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# Carotid stenting step by step and tips and tricks

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# DISCLOSURE STATEMENT OF FINANCIAL INTEREST

Within the past 12 months, I have had a financial interest with the organizations listed below.

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<b>AFFILIATION/FINANCIAL RELATIONSHIP</b>	<b>COMPANY</b>
<ul style="list-style-type: none"><li>• Consulting Fees/Honoraria</li></ul>	<ul style="list-style-type: none"><li>• Gore</li><li>• Terumo</li></ul>

# Vascular Anatomy

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- nearly every patient can be treated by CAS, but ...
- know the arterial anomalies
- respect severe elongations

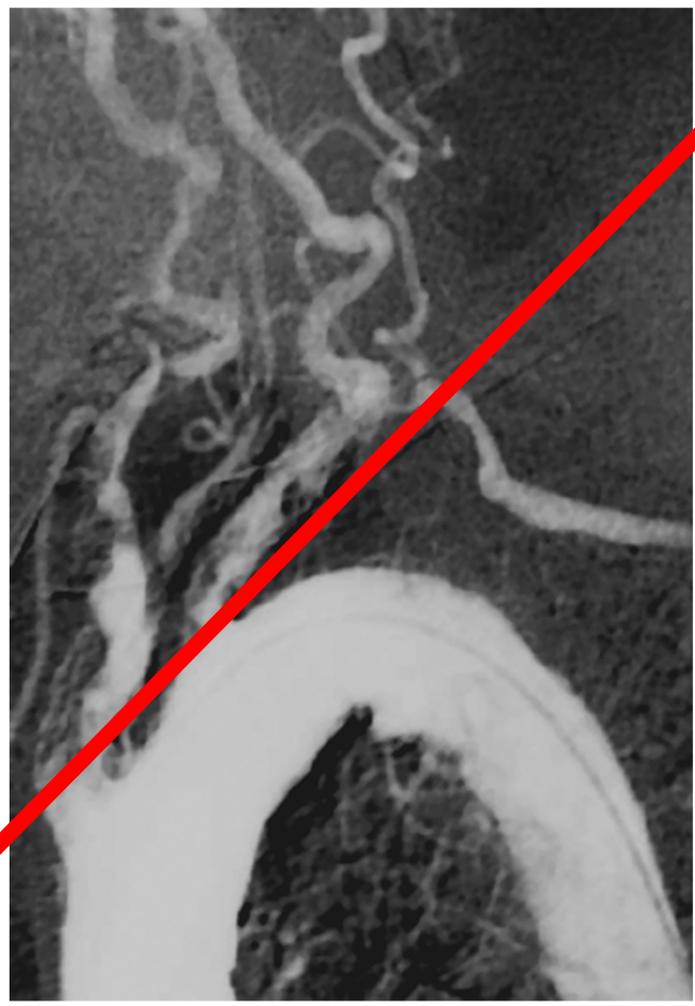
# You can treat most difficult anatomies

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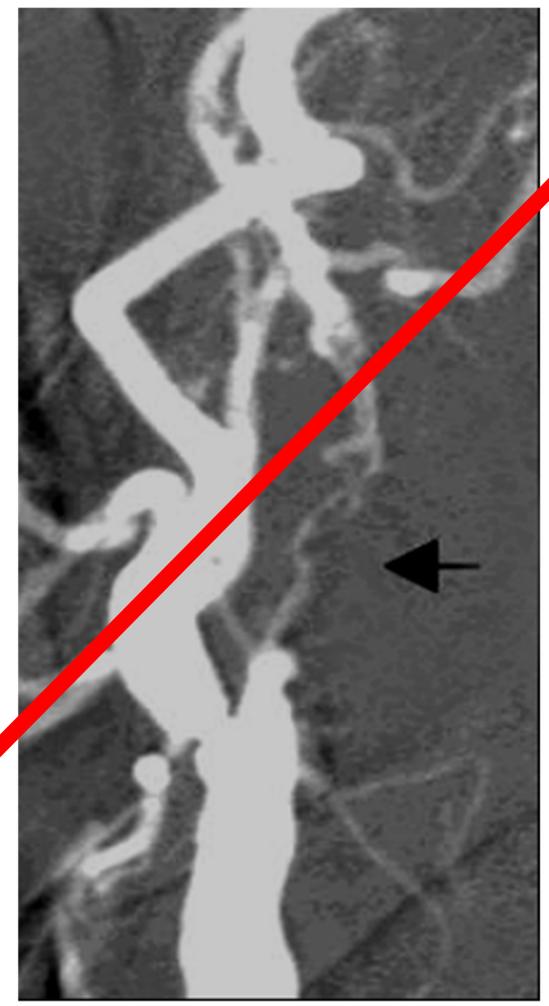


