

# Chronic Mesenteric Ischemia (CMI)

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## Definitions

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### Definitions

- *Intestinal Ischemia*: Inadequate Blood Supply to Meet Demands of Intestines
  - *Mesenteric Ischemia*: Ischemia of the Small Intestine (Often Used Interchangeably with Intestinal Ischemia)
  - *Colonic Ischemia*: Ischemia of the Large Intestine
- *Splanchnic/Visceral Ischemia*: A Broader Term to Describe Ischemia of the Intestine and Other Solid Organs (Liver, Kidney, Spleen)

### Classification/Timing

- *Acute Mesenteric Ischemia (AMI)* – Rapid Onset Over Hours-Days
  - Most Common Cause: Arterial Embolism
  - **\*See Acute Mesenteric Ischemia (AMI)**
- *Chronic Mesenteric Ischemia (CMI)* – Slow Onset Over Weeks-Months
  - Also Known as “Abdominal Angina”<sup>1</sup>
  - Most Common Cause: Arterial Thrombosis/Atherosclerosis

### Pathophysiology<sup>2-4</sup>

- Becomes Symptomatic Once the Combined Primary and Collateral Perfusion is Inadequate to Meet the Postprandial Metabolic Demand
- Mesenteric Circulation Has a Rich Collateral System – Typically Become Symptomatic Only Once  $\geq 2$  Vessels (Celiac, SMA, or IMA) are Severely Stenosed or Occluded
  - May Still Present Even if Only a Single Vessel is Involved (Especially the SMA)

- Mesenteric Artery Stenosis is a Common Finding at Autopsy (30-50%)
  - The Majority are Asymptomatic and Rarely Develop Ischemia Due to Rich Collaterals

## Etiology <sup>3-5</sup>

- Atherosclerosis (90% – Most Common)
  - Most Often Develop at the Origin as an Extension from an Aortic Plaque
  - Often Have Concurrent Atherosclerosis Elsewhere
- Median Arcuate Ligament Syndrome (MALS)
  - **\*See Median Arcuate Ligament Syndrome (MALS)**
- Vasculitis
- Arterial Dissection
- Fibromuscular Dysplasia
- Radiation Arteritis
- Mesenteric Venous Stenosis
- Drug-Induced Arteriopathy

## Risk Factors <sup>2,3,6</sup>

- Elderly
- Female (3:1)
- Smoking
- Hypertension
- Hyperlipidemia

# Presentation and Diagnosis

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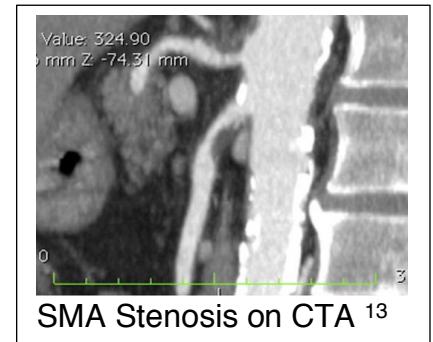
## Presentation <sup>7,8</sup>

- Postprandial Abdominal Pain (“Intestinal Angina”) (90%)
  - Starts 10-15 Minutes After Eating
  - Can Last 5-6 Hours
  - **\*May Have Altered Eating Habits and Not Report Abdominal Pain**
- **“Food Fear”** (Sitophobia)
- **Weight Loss (65%)**
- Malnutrition and Cachexia
- Postprandial Nausea and Vomiting
- Postprandial Diarrhea
- Recurrent Peptic Ulcers
- At Risk for Developing an Acute Mesenteric Ischemia (Second Most Common Cause) <sup>8,9</sup>
  - **\*See Acute Mesenteric Ischemia (AMI)**



