AORTOENTERIC FISTULA
diagnosis and management

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AORTOENTERIC FISTULA

• Aortoenteric Fistula (AEF) is a rare, life-threatening disease process.
• Most commonly a complication of repair of abdominal aortic aneurysms.
• Occurs in approximately 0.3-2% of patients with open AAA repairs.
AORTOENTERIC FISTULA

- Carries a very high morbidity and mortality
- 100% without surgical intervention
- 60-90% with intervention
- 9% limb amputation
- 15% renewed graft infection
DEFINITION

• Direct communication between the aorta and the GI tract.
  • *Primary AEF*: spontaneous fistula formation in the absence of prosthetic aortic materials.
  • *Secondary AEF*: fistula in the setting of prosthetic aortic materials.
PRIMARY AEF

- First described by sir Ashley Cooper in 1817.
- Primary AEF is very rare
- Fewer than 200 cases reported
- Usually occurs in the setting of large aortic aneurysms abutting the bowel with fistula formation over time.
- Usually, the AAA erodes into the 3rd or 4th portion of the duodenum.
85% of AAA with AEF were atherosclerotic
8% mycotic
1% media necrosis

A.H. Tareen and T.V. Schroeder, Primary aorto-enteric fistula Eur J Vasc Endovasc Surg 12 (1996)
# PRIMARY AEF

## Table 2. Characteristics of patients with primary aortoenteric fistula due to aortitis without previous aortic aneurysm

<table>
<thead>
<tr>
<th>Authors/year</th>
<th>Gender</th>
<th>Age</th>
<th>Clinical findings</th>
<th>Diagnostic approach/fistula site</th>
<th>Etiological agent</th>
<th>Treatment</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>McIntyre et al., 1981</td>
<td>M</td>
<td>73</td>
<td>Diabetes, low back pain, fever, pulsatile mass</td>
<td>Laparotomy: 3rd portion of duodenum</td>
<td>Arizona hinthawii</td>
<td>Aortic division + axillo-bilemoral bypass</td>
<td>Satisfactory after 9 months</td>
</tr>
<tr>
<td>Goldbaum et al., 1986</td>
<td>M</td>
<td>75</td>
<td>Abdominal pain, fever, hematemesis</td>
<td>Laparotomy: 3rd portion of duodenum</td>
<td>Mycobacterium tuberculosis</td>
<td>Dacron graft in situ</td>
<td>Satisfactory after 20 years</td>
</tr>
<tr>
<td>Morrow et al., 1987</td>
<td>F</td>
<td>32</td>
<td>Abdominal pain, back pain, hematemesis</td>
<td>Laparotomy: 4th portion of duodenum</td>
<td>Salmonella enteritidis</td>
<td>Dacron graft in situ</td>
<td>Satisfactory after 3 years</td>
</tr>
<tr>
<td>Wheeler et al., 1992</td>
<td>M</td>
<td>63</td>
<td>Melena, abdominal pain, pulsatile mass</td>
<td>Laparotomy: 4th portion of duodenum</td>
<td>Mycobacterium tuberculosis</td>
<td>Dacron graft in situ</td>
<td>Satisfactory after 7 years</td>
</tr>
<tr>
<td>Calligaro et al., 1992</td>
<td>F</td>
<td>50</td>
<td>Abdominal pain, fever</td>
<td>Laparotomy: 3rd portion of duodenum</td>
<td>Streptococcus viridans</td>
<td>Aortic division</td>
<td>Death in the operating room</td>
</tr>
</tbody>
</table>
SECONDARY AEF

- First published case was in 1953 by R.C Brock
- First successful repair was in 1957 by G. Heberer in Germany
- More common
- Due to development of a pseudo aneurysm at the proximal suture line of AAA repair or by direct mechanical effects of scarring between bowel and the suture line.
- This usually occurs *years* following open aortic surgery
SECONDARY AEF

- Classified according to their anatomical and pathophysiological characteristics
- Three types:
  - Ia (direct fistula) fistula directly to the suture line
  - Ib (indirect fistula) fistula to a false aneurysm
  - II (para prosthetic) erosion of the intestinal wall by the prosthesis itself
ANATOMIC DISTRIBUTION

- 3rd and 4th part of Duodenum (80%)
  - located retroperitoneal
  - direct contact with the abdominal aorta
- Jejunum and ileum (10%)
- Large bowel (6%)
- Stomach (4%)

