Spontaneous Visceral Artery Dissection

Diagnosis and Treatment in an Era of Uncertainty

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Disclosures

- No financial disclosures
- No current consensus guidelines for treatment or follow-up
Overview

- Case Presentation
- Symptomatic vs. Asymptomatic
- Conservative treatment options
  - Anticoagulation/Antiplatelet/Observation
- Intervention Options
  - Open vs. Endovascular
- Surveillance
- Case review

SMA Dissection

- 51 year old female
- Presented with abdominal and back pain
- Mild nausea, no emesis
- Benign abdominal exam
Case 1

- A. Observe
- B. Antiplatelet
- C. Anticoagulate & Antiplatelet
- D. Endovascular Stenting
- E. Open Repair
Spontaneous Combined CA Dissection

- 62 YO man with HTN, PSVT, OA
- Diffuse dull abdominal pain, worsened with eating
- SBP 190/100s
- Abdomen benign
- WBC 8.6, Lactate 0.4
Case 2: Combined SMA CA Dissection

- A. Imaging Surveillance
- B. Antiplatelet
- C. Anticoagulate & Antiplatelet
- D. Endovascular Stenting
- E. Open Repair

Case 3: Chronic CA Dissection

- 75 year old man with HTN AFIB (on Eliquis)
- Known celiac artery dissection (found incidentally on hematuria work up)
- CA 1.4 cm in 2015
- Denies abdominal and back pain.
Case 3: CA Dissection with Slow Growing Aneurysm

- A. Imaging Surveillance
- B. Antiplatelet
- C. Endovascular Stenting
- D. Open Repair
Mesenteric Artery Dissection

Risk Factors
Usually We Don’t Know

- Cystic medial degeneration (SAM)
- FMD
- Atherosclerosis
- Pregnancy
- Connective Tissue Disorders
- Trauma
- Idiopathic

Gobble et al. JVS 2009
Incidence

Imaging

- 0.09% of all Contrast enhances CT scans
- 0.68% of all abdominal CT scans obtained for abdominal symptoms

Yamaguchi et al. Eur J Radiol Open. 2018

Early Management

Prior to Anticoagulation

- Bowel Rest and observation
  - 31/56 (55%) success rate
  - Surgical success in 12, 13 patients died
- Bowel Rest with Heparin GTT
  - 14/22 successful (63%)
  - 7/8 surgical cases successful

Gobble et al. JVS 2009
From the Society for Clinical Vascular Surgery

Ten-year review of isolated spontaneous mesenteric arterial dissections

Courtney E. Morgan, MD, Neel A. Mansukhani, MD, Mark K. Eskandari, MD, and Heron E. Rodriguez, MD, Chicago, Ill

Morgan et al. JVS April 2018

Distribution of Mesenteric Artery Dissection

- SMA 39%
- CA 43%
- Both 18%

Fig 1. Distribution of affected mesenteric artery. CA, Celiac artery; SMA, superior mesenteric artery.
Demographics

- 80.5% male
- Average Age 56 years
- 13% connective tissue disorder (FMD, SAM)
- 36% asymptomatic

Asymptomatic Management

- 33% observation alone
- 41% antiplatelet (aspirin, clopidogrel) indefinite
- 22% anticoagulation (3 months)
Symptomatic SMAD

- 8% required intervention
- 2% observation alone
- 24% antiplatelet (indefinite)
- 68% anticoagulation (5 months)

Table IV. Patients requiring surgical and endovascular intervention

<table>
<thead>
<tr>
<th>Artery</th>
<th>Initial treatment</th>
<th>Initial treatment details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Both (SMA)</td>
<td>Anticoagulation</td>
<td>SMA endarterectomy, ileocolic endarterectomy patch angioplasty</td>
</tr>
<tr>
<td></td>
<td></td>
<td>within 24 hours of presentation</td>
</tr>
<tr>
<td>SMA</td>
<td>Anticoagulation</td>
<td>Iliomesenteric bypass to a branch of the SMA within 24 hours</td>
</tr>
<tr>
<td>SMA</td>
<td>Anticoagulation</td>
<td>Aortomesenteric bypass to a branch of the SMA on hospital day 9</td>
</tr>
<tr>
<td>Both (CA)</td>
<td>Anticoagulation</td>
<td>Aneurysmal dilation of the hepatic artery; stent graft placed at 4 weeks</td>
</tr>
</tbody>
</table>

CA, Celiac artery; SMA, superior mesenteric artery.
Factors associated with Treatment

- SAM/FMD
  - OR 8.1 CI: 1.002-65.88, p=0.05
### Table I. Demographics and comorbid factors

<table>
<thead>
<tr>
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<th>All (N = 25)</th>
<th>Symptomatic (n = 15)</th>
<th>Asymptomatic (n = 10)</th>
<th>P value</th>
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<td></td>
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<td>%</td>
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<td>%</td>
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<td>50 (9)</td>
<td>66 (13)</td>
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<td>Male</td>
<td>18</td>
<td>72</td>
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<td>80</td>
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<td>56</td>
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<td>Smoker (current)</td>
<td>4</td>
<td>16</td>
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<td>Hypertension</td>
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<td>48</td>
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<td>47</td>
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<td>Coronary artery disease</td>
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<td>0</td>
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<td>Connective tissue disorder</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Diabetes</td>
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<td>12</td>
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<td>End stage renal disease</td>
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<td>Trauma</td>
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<td>7</td>
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<tr>
<td>Recent drug use&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>4</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>SD: Standard deviation.</td>
<td></td>
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<sup>a</sup>Cocaine.

