CONFIDENCE Trial: Nitinol Mesh-covered Carotid Stent- Trial Design and Early Experience

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Disclosure Statement of Financial Interest

Within the past 12 months, I or my spouse/partner have had a financial interest/arrangement or affiliation with the organization(s) listed below.

<table>
<thead>
<tr>
<th>Affiliation/Financial Relationship</th>
<th>Company</th>
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<tbody>
<tr>
<td>Grant/Research Support</td>
<td>None</td>
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<tr>
<td>Consulting Fees/Honoraria</td>
<td>Abbott, Endologix, Boston</td>
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<td></td>
<td>Scientific, CSI, Medtronic,</td>
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<td>Major Stock Shareholder/Equity</td>
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<td>Royalty Income</td>
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<td>Ownership/Founder</td>
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<td>Intellectual Property Rights</td>
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<tr>
<td>Other</td>
<td>VIVA Board Member</td>
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Co- Primary Investigator for the CONFIDENCE Trial
Why a New CAS Design in 2017?

- Because we want to minimize strokes during or after CAS procedures
- We do have improved embolic protection during CAS (new filters, proximal protection, and surgical access with flow reversal)
- But, a significant proportion of CAS strokes occur after the CAS (likely related to inadequate plaque coverage by the stent)
Causes of Late Embolization

Plaque protrusion may lead to late events.

- Debris
- Arterial Wall
- Stent Struts

Prof. Dr. Klaus Mathias, TCT 2013
~ 2/3 of CAS strokes occur POST-procedure (hours to 30 days)

(More likely related to STENT coverage)

Boosiers; N\(\approx\) 3200

US Registries
Do device characteristic affect outcome in carotid artery stenting?

M. Bosiers – P. Peeters
Boosiers, *et al*

"Stent design" based analysis

\[ N = 3179 \]

<table>
<thead>
<tr>
<th>ALL EVENTS</th>
<th>Total population</th>
<th>Symptomatic</th>
<th>Asymptomatic</th>
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<tbody>
<tr>
<td></td>
<td>n/N</td>
<td>n/N</td>
<td>n/N</td>
</tr>
<tr>
<td>Closed</td>
<td>51/2242</td>
<td>21/934</td>
<td>30/1308</td>
</tr>
<tr>
<td>Open</td>
<td>39/937</td>
<td>27/383</td>
<td>12/554</td>
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<tr>
<td>TOTAL</td>
<td>90/3179</td>
<td>48/1317</td>
<td>42/1862</td>
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</table>
“Free cell area” based analysis

LATE EVENTS
symptomatic population

Free cell area

2.5-5 vs <2.5 mm²

5-7.5 vs <2.5 mm²

>7.5 vs <2.5 mm²

Odds Ratio  95% C.I.

1.553  [0.197-12.261]

4.309  [1.705-10.893]

5.976  [2.733-13.065]

Odds ratio

[Image]
### SPACE Clinical Trial Sub Analysis

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Cell Design</th>
<th>MAE All Patients</th>
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<tbody>
<tr>
<td>Carotid Endarterectomy (CEA)</td>
<td></td>
<td>6.3% (37/584)</td>
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<tr>
<td>Carotid Artery Stent (CAS)</td>
<td>Closed Cell</td>
<td>6.0% (26/434)</td>
</tr>
<tr>
<td>Carotid Artery Stent (CAS)</td>
<td>Open Cell</td>
<td>11.0% (13/118)</td>
</tr>
</tbody>
</table>

**Symptomatic Patients**

Prof. Jansen sub-analysis
Future Scaffolding Solutions?

- Flexible *porous membrane* stent (± 100 µm ~ EPD)
Roadsaver – dual layer micromesh Carotid stent

- Braided Nitinol carotid stent with a built-in Nitinol micromesh for sustained embolic protection
B: 3D Optimal Frequency Domain Imaging - No plaque prolapse; good apposition
C: OCT - Some plaque prolapse thru stent, NOT thru micro-mesh
D: OCT 3D reconstruction - no plaque prolapse
CASPER (= Roadster) Device vs. Other Closed Cell CAS

Dr. M Amor, Polyclinique Louis Pasteur, Nancy, France
First clinical cases
33 Patients with high risk carotid artery lesions treated with Roadsaver dual layer stent

Midterm results
Single center experience

Clinique Louis Pasteur Essey Les Nancy France
Follow-up for 33 patients with high risk carotid lesions treated by Micromesh Carotid Roadsaver Stent

- Mean Follow up period: $16.7 \pm 6.6$ months (23 to 6 months)
  - 1 Male pt lost for FU: 76 y asymptomatic Pt
  - 1 Women 86 y died 7 months after procedure (6m Echo: NI)
  - 1 Male 76y died one year after procedure (Heart Failure)