RISK FACTORS

- **Primary AEF:**
  - Atherosclerotic (Most common in USA)
  - Inflammatory aortitides: Syphilis, Tuberculosis, Mycotic infection, Collagen Vascular Disease (Most common worldwide)

- **Secondary AEF:**
  - Abdominal aortic aneurysm
  - Aortic aneurysm repair with prosthetic graft
  - Aortic endovascular stent
  - Infection of prosthetic aortic graft
  - Aortic radiation
  - Gastrointestinal disease: peptic ulcer disease, gallstones, pancreatitis, diverticular disease
  - Tumor invasion
  - Trauma
  - Foreign body perforation
CLINICAL MANIFESTATIONS

- Most frequent sign is gastrointestinal bleeding: both upper and lower
- *Herald bleed*: initial bleed presenting as melena or hematochezia with relatively few hemodynamic consequences. This is almost always followed by a catastrophic bleeding and exsanguination. Herald bleeds occur as clot fills the fistula with subsequent small bowel contraction. This bleed can occur hours to several days before diagnosis is made.
CLINICAL MANIFESTATIONS

• Once the clot dislodges or is lysed, and aortic pressure increases leading to a larger volume bleed
• May present with hematemesis, melena, or hematochezia
• Crampy, upper abdominal pain
• Back pain
• Physical exam may demonstrated palpable abdominal aortic aneurysm with abdominal bruit
EVALUATION

• High index of suspicion is the key.
• Any patient with known aortic aneurysm repair presenting with GI bleed should be evaluated for AEF.
• There is not one superior diagnostic modality
• EGD is most commonly employed, follow by CT scan
ENDOSCOPY

• Procedure of choice
• Fastest way to determine presence of AEF
• 90% of AEFs are within the range of endoscopy
• Can exclude other causes of acute UGI bleed (ulcer)
Ulcer over the posterior wall of duodenum (D3) with the underlying prosthetic aortic graft clearly visible

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CT SCAN

- Used if EGD fails to demonstrate lesion
- May confirm the diagnosis
Black arrow: Pseudoaneurysm and calcification of aneurysm wall

White arrow: Contrast media seeping into colon (white arrows)

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OTHER DIAGNOSTIC TOOL

- Not frequently used
- Time consuming
- 11 patients diagnosed prior to surgery
- 17 cases suspected and confirmed during surgery
- Not one single superior diagnostic modality

**Table III. Methods of diagnostic evaluation**

<table>
<thead>
<tr>
<th>Method</th>
<th>Abnormal</th>
<th>Diagnostic</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Esophagogastroduodenoscopy</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>Abdominal/pelvic CT</td>
<td>24</td>
<td>22</td>
</tr>
<tr>
<td>Angiography</td>
<td>30</td>
<td>12</td>
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<tr>
<td>Sinography</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Colonoscopy</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Upper GI series</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Lower GI series</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Magnetic resonance scan</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Gallium scan</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Indium WBC scan</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Technetium WBC scan</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

GI, Gastrointestinal; WBC, white blood cell.

TREATMENT

• Surgical intervention is mandatory for survival and successful outcome.
• Surgery involves:
  – stop bleeding
  – removal of prosthetic aortic graft
  – ensure peripheral circulation via extra-aortic bypass
  – repair (<3cm) or resect intestinal lesion
• Omental or peritoneal flap interposition recommended to prevent formation of another fistula
• Intravenous antibiotics are an essential adjunct therapy
PROGNOSIS

- Prognosis is poor
- Mortality rate of 100% if no surgical intervention done.
- Mortality rate between 60-90% with surgical intervention
- 9% limb amputation
- 15% renewed graft infection
Fig. 2. Stretched-out jejunal segment with three ragged hemorrhagic openings (arrows) of the aortoenteric fistula.
CONCLUSION

• A high index of suspicion along with good history and physical exam is critical for making a successful diagnosis
• Surgical exploration is warranted with continued bleeding and high index of suspicion even if EGD and CT scan is not diagnostic
REFERENCES


Napoli, P.J., Meade, P.C., Adams, C.W. Primary Aortoenteric Fistula from a Posttraumatic Pseudoaneurysm. *Journal of Trauma and Critical Care* 1996; 41:149-152
THE END