## Diagnosis <sup>8,10</sup>

- Physical Exam and Laboratory Evaluation are Nonspecific
- Screening: Mesenteric Duplex US
  - Can Assess Celiac and SMA but the IMA is Difficult to Visualize
  - Moneta Criteria Indicating  $\geq 70\%$  Stenosis: <sup>11</sup>
    - SMA Peak Systolic Velocity (PSV)  $\geq 275$  cm/s
    - Celiac Peak Systolic Velocity (PSV)  $\geq 200$  cm/s
  - Cutoff Values are Overall Poorly Defined
- Primary Diagnosis: CTA or MRA
  - Also Allows Analysis of the Anatomy to Plan Treatment
- Angiography is the Defined “Gold Standard” Diagnostic Study
  - Most Been Replaced by the Use of CTA/MRA for Actual Diagnosis
  - Now Primarily Used in the Endovascular Treatment



## Treatment

### Indications for Revascularization <sup>14,15</sup>

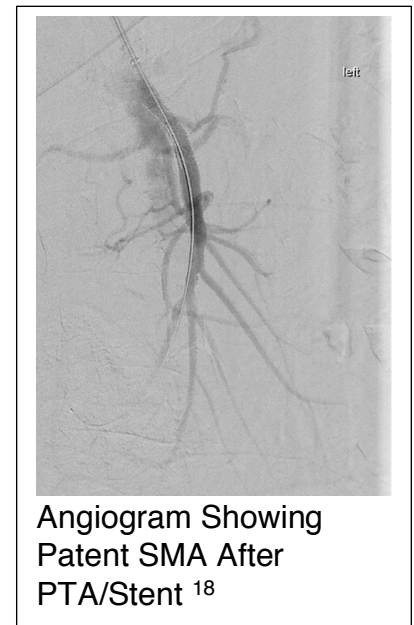
- All Symptomatic Patients
- Asymptomatic with Severe 3-Vessel Disease

### Goals of Revascularization <sup>16</sup>

- Resolve Symptoms
- Obtain a Normal Weight
- Prevent Development of Acute Mesenteric Ischemia and Bowel Necrosis

### Approaches to Revascularization

- Often Require Preoperative Nutritional Optimization
- **Percutaneous Transluminal Angioplasty (PTA) and Stenting**
  - The Preferred initial Approach for Suitable Lesions <sup>14</sup>
  - The SMA is Generally the Primary Target of Revascularization <sup>14,16</sup>
  - The Celiac Artery and IMA are Generally Considered Secondary Targets <sup>14,16</sup>
- **Open Revascularization/Bypass**
  - Indicated for Lower Operative Risk Groups if the Anatomy is Unfavorable <sup>14</sup>
  - Unfavorable Anatomy:
    - Severe Eccentric Calcification
    - Flush Occlusion of the Aorta
    - Longer Occlusion
    - Small Outflow Vessels



- Tandem Lesions Affecting the Branches
- Open Reconstructions are More Durable – Lower Rates of Restenosis, Symptom Recurrence, and Reintervention <sup>17</sup>

## Open Revascularization and SMA Bypass

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### Revascularization Approach

- *Antegrade Mesenteric Bypass*
  - Inflow from the Supraceliac Aorta
  - Two-Vessel Antegrade Bypass Using a Bifurcated Prosthetic Conduit to Both the Celiac and SMA is the Most Common Open Reconstruction (> 80%) <sup>16</sup>
  - Can Be Performed Through Either a Transperitoneal or a Retroperitoneal Incision
- Other Approaches:
  - *Retrograde Mesenteric Bypass*
    - Inflow from the Infrarenal Aorta or Iliac Vessels)
    - Preferred for Higher Risk Surgical Patients that Are Not Candidates for Supraceliac Aortic Procedures
  - *Hybrid Retrograde SMA Stent* – Done from an Open Approach
  - *Endarterectomy* – Rarely Indicated

### Graft Options

- *Synthetic Graft (Dacron)* – Generally Preferred
  - Benefits:
    - Better Patency
    - Better Size Match
    - Easier Handling
    - Kink Resistant
    - Avoid Additional Time Required for Vein Harvesting
  - Generally Avoided in the Setting of Bowel Necrosis or Perforation
- *Autogenous Vein*
  - Preferred if Bowel is Necrosed or with Peritoneal Spillage
  - Requires a Vein of Suitable Size and Quality – Most Commonly the GSV
  - Higher Risk of Kinking and Requires Extra Time for Harvesting

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