Vascular Access Banding
Techniques and Outcomes

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Disclosures
None

Disclaimer
Art is I. Science is we.
Claude Bernard 1850

Surgical Dogma
• Banding is a poor option for treating dysfunctional vascular accesses
  – Difficult to modulate
  – Inconsistent results

Is this dogma true?
When should banding be used?

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Is this dogma true?
When should banding be used?
What is the preferred banding technique?
Can the disadvantages of banding be mitigated?

Vascular access banding is used to treat:

- Arterial Steal
- High-output Heart Failure
- Venous Hypertension?

Banding Techniques

- Hemoclip
- PTFE, Dacron, Artergraft
- Plication

Arterial Steal Treatment Options

- Ligation
- Flow-reducing procedures
  - Banding
  - Tapering of arterial inflow
  - Graft interposition
- Bypass procedures
  - Distal Revascularization Interval Ligation (DRIHL)
  - Proximalization of the arterial inflow (PAI)
  - Revision Using Distal Inflow (RUDI)
Studies Supporting Surgical Dogma- “Banding is Bad”

<table>
<thead>
<tr>
<th>N</th>
<th>Technique</th>
<th>Patency</th>
<th>Clinical Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>Plication/PTFE Doppler/Pulse</td>
<td>81% (early)</td>
<td>52% Cured/Improved</td>
</tr>
<tr>
<td>16</td>
<td>Ligation clips Finger PPGs (&gt;50 mm Hg)</td>
<td>38% @ 1 yr</td>
<td>100% Cured/Improved</td>
</tr>
</tbody>
</table>

Studies Refuting Surgical Dogma- “Banding is Good”

<table>
<thead>
<tr>
<th>N</th>
<th>Technique</th>
<th>Patency</th>
<th>Clinical Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Dilator-assisted Doppler/Pulse</td>
<td>100%</td>
<td>7/7 Cured/Improved</td>
</tr>
<tr>
<td>114</td>
<td>Balloon-assisted T-band with PTFE</td>
<td>52% @ 3mo, 89% - 1 band 96% - Multiple bands</td>
<td>96% Cured/Improved</td>
</tr>
<tr>
<td>7</td>
<td>Plication Doppler/Pulse</td>
<td>100%</td>
<td>7/7 Cured/Improved</td>
</tr>
<tr>
<td>78</td>
<td>Spindle/PTFE Flow-400cc AVF, 600cc AVG</td>
<td>91%/1 yr AVF 58%/1 yr AVG</td>
<td>86% Cured/Improved</td>
</tr>
<tr>
<td>6</td>
<td>Dacron Finger PPG (&gt;80 mm Hg)</td>
<td>100%</td>
<td>6/ Cured/Improved</td>
</tr>
</tbody>
</table>

High Output Heart Failure

Treatment Options

- Ligation
- Flow-reducing procedures
  - Tapering of arterial inflow
  - Graft interposition

Outcomes of Banding for High Output Heart Failure

<table>
<thead>
<tr>
<th>N</th>
<th>Technique</th>
<th>Patency</th>
<th>Clinical Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Not described Flow &lt;700 cc/min</td>
<td>Not reported</td>
<td>3/3 Cured/Improved</td>
</tr>
<tr>
<td>20</td>
<td>T-band with PTFE None</td>
<td>90% @ 3 mo.</td>
<td>19/20 Cured/Improved</td>
</tr>
<tr>
<td>69</td>
<td>Balloon-assisted</td>
<td>85% @ 6 mo.</td>
<td>69/69 Cured/Improved</td>
</tr>
<tr>
<td>17</td>
<td>Spindle/PTFE Flow-400cc AVF, 600cc AVG</td>
<td>91%/1 yr AVF 58%/1 yr AVG</td>
<td>16/17 Cured/Improved</td>
</tr>
</tbody>
</table>

Venous Hypertension

Treatment Options

- Ligation
- Central venous angioplasty ± stenting
- Central venous bypass
- Vascular access flow-reducing procedure
  - Tapering of arterial inflow
  - Graft interposition

Outcomes of Banding for Venous Hypertension

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<th>Clinical Success</th>
</tr>
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<tbody>
<tr>
<td>22</td>
<td>Balloon-assisted</td>
<td>20/22</td>
<td>22/22 Cured/Improved</td>
</tr>
</tbody>
</table>

Conclusions- Unlikely to be successful in:
- AVGs with flow rates < 800 cc/min
- AVFs with flow rates < 600 cc/min
- Central venous occlusions with few venous collaterals on fistulagram
Banding
Mitigating the Disadvantages

- Use for “high-flow” accesses (>1000 cc/min)
- Intraoperative measurement of hand perfusion/access flow rates
  - Finger PPGs, Pressures
  - Return of pulse
  - Monophasic to biphasic Doppler signals
  - Electromagnetic flowmeter or Duplex-derived access flow measurements

Conclusions

- Banding technique has less influence on outcomes than the intraoperative method used to gauge adequacy of banding.
- Banding outcomes seem to be best for high flow fistulas/grafts
- Banding outcomes seem to be dependent on treatment indications
  - High output heart failure: good outcomes
  - Arterial steal: inconsistent outcomes
  - Venous hypertension?