# CAS - Forbidden

G.H. m-77  
2x TIA



M.I. f-81  
minor  
stroke



# Plaque Morphology

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## ideal lesions

- FMD, Takayasu's disease
- early recurrent stenosis after CEA
- short membrane-like lesion

## critical lesions

- extended plaques
- floating thrombus
- circular heavily calcified plaques

# You can treat most calcified lesions

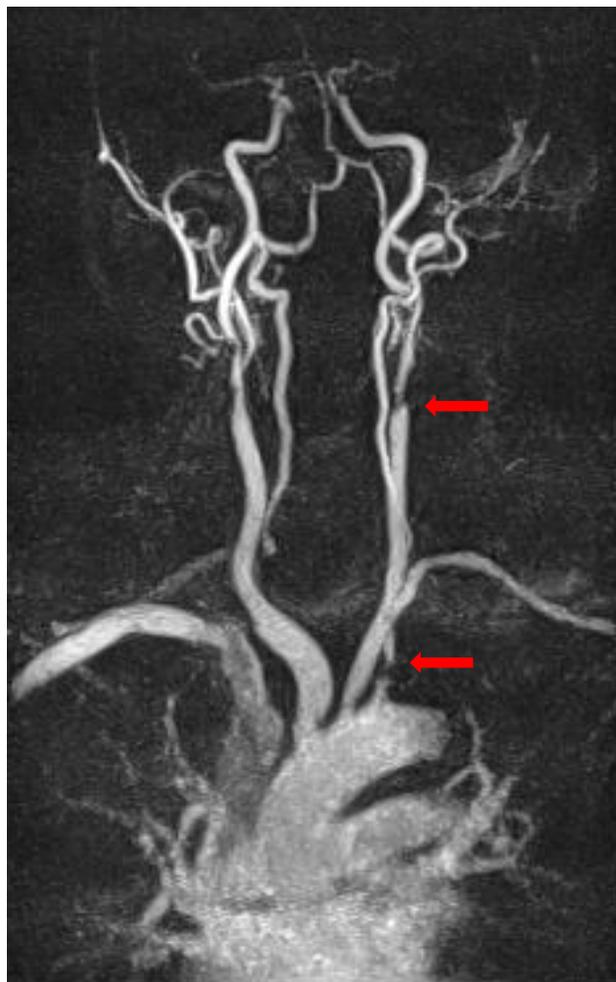
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. . . but when US can not penetrate the arterial wall you will need additional information:

We use routinely  
CTA!



# MR-Imaging



# Technique

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be familiar with all necessary devices  
select stent & EPD to the anatomy and  
plaque characteristics  
use the best suitable protection device  
pre-dilatation when necessary  
no over-dilatation

# Training & Experience

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Don't forget:

with your first 100 patients you are a beginner\*

experts start with > 500 CAS

I have done more than 6,000 CAS - still learning

→ EVA3-S, SPACE, ICSS do not fulfil the criterion of good medical practice

Leave CAS alone when you have less than 50 cases/year, 1/week.

# Technical Success

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CAS is successfully performed  
in 97 - 100% of intended treatments

