Deep Dive Session: Carotid revascularization

Revascularization in recently symptomatic patients: How to achieve optimal results?

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Disclosure

Speaker name:

...............Carlo Setacci......................

I have the following potential conflicts of interest to report:

☐ Consulting
☐ Employment in industry
☐ Stockholder of a healthcare company
☐ Owner of a healthcare company
☐ Other(s)

☐ I do not have any potential conflict of interest
Deferred urgency carotid artery stenting in symptomatic patients: clinical lessons and biomarker patterns from a prospective registry.

Is early carotid stenting indicated in patients with recent neurological events?
Siena Carotid Artery Stenting Score: A Risk Modelling Study for Individual Patients

Carlo Setacci, Emiliano Chisci, Francesco Setacci, Francesca Iacoponi, Gianmarco de Donato and Andre Rossi
Avoid: excessive catheter manipulation

Aortic arch has its own set of embolic potential
High Risk of Embolization

SIENA RISK SCORE

- **0**: no tortuosity
- **1**: point for each tortuosity
  - either in CCA and ICA
- **2**: severe tortuosity

![Images showing the SIENA RISK SCORE criteria with diagrams and angles.]
## Operator experience

<table>
<thead>
<tr>
<th>Experience Range</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS &lt; 25</td>
<td>6</td>
</tr>
<tr>
<td>CAS 25-50</td>
<td>4</td>
</tr>
<tr>
<td>CAS 50-75</td>
<td>2</td>
</tr>
<tr>
<td>CAS &gt; 75</td>
<td>1</td>
</tr>
<tr>
<td>CAS &gt; 150</td>
<td>0</td>
</tr>
</tbody>
</table>
Carotid lesions in symptomatic patients
Do we need EPD?

Always !
Protected carotid stenting: clinical advantages and complications of embolic protection devices in 442 consecutive patients.

Cremonesi A, Manetti R, Setacci F, Setacci C, Castriota F.

Interventional Cardio-Angiology Unit, Department of Medical and Surgical Cardiology, Villa Maria Cecilia Hospital, Via Corriera 1, 48010 Cotignola, Italy.

BACKGROUND AND PURPOSE: Periprocedural embolization of debris during carotid stenting interventions may result in neurological deficit. This study was designed to evaluate in-hospital and 30-day adverse events in patients percutaneously treated for carotid artery disease with embolic protection devices. METHODS: From 1999 to June 2002, a total of 442 consecutive patients underwent percutaneous angioplasty and/or stenting of the extracranial carotid artery. The endovascular procedure was conducted under embolic protection devices. RESULTS: The percutaneous procedure was successful in 440 of 442 patients (99.5%). No periprocedural death occurred with any embolic protection device. All in-hospital stroke/death and 30-day ipsilateral stroke/death rate was 1.1%. The overall complication rate was 3.4%. Major adverse events included 1 major stroke (0.2%), 4 intracranial hemorrhages (0.9%), 1 carotid artery wall fissuration (0.2%), and 1 case of cardioembolism (0.2%). Minor adverse events included 4 minor strokes (0.9%) and 4 transient ischemic attacks (0.9%). The cerebral protection device-related complications were 4 (0.9%): 1 case of abrupt closure of the internal carotid artery because of spiral dissection of the filter, 1 case of trapped guide wire (0.2%), and 2 cases of intimal dissection (0.5%). Transient loss of consciousness occurred. Occlusive protection devices were used. CONCLUSION: When a cerebral protection device is used is feasible and complications exist for the proper use of some embolic protection devices.

Overall complication rate 3.4%
MANE 1.5%
Minor stroke 0.9%
TIA 0.9%

Publication Types:
- Clinical Trial

PMID: 12843347 [PubMed - indexed for MEDLINE]
### Do we need EPD?

<table>
<thead>
<tr>
<th>Carotid lesion / vascular anatomy issue</th>
<th>Type of EPD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard anatomies</strong></td>
<td>Distal filters</td>
</tr>
<tr>
<td><strong>Low to medium risk of embolization</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Complex anatomies</strong></td>
<td>Proximal endovascular clamping devices</td>
</tr>
<tr>
<td><strong>High risk of embolization</strong></td>
<td></td>
</tr>
</tbody>
</table>

1. Predominantly echogenic fibrous plaques
2. Calcified plaques
3. Contralateral carotid severe stenosis / occlusion

1. Anechoic soft plaques at high risk for distal embolization
2. ICA lesions followed by extreme post-stenosis tortuosity
3. Sub-occlusive / string sign lesions

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Cremonesi A, Setacci C et al  
*EuroIntervention* 2005;1:289-95
# Stent Selection

