Percutaneous access and closure of the axillary artery during complex aortic endovascular procedures

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Chief: Prof. Roberto Chiesa
Disclosure

Speaker name:
Andrea Melloni

☑️ I do not have any potential conflict of interest
TAAA unfit for surgery

2001 - 2012
Hybrid surgery
55 cases

2008 - present
CHIM PS
8 cases

2013 - present
BEVAR / FEVAR
76 cases

High-risk patients
Upper extremity accesses for B/FEVAR

San Raffaele experience (2013-2018): 72/76 cases (94.7%)

OPEN
22 cases (32%)

Illustration modified from David Factor (Mayo Clinic) in Oderich GS edition. Springer 2017
Percutaneous Axillary Access (pAXA)

San Raffaele experience (Dec. 2016 - present)

ENDO
50 cases (68%)

Illustration modified from David Factor (Mayo Clinic) in Oderich GS edition. Springer 2017
Large sheaths puncture site

1st Segment

Pectoralis minor
Axillary ecoguided puncture

All cases

AxA 1st segment

Bertoglio et al. J Vasc Surg 2018
Online video
Standard double Proglide implant

According to IFU

Bertoglio et al. J Vasc Surg 2018
Online video
Percutaneous femoral downsizing

Early limb reperfusion – one femoral access available
AXA closure 1\textsuperscript{st} step

In-graft through-and-through wire and sheath rendez-vous
AXA closure 2\textsuperscript{nd} step

Sheaths unlink and disassemble the through-and-through
AXA closure 3rd step
Sheaths unlink and balloon-assisted sheath removal
pAXA study

*ClinicalTrials.gov Identifier: NCT03223311 – currently enrolling*

**Population:** 60 patients treated with F/BEVAR requiring UEA

- 20 patients retrospective [14 cases already published in J Vasc Surg 2018]
- 40 patients prospective [30 patients enrolled]

**Inclusion:** pAXA access closed with double Proglide technique

**Primary endpoint:** Primary technical success

Bertoglio et al. J Vasc Surg 2018
**pAXA study: Access details**


<table>
<thead>
<tr>
<th>Left access side</th>
<th>42 (84%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median AXA diameter (mm)</td>
<td>8.9 mm (8.5 -9.8)</td>
</tr>
<tr>
<td>Median AXA tortuosity index</td>
<td>1.5 (1.4-1.6)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sheath size (ID)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10F</td>
<td>6 (12%)</td>
</tr>
<tr>
<td>12F</td>
<td>38 (76%)</td>
</tr>
<tr>
<td>14F</td>
<td>4 (8%)</td>
</tr>
<tr>
<td>16F</td>
<td>2 (4%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hostile accesses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pacemaker</td>
<td>6 (12%)</td>
</tr>
<tr>
<td>Scars (Previous cannulation)</td>
<td>2 (6%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Relative controindication</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous LIMA-CABG or Dyalisis fistulas</td>
<td>1 (2%)</td>
</tr>
</tbody>
</table>
### pAXA study: 30-day outcomes

Postoperative US and CT scan assessment

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary technical success</strong></td>
<td>46</td>
<td>92%</td>
</tr>
<tr>
<td>Any 30-day open conversion</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Assisted technical success</strong></td>
<td>50</td>
<td>100%</td>
</tr>
<tr>
<td>Need for bare stents for dissection</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Need for covered stents for bleeding</td>
<td>3</td>
<td>6%</td>
</tr>
<tr>
<td><strong>Access site hematoma (any)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinically evident</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Radiological (US or CT assessment)</td>
<td>4</td>
<td>8%</td>
</tr>
<tr>
<td><strong>Access site false aneurysm (any)</strong></td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Access artery thrombosis (any)</strong></td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Peripheral neurological complications</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permanent</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Temporary paraesthesia &lt; 48 hours</td>
<td>2</td>
<td>4%</td>
</tr>
</tbody>
</table>
Discussion
Discussion

A) Axillary puncture site: 1\textsuperscript{st} segment vs 3\textsuperscript{rd} segment

1\textsuperscript{st} segment
Mean Ø 8.9 mm
Proximal
No brachial plexus

3\textsuperscript{rd} segment
Mean Ø 7.7 mm
Distal
Brachial plexus

Bertoglio et al. J Vasc Surg 2018
Harris et al. J Vasc Surg 2018
Schäfer et al. Int J Cardiol 2017
Puippe et al. Vasa 2018

Branzan et al. ESVS annual meeting 2017
Pratesi et al. Veith symposium 2017
Discussion

B) Decreased X-ray exposure?

Standard: Working from the left

New: Working from the right

Illustration from David Factor (Mayo Clinic) in Oderich GS edition. Springer 2017
Discussion

C) Enhanced pushability from upper extremities access
Discussion

D) More Extensive use of upper extremities access

Indwelling catheter

One vessel from above

14Fr (2 vessels)
### Discussion

#### E) Total percutaneous approach (univariate analysis)

<table>
<thead>
<tr>
<th></th>
<th>Total PF/BEVAR (n=46)</th>
<th>Cutdown F/BEVAR (n=27)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local anaesthesia</td>
<td>22 (56%)</td>
<td>10 (37%)</td>
<td>ns</td>
</tr>
<tr>
<td>Procedural time (min)</td>
<td>290 (215-350)</td>
<td>340 (285-415)</td>
<td>.031</td>
</tr>
<tr>
<td>OR occupation time (min)</td>
<td>327 (283-450)</td>
<td>434 (360-500)</td>
<td>.003</td>
</tr>
<tr>
<td>Fluroscopy time (min)</td>
<td>80 (69-96)</td>
<td>90 (57-114)</td>
<td>ns</td>
</tr>
<tr>
<td>DAP (cGycm²)</td>
<td>593 (350-912)</td>
<td>500 (305-1049)</td>
<td>ns</td>
</tr>
<tr>
<td>Contrast media (mL)</td>
<td>264</td>
<td>300</td>
<td>ns</td>
</tr>
<tr>
<td>Estimated blood loss (mL)</td>
<td>250 (100-500)</td>
<td>450 (0-600)</td>
<td>ns</td>
</tr>
<tr>
<td>Mean n. of RBC transfusions</td>
<td>2 (0-3)</td>
<td>3 (1-5)</td>
<td>.05</td>
</tr>
</tbody>
</table>
Conclusions
pAXA study

TECHNIQUE

- 1\textsuperscript{st} segment of axillary artery
- Ecoguided puncture
- Balloon-assisted removal

RESULTS

- Feasible and safe
- Potential advantages over brachial and cutdown
- Ongoing study
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