Most frequent reason of failure?  
*ACCESS!*

# CAS Technique

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## ***Steps:***

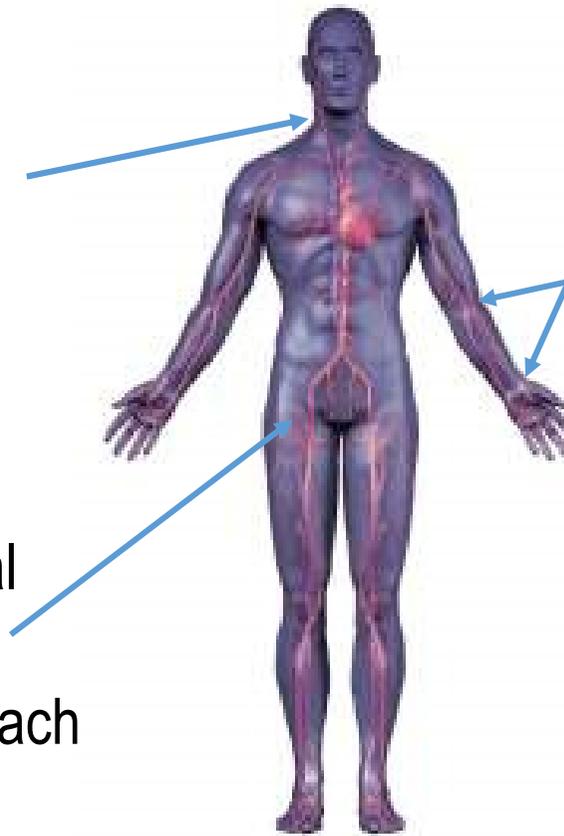
- Vascular access
- Angiographic evaluation
- Common carotid engagement
- Pre-dilatation
- Stent deployment
- Post-dilatation
- EPD management

# Vascular Access

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Direct percutaneous  
puncture of CCA:  
Only in rare cases

Right or Left femoral  
arteries:  
Recommended approach



Brachial / Radial puncture:  
Occlusions, elongations,  
tortuosity of iliac arteries  
Bovine aortic arch

# Common Carotid Engagement

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## *Three Techniques*

anchoring  
technique

*Aortic Arch Type I*  
Diagnostic catheter  
Terumo wire  
Stiff Amplatz wire  
Sheath

telescoping  
technique

*Aortic Arch Type II*  
Diagnostic catheter  
Terumo wire  
Sheath

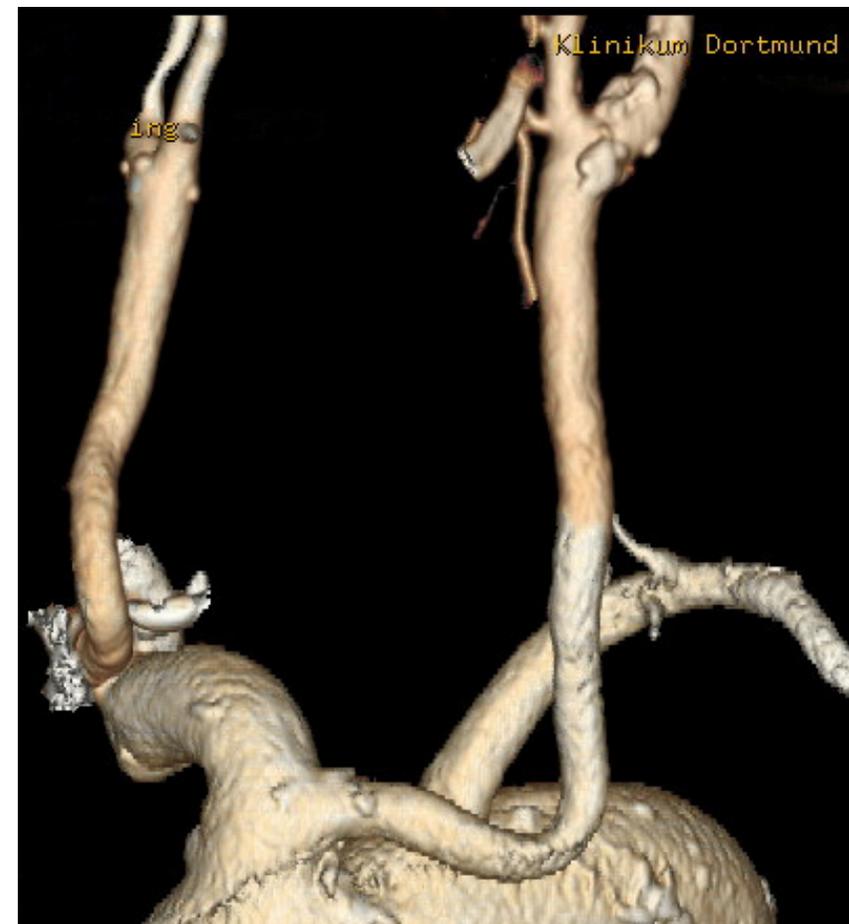
guiding catheter  
engagement

*Aortic Arch Type III*  
Diagnostic catheter VTK  
Terumo wire stiff  
Sheath

# Aortic Arch

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Don't forget that you often  
Look at the angio in only  
one projection!



