Evaluation of a new micromesh carotid stent with Optical Coherence Tomography.

Technical case report.

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Disclosure

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I do not have any potential conflict of interest
**Closed or open cells stent?**

- They all differ by size, geometry, tapering...
- Some have been used as the carotid wallstent for the past 15 years and some have been abandoned (Cristallo invatec).
- The main claimed difference is: Open vs Closed cells stents.
- Several studies (retrospective) support the superiority of a closed cell stent over an open cell.
- One recent randomized study did not confirm this superiority.
Why we need a better carotid stent

- Despite carotid protection, more than 50% of neurologic events occur after procedure.

- 2/3 of these events occur within 30 days.

- These results are probably the consequence of delayed embol from covered or non covered carotid plaque.

- It has been shown that the scaffolding of carotid stent is insufficient to avoid the protrusion of the plaque through the struts.
the new stent, design

Rx Roadsaver™
Microvention & TERUMO

- Plaque coverage
- The micromesh
- Small cell size, ¼ of the area compared to the smallest cell size on the market ~ 375 – 500 µ
- Preventing emboli release.
the new stent performance

- **In-vessel flexibility**
  - Double braided
  - Flexibility of an open cell stent
  - Benefits of a closed cell stent.

- **Wall apposition**
  - The two Nitinol mesh layers
  - Flexible scaffold
  - Conforms to every morphology.
How to evaluate the stent in vivo?

**OCT**

- Optical Coherence Tomography: near infrared
- 10μm
- 100 frames s\(^{-1}\)
- Scanning a 55-mm segment in 2.7 s
- the site was imaged by OCT from the distal section

at 20 mm/sec using a built-in pull-back system
WHAT CAN YOU SEE? OCT SIGNS

- **STENT**<sup>1,2</sup>:
  - STENT MORPHOLOGY AND GEOMETRY
  - APPOSITION OF THE STENT
  - STRUT DEPLOYMENT: (RELATION TO THE WALL AND TO OVER STRUTS)
  - STRUTS DEFORMATION

- **PLAQUE**:
  - NATURE AND COMPOSITION
  - PLAQUE COVERAGE
  - PLAQUE PROLAPSE
  - DISSECTION RUPTURE
  - EVOLUTION OF ULCERATION
  - THROMBUS

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1. Preliminary experience with OCT imaging to evaluate carotid artery stents: safety, feasibility.

Reimers and coll. Mirano Italy 2011

2. OCT after Carotid Stenting: rate of stent Malapposition, Plaque Prolapse and Fibrous Cap Rupture According to stent design.

Donato and coll. 2013

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a. Plaque prolapse between the stent struts;
b. b. rupture of the fibrous cap.
Clinical CASE

- 85-year old male
- Multiple risk factors (former smoker, HBP, diabetes (insulin), dyslipidemia)
- Prior medical history: transitory left ischaemic cerebral stroke
- Indication: highly symptomatic extra cranial right internal carotid artery stenosis.
- Severe stenosis (70-90%), calcified and ulcerated.
- The reference diameter is 6 mm.
Detail of the procedure

- Pre procedure traitement :
  - >>DAPT before

- During procedure:
  - Heparin
  - >> Midazolam

- Femoral Approach :
  - >>8F 23 cm

Protective device : EMBOSHIELD NAV 6 filter (Abbott) over a stiff 0.035” guidewire
Predilatation with an ultrasoft 4*15 mm balloon (Boston Scientific), after administration of atropine.
STENT DEPLOYMENT

Placement of a Roadsaver 7*25 mm
• Post dilatation with an ultrasoft 5*20 mm balloon (Boston Scientific).
RESULT : ANGIOGRAM

- Retrieval of the distal protective device.
- Always protective filter distally

- non-occlusive flush

- continuous injection 24 ml of 2/3 contrast media and 1/3 saline at 6ml/s (total injection time 4 s), 750 psi (to completely replace blood from the artery)

- the site is imaged by OCT from the distal section

- 20 mm/sec using a built-in pull-back system*
SEVERAL STENTS

CLOSED CELLS
OCT RESULT

DOUBLE LAYER

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one thick layer
one fine layer

1 mm

mm 0 10 20 30 40 mm
RESULT: OCT

Harmonius deployment

« Conforms to every morphology »
CONCLUSION

• The present case further confirms the feasibility and use of OCT in carotid stenting.

• The OCT results confirm the beneficial role of micromesh in containing the plaque.

• Large trials are of course needed with mid and long term results to confirm the clinical benefit.
Thank you

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RESULT: OCT
« Preventing emboli release »
RESULT : OCT