Step by Step: Carotid artery stenting procedures

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Ten Steps of Carotid Stenting

1. Vascular Access (femoral - brachial)
2. Angiographic evaluation
3. Guiding Sheath Placement
4. Crossing the Stenosis
   - without protection
   - with distal protection
   - with proximal protection
5. Lesion predilatation
6. Stent Deployment
7. Postdilatation
8. Removal of Protection Device
9. Final Angiographic Control
10. Sheath removal/ Access Care
Carotid Access

- Can I safely Get There?
  - CCA Access

- Can I safely Get There?
  - Protection Device into ICA or CCA
Carotid Access Determinants

- Aortic Arch Type
- CCA/ECA Disease
- Carotid Tortuosity
Types of Aortic Arches

- Type I normal
- Type I elongated
- Type II elongated
- Type III deep seated
Prefered Catheters

Aortic Arch Type I

- Vertebral tip
- Judkins right
- Head Hunter
- JB 1
- Berenstein
- Weinberg
Prefered Catheters

Aortic Arch Type III

- JB 2
- Newton
- Sidewinder
- Vitek

Catheter tip should be formed in abdominal aorta or subclavian artery.
Wires, Shaeths, Catheters …

To the *right* ICA via the right brachial artery
Wires, Shaeths, Catheters ... …

To the *left* ICA via the right brachial artery
Accessing the CCA
Tips

- Beware of adverse anatomy, ie.
  - Type II and III aortic arch
  - Irregular contour of proximal CCA on angiography
  - Kinking / coiling of CCA

- To avoid vessel wall trauma, use of soft and flexible catheters that do not scrape the aorta (prograde cath.)
- Go from the easiest to the more complex approach
- Don't try to hard for too long!
- It is better to refer the patient to CEA than to inflict permanent damage!
Accessing the CCA
Conclusions

- It is important to realize that embolic events may be elicited "on the way" to the target lesion, that is before the lesion has even been touched.

- A skillful and cautious approach using appropriate endoluminal equipment may help to avoid emboli-related complications.

Access is the major issue
The "easy parts" are EPD and Stent placement.
Carotid Filter Issues

- Should I Pre-dilate Before Filter Placement?
- What to do with slow Flow/ Occlusion in a filter?
  - Filter filled?
  - Carotid Spasm?
- What to do when the retrieval sheath fails to advance?
- How to handle a detached filter?
Carotid Filter Issues

- What to do when filter doesn't advance?

- Power Guide support
- Pre-dilatation
- Buddy-wire
- Buddy-Catheter
- Bare wire/Spider
- proximal Protection
Carotid Filter Issues

What to do with slow flow / occluded Filter?

- Filling defect below filter dots
  - Aspirate with, e.g. Diver®
  - Close Filter

- Filling defect above filter dots
  - Close filter and remove

Incidence
- slow flow 10-20%
- Aspiration 2-5%
Carotid Filter Issues

What to do with slow Flow/Occluded filter?

Are filter Dots Closed?

- Yes
  - Carotid spasm
    - Give Nitro

- No
  - Filter slow flow due to emboli
    - Retrieve Filter
Asymptomatic Flow Obstruction

Spasm
Asymptomatic Flow Obstruction

Filled Filter
Filter Detachment

- RC Catheter advancement problem
- Filter Slides down and impinges on stent
- Guide catheter prolapse into Aorta pulls Filter down
Filter Detachment

Preventive Strategies

- Avoid cases with poor landing zone
- Always keep guide tip in view
- Never force to pull the Filter into RC
- Change RC Type (Accunet?)
Carotid Filter Issues

What to do when Retrieval Catheter does not advance?

- Don't panic and pull on filter!
- Neck rotation
- Advance sheath distally
- Bent tip retrieval sheath
- Buddy-wire
- Additional balloon dilatations
- Neck Compression
Carotid Stent Issues

Should I Pre-dilate Before Stent-Placement?

- Carotid Stent Profile
- Tip of Stent Delivery System
- Carotid Lesion Severity
- Carotid Tortuosity
- Operator Experience
- Carotid Lesion Complex
- Morphology
  - Sharp Entry Angle
  - Sharp Exit Angle
  - Heavy Calcification
Hands off!
Take Home Message
Avoid These S

- STEEP Arch (Type III)
- SEVERE Tortuosity
- SHARP Entry Angle
- SHARP Exit Angle
- INSUFFICIENT Landing Zone
- UNSATISFACTORY Collaterals
Thank You for Your Attention!

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