# Type III Aortic Arch

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Origin of left subclavian artery is located deeper by 1 cm than highest point of aortic arch.



# Type III Aortic Arch

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- push and pull
- multiple wires
- guiding catheter

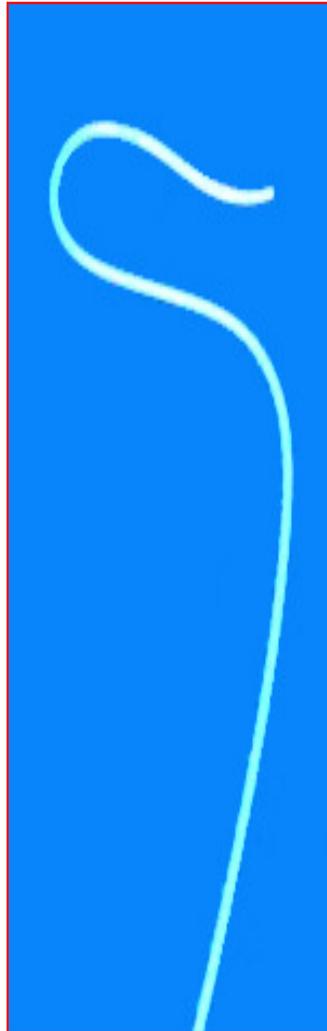
# Diagnostic Catheters

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- Vertebral
  - Vitek
  - Sidewinder
- 
- torque control required
  - cave: aortic arch is  
a possible source of emboli

# My preferred catheter ...

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VITEK catheter 125cm  
... for type I - III aortic  
arches

# Aortic Arch

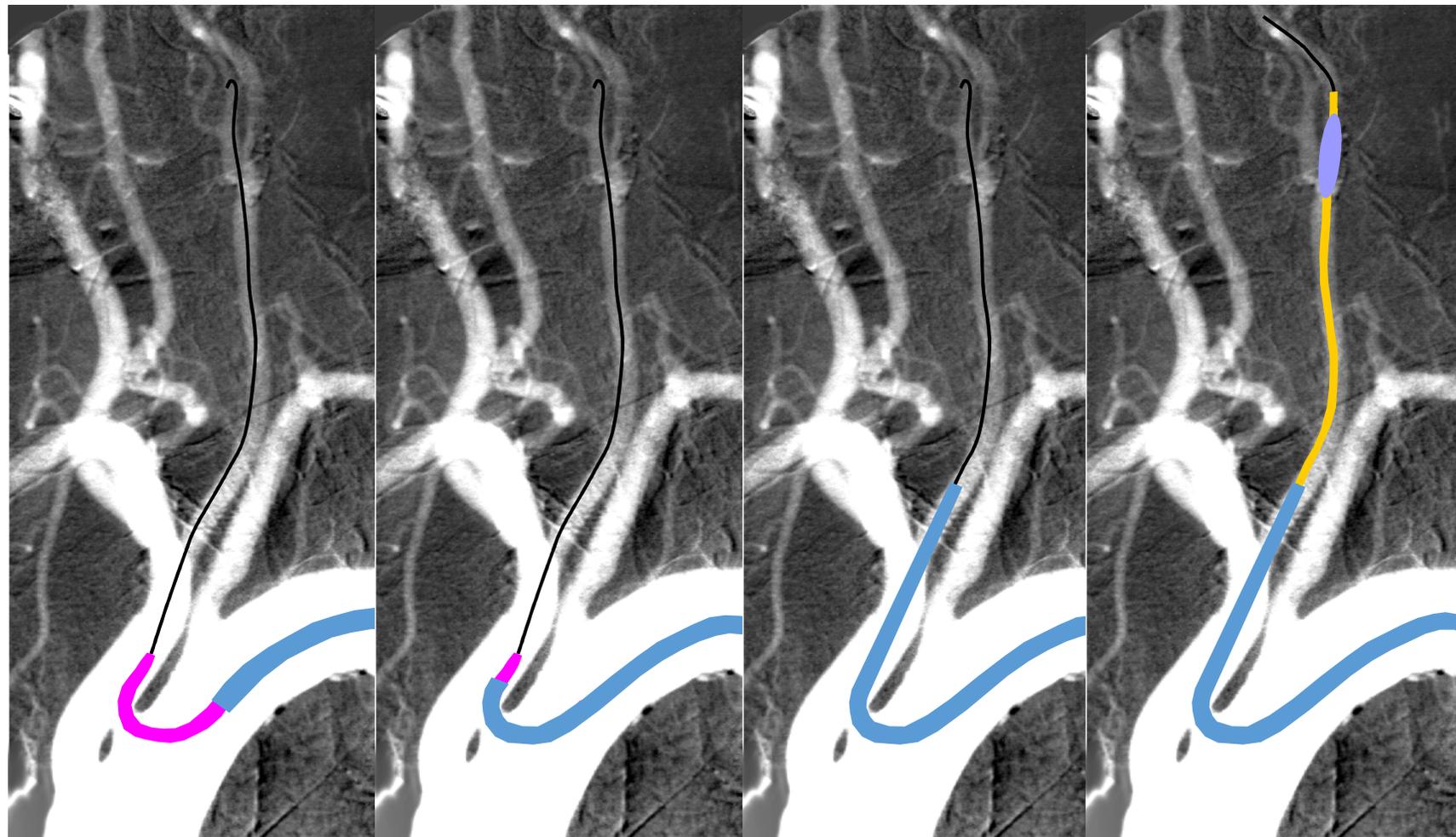
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## Telescoping technique

