Diagnosis and Endovascular Approach of Chronic Mesenteric Ischemia

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Disclosure

None
Chronic Mesenteric Ischemia

• Due to decreased perfusion to visceral organs, especially intestine
Clinical Presentations

• **Triad of visceral ischemia**
  • Postprandial abdominal pain
    • Epigastric or periumbilical
  • Fear of eating
  • Weight loss

• Patients may not have all 3 presentations
Diagnosis

- Criteria >70% stenosis
  - Fasting
  - SMA: PSV > 275
    EDV > 45
  - Celiac: PSV > 200
    EDV > 55
Diagnosis

- CTA
  - Choice of imaging study
  - Direct evidence of visceral artery disease
  - Evidence of bowel infarction
  - Associated pathology
Diagnosis

- Angiography
  - Diagnostic and therapeutic
- Invasive
- Procedure related complications
- Contrast related complications
Diagnosis

- Angiography
  - Diagnostic and therapeutic
- Invasive
- Procedure related complications
- Contrast related complications
Open Surgery

• Surgery
  • Bypass
    • Antegrade vs. Retrograde
    • Single vs. Multiple
    • Vein vs. Prosthetic

• Re-implantation
Open Surgery

Diagram showing:
- Superior mesenteric artery (SMA)
- Celiac artery
- Aorta
- Inferior mesenteric artery (IMA)
- Celiac trunk
- Left renal artery
- Pancreas
- Superior mesenteric artery (SMA)
- Aorta
- Left renal artery
Open Surgery

- Outcomes
  - Equivalent with different operative procedures
    - Perioperative mortality
    - Perioperative morbidity
    - Recurrent symptoms
Endovascular Treatment

PTA of SMA first reported in 1980
Open versus endovascular revascularization for chronic mesenteric ischemia: Risk-stratified outcomes

Gustavo S. Oderich, MD, Thomas C. Bower, MD, Timothy M. Sullivan, MD, Haraldur Bjarnason, MD, Stephen Cho, MS and Peter Glowacki, MD, Rochester and Minneapolis, Minn.

Primary Patency

Secondary Patency

NS). In the subset analysis of patients having first-time operations vs stenting, OR resulted in improved (\(P < .05\)) recurrence-free survival (91% ± 3% vs 56% ± 8% at 5 years) and better primary and secondary patency rates (93% ± 2% and 98% ± 1% vs 52% ± 8% and 93% ± 4% at 3 years).

Conclusion: OR has similar mortality but higher morbidity and longer hospitalization than ER in low-risk or high-risk patients with CMI. Both treatments effectively improved symptoms, but restenosis, recurrent symptoms, and reinterventions were more likely in ER patients. These findings may guide treatment selection and counseling of low-risk and high-risk CMI patients undergoing OR or ER procedures. (J Vasc Surg 2009;49:1472-9.)
Table I. Baseline characteristics of patients undergoing angioplasty, with or without stenting, compared with surgical repair for chronic and acute mesenteric ischemia from 2000 to 2006

<table>
<thead>
<tr>
<th>Variable</th>
<th>PTSA/S (No. (%))</th>
<th>Surgery (No. (%))</th>
<th>P&lt;sup&gt;b&lt;/sup&gt;</th>
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<th>Surgery (No. (%))</th>
<th>P&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients, No. (%)</td>
<td>3455 (61.9)</td>
<td>2128 (38.1)</td>
<td>.001</td>
<td>1857 (35.5)</td>
<td>3380 (64.5)</td>
<td>.53</td>
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<tr>
<td>Age, median (range), y</td>
<td>74 (24-97)</td>
<td>68 (29-99)</td>
<td>.001</td>
<td>72 (26-96)</td>
<td>72 (21-99)</td>
<td>.53</td>
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<tr>
<td>&lt;60, %</td>
<td>15</td>
<td>32</td>
<td>.001</td>
<td>24</td>
<td>26</td>
<td>.34</td>
</tr>
<tr>
<td>60-69, %</td>
<td>23</td>
<td>28</td>
<td>.05</td>
<td>25</td>
<td>22</td>
<td>.36</td>
</tr>
<tr>
<td>70-79, %</td>
<td>37</td>
<td>30</td>
<td>.01</td>
<td>31</td>
<td>33</td>
<td>.62</td>
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<tr>
<td>≥80, %</td>
<td>25</td>
<td>11</td>
<td>.001</td>
<td>21</td>
<td>19</td>
<td>.52</td>
</tr>
<tr>
<td>Female, %</td>
<td>74</td>
<td>79</td>
<td>.05</td>
<td>70</td>
<td>66</td>
<td>.14</td>
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<tr>
<td>Comorbidities, %</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Hypertension</td>
<td>66</td>
<td>51</td>
<td>.001</td>
<td>56</td>
<td>46</td>
<td>.01</td>
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<tr>
<td>PVD</td>
<td>40</td>
<td>32</td>
<td>.01</td>
<td>33</td>
<td>13</td>
<td>&lt;.001</td>
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<tr>
<td>CAD</td>
<td>39</td>
<td>26</td>
<td>.001</td>
<td>34</td>
<td>19</td>
<td>&lt;.001</td>
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<tr>
<td>AFib/flutter</td>
<td>16.5</td>
<td>14.9</td>
<td>.49</td>
<td>23.6</td>
<td>38.7</td>
<td>&lt;.001</td>
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<td>Prior MI</td>
<td>8.3</td>
<td>6.0</td>
<td>.17</td>
<td>6.4</td>
<td>4.7</td>
<td>.23</td>
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<tr>
<td>CHF</td>
<td>17.5</td>
<td>10.5</td>
<td>.01</td>
<td>22.1</td>
<td>22.6</td>
<td>.85</td>
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<tr>
<td>Diabetes mellitus</td>
<td>19</td>
<td>12</td>
<td>.01</td>
<td>18</td>
<td>17</td>
<td>.73</td>
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<td>COPD</td>
<td>25</td>
<td>27</td>
<td>.40</td>
<td>29</td>
<td>23</td>
<td>.06</td>
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<tr>
<td>Chronic renal disease</td>
<td>6.3</td>
<td>1.2</td>
<td>&lt;.001</td>
<td>9.8</td>
<td>3.5</td>
<td>&lt;.001</td>
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<tr>
<td>CVD</td>
<td>6.9</td>
<td>7.7</td>
<td>.61</td>
<td>4.7</td>
<td>5.9</td>
<td>.41</td>
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<tr>
<td>Charlson, mean ± SD</td>
<td>1.3 ± 1.1</td>
<td>1.0 ± 1.0</td>
<td>&lt;.001</td>
<td>1.4 ± 1.3</td>
<td>0.9 ± 1.1</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Bowel resection, %</td>
<td>. . .</td>
<td>. . .</td>
<td>&lt;.001</td>
<td>28.1</td>
<td>47.8</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