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### Table II. Presentation

<table>
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<th></th>
<th>All (N = 25)</th>
<th>Symptomatic (n = 15)</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>%</td>
<td>No.</td>
<td>%</td>
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<td>60</td>
<td>15</td>
<td>100</td>
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<td>Abdominal pain</td>
<td>15</td>
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<td>15</td>
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<td>Vomiting</td>
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<td>Back pain</td>
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<td>Location</td>
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<td>76</td>
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<tr>
<td>CTA</td>
<td>23</td>
<td>92</td>
<td>15</td>
<td>100</td>
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<td>MRA</td>
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<td>Angiography</td>
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<sup>a</sup>Computed tomography angiography. MRA, magnetic resonance angiography. Among patients admitted to the hospital.

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Zettervall et al. JVS 2017
## Treatment

**Table V. Treatment**

<table>
<thead>
<tr>
<th></th>
<th>All (N = 25)</th>
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<th>P value</th>
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</thead>
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<td>No.</td>
<td>%</td>
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<td>Acute</td>
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<td>2</td>
<td>13</td>
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<tr>
<td>Late</td>
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<td>4</td>
<td>1</td>
<td>7</td>
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<tr>
<td>No new medications</td>
<td>12</td>
<td>48</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>Any new medication</td>
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<td>52</td>
<td>13</td>
<td>87</td>
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<td>Any antiplatelet</td>
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<td>40</td>
<td>10</td>
<td>67</td>
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<td>Aspirin</td>
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<td>Anticoagulation</td>
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<td>40</td>
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<td>New antihypertensive</td>
<td>4</td>
<td>16</td>
<td>4</td>
<td>27</td>
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Zettervall et al. JVS 2017

## Outcomes

**Table VI. Outcomes at follow-up**

<table>
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<th>Outcomes</th>
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<tr>
<td>Mortality(^a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-day</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1-year</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Hospital length of stay, days, range</td>
<td>4</td>
<td>(2-6)</td>
<td>4</td>
<td>(2-5)</td>
</tr>
<tr>
<td>Readmission related to dissection</td>
<td>2</td>
<td>8</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>Change in vessel diameter(^b)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diameter growth &gt;2 mm</td>
<td>4</td>
<td>25</td>
<td>2</td>
<td>20</td>
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<tr>
<td>Stable diameter</td>
<td>11</td>
<td>69</td>
<td>7</td>
<td>70</td>
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<tr>
<td>Decreased diameter</td>
<td>1</td>
<td>6.3</td>
<td>1</td>
<td>10</td>
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<td>Rupture</td>
<td>0</td>
<td>0</td>
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</tbody>
</table>

\(^a\)Death because of cancer.  
\(^b\)Among those with follow-up imaging.

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Zettervall et al. JVS 2017
Imaging Findings

- 67% of symptomatic patients had evidence of thrombosis
- 53% had evidence of inflammation
- Higher degree of stenosis

Gobble et al. JVS 2009

Stenting for Luminal Compression

Gobble et al. JVS 2009
Summary

- Majority Male
- Occurs in the 50’s
- 2/3rds are symptomatic
- Symptoms associated with inflammation and thrombosis on imaging

Imaging Recommendations

- At 1 month
- Every 6 months for 2 years
- U/S and CTA initially
  - if concurrent results continue with ultrasound

Zettervall et al
Treatment In Practice

- **Gobble *et al.* (9 patients)**
  - Asymptomatic: stent if progression on serial imaging
  - Symptomatic: stent

- **Zettervall *et al.* (25 patients)**
  - Short term anticoagulation and lifelong aspirin for all patients

- **Morgan *et al.* (77 patients)**
  - Asymptomatic: 33% observation, 41% antiplatelet, 22% anticoagulation
    - No interventions
  - Symptomatic: 68% anticoagulation, 2% observation, 24% antiplatelet
    - 8% operative intervention

Asymptomatic Treatment Summary

- **Medical Management**
  - Antiplatelet
    - DAPT if lumen stenosis
  - Anticoagulation for thrombosis

- **Intervention when rapid growth or Aneurysm >2cm**

- **Surveillance CTA vs. Ultrasound/MRA**
Symptomatic Controversy
Stenting, Anti-coagulation, Antiplatelets, or Nothing?

