclusive mesenteric ischemia (NOMI) were found in approximately 68%, 16%, and 16%, respectively. **T**he incidence increased with age, equally distributed among men and women after adjusting for age and gender in the population. Thrombotic occlusions were located more proximally than embolic occlusions and intestinal infarction was more extensive, whereas patients with embolus had a higher frequency of acute myocardial infarction, and had cardiac thrombi in 48% and synchronous emboli in 68% of the patients. **T**he proportion of patients with symptoms inherent with chronic mesenteric ischemia prior to onset of acute thrombotic occlusion has been reported to occur in 73%. Cardiac failures, history of atrial fibrillation and recent surgery have all been associated with fatal NOMI. MVT is either caused by thrombophilia, direct injury, or local

venous congestion or stasis. In-hospital mortality is highest for NOMI, lower for acute SMA occlusion, and lowest, around 20%, for MVT **(Acosta , 2010)**

Mortality related to acute mesenteric arterial occlusion remains very high. Patient survival is dependent on prompt recognition and revascularization before ischemia progresses to intestinal gangrene. **B**iphasic computed tomography angiography has surpassed angiography as the diagnostic test of choice due to its ability to define the arterial anatomy and to evaluate secondary signs of mesenteric ischemia. **U**nlike chronic mesenteric ischemia, the treatment of acute arterial mesenteric ischemia, either embolic or thrombotic, remains largely surgical. This is due to the emergent need for revascularization combined with a careful evaluation of the intestine. **E**ndovascular techniques remain useful, however, and can save precious time in the treatment of these challenging patients if integrated into a treatment pathway combined with definitive surgical treatment. **(Wyers. , 2010)**.

Chronic mesenteric ischemia (CMI) remains a well-described disease process that is difficult to diagnose.

Since its initial description more than a century ago, a myriad of diagnostic and treatment modalities have been applied to ameliorate the classic symptoms of postprandial abdominal pain and weight loss. **I**t is estimated that mesenteric occlusive disease affects 1% to 18% of the population, with a majority of these patients manifesting no symptoms of CMI. **T**he primary etiology of CMI is atherosclerotic occlusive disease involving the ostia of the mesenteric arteries. Several studies have investigated the pathophysiology of the postprandial abdominal pain associated with ischemia focusing on transport mechanisms, claudication of the intestinal musculature, and ischemia of the visceral nerves. **T**he process of diagnosing CMI involves assimilation of the presentation, typical history and physical examination findings, and results of imaging modalities. **A**t the end of this diagnostic process, the decision to offer a patient surgical intervention is primarily based on symptomatology and results of duplex and other imaging modalities. **T**here are specific criteria for which to offer symptomatic patients interventions. **P**atients who are asymptomatic do not

need to undergo revascularization, which may disrupt collateral arterial circulation to the mesentery. **T**hey should be followed conservatively. **(Chandra and Quinones. , 2010) .**

The main focus when discussing acute or chronic mesenteric ischemia is on occlusive disease, arterial or venous, but for mesenteric non-occlusive hypoperfusion syndromes the following three clinical entities are reviewed: (1) Intraabdominal hypertension (IAH), or abdominal compartment syndrome (ACS), is important after ruptured abdominal aortic aneurysm repair. IAH >20 mm Hg occurs in approximately 50% of patients after open repair and in 20% after endovascular repair of ruptured abdominal aortic aneurysm, but these patients are different and no randomized data exists yet. A consensus issued by the World Society of Abdominal Compartment Syndrome provides guidance. **E**arly conservative treatment of IAH and, alternatively, abdominal closure devices for leaving the abdomen partially open temporarily are discussed. (2) **C**olonic ischemia after abdominal aortic surgery, its risk factors, clinical presentation, and treatment are

discussed. A significant number of such patients develop IAH and reducing the abdominal perfusion pressure affects the left colon, the sentinel organ in these patients. (3) **N**onocclusive mesenteric ischemia (NOMI); most often such patients suffer from severe cardiac failure requiring massive inotropic support. **T**he condition is difficult to define. **E**arly diagnosis with multidetector row computed tomography is a worthwhile alternative when angiography presents difficulties. **A** stenosis of the superior mesenteric artery is frequently enough that it should be ruled out because endovascular treatment can be lifesaving. **N**ew knowledge on these three different mesenteric hypoperfusion syndromes is reviewed. **S**uccess in treating these difficult patients is benefited from a multidisciplinary approach. **(Björck and Wanhainen. , 2010)**.

Mesenteric vein thrombosis has a similar clinical course as arterial, although more prolonged. **I**n the majority of cases conventional anticoagulant treatment should be used and is often successful. **T**he duration should be at least 6 months. **T**hrombolysis has

been used, both systemic and local, although only in small series. **S**urgery is indicated when there is peritonitis, when often bowel resection is necessary. **T**hrombectomy has been used infrequently. **(Bergqvist, and Svensson. , 2010)**.

Treatment of chronic mesenteric ischemia has evolved during the last 2 decades. **E**ndovascular treatment has first emerged as an alternative to bypass in the elderly or higher-risk patient, but has become the primary modality of treatment in most patients with suitable lesions, independent of their surgical risk. **O**pen mesenteric revascularization with bypass or (rarely) endarterectomy still has an important role in the treatment of patients with more extensive disease, including long-segment or flush occlusions, small vessel size, multiple tandem lesions, and severe calcification. **T**he preference for open reconstruction in good-risk patients with multivessel disease is a supraceliac aorta to celiac and superior mesenteric artery (SMA) bypass, whereas an iliac artery to SMA bypass or, occasionally, an infrarenal aortic to SMA bypass is used in the higher-risk group. **(Oderich et al., 2010).**