<table>
<thead>
<tr>
<th>Carotid lesion / bifurcation issue</th>
<th>Type of stent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. medium to long lesions (15 to &gt;25 mm)</td>
<td>Cobalt-alloy braided thread stent</td>
</tr>
<tr>
<td>2. soft-dishomogeneous lesions</td>
<td></td>
</tr>
<tr>
<td>3. straight carotid bifurcation</td>
<td></td>
</tr>
<tr>
<td>1. carotid bifurcation lesions with ICA/CCA diameter mismatching</td>
<td>Nitinol open cell stents</td>
</tr>
<tr>
<td>2. angled carotid bifurcation</td>
<td></td>
</tr>
<tr>
<td>1. short lesions (&lt;15 mm)</td>
<td>Nitinol closed cell stents</td>
</tr>
<tr>
<td>2. highly calcified lesions</td>
<td></td>
</tr>
<tr>
<td>3. straight carotid bifurcation</td>
<td></td>
</tr>
</tbody>
</table>
BOSIERS M, de DONATO G, DELOOSE K, VERBIST J, PEETERS P, CASTRIOTA F, CREMONESI A, SETACCI C. Does free cell area influence the outcome in carotid artery stenting?

*Eur J Vasc Endovasc Surg. 2007; 33: 135-41.*
OCT for Stent Selection

- Optical Coherence Tomography is an intravascular high-resolution imaging technology that employs near-infrared light.
Safety and Feasibility of Intravascular Optical Coherence Tomography Using a Nonocclusive Technique to Evaluate Carotid Plaques Before and After Stent Deployment

Carlo Setacci, MD; Gianmarco de Donato, MD; Francesco Setacci, MD; Giuseppe Galzerano, MD; Pasqualino Sirignano, MD; Alessandro Cappelli, MD; and Giancarlo Palasciano, MD

Department of Surgery, Vascular and Endovascular Surgery Unit, University of Siena, Italy.
Interaction between plaque & stent

Intraop control:
- Residual stenosis
- Stent apposition
- Stent malapposition
- Cell area modification
- Fibrous cap rupture
- Plaque micro-prolaps
- Branch side coverage

Follow-up control:
- Neointimal thickness
- Complete/incomplete stent struts coverage
Plaque Prolapse

<table>
<thead>
<tr>
<th>Plaque prolapse</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed-cell</td>
<td>23.3</td>
</tr>
<tr>
<td>Open-cell</td>
<td>68.6</td>
</tr>
<tr>
<td>Hybrid</td>
<td>30.8</td>
</tr>
</tbody>
</table>

$p<0.05$
Impact of new stent design

Sustained embolic protection
- Double layer micromash nitinol design
- Smallest cell stent size preventing embolic release

Lesion specific scaffolding:
- Extremely high plaque coverage
- Superior in vessel flexibility
- Excellent wall apposition: the two mash layers enable a flexible scaffold
3 Italian Vascular Centers

Torino: Dr. C. Rabbia
Radiologist

Cotignola: Dr. A. Cremonesi
Cardiologist

Siena: Prof. C. Setacci
Vascular Surgeon
Impact of new stent design
Impact of new stent design
Impact of new stent design

Inspire CGuard is based on a stent which is wrapped with an expandable, MicroNet (mesh). The net is made of a single knitted PET fiber, and it is attached only to the proximal and distal edges of the stent.
Impact of new stent design

ITALIAN REGISTRY IN VASCULAR SURGERY CENTRES
WE NEED SIMILAR OUTCOME OF CEA AND CAS WITHIN 30 DAYS
Conclusions

• Recently Symptomatyc Patients secondary to embolization from an instable carotid plaque deserve maximal medical treatment, and an early and effective intervention.

• Although level 1 evidence seems clearly in favor of carotid endarterectomy in symptomatic patients, carotid stenting has been proposed as a possible alternative ….but…. 
When can CAS compete with CEA in such patients?

Almost all patients could benefit from CAS in case of precise planning, soft technique and right material choice in expert hands.
Conclusions

Emergency carotid artery stent placement in the right hands and with the appropriate materials may safely correct a critical stenosis or stabilize the embolic source to the brain, resolving the ischemia in a short time without reduction in cerebral blood flow in the affected hemisphere during the procedure.
Conclusions

• Improving experience of Operators and new materials could in the next future change the game...
• More data are needed to validate these findings....
• However if CAS seems too complicate.....
Don’t forget the Surgeons!!!
SAVE THE DATE

SIVEC / SIENA
Siena Vascular and Endovascular Course - Course Director: Carlo Setacci

7 - 9
September
2015