Primary Treatment objective: limit the extension of dissection, preserve the blood flow distally through the true lumen, and to prevent the rupture of the SMA\(^1\)

Min et al. JVS Aug 2011

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Gobble et al. JVS 2009
Table 1. Characteristics of the Selected Studies.

<table>
<thead>
<tr>
<th>Authors Year</th>
<th>Country</th>
<th>N</th>
<th>Sex, MF</th>
<th>Age, y</th>
<th>Symptomatica</th>
<th>Conservative Treatmentb</th>
<th>Invasive Treatmentc</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ATT</td>
<td>No ATT</td>
</tr>
<tr>
<td>Sako 2009×6</td>
<td>Japan</td>
<td>12</td>
<td>11/1</td>
<td>50 (43-61)</td>
<td>12</td>
<td>10</td>
<td>0</td>
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<tr>
<td>Goldhaber 2008×7</td>
<td>USA</td>
<td>9</td>
<td>7/2</td>
<td>70 (46-73)</td>
<td>6</td>
<td>NR</td>
<td>2</td>
</tr>
<tr>
<td>Zerbib 2010×7</td>
<td>France</td>
<td>7</td>
<td>5/2</td>
<td>52 (36-61)</td>
<td>7</td>
<td>7</td>
<td>0</td>
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<tr>
<td>Cho 2011×11</td>
<td>Korea</td>
<td>30</td>
<td>26/4</td>
<td>55 (38-74)</td>
<td>17</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Min 2013×12</td>
<td>Korea</td>
<td>14</td>
<td>12/2</td>
<td>59 (50-74)</td>
<td>14</td>
<td>0</td>
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<tr>
<td>Jibiki 2013×13</td>
<td>Japan</td>
<td>14</td>
<td>11/3</td>
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<td>8</td>
<td>NR</td>
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<tr>
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<td>China</td>
<td>14</td>
<td>12/2</td>
<td>52 (44-63)</td>
<td>14</td>
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<tr>
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<td>Korea</td>
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<td>NA</td>
<td>50 (39-65)</td>
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<td>12/5</td>
<td>57 (47-76)</td>
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<td>11/1</td>
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<td>42</td>
<td>39/3</td>
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<td>NR</td>
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<td>14/4</td>
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<td>18</td>
<td>NR</td>
<td>2</td>
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<tr>
<td>Okamura 2014×21</td>
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<td>17</td>
<td>15/2</td>
<td>63 (37-83)</td>
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<td>19/5</td>
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<td>7/2</td>
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<td>56/3</td>
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<td>46/6</td>
<td>53 (36-74)</td>
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<td>Hon 2016×30</td>
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<td>107/9</td>
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<td>88</td>
<td>27</td>
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<td>Kim 2018×31</td>
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<td>26/3</td>
<td>51 (38-65)</td>
<td>25</td>
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<td>25</td>
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<tr>
<td>Total</td>
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<td>55 (33-88)</td>
<td>514</td>
<td>238</td>
<td>172</td>
<td>45</td>
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</table>
Initial Treatment Approach

Value of Anticoagulation?

- ICT failure rate: 14.3%
- No anticoagulation failure rate: 10.1%
- Anti-coagulation failure rate: 17.8% (no statistical difference)

Conclusion: Anticoagulation not beneficial
**Stenting in Symptomatic SMA Dx**

**China vs. The World**

- **Overall 8.7% Rx with ESP**

- **China 33.6% Rx with ESP**
  - Aimed at rapid symptom relief, shorter length of stay, lower in-hospital severe AE
Treatment Indications

- Bowel Ischemia
- Persistent symptoms
- Rapid Growth
- Size >2 cm

Care Controversies

- Routine Antiplatelet use
- Anticoagulation?
  - Cases of luminal stenosis or thrombosis
- Role of Thrombolysis
- Symptomatic Stenting
  - Persistent symptoms
Case 1: SMA Dissection with Thrombosis

- 51 year old female
- Presented with abdominal and back pain
- Mild nausea, no emesis
- Benign abdominal exam
Case 1: SMA Dissection & Thrombosis

- Heparin Gtt
- Serial abdominal exams
- Repeat CT scan
- Discharged home on Eliquis and ASA 81 mg daily
Case 2: Spontaneous CA Dissection

- 62 YO man with HTN, PSVT, OA
- Diffuse dull abdominal pain, worsened with eating
- BPO 190/100s
- Abdomen benign
- WBC 8.6, Lactate 0.4
Spontaneous Acute CA Dissection

- Discharged home on ASA 81 mg
- Improved blood pressure control
- 1 Month follow up CTA

Case 3: Chronic CA Dissection

- 75 year old man with HTN afib on Eliquis
- Known celiac artery dissection
- CA 1.4 cm in 2015
- Denies abdominal and back pain.