Endoluminal Bypasses With Stent-Grafts For Thrombosed Popliteal Aneurysms: When Can It Work And How To Do It

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Disclosure

Giovanni Pratesi, M.D.
I have the following potential conflicts of interest to report:

- Consulting: Abbott, Cook, Cordis, Medtronic, WL Gore & Associates
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s)
- I do not have any potential conflict of interest

A Multicentric Experience with Open Surgical Repair and Endovascular Exclusion of Popliteal Artery Aneurysms

R. Pulli1, W. Dorigo1, R. Castello2, F. Dorosini1, F. Ioco1, G. De Blas1, U. Mannavà1, E. Vochten1, A. Boniuchio1, C. Pratesi1

Materials and methods: We retrospectively collected data concerning 178 open surgical interventions (OR group) and 338 endovascular exclusions (EV group) for PAs performed between January 2020 and December 2021. Early and follow-up results were analyzed in terms of mortality, graft patency, reintervention and limb preservation.

Table 2. Univariate and multivariate (for significant factors in univariate) analysis for primary patency during follow-up in the whole study group.

<table>
<thead>
<tr>
<th>Factors</th>
<th>OR [95% CI]</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female gender</td>
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<td>0.6</td>
</tr>
<tr>
<td>Diabetes</td>
<td>1.50</td>
<td>0.10</td>
</tr>
<tr>
<td>Symptomatic PA</td>
<td>2.00</td>
<td>0.000</td>
</tr>
<tr>
<td>Diabetes and symptomatic PA</td>
<td>2.50</td>
<td>0.000</td>
</tr>
<tr>
<td>Pre-operative thrombosis</td>
<td>1.50</td>
<td>0.05</td>
</tr>
<tr>
<td>Pre-operative PA</td>
<td>2.00</td>
<td>0.000</td>
</tr>
<tr>
<td>Femoral endoendarterectomy</td>
<td>1.50</td>
<td>0.000</td>
</tr>
<tr>
<td>Surgical endoendarterectomy</td>
<td>2.00</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Conclusions: In this large multicentric retrospective registry, open and endovascular treatment of PAs are used in different patients with regard to clinical and anatomical characteristics. Both treatments are feasible and safe, providing satisfactory early and long-term results.

A Multicentric Experience with Open Surgical Repair and Endovascular Exclusion of Popliteal Artery Aneurysms

Piazza M et al., Eur J Vasc Endovasc Surg 2014

Long-term Outcomes and Sac Volume Shrinkage after Endovascular Popliteal Artery Aneurysm Repair

EVARR provides successful aneurysm exclusion with good long-term patency, excellent limb salvage and survival rates
Endovascular management of thrombosed popliteal aneurysms

<table>
<thead>
<tr>
<th>Author, Year</th>
<th>Pts</th>
<th>Symptomatic (AJI)</th>
<th>Endo repair</th>
<th>Preoperative thrombolysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kropman, 2010</td>
<td>895</td>
<td>895</td>
<td>9</td>
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<tr>
<td>Carg, 2012</td>
<td>26</td>
<td>10</td>
<td>10</td>
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<td>Pulli, 2012</td>
<td>64</td>
<td>15</td>
<td>2</td>
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<td>Trinidad-Hernandez, 2012</td>
<td>81</td>
<td>11</td>
<td>11</td>
<td>Yes</td>
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<tr>
<td>Pulli, 2013</td>
<td>312</td>
<td>40</td>
<td>10</td>
<td>Yes</td>
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<tr>
<td>Ying Huang, 2014</td>
<td>149</td>
<td>24</td>
<td>10</td>
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<tr>
<td>Leake, 2015</td>
<td>186</td>
<td>34</td>
<td>7</td>
<td>N/A</td>
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</tbody>
</table>

Is preoperative thrombolysis really necessary in 100% of the cases?

Endovascular repair of a ruptured popliteal artery aneurysm associated with popliteal arteriovenous fistula


Primary endobypass for thrombosed PAA: when can it work?

Distal landing zone

“Third option” in selected patients
Primary endobypass for thrombosed PAA: when can it work?

