Tips & Tricks for Use of Proximal Embolic Protection during Carotid Stenting: A Case Series

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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.

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CAS: Proximal Protection Background

- A “Must Have” skillset for CAS operators
- Consistently best in class CAS EPD data
- Consistently performs well in high risk CAS patients (octogenarian, symptomatic)
- Less MRI DWI events c/w distal protection
- Protects for entirety of CAS procedure
- Is well tolerated (<1% intolerance in trials)
- Has easy learning curve
(\textit{Relative}) Requirements for Proximal Protection

- Intact ECA on ipsilateral side
- Collateral support to Treated Hemisphere
- CCA and arch anatomy for 9F OD device (\textit{\textbar} ANY anatomy OK for Sheath/ Guide)
- \textit{\textbar} NOT proximal EPD cases:
  - Bifurcation lesion, severe ECA disease in patent ECA; no collateral support & easy dEPD lesion; CCA disease
Proximal Protection Procedure
(Case Examples..)

- Bilateral carotid & cerebral angios- MoMa?
- 9F long (23-25cm) sheath
- Anticoagulate early; GW to terminal ECA
- Exchange to support XC wire in ECA
- Advance MoMa ECA balloon to prox ECA
- Inflate/ confirm ECA balloon; then remove wire
- Angio- “freeze” w ECA balloon vs. lesion
- ALL Equipment prepped, review procedural steps with staff
Proximal Procedure- 2

- Advance 0.014 wire, confirm tip is “free”
- Perform roadmap, THEN CCA balloon up
- Proximal Protection- √ “stump pressure”
- Wire the ICA lesion (on roadmap)
- Pre-dilate, stent, post-dilate (using roadmap and “freeze” w/ ECA balloon)
- Aspirate slowly @ least 3 “clean” syringes
- ECA balloon down 1st; then CCA balloon
Proximal Protection-3

• Do carotid and cerebral angios via MoMa after aspirating; do neurologic checks
• If angios, neuro checks, and patient OK, remove MoMa device while aspirating (cannot re-insert wire)
• “Preclose” before 9F sheath OR 8F Angioseal OR Perclose after procedure
Tips & Tricks Learned..

• If difficulty wiring lesion, aspirate, restart
• Put 1-4 cc saline in 20cc aspiration syringe
• CAN use in combination w/ dEPD devices; insert AND remove dEPD w/ Px protection
• Review steps, prep equipment; be efficient
• Intolerance?: Don’t panic, either complete procedure OR aspirate \textbf{b4} balloons down
• Can re-initiate proximal protection
LICA angios

Symptomatic, High Risk Patient; R carotid/cerebral angios OK
Wiring ECA w/ GW

Vertebral catheter into ECA
Vert catheter out after XC for SupraCore

MoMa ECA Balloon into ECA
Confirming ECA balloon position

Unsubtracted “freeze”/ Guide
SupracoR out

Confirm 0.014 wire is “free” before PP
Roadmap, THEN
CCA balloon up

“Stump pressure”
Wiring “protected”
Distal EPD deployed
Predilation w/ 4 X 30 on Roadmap
Stent deployed w/ same Roadmap & “Freeze”
“Magged up” for post-PTA w/ 5 X 20
Removing distal EPD 
*with* proximal protection
AFTER $\geq 3$ Clean aspirate syringes

ECA balloon down 1st

Then CCA down
Angios through Moma and do neuro checks

*(Can reinitiate proximal protection)*
Final cerebral angios
Remove Moma w/ aspiration; Can NOT reinsert wire
Brief Case 2: High Risk, Symptomatic Patient
MoMa ECA into ECA over Supracore
Confirm ECA; Remove SupraCore wire

Save as “Guide Freeze”
Roadmap, CCA balloon up, wire RICA
Pre- Dilation w/ 4 X 30
Stent, use ECA position

Post- PTA
CAS Patients that We Consider for both Proximal & Distal EPD

- High risk patients for embolic events, &
  - Sx patients, elderly, ↑ embolic risk lesions
- CAS anatomy amenable to both EPD’s
- Especially if there is concern for a deficiency in one EPD system that would be “covered” by the other EPD
- If these criteria are all met, we use both
Deeply Ulcerated, Symptomatic LICA; Low superior thyroidal artery
Right Cerebrals: No crossover

Left cerebrals; ~ receives no collaterals
Deep Ulceration

Low ECA Branches
ECA Balloon Inflated w/ Positioning angiogram
Wiring Lesion w/ Barewire WITH Proximal Protection
Distal EPD Deployed

PTA 4 X 30
Deploying 10 X 40 Precise Stent; THEN PTA with 5 X 20
Deploying 9 X 20 XACT Stent
Removing Distal EPD with Proximal Protection
1. ECA balloon deflated

2. CCA balloon deflated
Final Angios via MoMa
Case to Consider Both

- PCP call: “>20 TIA’s, CDU w/ 99% R and 100% LICA”; High CEA risk patient
- CDU: LICA 100%; R PSV 881 cm/sec; R EDV 411 cm/sec; R ICA/CCA 14.3
- CTA: 100 LICA; “critical” RICA w/ poor flow and under filled vessel.....
LICA Occluded
LICA Occluded, no L cerebral flow
Low ECA Branches
Wiring with Proximal Protection
Aspiration Thrombectomy
Severe RCCA & RICA dz in Sx’matic Patient
“Off – label”
“Mo” in position; Roadmap, same steps..
CONCLUSIONS

• Proximal embolic protection is an essential tool for CAS, especially in ↑ risk patients
• Proximal embolic protection can be safely, effectively, and efficiently used with a systematic approach
• For high risk appropriate CAS patients, the use of both proximal and distal embolic protection systems may be beneficial
Thank You for Your Attention!