- Vitek catheter 125 cm
- Terumo stiff J 0.035"
- Cook shuttle sheath 90 cm
- catheter in sheath
- probing of cca
- advancing of sheath over Vitek & guide wire



# Aortic Arch



# Aortic Arch



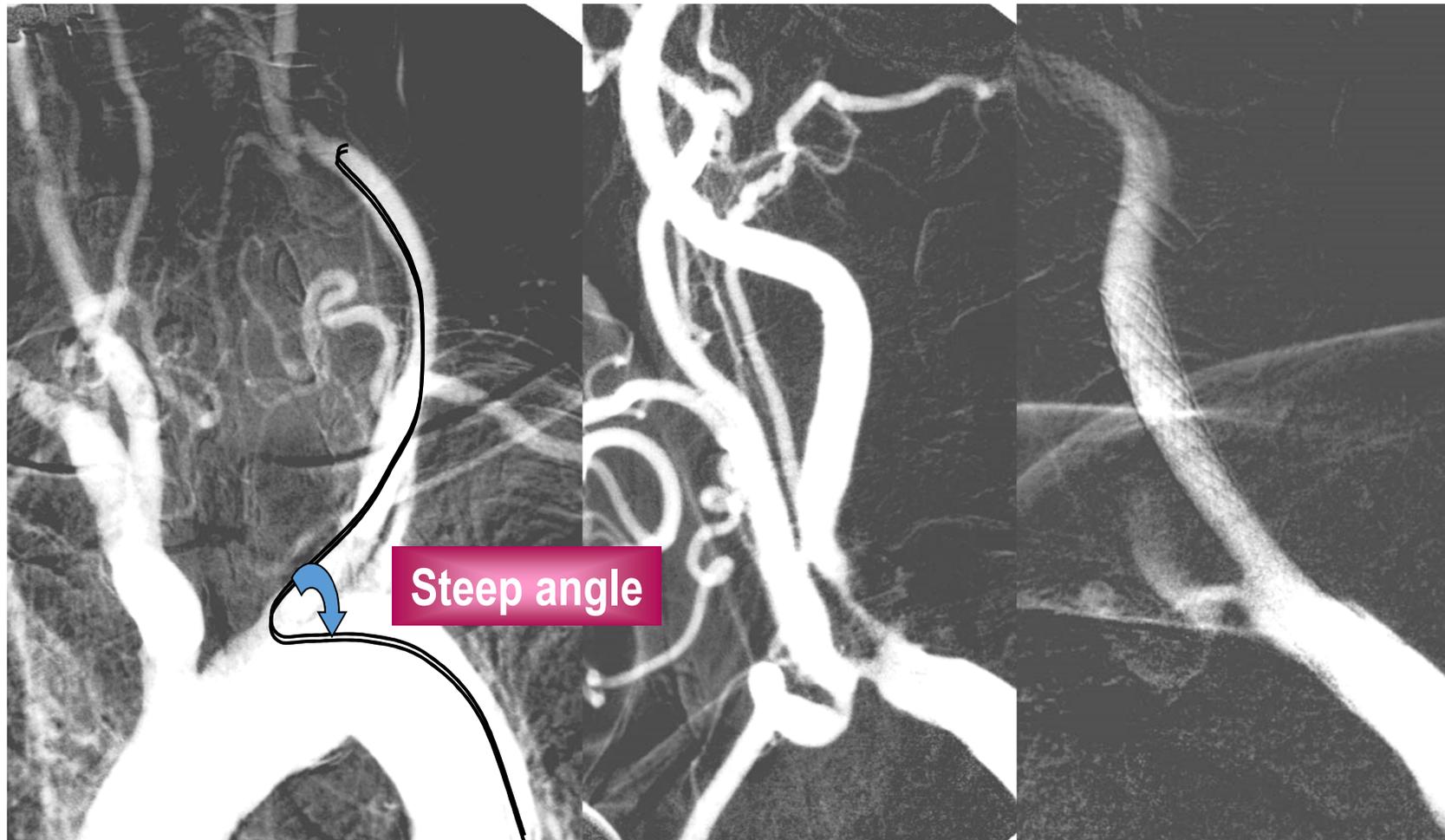
# Guide Wires

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## Use of several wires:

- **Probe deep seated aortic arch**  
Place several 0.014" wires in cca to advance sheath
- **Stabilize position of sheath**  
Buddy wire 0.014 prevents slipping back of sheath
