Use of suture-mediated closure devices in the treatment of femoral artery pseudoaneurysms

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Disclosures

I have the following potential relevant conflicts of interest to report:

☐ Consulting
☐ Employment in industry
☐ Stockholder of a healthcare company
☐ Owner of a healthcare company
☐ Other(s)

I do not have any potential conflict of interest
Femoral artery Pseudoaneurysms

• Incidence:
  – 0.2% to 2.9% post-diagnostic angiograms
  – Up to 8% following interventional procedures

• Risk Factors
  – Patient: male, obesity
  – Procedure: access sheath size, anticoagulation, e-cases
Management of Femoral artery Pseudoaneurysms (PSAs)

• Manual / US guided Compression
  – Most-common technique for haemostasis
  – High failure rate: 15-38%

• Thrombin injection
  – High success rate: > 90%
  – Risk of distal embolization / thrombosis, limb ischaemia

• Open surgical repair
  – Thrombin exclusion factors – short / wide neck
Patient selection (n=5)

- Complex vs. simple pseudoaneurysms (4/5)
- On anticoagulation (2/5)
- Uncontrolled hypertension (1/5)
- Recanalization post-prior successful Thrombin injection (2/5)
Technique

- US guided 21G direct access of PSA lobe closest to neck
- Direct needle angiography
- 0.018” Guidewire crossing of ‘neck’ into CFA
- Micropuncture transition to 4F dilator
- Formal CFA/EIA angiography
- Conversion to 0.035” hydrophilic wire
- Perclose ProGlide primary closure of PSA
  - Optional closure ‘over-the-wire’
## Baseline Characteristics

<table>
<thead>
<tr>
<th>Patient</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>38</td>
<td>65</td>
<td>69</td>
<td>53</td>
<td>73</td>
<td>59.6</td>
</tr>
<tr>
<td><strong>Male</strong></td>
<td>M</td>
<td>M</td>
<td>F</td>
<td>M</td>
<td>M</td>
<td>4 / 5</td>
</tr>
<tr>
<td><strong>Anticoag</strong></td>
<td>Yes</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Y</td>
<td>2 / 5</td>
</tr>
<tr>
<td><strong>Procedure</strong></td>
<td>Transaortic Intervention</td>
<td>PCI</td>
<td>Electrophys Ablation</td>
<td>PCI</td>
<td>Post-IABP</td>
<td>-</td>
</tr>
<tr>
<td><strong>Access artery</strong></td>
<td>CFA</td>
<td>SFA</td>
<td>CFA</td>
<td>SFA</td>
<td>CFA</td>
<td>-</td>
</tr>
<tr>
<td><strong>Prior Thrombin</strong></td>
<td>Yes</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Yes</td>
<td>2 / 5</td>
</tr>
<tr>
<td><strong>Contrast</strong></td>
<td>15 mls</td>
<td>15 mls</td>
<td>15 mls</td>
<td>9 mls</td>
<td>22 mls</td>
<td>15.2 mls</td>
</tr>
<tr>
<td><strong>Procedure time</strong></td>
<td>41 min</td>
<td>35 min</td>
<td>30 min</td>
<td>36 min</td>
<td>38 min</td>
<td>36 min</td>
</tr>
<tr>
<td><strong>Complex</strong></td>
<td>No</td>
<td>Yes</td>
<td>Yes with AVF</td>
<td>Yes</td>
<td>Yes</td>
<td>3 / 5</td>
</tr>
<tr>
<td><strong>PSA size</strong></td>
<td>1.3 cm</td>
<td>6.5 cm</td>
<td>1.2 cm</td>
<td>5.3 cm</td>
<td>3.6 cm</td>
<td>3.6 cm</td>
</tr>
<tr>
<td><strong>Neck width</strong></td>
<td>2 mm</td>
<td>2.2 mm</td>
<td>2.4 mm</td>
<td>3.0 mm</td>
<td>5.7 mm</td>
<td>3.1 mm</td>
</tr>
</tbody>
</table>
65 Male with ESRF and EF of 32% - suspected CAD

- Underwent diagnostic coronary angiogram
- 5F sheath access → manual compression haemostasis
- Presented 1 week later - groin bruising and swelling
- CT angiogram
  - 6.5 x 2.5 x 1.7cm multilobulated complex PSA –
  - Partially thrombosed (most superficial lobe)
- Real-time US: no perceptible neck length – not suitable for thrombin
- Offered surgical repair vs. ProGlide closure
Case 2

‘Zero neck’ length PSA
Case 2
Case 2

Direct 21G needle angiography
Case 2

Guidewire crossing → 4F dilator angiography
Case 2

Trial of ‘tract occlusion’ with 6F sheath

[OD=2.66mm]
Closure ‘over-the-wire/catheter’

69 F post EP ablation, restarted rivaroxaban
• 6.1 x 3.2cm PSA
• Successful US guided compression
• Recurred 2 days later – 1.2cm with 2.4mm neck
• New AVF

In view of high risk of recurrence – Proglide closure done
• Closed ‘over-the-wire’
• 4F diagnostic catheter re-introduced
• Arteriotomy Proglide sutures tightened with pusher/trimmer
• Check angiography done
• Final closure of arteriotomy with on-table US duplex check
Prior to Closure

Post-Closure
Summary

• Useful adjunct to treatment of a common complication

• Safe, Reliable and Reproducible

• Can be considered as viable alternative to open surgical repair

• Can be used as a first line approach in high risk patients
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