Spontaneous SMA Dissections

- Typically found at the convex curvature of the SMA
  - 14% Zone 1
  - 64% Zone 2
  - 21% Zone 3
- Mean distance from SMA ostium – 3 cm
- Area of SMA that is possibly more susceptible to shearing forces due to relationship to the pancreas
- Creation of complex flow dynamics at convex part of SMA (Park, J Vasc Surg 2011)

SMA Dissection - Location

Classification of Dissection

- A number of proposed classifications take in account:
  - Presence or absence of false lumen thrombosis
  - Compression of true lumen
  - Occlusion of SMA
  - Aneurysmal change
- Classification by Yun
  - Type I – Patent true and false lumen
  - Type II – Patent true lumen
    - IIA – False lumen: blind pouch
    - IIB – Thrombosed false lumen
  - Type III – Dissection with SMA occlusion

SMA Dissection

- Spontaneous, isolated dissection - 0.06% in autopsy series
  - Prior to 2007: Morris reported on 71 cases*
  - 2007-2013: 226 cases compiled by Ahn**
- Not a topic found in Rutherford’s Vascular Surgery
- Patient characteristics (symptomatic):
  - More often affects men (85%) than women (15%)
  - Typically in 5th decade of life
  - Abdominal pain (100%) – due to dissection, not intestinal ischemia
  - Hypertension (44%)
  - Hyperlipidemia (41%)
  - Smoking (13%)
  - Abdominal tenderness (33%)
  - Possible association with Marfan’s Syndrome, fibromuscular dysplasia, Ehlers-Danlos Syndrome, cystic medial necrosis
  - Rare cause of bowel infarction
- Diagnostic method of choice - CTA

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**Ahn, An Vasc Surg 201428
Classification of Dissection

- 32 patients:
  - 41% Type I
  - 50% Type II
  - 9% Type III

- Incidentally found lesions (no symptoms): 7/10 (70%) Type I
- Symptomatic patients: 13/22 (69%) Type II
- Severity of symptoms correlated with length of dissection – not type of dissection

Yun, Eur J Endovasc Surg 2009

Treatment of SMA Dissection

- Historically, treated aggressively
- Conservative Management
  - Bowel rest
  - Intravenous fluid
  - Anticoagulation – heparin, antiplatelet agent
    - Prevent thrombus propagation
    - Yun suggests anticoagulation not necessary
- Indications for Invasive Management
  - Signs of bowel infarction
  - Arterial rupture
  - Persistent abdominal pain
  - Severe compression of true lumen
  - Aneurysmal change of SMA

Yun, Eur J Endovasc Surg 2009

Invasive Treatment

- Open Surgical approach
  - Interposition graft
  - Bypass
    - Antegrade
    - Retrograde (from aorta or iliac arteries)
  - Excision of dissection flap with patch angioplasty

Zettl, Arch Surg. 2010

- Endovascular
  - Antegrade angioplasty/stent
    - Bare metal
    - Covered
  - Retrograde angioplasty/stent

Gobbel, JVS. 2009

Management Algorithm

Kim, J Vasc Surg 2014

Conclusion

- Incidentally found SMA dissection:
  - Regular surveillance imaging (annual CTA)
  - Progression of dissection or aneurysm dilation: Stent placement
- Acute abdominal pain with SMA dissection:
  - Initial conservative management for most patients
  - Suspension of bowel infarction – open surgery
    - Evaluate bowel
      - Revascularization (bypass, retrograde stent, antegrade stent)
    - Compromised flow in SMA (severe narrowing of true lumen, persistent pain)
      - Anticoagulation
      - Stent
    - Resolution of symptoms with conservative management
      - Regular surveillance
Chronic SMA Occlusion

SMA Occlusion

- **Etiology**
  - Atherosclerosis
  - SMA dissection
  - Aortic Dissection
  - Vasculitis (e.g., Lupus, Radiation arteritis)

- **Symptoms**
  - Weight loss
  - Post-prandial abdominal pain
    - Mid-epigastric
    - Occur 15 – 45 minutes after a meal
    - Severity varies based on amount and type of food ingested
    - Food fear – leads to decrease in oral intake
  - Significant occlusive disease is typically seen in two of three mesenteric vessels (celiac, SMA, IMA) before patients become symptomatic

SMA Occlusion - Diagnosis

- History and physical examination
  - May be unclear, patients can present with cachexia and appear to have advanced cancer
  - Typically a strong history of smoking, other peripheral vascular disease manifestation
- Rule out other causes
- Diagnostic studies:
  - Duplex scan
  - CTA
  - MRA
  - Angiography
  - Lesion typically at the ostium of SMA – extension of aortic plaque into the SMA

SMA Occlusion - Stent

- Antegrade stent
  - Femoral access
  - Brachial access – may be advantageous for crossing occlusion
  - Ostial lesion – may not have a target to engage catheter/wire – increased incidence of failure
- Retrograde
  - Expose SMA and place sheath in distal SMA
  - Allows evaluation of bowel (important in acute ischemia)

- **Bare metal vs. covered stent**
  - Comparison between bare metal stent (BMS) and Covered stent (CS) for chronic mesenteric angioplasty
  - BMS – 147 patients, CS – 42 patients
  - Less restenosis, recurrence, re-intervention with covered stent

*Oderich, J Vasc Surg 2013

Retrograde SMA stent

SMA Occlusion - Bypass

- Antegrade bypass
  - Supra-renal aorta to SMA (and often to celiac trunk)
    - Supra-renal aorta typically is relatively free of atherosclerotic disease
    - Historically, two vessels are revascularized
    - Use a bifurcated prosthetic graft – Dacron
  - Retrograde bypass
    - Iliac artery as inflow vessel
    - Prosthetic or vein
      - GSV vs. Deep vein
      - Inferior vena cava
    - Possible graft kinking
Conclusions

- Patients may be asymptomatic
  - If no celiac stenosis, may not need intervention
- Symptomatic patients or patients with multi-vessel mesenteric disease – revascularization
  - Endovascular approach
    - Brachial approach may offer best chance
  - Personal approach is to use a covered stent
  - Open revascularization
    - Antegrade bypass
    - Retrograde bypass – my preference, using deep vein
- Open surgical revascularization with ischemic/infarcted bowel
  - Retrograde angioplasty/stent
  - Retrograde bypass using vein


Selected References