Hepatic Artery Aneurysms

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Case

68 yo man referred to vascular clinic for asymptomatic hepatic artery aneurysm detected on CT screening for lung cancer

**PM/SH:** DM, HTN, HLD, Parkinson’s, Bipolar disorder

**Meds:** ASA, benztropine, citalopram, divalproex, lisinopril, metformin, simvastatin, risperidone, pramipexole

**Social hx:** current tobacco (60 pack-years), past ETOH, cocaine marijuana
Physical Exam
No abdominal tenderness or pulsatile masses

Labs
WNL
Operation

Repair of hepatic artery aneurysm with interposition PTFE graft
POD 1 reintubated for decreased mental status
POD 7 atrial fibrillation refractory to medical management, requiring cardioversion
POD 13 ablation for a. fib
POD 21 discharged to subacute rehab facility
Splanchnic Artery Aneurysms

- **Aneurysm** – dilation or enlargement of an artery to > 1.5-2 X normal diameter
- **Saccular** (focal, eccentric) vs **fusiform** (elongated, concentric)
- Affecting the celiac artery, SMA, IMA, or branches
- Aortic and renal artery aneurysms **excluded**
Splanchnic Artery Aneurysms

• 1/3 will have associated aortic, renal, iliac, lower extremity, or cerebral artery aneurysm
• Incidence 0.1-0.2% general population, ↑10% in elderly
• 22% present with rupture
  – Periop mortality rate 20-70%
Splanchnic Artery Aneurysms

- True aneurysms
  - Atherosclerosis
  - Medial degeneration
  - Collagen vascular disease
  - Fibrousvascular dysplasia

- Pseudoaneurysms
  - Infection
  - Inflammation
  - Vasculitis
  - Iatrogenic
  - Trauma
  - Rapid growth rates

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Hepatic Artery Aneurysms

- 1809 first described by Wilson
- 1903 first successful ligation
- Incidence 0.1-0.4% in general population
- Hepatobiliary instrumentation → ↑ incidence, ↑ pseudoaneurysms
- Distribution
  - 80% extrahepatic
    - 63% common hepatic artery
    - 28% right hepatic artery
    - 5% left hepatic artery
  - 20% intrahepatic
Hepatic Artery Aneurysms

- Male to female ratio 3:2
- Highest rupture risk: 20-80%
- Mean age 60
- Etiology
  - 30% degenerative (atherosclerotic)
  - Associated comorbidities: HTN (72%), arterial dysplasia, biliary diseases, percutaneous, endoscopic procedures
- 1/3 with concomitant splanchnic aneurysms
- 40% nonsplanchnic aneurysms
Clinical Presentation

- Majority identified incidentally
- Symptoms
  - Abdominal discomfort
  - Back pain
  - Rupture to peritoneal cavity or biliary tract
  - Quincke’s triad: hemobilia, jaundice, right upper quadrant pain
  - Erosion into stomach
Natural History

• Not well defined
• Pseudoaneurysms: ↑ symptomatic, ↑ rupture
Treatment

• Indications for intervention
  – Symptoms
  – Pseudoaneurysms
  – > 2 cm
  – Multiple HAAs
  – Inflammatory conditions (periarteritis nodosa)

• Surgery vs. endovascular
Surgical Repair

• Dependent on lesion location
  – Excision and repair
  – Ligation w/ or w/o reconstruction
  – Hepatic resection
Hepatic Artery Aneurysmorrhaphy
Inflow to the Liver

- **Portal vein**
  - 75% volume
  - 50-70% oxygenation

- **Hepatic artery**
  - 25% volume
  - 30-50% oxygenation
  - Collaterals: perihepatic arteries from inferior phrenic, GDA
1. Ligation
2. Endovascular Ablation
Arterial Reconstruction
Aortohepatic Bypass
Embolization
Resection
Ligation
Intervention

- Avoid ligation of hepatic artery in ↓ liver function
- If proper or right hepatic artery ligated → cholecystectomy
- Embolization ideally suited for intraparenchymal aneurysms – parenchymal necrosis
Hepatic Artery Pseudoaneurysms after Liver Transplantation

- 0.3-2%
- Intra-abdominal or GI bleeding 2 months after transplant
- Rupture preceded by intra-abdominal infection
- Treatments: resection and revascularization, coil embolization, re-transplantation
<table>
<thead>
<tr>
<th>Management</th>
<th>All</th>
<th>Complications</th>
<th>Re-bleeding</th>
<th>Mortality at 30 days</th>
<th>Mortality at 51.0±21.1 months</th>
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<tbody>
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<tr>
<td>Intervention</td>
<td>45 (40)</td>
<td>5</td>
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<td>Coil embolization</td>
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<td>Glue embolization</td>
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<td>Covered stent</td>
<td>5 (5)</td>
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<td>Combined methods</td>
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<tr>
<td>Surgery</td>
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<td>4</td>
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<td>Venous bypass</td>
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<td>Resection+ligation</td>
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<td>Nephrectomy</td>
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<tr>
<td>Splenectomy</td>
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<td>Conservative</td>
<td>194 (182)</td>
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<td>With follow-up</td>
<td>108 (104)</td>
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<td>28</td>
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<tr>
<td>Without follow-up</td>
<td>86 (78)</td>
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</table>
Summary

• Hepatic artery aneurysms ↑ing incidence
• Pseudoaneurysms have ↑ risk of rupture
• Intervention indicated in size >2 cm
• Approach dependent on location of aneurysm
OMG Dr. Song is running the bowel!!

Why am I running the bowel??