Cerebral Embolic Protection in Thoracic Aortic Stent-grafting

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Disclosure

Speaker name:

Gagandeep Grover.

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
Silent cerebral infarction and stroke in TEVAR

- 2%–10% Stroke, SCI still remain a significant risk
- SCI ‘silent brain injury’ detected on DW MRI – predictor of stroke, dementia, depression and neurocognitive decline
- Cerebral embolisation – principle risk factor
SCI, stroke and neurocognitive decline
St Mary’s experience...

- Silent cerebral infarction after TEVAR: a neuroimaging study
  - N=19, 63% SCI rate

- Perera et al, prospective observational study:
  - N=52, 81% cerebral infarction, 68% SCI rate, 13% overt stroke
Neuro-psychometric testing demonstrates a worrying cognitive decline.

- **TEVAR**: N=52, Median age 69
- **TCD**: N=42
  - 100%
- **DW-MRI**: N=31
  - 68% SCI
- **Neurocognitive assessment**: N=17
  - 88% Decline 6/7, domains age>69

### Maximum HITS
- Stent deployment: 62 (IQR 35-192)
- Contrast injection: 62 (IQR 22-163)

### Median Infarct Volume
- $164 \text{mm}^2$, IQR (108.64-1328.30mm$^2$)

- **Tests**:
  - REY auditory verbal test, verbal learning and memory
  - Trail A - visual search and motor
  - Trail B - mental flexibility & switching
  - Grooved pegboard - fine motor skills
  - COWA - executive function
Sentinel Cerebral Embolic Protection System SPCS; Claret Medical, CA, USA
MISTRAL-C Trial Shows Neurocognitive Benefit of Sentinel Cerebral Protection System during TAVR

14 October 2015

Results presented at TCT 2015 by Dr. Nicholas Van Mieghem

Claret Medical™, an innovator in cardiovascular cerebral protection, today announced results from the MISTRAL-C study showing the first definitive cognitive benefit from use of the Sentinel™ Cerebral Protection System (CPS) during transcatheter aortic valve replacement (TAVR).

Data show that unprotected patients have a statistically significant (p=0.017) worsening in cognition when compared to Sentinel-protected patients at five days post-TAVR, when assessed using the Mini Mental State Exam (MMSE).

Results from the multi-center, randomized, controlled MISTRAL-C study were presented in an oral presentation today at the Transcatheter Cardiovascular Therapeutics (TCT) annual meeting by Principal Investigator Nicholas van Mieghem, MD, Thoraxcenter, Erasmus Medical Center, Rotterdam. MISTRAL-C also validates findings from the landmark CLEAN-TAVI study that showed the use of a Claret Medical cerebral protection system reduced the number and volume of brain lesions in TAVR patients.

MISTRAL-C showed a 52 percent reduction in the median total new lesion volume at five days post-procedure as assessed using highly sensitive 3-Tesla brain MRI. None of the protected patients had National Institute of Health Stroke Scale (NIHSS) deterioration at five days post-procedure, while five percent of unprotected patients showed deterioration.

MISTRAL-C studied 65 patients enrolled at four centers in the Netherlands that underwent

CLEAN-TAVI Trial Shows Claret Medical Cerebral Protection System Dramatically Reduces Brain Lesions and Neurological Events Following Transcatheter Aortic Valve Replacement (TAVR)

Clinical Trial is First to Definitively Demonstrate That Removing Embolic Debris from Cerebral Circulation Can Significantly Shield the Brain

TCT 2014

September 13, 2014 11:42 AM Eastern Daylight Time

WASHINGTON—(BUSINESS WIRE)—Claret Medical™, Inc. today announced that the CLEAN-TAVI Trial met its primary endpoint by demonstrating that the company’s cerebral protection system significantly reduced the quantity and volume of brain lesions detected by a serial review of magnetic resonance imaging (MRI) following transcatheter aortic valve replacement (TAVR). The trial results showed a 53 percent reduction in the total volume of new brain lesions and a 60 percent reduction in the number of new brain lesions two days after the procedure. The results were reported today by Professor Axel Linke, MD in a Late Breaking Clinical Trial session at the 26th Transcatheter Cardiovascular Therapeutics (TCT) meeting, the annual scientific symposium of the Cardiovascular Research Foundation.

“The results seen with the Claret Medical system are striking”

As at two days post-TAVR in the “Intent to Treat” analysis, a neurological deficit was observed in 28 percent of all control patients when evaluated by a NIHSS (National Institute of Health Stroke Scale) trained specialist, demonstrating that prospective assessment pre-
Cerebral Embolic Protection in TEVAR
A Pilot Study

- SPCS successfully deployed and retrieved with all commercially available grafts: c-Tag GORE, Medtronic, COOK, Bolton on pulsatile flow model testing N=8

- CEPD deployment & retrieval time(mins): 16 9 8 2

<table>
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<tr>
<th>Patient</th>
<th>Age</th>
<th>Gender</th>
<th>CTA grade of arch</th>
<th>Pathology</th>
<th>Proximal landing zone</th>
<th>Post-op 3T DW-MRI (DAY2-5)</th>
<th>TCD HITS</th>
<th>Neurocognitive assessment</th>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>No of lesions</td>
<td>Volume of lesions mm²</td>
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<td>M</td>
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<td>76</td>
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</tbody>
</table>
MRI lesions

FEMALE 1

MALE 2

25.3mm²

15.2mm²
Debris captured in 100% of filters

Debris captured in Proximal filters (n=4)

- Any debris: 100%
- Acute thrombus*: 100%
- Organizing thrombus: 25%
- Valve Tissue: 0%
- Arterial Wall: 100%
- Calcification: 0%
- Foreign material: 0%

Debris captured in Distal filters (n=4)

- Any debris: 100%
- Acute thrombus*: 100%
- Organizing thrombus: 75%
- Valve Tissue: 75%
- Arterial Wall: 75%
- Calcification: 25%
- Foreign material: 75%

*Acute thrombus was always found in combination with other materials
Conclusion

• Encouraging results with initial experience with embolic protection device in TEVAR

• Further work needed in form of RCT to ascertain benefit
Acknowledgments

• **Beccy Holmerg**, Claret – technical support.
• CV Path – Santa Rosa, CA: histopathological analysis
Thank you

Any Questions?
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