- 2D Echo Examination for all patients after 6 months
  - 33 pts explored by echo
  - All External carotid artery patent
  - 4 External ostial carotid stenosed (2 new lesions)

- No Stented Carotid restenosis at 6 months

- No new neurological event during FU
### Roadsaver Carotid Stent: Mid-term Results (33 Pts) (23 to 6 months, 16.7±6.6 months)

<table>
<thead>
<tr>
<th></th>
<th>Events</th>
<th>30th days</th>
<th>6 months</th>
<th>1 year</th>
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<tr>
<td><strong>Clinical</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Delayed embolisation</td>
<td>no</td>
<td></td>
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<tr>
<td>Neurological events</td>
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<td>no</td>
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<tr>
<td><strong>Anatomical</strong></td>
<td></td>
<td></td>
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<tr>
<td>External Carotid Occlusion</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>No</td>
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<tr>
<td>Restenosis</td>
<td>no</td>
<td>no</td>
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<tr>
<td><strong>Stent Geometry</strong></td>
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<td></td>
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<tr>
<td>Migration</td>
<td>no</td>
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<tr>
<td>Compression</td>
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<td>Deformation</td>
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<td>no</td>
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<tr>
<td>Fracture</td>
<td>no</td>
<td>no</td>
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</table>
100 High- CEA Risk Patients at 9 centers
CDU @ 30 days
EPD NOT mandated (58%)
1 MI
1 minor stroke in Afib patient
100% Technical success
CONFIDENCE Study

Protocol Synopsis
Roadster Micromesh Stent.
Nanaparasol Filter (Terumo)

- Concentric Nitinol micromesh filter with proximal Tantalum markers
- Avg. pore size 150μm
- 2 sizes
  - Large: Ø 4.6 – 6.5mm
  - Small: Ø 3.0 – 4.5 mm
- 3.5Fr RX Delivery catheter
  - Delivery via 0.014” guide wire of choice
  - Peel-away catheter
- 5Fr RX Retrieval Catheter

Slide from Max Amor, MD
Study Objective
To evaluate the safety and effectiveness of Terumo Roadsaver™ Carotid Stent System used in conjunction with the Nanoparasol® embolic protection system for the treatment of carotid artery stenosis (CAS) in subjects with elevated risk for adverse events following carotid endarterectomy (CEA).

Study Design
A prospective, multicenter, single-arm, open label clinical study. Subjects will be followed for 36 months post-procedure. Total study duration: ~ 65 months.

Subject Enrollment
Total enrollment: 295 subjects
Required subjects to complete 1-year f/u visit: 245 subjects (17% attrition rate)

Enrollment period: 18 – 24 months
Target enrollment:

- 80% asymptomatic / 20% symptomatic
- 72% comorbid high risk / 28% anatomic high risk
Target Population

Subjects who are between the ages of 21 and 80 years old and who have either de-novo asthersclerotic or post endarterectomy restenotic lesion(s) in the internal carotid arteries or at the carotid bifurcation.

- **Symptomatics:** ≥50% stenosis as determined by angiography using NASCET methodology. Also defined as amaurosis fugax ipsilateral to the carotid lesion; TIA or non-disabling stroke within 180 days of the procedure within the hemisphere supplied by the target vessel OR

- **Asymptomatics:** ≥80% stenosis as determined by angiography using NASCET methodology
CONFIDENCE Study Update

- Protocol Version 4 approved by FDA on December 22, 2016
- Enrollment to re-start in February 2017
- Study to involve neurointerventionalists, interventional cardiologists, and vascular surgeons

<table>
<thead>
<tr>
<th>Site Start-up Activities</th>
<th>Value</th>
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<tr>
<td>Sites selected</td>
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<tr>
<td>IRB Submission (Protocol Version 4)</td>
<td>18</td>
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<tr>
<td>IRB Approval (Protocol Version 4)</td>
<td>2</td>
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<td>Sites Trained (Protocol Version 4)</td>
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<tr>
<td>Sites Initiated (Protocol Version 1 or 2)</td>
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<tr>
<td>Subjects Screened</td>
<td>3*</td>
</tr>
<tr>
<td>Subjects Enrolled</td>
<td>2*</td>
</tr>
</tbody>
</table>

Conclusions

- The Roadster micromesh stent has unique features designed to prevent plaque prolapse and reduce early and late strokes after CAS.
- Early data and OCT imaging is favorable.
- The CONFIDENCE Trial will thoroughly evaluate this stent in a rigorous, prospective multi-center trial with long term follow up.
Thank You for Your Attention!
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