How To Obtain **Percutaneous Axillary Access For F/B/EVAR:**

It Is Not Simple But It Can Be Safe

How To Prevent Bleeding And Nerve Injury

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Disclosures

- Illustrations of JVS paper 2018 paid by Abbott company

- Consultant for Abbott and Cook®
TAAA unfit for surgery


- 76 cases: BEVAR / FEVAR
- 55 cases: Hybrid surgery
- 8 cases: CHIMPS
- 76 cases: BEVAR / FEVAR

High-risk patients

2001 - 2012

2008 - present

2013 - present
Upper extremity accesses for B/FEVAR
San Raffaele experience (2013-2018): 72 / 76 cases (94.7%)

OPEN
22 cases (32%)

High-brachial
Brachial

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

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

According to IFU
Percutaneous femoral downsizing

Early limb reperfusion – one femoral access available
AXA closure 1st 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 3\textsuperscript{rd} step

Sheaths unlink and balloon-assisted sheath removal
pAXA study
ClinicalTrials.gov Identifier: NCT03223311

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 rates

Status: enrolling (83% completed)
# pAXA study: Access details


<table>
<thead>
<tr>
<th>Access Details</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Left access side</td>
<td>42 (84%)</td>
</tr>
<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>

**Hostile accesses**
- Pacemaker: 6 (12%)
- Scars (Previous cannulation): 2 (6%)

**Relative contraindication**
- Previous LIMA-CABG or Dialysis fistulas: 1 (2%)
## pAXA study: 30-day outcomes
Postoperative US and CT scan assessment

<table>
<thead>
<tr>
<th>Category</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: 1st segment vs 3rd segment

1st segment
Mean Ø 8.9 mm
Proximal
No brachial plexus

3rd 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

12 Fr x 45 mm

7 Fr x 90 mm

7F

12F
Discussion

D) More Extensive use of upper extremities access

- Indwelling catheter
- one vessel from above
- 14Fr. (2 vessels)

San Raffaele Scientific Institute - Vascular Surgery - "Vita-Salute" University
### 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

• 1st segment of axillary artery
• Ecoguided puncture
• Balloon-assisted removal

RESULTS

• Feasible and safe
• Potential advantages over brachial and cutdown
• Ongoing study
SAVE THE DATE

Milano, December 13^{th}-15^{th} 2018