Aortoenteric Fistula

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Agenda

- Anatomy
- Etiology
- Signs & Symptoms
- Radiologic Diagnosis
- Patient Case
- Intervention
Third and fourth parts of duodenum are retroperitoneal and abut the abdominal aorta anteriorly.
Etiology

- Abnormal connection between lumina of aortoiliac tree & GI tract
  - Most commonly aortoduodenal
- Mortality 86% overall: 100% untreated, 36% treated
- **Primary** aortoenteric fistula (PAEF)
  - AAA erodes into bowel via inflammation + mechanical forces
  - Exceedingly rare: annual incidence = 0.007/million
- **Secondary** aortoenteric fistula (SAEF)
  - Occurs in ~1% of patients weeks to years following aortic reconstruction
  - Pathophysiology not well understood
    - Theories: mechanical, inflammatory, suture defect

Shetty et al. (Radiopaedia) & Leon (UpToDate)
Aortobifemoral Bypass Surgery

3rd portion of duodenum crosses anterior to aortic prosthesis

Abdominal aorta

Femoral artery

Graft

Blockage

http://www.geetanjalicardiaccentre.com/treatment-cardiac-surgery.html
Signs & Symptoms of SAEF

- Gastrointestinal bleeding (80%)
  - Massive hemorrhage sometimes preceded by “herald bleed”
- Sepsis (44%)
- Abdominal pain (30%)
- Back pain (15%)
- Groin mass (12%)
- Abdominal pulsatile mass (6%)
Radiologic Diagnosis

- **CT angiography** is first-line if AEF is suspected
- Sensitivity 40-90%, Specificity 33-100%

### AEF on CT Angiography

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<thead>
<tr>
<th>Specific Findings</th>
<th>Non-specific Findings</th>
<th>Mimics of AEF</th>
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<td>Ectopic gas in the aorta</td>
<td>Increased perigraft soft tissue</td>
<td>Infectious aortitis</td>
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<td>Aortic contrast extravasation into bowel lumen</td>
<td>Obliteration of fat plane separating bowel from aorta</td>
<td>Retroperitoneal fibrosis</td>
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<td>Focal bowel wall thickening</td>
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<td>Perigraft infection without fistulization</td>
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<td>Discontinuity of aortic wall</td>
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Quan et al. (Radiographics) 2009 & Leon (UpToDate)
Supplementary Imaging

- **Endoscopy**
  - Only 50% sensitive for AEF
  - Risk of dislodging clots and exacerbating hemorrhage
- **Ultrasound**
  - Can confirm AAA in hemodynamically unstable patients
  - But overlying bowel gas prevents visualization of AEF
- **MR Angiography**
  - Duration, availability, expertise required
  - Difficulty distinguishing ectopic gas from aortic calcifications
- **Nuclear Medicine**
  - SPECT can aid in diagnoses of stable patients with equivocal CTA
- **Fluoroscopy**
  - Esophagography with water-soluble contrast
  - Conventional angiography

Quan et al. (Radiographics) 2009, Leon (UpToDate), ACR Appropriateness Criteria
Our Patient: Part I

- 62yo male with h/o bilateral claudication s/p aortobifemoral bypass surgery.
Initial Evaluation of Worsening Bilateral Claudication

CTA shows small infrarenal AAA with a nearly occlusive circumferential atheroma

Our Patient
PACS, BIDMC
4 months after aortic bypass surgery, patient was found unresponsive at home in a pool of blood with hypotension to the 60s. Once transfused & volume-resuscitated, he reported recent malaise, diarrhea + brown emesis.

Massive hematemesis + hematochezia in ED → intubation + sedation

Upper endoscopy inconclusive; CTA ordered
Evaluation of Massive GI Bleed 4 Months Post-Surgery

CTA shows duodenum distended with IV contrast
Evaluation of Massive GI Bleed 4 Months Post-Surgery

AEF evidenced by focal absence of fat plane and continuity of IV contrast between lumina of aortic graft + duodenum.

Irregular aortic border and increased perigraft soft tissue c/w prosthetic aortitis

Extravasated IV contrast in duodenum
Evaluation of Massive GI Bleed 4 Months Post-Surgery

IV contrast in the distal duodenum

Prosthetic iliac arteries

Calcified native iliac arteries

Our Patient
CTA w/o oral contrast
PACS, BIDMC
Evaluation of Massive GI Bleed 4 Months Post-Surgery

Our Patient
CTA w/o oral contrast
PACS, BIDMC

Native aorta

Aortic graft

Fistula connecting 3rd part of duodenum to aortic graft just proximal to the graft’s bifurcation

Extravasated IV contrast from aortic graft in 3rd part of duodenum
Emergent Intervention

1) Endovascular aorto-unii-iliac stent graft

2) Left iliac artery plug

3) Femorofemoral bypass graft

Chuter 1999
Summary

• Most AEFs form between aortic graft and duodenum as rare complication of aortic bypass surgery
• Massive GI bleed often follows smaller “herald” bleed
• First-line imaging is CTA – look for IV contrast in GI lumen or gas in aortic lumen
• Emergent repair with endovascular stent graft – still with 36% mortality
References


• Leon, LR. Aortoenteric fistula: Recognition and management. In: UpToDate, Post TW (Ed), UpToDate, Waltham, MA. (Accessed on April 20th, 2016.)


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