VENOUS STENTS FOR CENTRAL VENOUS DISEASE IN HEMODIALYSIS PATIENTS

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DISCLOSURE

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☐ I do not have any potential conflict of interest
CENTRAL VENOUS DISEASE IN HD

CVD in hemodialysis ≠ CVD from other benign or malignant causes

• Unique factors:
  • Hemodynamic changes due to presence of a graft/fistula
  • Lines and catheters

• Anatomy:
  • TCVO type
  • Thoracic inlet/bony compression
  • Jugular veins
CURRENT OPTIONS FOR SYMPTOMATIC CVO

High pressure PTA: first option but what if it fails?? (~50-90% success rate)

- Bare Metal Stents: ~60% PP at 12m (most studies exclude thoracic inlet)
- DCBs: few studies (Kitrou et al PP of 63% at 6m*)
- Covered stents: promising results but major limitations

Signs or symptoms of CVO/HD clinical indicator

VENOUS STENTS: BEYOND VS ABRE

**Bentley**
- Self expanding stent approved for use in iliofemoral veins with excellent 12m results
- Very high radial force and crush resistance
- 10FR device

**Medtronic**
- Self expanding stent approved for use in iliofemoral veins with good 36m results
- Wider struts
- 9FR device
# Patient and Lesion Characteristics

<table>
<thead>
<tr>
<th>Baseline patient characteristics</th>
<th>Bentley</th>
<th>Abre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factors</td>
<td>n=19</td>
<td>n=15</td>
</tr>
<tr>
<td>Age (median in years)</td>
<td>69</td>
<td>73</td>
</tr>
<tr>
<td>Male/Female</td>
<td>16/3</td>
<td>12/3</td>
</tr>
<tr>
<td>Hypertension</td>
<td>11 (61%)</td>
<td>12 (80%)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>7 (39%)</td>
<td>8 (53%)</td>
</tr>
<tr>
<td>Coronary Artery Disease</td>
<td>9 (50%)</td>
<td>10 (67%)</td>
</tr>
<tr>
<td>Fistula/Graft</td>
<td>16/2</td>
<td>8/7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Baseline lesion and stent characteristics</th>
<th>Bentley</th>
<th>Abre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean percent stenosis (%)</td>
<td>75</td>
<td>79</td>
</tr>
<tr>
<td>Mean lesion length (cm)</td>
<td>2.7</td>
<td>2.5</td>
</tr>
<tr>
<td>TCVO (n)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type 1</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Type 2</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Type 3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Type 4</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Stent size (n)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 mm</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>14 mm</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>16 mm</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>18 mm</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Stent Length (n)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60 mm</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>80 mm</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>100 mm</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Number of stents per patient (n)</td>
<td>1.1</td>
<td>1.3</td>
</tr>
<tr>
<td>Stent across thoracic inlet</td>
<td>11 (61%)</td>
<td>11 (73%)</td>
</tr>
</tbody>
</table>
CV OCCLUSION: HOW WE DO IT

• Pre op
  • Patients are diagnosed through our IR access clinic
  • CTV for complex occlusions
• Peri op
  • GA depending on complexity (if sharp recan planned)
  • Multiple access sites
  • Attempted wire crossing —> back end of wire —> needle/go back
  • Constant rotation of the II to make sure needle and balloon are in plane. Be prepared for arterial access and/or pericardial drain placement
  • Stent placement
• Post
  • US every 3 months
CASE 1

81 yo with dysfunctional AV access and arm edema. TCVO type 1.
Use of Bentley BeBack for sharp recanalization
CASE 2

84 yo with dysfunctional right AV fistula and arm edema. TCVO type 2.
CASE 3

75 yo with dysfunctional AV access. TCVO type 3.
RESULTS

Bentley 6m PP: 86%
Abre 6m PP: 77%
Abre 12m PP: 70%

Bentley 6m AP: 100%
Abre 6/12m AP: 93%
THORACIC INLET

- Area is particularly problematic
- Is there significant bony compression?
- Is patient a candidate for surgical decompression?
  - Poor results in HD patients even after decompression
  - 26% complication rate and 30% reintervention rate!*
- Lesions respond poorly to PTA
- Stenting may allow patients to be symptom free and receive adequate HD (with active maintenance)
  - No stent fractures seen in our experience

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TECHNICAL NOTES FROM OUR EXPERIENCE

❖ Stent cell design and curves in anatomy

❖ Need for good pre-dilatation, especially with Abre

❖ If using multiple stents have significant overlap

❖ Both stents can be placed precisely → open a few struts and readjust
CONCLUSION

1) Venous stents offer promising alternative to existing treatments for CVD in hemodialysis patients
   • Abre: Acceptable PP at 12m. Very good assisted patency rates
   • Bentley Beyond: **Excellent** all around 6m data. Awaiting 1yr data

2) Stenting across thoracic inlet is **safe** with acceptable patency rates