Improving your safety profile through proximal protection: experiences from a high volume carotid artery stenting center

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<table>
<thead>
<tr>
<th>Physician name</th>
<th>Company</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horst Sievert</td>
<td>4tech Cardio, Abbott, Ablative Solutions, Ancora Heart, Append Medical, Axon, Bavaria Medizin Technologie GmbH, Bioventrix, Boston Scientific, Carag, Cardiac Dimensions, Cardiac Success, Cardimed, Celonova, Contego, CVRx, Dinova, Edwards, Endobar, Endologix, Endomagic, Hemoteq, Hangzhou Nuomao Medtech, Holistick Medical, Intershunt, K2, Lifetech, Maquet Getinge Group, Medtronic, Mitralix, Mokita, Occlutech, Recor, Renal Guard, Terumo, Trisol, Vascular Dynamics, Vectorious Medtech, Venus, Venock, Vivasure Medical, Vvital Biomed</td>
<td>Study honoraria to institution, travel expenses, consulting fees to institution$^1$</td>
</tr>
</tbody>
</table>
Proximal Protection during carotid stenting

External carotid balloon

Common carotid balloon

Aspiration of Debris with Syringe

MO.MA
Multiple studies have shown that proximal occlusion is effective!
# Less Microemboli Signals During Different Phases of Carotid stenting

<table>
<thead>
<tr>
<th>Filter Group</th>
<th>MO.MA Group</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheath placement-protection device placement</td>
<td>20 ± 15</td>
<td>18 ± 10</td>
</tr>
<tr>
<td>Wiring of the stenosis</td>
<td>25 ± 22</td>
<td>2 ± 3</td>
</tr>
<tr>
<td>Stent deployment</td>
<td>73 ± 49</td>
<td>11 ± 19</td>
</tr>
<tr>
<td>Balloon dilation</td>
<td>70 ± 31</td>
<td>12 ± 21</td>
</tr>
<tr>
<td>Retrieval of the protection device</td>
<td>14 ± 15</td>
<td>19 ± 15</td>
</tr>
<tr>
<td>Total</td>
<td>196 ± 84</td>
<td>57 ± 41</td>
</tr>
</tbody>
</table>

Data are mean values ± SD or n (%).
Abbreviations as in Table 3.

Less Microemboli Signals During Different Phases of Carotid stenting
Less MRI lesions and smaller lesions with proximal protection compared to filter

<table>
<thead>
<tr>
<th>MO.MA</th>
<th>DWMRI Subgroup</th>
</tr>
</thead>
<tbody>
<tr>
<td># new lesions</td>
<td>Filter</td>
</tr>
<tr>
<td>7</td>
<td>38</td>
</tr>
<tr>
<td># pts with new lesions</td>
<td></td>
</tr>
<tr>
<td>14.2%</td>
<td>42.8%</td>
</tr>
</tbody>
</table>

Montorsi et al. JACC 2011
Lower MACCE rate and less MRI lesions and smaller lesions with proximal protection compared to filter

- 62 consecutive patients
- Prospective, randomized

Bijiklic K et al., J Am Coll Cardiol 2012 Jan 19. [Epub ahead of print]
For comparison

30 Day Results: Stroke

In all trials using proximal protection the stroke rate was lower than in CREST!

P<0.01

Driven by minor strokes, no difference regarding major stroke

CAS: 4.1

CEA: 2.3

Brott et al. @ International Stroke Conference 2010
Proximal Protection  MO.MA

• Advantages
  - Complete block of distal flow
  - Protects against emboli of all sizes
  - Full protection during all steps of the procedure
    • Lesion crossing, pre-dilatation, stent implantation, post-dilatation

• Disadvantages
  - "more complex" to use than distal filter
  - Intolerance in some patients
    • Contraindicated in contralateral occlusions and "isolated hemisphere"?

Due to the disadvantages, many operators use distal filter for "low risk carotid stenoses" and proximal protection for "high risk stenoses"
But proximal protection is not that complex!
Intolerance?

• Just do it fast
• Or do it stepwise
  - Pre-dilate → aspirate → deflate MOMA → inflate MOMA → stent → aspirate → deflate MOMO → inflate MOMA → post-dilate → aspirate → deflate MOMA
If proximal occlusion is good for complex high risk lesions …

… it should also be good for simple low risk lesions
So why not …

- … to use proximal protection in all patients?
- In complex and simple lesions?
- In patients without or with contralateral occlusion?

**Evaluation of proximal protection devices during carotid artery stenting as the first choice for embolic protection**

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*CardioVascular Center Frankfurt, Frankfurt, Germany*

EuroIntervention. 2015 Mar;10(11):1362-7
CVC Frankfurt

- Carotid stenting with proximal protection in all-comers
- 207 consecutive patients regardless of anatomy
  - No periprocedural stroke
  - One stroke after discharge due to stent thrombosis
    - 30 day stroke rate 0.5%

Tips and Tricks:

• Do it fast!
  - You should be finished before the patient can count to 200
• Leave the proximal hub of the MOMA open so that you have continuous backflow during the entire procedure
• Make sure that you have 100% protection
  - Also side branches of the external carotid artery should be occluded
Case Example

- Tight bifurcation stenosis
- Thrombus in the ICA
• Both occlusion balloons are inflated …

➢ … but we have persistent flow into the ICA !!
➢ No protection!
• Occlusion balloons re-positioned
• Both occlusion balloons inflated

➢ Complete protection
What if a side branch could not be occluded?

Apply continuous suction during the entire procedure
Proximal protection …

- Can be used in all-comers
- Contralateral occlusion and isolated hemishere is not a contraindication
- It results in a very low complication rate
- Can and may be should be used as first choice during carotid stenting
Thank you for your time!

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