AFib, Atrial fibrillation; CAD, coronary artery disease; CHF, congestive heart failure; COPD, chronic obstructive pulmonary disease; CVD, cerebrovascular disease; MI, myocardial infarction; PTSA/S, percutaneous transluminal angioplasty, with or without stenting; PVD, peripheral vascular disease; SD, standard deviation.

*P<sup>b</sup> for PTSA/S versus Surgery.

Surgery includes bypass, endarterectomy, or embolectomy.

Statistical significance set at P < .01.
Endovascular Treatment

- When to intervene
- How many vessels need to be treated
- Access
- Crossing the lesions
- PTA vs. Stenting
- Post-tenting medical management
Endovascular Treatment

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- How many vessels need to be treated
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Indications

- High grade mesenteric artery stenosis or total occlusion
  - Symptomatic
  - Asymptomatic
    - >2-vessel significant disease
      - Without revascularization, >30% will develop bowel infarct in 2-3 years
Endovascular Treatment

- When to intervene
- **How many vessels need to be treated**
- Access
- Crossing the lesions
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Endovascular Treatment

• **Revascularization**
  • Reportedly **1.4-1.8** vessels

• **Single-Vessel** revascularization
  • Adequate to relieve symptoms in most of patients

• **Two-vessel** revascularization
  • Lower risk of symptom recurrence and secondary re-intervention
  • Progressive or inflammatory disease
Endovascular Treatment

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Endovascular Treatment

- **Access**
  - Brachial
    - Common
  - Femoral
Endovascular Treatment

- Lateral views
  - Confirm diagnosis

- Anterior-posterior views
  - Collaterals
Endovascular Treatment

- When to intervene
- How many vessels need to be treated
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- **Crossing the lesions**
- PTA vs. Stenting
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Endovascular Treatment

- Lateral view
  - Roadmap if needed
- Angle sheath and catheter
- Brachial access if sharp angle
Endovascular Treatment

- Crossing catheter
- CTO devices
- Pre-dilatation: 3-4 mm balloon before stenting
- Embolization protection devices
  - May need if 3-vessel disease and SMA is the only vessel treatable
Endovascular Treatment

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- **PTA vs. Stenting**
- Post-tenting medical management
Endovascular Treatment

- Prefer to use stiff or super-still wire
- Balloon angioplasty (PTA) alone
  - 15%
- Primary stenting
  - 85%
  - Lower recoil and re-intervention
  - Balloon expendable stent
    - Accurate
    - May post-dilate to a larger size needed
  - May need covered stent if instent stenosis
Endovascular Treatment

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Endovascular Treatment

Post-procedure medications

- Plavix: 6 months
- ASA: life time
In Summary

- Indications for endovascular treatment of CMI
  - Symptomatic
  - Asymptomatic with 2 vessel significant disease
- One vessel PTA/Stenting is adequate
  - Two-vessel treatment has better long-term outcomes
- Primary stenting is recommended
- Balloon expendable stent is preferred
- Post-stenting antiplatelet
  - Plavix 6 months
  - ASA life time
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Thank You & Questions?
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2105 NCVH Fellow Course