Proximal landing zone

Primary endobypass for thrombosed PAA: when can it work?

PAA morphology

Primary endobypass for thrombosed PAA: how to do it?

Standard recanalization technique

Primary endobypass for thrombosed PAA: how to do it?

2 mm “channel” balloon predilatation

Primary endobypass for thrombosed PAA: how to do it?

Primary endobypass with stent-grafts

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318 popliteal artery aneurysms: 73 EVPAR (22.9%)

Symptomatic (n=73)

- Acute PAA thrombosis: 23/73 (31.5%)
- Embolization: 6/73 (8.2%)
- PAA Rupture: 12/73 (16.4%)
- IC: 4/73 (5.4%)
- CLI: 3/73 (4.1%)

Asymptomatic (n=46)

- IC: 1/46 (2.1%)
- CLI: 1/46 (2.1%)

18 thrombosed PAA (24.6%) treated with endoluminal bypasses

Technical success

Asymptomatic: 46/46 (100%)
Symptomatic: 26/27 (96.2%)

Mortality

Asymptomatic: 1/46 (2.1%)
Symptomatic: 1/27 (3.7%)

Graft occlusion

Asymptomatic: 1/46 (2.1%)
Symptomatic: 2/27 (7.4%)

Reintervention

Asymptomatic: 2/46 (4.3%)
Symptomatic: 3/27 (11.1%)

Amputation

Asymptomatic: 1/27 (3.7%)
Symptomatic: 1/27 (3.7%)

Vascular Surgery – University of Rome “Tor Vergata” – University of Florence
18 thrombosed PAA treated with endoluminal bypasses

Group 1 (with P3 thrombosis)
- Preop thrombolysis+endobypass
- 12 patients

Group 2 (without P3 thrombosis)
- Primary endobypass
- 6 patients

30-day Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Group 1 (n=12)</th>
<th>Group 2 (n=6)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical success</td>
<td>11/12 (91.6%)</td>
<td>5/6 (83.3%)</td>
<td>.56</td>
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<tr>
<td>Thrombolysis failure</td>
<td>1/12 (8.3%)</td>
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<td></td>
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<tr>
<td>Stent-graft occlusion</td>
<td>1/12 (8.3%)</td>
<td>1/6 (16.6%)</td>
<td>.56</td>
</tr>
<tr>
<td>Reintervention</td>
<td>1/12 (8.3%)</td>
<td>1/6 (16.6%)</td>
<td>.56</td>
</tr>
<tr>
<td>Mortality</td>
<td>-</td>
<td>1/6 (16.6%)</td>
<td>.33</td>
</tr>
<tr>
<td>Amputation</td>
<td>-</td>
<td>1/6 (16.6%)</td>
<td>.33</td>
</tr>
</tbody>
</table>

Mean follow-up: 22.9 ± 17.1 months

3-year Outcomes

<table>
<thead>
<tr>
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<th>Group 1 (n=12)</th>
<th>Group 2 (n=6)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td>-</td>
<td>1/6 (16.6%)</td>
<td>.33</td>
</tr>
<tr>
<td>Primary Patency</td>
<td>11/12 (91.6%)</td>
<td>5/6 (83.3%)</td>
<td>.56</td>
</tr>
<tr>
<td>Secondary Patency</td>
<td>12/12 (100%)</td>
<td>5/6 (83.3%)</td>
<td>.56</td>
</tr>
<tr>
<td>Reintervention</td>
<td>1/12 (8.3%)</td>
<td>1/6 (16.6%)</td>
<td>.56</td>
</tr>
<tr>
<td>Amputation</td>
<td>-</td>
<td>1/6 (16.6%)</td>
<td>.33</td>
</tr>
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</table>

Mean follow-up: 22.9 ± 17.1 months

Conclusions

- Endovascular management of thrombosed popliteal aneurysms is safe and effective
- In selected thrombosed popliteal aneurysms primary endoluminal bypasses with stent-grafts seems to be a viable alternative to preoperative thrombolysis
- Appropriate patient selection and meticulous intraoperative technique are crucial to obtain successful and durable results

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