Techniques for the End Stage of Dialysis Access

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Disclosures

- Previously a paid consultant for CryoLife
Prevalence of ESRD in the US

Per million population

http://www.usrds.org/2010/slides/indiv/1v2index.html
Annual mortality rate of Dialysis Patients

Per 1,000 patient years at risk


http://www.usrds.org/2010/slides/indiv/1v2index.html
Failing dialysis access

- Thrombosis
- Infection
- Central venous stenosis
Treatment of central venous stenosis

- K-DOQI: angioplasty combined with stenting for elastic central venous stenoses or recurrent stenoses within a 3 month period\(^1\)
- Primary patency 12 – 29% at 12 months\(^2\)
- Cumulative patency 69 – 100%\(^3\)

Techniques for circumventing central stenoses

 Hemodialysis Reliable Outflow (HeRO) device
 Femoral vein arteriovenous fistulae
 Transhepatic and direct caval tunneled catheters
LA

- 74 y/o male, HTN, DM, ESRD
- Failed left radiocephalic AVF
- Failed left upper arm AVG
- History of bilateral upper extremity dialysis catheters
Central Venous Stenosis
Central Venous Stenosis
Post-angioplasty
Recanalized central venous occlusion
Hybrid dialysis catheter

- HeRO (Hemodialysis Reliable Outflow)
HeRO diagram
# HeRO clinical outcomes

<table>
<thead>
<tr>
<th>Multi-Center Data</th>
<th>AVG Literature</th>
<th>Catheter Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacteremia Rates (Infections/1,000 days)</td>
<td>0.11</td>
<td>2.30</td>
</tr>
<tr>
<td>Intervention Rates (Per patient year)</td>
<td>1.6 – 2.4</td>
<td>5.8</td>
</tr>
<tr>
<td>12 Month Secondary Patency Rates</td>
<td>65%</td>
<td>37%</td>
</tr>
<tr>
<td>Adequacy of Dialysis (mean Kt/V)</td>
<td>1.37 – 1.62</td>
<td>1.29 – 1.46</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th></th>
<th><strong>Katzman</strong>¹</th>
<th><strong>Gage</strong>²</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>(n = 36)</td>
<td>(n = 164)</td>
</tr>
<tr>
<td>Bacteremia</td>
<td>0.70</td>
<td>0.14</td>
</tr>
<tr>
<td>Intervention rate</td>
<td>2.5</td>
<td>1.5</td>
</tr>
<tr>
<td>12 month primary patency</td>
<td>38.9%</td>
<td>48.8%</td>
</tr>
<tr>
<td>12 month secondary patency</td>
<td>72.2%</td>
<td>90.8%</td>
</tr>
</tbody>
</table>

GJ

- Spina bifida
- Paraplegia
- History of decubitus ulcers with lower extremity muscle flaps
- Atretic femoral veins
- Left sided SVC
- Multiple line infections and episodes of sepsis
Femoral Vein Transposition AVF

- Similar to single stage basilic vein transposition
- Elevation of femoral vein
- Tunnel femoral vein
- Anastomosis to SFA
Results of Femoral Vein Transposition

- 72 AVF
- Mean time from initiation of HD to femoral fistulae: 10 years
- 82% successful HD
- 1 year primary/secondary patency 91/45 %
Complications

- Minor complications 56%
  - Hematoma, wound healing, access complication, stenosis
- Major complications 18%
  - Arterial ischemia, amputation, high output cardiac failure, bleeding
Recalcitrant central venous occlusion

- Alternate approach for tunneled dialysis catheters
Keck Experience in Unconventional Dialysis Catheter Access

- Keck Hospital of USC, LAC + USC Medical Center
- Mean age 44
Results

- Total access site interval (duration of use)
  - Mean - 380 days
  - Range - 15-790 days
  - Median - 245 days

- Initial access site interval
  - Mean - 295 days
  - Range – 15-658 days
  - Median - 245 days
Unconventional Access

- Transhepatic and Translumbar central venous catheters are a useful tool for hemodialysis access when other options have been exhausted.

- Potential benefit as a bridge to transplantation or recanalization of central venous occlusion.
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