Minimizing Risks When Using Upper Extremity Access For Treating Abdominal And Lower Extremity Lesions

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Brachial Artery Access
Access-site complications
- 3.5% of peripheral vascular interventions
- 7.9% arm access complication rate
- No direct comparison of brachial vs. femoral access

Cleveland Clinic experience
- Brachial complication rates - 6.5% of 323 cases
  - Risk factors: female, long interventional sheaths
  - Primary cut-down – 9% of cases
  - No complications observed

Vascular Quality Initiative Study
- Compare brachial vs. femoral access complication rates
- Identify risk factors for arm access site complications
- 44,634 eligible procedures
  - Single femoral – 43,901
  - Single brachial – 732 (1.64%)

Brachial versus Femoral Access

Vascular Quality Initiative Study
- Compare brachial vs. femoral access complication rates
- Identify risk factors for arm access site complications
- 44,634 eligible procedures
  - Single femoral – 43,901
  - Single brachial – 732 (1.64%)
Multi-variate analysis

<table>
<thead>
<tr>
<th></th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1.01</td>
<td>1.00 - 1.05</td>
<td>0.07</td>
</tr>
<tr>
<td>Male gender</td>
<td>0.47</td>
<td>0.27 - 0.83</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>BMI</td>
<td>0.98</td>
<td>0.94 - 1.02</td>
<td>0.34</td>
</tr>
<tr>
<td>Diabetes</td>
<td>0.59</td>
<td>0.31 - 1.12</td>
<td>0.11</td>
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<tr>
<td>Sheath size ≤ 5F</td>
<td>0.57</td>
<td>0.37 - 0.87</td>
<td>0.01</td>
</tr>
<tr>
<td>Access Guidance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ultrasound</td>
<td></td>
<td>Referent</td>
<td></td>
</tr>
<tr>
<td>None/fluoroscopy</td>
<td>0.49</td>
<td>0.27 - 0.92</td>
<td>.03</td>
</tr>
<tr>
<td>Arterial cut-down</td>
<td>0.25</td>
<td>0.007-0.87</td>
<td>0.04</td>
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</tbody>
</table>

Overall PVI Experience

<table>
<thead>
<tr>
<th>Quintile</th>
<th>PVI cases/surgeon (mean and range)</th>
<th>Brachial Access Complication Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25.8 (4-44)</td>
<td>6.8</td>
</tr>
<tr>
<td>2</td>
<td>65.9 (46-86)</td>
<td>10.4</td>
</tr>
<tr>
<td>3</td>
<td>117.8 (87-147)</td>
<td>9.8</td>
</tr>
<tr>
<td>4</td>
<td>192.5 (149-243)</td>
<td>8.0</td>
</tr>
<tr>
<td>5</td>
<td>309.0 (244-680)</td>
<td>9.8</td>
</tr>
</tbody>
</table>

p = .8 across all groups

Experience with Arm Access

<table>
<thead>
<tr>
<th>Quintile</th>
<th>Brachial Access Frequency (as % of total cases)</th>
<th># Arm Access Cases</th>
<th>Complication Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0.6</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>77</td>
<td>15.6</td>
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<tr>
<td>4</td>
<td>3.0</td>
<td>170</td>
<td>9.4</td>
</tr>
<tr>
<td>5</td>
<td>8.6</td>
<td>476</td>
<td>8.0</td>
</tr>
</tbody>
</table>

p = .2 across all groups

Technical Considerations

1. Consider radial artery access
2. Fluoroscopy to confirm presence of bony landmark for compression
3. Ultrasound to confirm brachial artery
4. Micro-puncture kit (21 G needle, 0.018" wire, 4F or 5F microsheath)
5. Confirmation angiogram prior to up-sizing to a working sheath

Technical Considerations

Post-procedural access site management

<6F:
- Direct pressure
- Arm immobilization
- 2% reported complication rate

>6F:
- Open approach

No Effect

- Body-mass index
- Diabetes
- Pre-operative anti-platelet agents
- Heparin
- Protamine
- Closure device use
Technical Considerations

Closure devices – not recommended

1. Off-label use for all devices
2. Safety and efficacy is not established for arm access
3. Up to 11% reported complication rate

Summary

• Higher complication rates with arm access
• Minimize sheath diameter for planned procedure
• U/S-guided access may not reduce complication risk as a lone adjunct
• Arterial cut-down should be considered for large sheath access

THANK YOU