A Radial Access Solution For Embolic Protection During Carotid Stenting

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I have the following potential conflicts of interest to report:

Consulting: (Medtronic, BSI, Terumo)
Optimizing Carotid Artery Stenting

*Issues still debated*

- Specific anatomies and variants of the aortic arch and of the supra-aortic vessels are associated with an increased risk of cerebral microembolization during CAS by the femoral route.
- Favorable results of TRCAS in a large center series (Etxegoien, 2012) and in one RCT (Ruzsa, 2014).
- Interventional cardiologists are very familiar with radial approach and TRPCI has been proved to be safe and effective.
- Transradial CAS is much more technically demanding requiring dedicated systems and techniques and a steep learning curve.
- Radial artery size may not allow the use of large device (8F).
Radial approach for CAS

The Monzino’s experience

N=1527

TR/TB w Filter
(n=296, 72%)

TR/TB w Mo.Ma
(n=114, 28%)

Last 5-year TRCAS rate: 51%

TR/TBA CAS: 410/1269 (32%)
High radial artery puncture (if patient height >180 cm)

Sheathless approach (cortesy by S.Kedev)

Standard radial puncture (8F 5.5 cm-long sheath)
Radial approach for CAS

Facing a difficult vascular anatomy

- Smooth anatomic pathway
- Mo.Ma system stiffness

LICA stenosis + BAAC type 2 8F

8F Mo.Ma Ultra system on a .035” stiff wire
Radial approach for CAS

Facing the difficult vascular anatomy

0.035” Emerald wire loaded into the working channel (mandrel withdrawn)

0.035” stiff wire loaded into the distal port

The No Mandrel 2 wires technique (NOMA2)

RICA stenosis
Radial approach for CAS

Mechanism(s) subtending the NO.MA2 technique efficacy

The No Mandrel 2 wires technique (NOMA2)

0.035” Emerald wire loaded into the working channel (mandrel withdrawn)

0.035” stiff wire loaded into the distal port

Single stiff wire

Double stiff wire

RICA stenosis
Critical ’zones’ on the way to target vessel

5F RJ cath
Radial approach for CAS w PP

Device positioning success

TRCAS w PP (N=114) (TR=74, TB=40)

Crossover to FA 4 (3.5%)

Device success
67 pts (70.2%)

Device failure (1st attempt)
20 pts (29.8%)

No.MA 2 (as 'bail-out')
Successful in all pts

No.MA 2 (as first option) *
Successful in 20 pts

Device success
74 pts

Device success
96.4%-100%

No.MA 2

2008-2014

2015...

* According to operator experience/preference and vascular anatomy
Radial approach for CAS w Mo.Ma system

Tips and tricks using the NOMA2 technique-1

- 76 y-o-m
- Multiple RFs + Type II diabetes
- 1997-2016 CAD with previous inferolateral STEMI in 3VD.

- 2016/11 Bilateral carotid artery disease. Right aortic arch with anomaly of supra-aortic trunks origin.
- CAS on RICA with distal protection (Protegee stent). At that time, failure to incannulate LCCA from the femoral artery due to the aortic arch anomaly

- Doppler US: PSV/ED LICA 4.0/1.31 m/s, calcified. Wide stent patency on RICA
Radial approach for CAS w Mo.Ma system

Tips and tricks using the NOMA2 technique-2

Aortic arch angiography

Left CCA
Left SA
Radial approach for CAS w Mo.Ma system

*Tips and tricks using the NOMA2 technique* - 3

- **5F IM cath into LCCA on a .035”, 260-cm Terumo wire**
- **Baseline LICA DSA**
- **5FIM cath in distal ICA (angio check)**
- **Terumo wire exchanged for a Stiff wire. 5F diagnostic removed**
Radial approach for CAS w Mo.Ma system

Tips and tricks using the NOMA2 technique-4

4F MP+6F RJ guide (coassial system) into the ECA

6FRJ guide

4FMP removed

Second wire (.035” Emerald) in ECA.
6F guide removed

ECA
Radial approach for CAS w Mo.Ma system

Tips and tricks using the NOMA2 technique

- MO.MA 8F advanced on the 2 wires
- Standard wire removed and check for ECA balloon positioning
- Endovascular full occlusion
- Mean BP: 61 mmHg
- Final result: Uneventful F/U at 2 year
Radial approach for CAS w Mo.Ma system

30-day and in-hospital results in 114 pts

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<th>End-point(s)</th>
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| Crossover to femoral approach    | 3.5% (4/114)* | - Complex anatomy: 2pts  
- MOMA kinking: 1pt  
- Unexpected RSA occlusion: 1 pt |
| Crossover to filter protection   | 6.3% (7/110) | - Intolerance to occlusion: 6pts  
- Mo.Ma too short: 1 pt |
| MACCE (per protocol)             | 1.94% (2/103) | Minor stroke for CCA balloon early deflation: 1 pt  
Minor stroke: 1 pt |
| Major vascular complication      | 0.87% (1/114) | BA pseudoaneurysm: 1 pt |
| Radial artery occlusion**        | 8.0% (6/74)  |                                                                        |

* 6.3% in TRCAS w distal EP; ** by Doppler US
Radial approach for CAS w PP

TR/TB CAS with PP (high risk of cerebral embolization)

Standard technique
- Stiff wire in (very) distal ECA
- Well done ‘push-and-pull’ technique
- Don’t force if resistance occurs

Successful

Unsuccessful

Slightly removed the mandrel (8-10 cm) and re-try

Successful

Unsuccessful²

‘No.Ma2’ (as ‘bailout’)

‘No.Ma2’ technique (as 1st option)
- Extreme complex anatomy
- Operator preference/experience
- Sheatless approach planned

Successful

Unsuccessful

Crossover to CAS with distal filter
Optimizing Carotid Artery Stenting: Role of TRCAS

**Take-home Messages**

- TRCAS should be considered as the natural completion of CAS learning curve to provide a tailored treatment in each patient (match the anatomy with the vascular approach and the technique).
- The whole CAS armamentarium used from the femoral approach can be used in order to include high-risk patients and lesions.
- Vascular access is only one of several variables that may affect clinical outcome during CAS. Thus, the “right” vascular approach should cope with the “right” brain protection device, stent and pharmacology.
- Needless to say: pre-CAS CTA and sound experience in extra-femoral access PCI are mandatory.
Optimizing Carotid Artery Stenting

Choosing the right cerebral protection, type of stent and vascular approach

Carotid Wallstent Versus Roadsaver Stent and Distal Versus Proximal Protection on Cerebral Microembolization During Carotid Artery Stenting

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