When Is Distal Embolic Protection Needed During Lower Extremity Interventions: How Should It Be Performed

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Disclosures
• Royalties (modest): Cook
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• Consulting: CSI, Silk Road Medical, Profusa, Surmodics

Lower Extremity Distal Embolic Protection

Easy wire passage

Post-DCB Dissection

Post-spot stent

1 hour later

Wish I had used a filter!

1 hour later

TASC D Reconstitution P2

TPA, angioplasty, anti-coagulation

Wish I had used a filter!
Problem of distal embolization

<table>
<thead>
<tr>
<th>Author</th>
<th>N</th>
<th>Indication</th>
<th>Debris</th>
<th>Predictors</th>
<th>Comment</th>
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</thead>
<tbody>
<tr>
<td>Schneider et al</td>
<td>45</td>
<td>Selective</td>
<td>70%</td>
<td>Atherectomy</td>
<td>Filter occlusion 15%</td>
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<td>Veith, 2008</td>
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<td>Allie et al</td>
<td>115</td>
<td>Selective</td>
<td>70%</td>
<td>Atherectomy</td>
<td>Occlusion &gt;2mm in 24%</td>
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<td>TCT, 2008</td>
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<tr>
<td>Shammas et al</td>
<td>40</td>
<td>Primary</td>
<td>55%</td>
<td>Atherectomy</td>
<td>&gt;2mm in 45%</td>
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<td>JEV, 2008</td>
<td></td>
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<td>Karnabatidis</td>
<td>48</td>
<td>Primary</td>
<td>50%</td>
<td>Occlusion</td>
<td>Long lesion Thrombectomy &gt;3mm in 12%</td>
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<td>JEV, 2006</td>
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</table>

Clinically apparent intra-procedural embolization
- Ranges from 2-19% overall
- Larger series of fem-pop interventions for PAD=2-4%

As we go after more complex lesions...

Embolus in basal plantar
- Many of these remain subclinical—we don’t know the long-term damage.

Lower Extremity Filters: Rationale
- Manage embolization:
  - Carotid and coronary vein graft stenting.
- As more complex lower extremity lesions are treated with endovascular techniques the risk of embolization increases.
  - Now also applied to aortic arch.
- Quality of runoff is a significant determinant of limb salvage and also the ability to proceed with future options.

Lower Extremity Filters: How?
- Use wire-wire system: Spider or Emboshield
- Use push filter at bifurcation
- Aspirate prior to removal if there is visible debris
- Disadvantages: Wire may not be ideal
  - If wire must be exchanged, filter must be removed
  - Filter may move during case

Lower Extremity Filters: Results

355 patients: 77 treated with Filters
- 4% of patients had clinically significant event
- Emboli associated with occlusion
- Amputation at 30d: 21%

566 patients: 77 treated with Filters
- 4% of patients had clinically significant event
- Emboli associated with occlusion
- Amputation at 30d: 11%

- Filters used selectively in high-risk cases

Femoral-popliteal Interventions with and without Filters
- Mayo experience
  - No difference in long-term patency: filter vs no filter
  - Filters used selectively in high-risk cases
When to Use a Filter?
Complex Lower Extremity Lesions

- Wire passes “too easily”.
- Atherectomy: Directional, Rotational, Laser
- Embolizing lesions
- Thrombus removal: with percutaneous thrombectomy
- ISR and occluded stents
- Recent SFA-pop occlusion (high thrombus content)
- Long segment lesions?

Lower Extremity Distal Embolic Protection
Algorithm for Filter Use with Atherectomy

Silverhawk atherectomy of long SFA lesion

No flow due to occluded filter
After aspiration of filter

Filter retrieval

Lower Extremity Distal Embolic Protection
Conclusion

- Will likely assume increasing role.
- Selective use of filters is warranted:
  - more likely to be helpful when managing complex lesions.
- Compelling case for filters during:
  - Atherectomy, embolizing lesions, thrombus removal.
  - ISR, recent occlusion, (long segment/TASC D lesions - not clear)