- **Straighten tortuous arteries**  
Two 0.014" wires together with the filter wire will lessen the radius of curves

# Aortic Arch II



# ICA Tortuosity

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# Aortic Arch Type II & III

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Guiding catheter instead of sheath

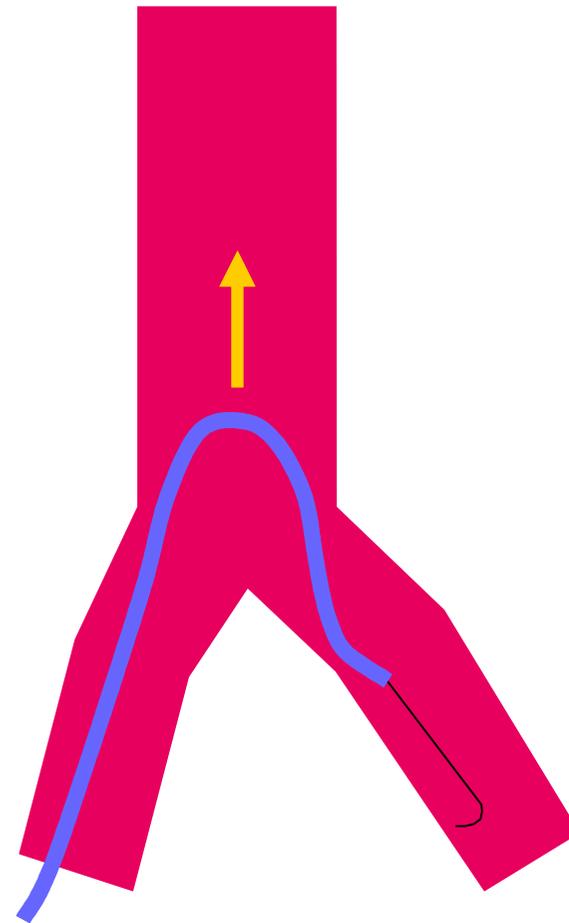


# Type III Aortic Arch

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Sidewinder guiding  
catheter

cross-over in iliac artery  
*push*

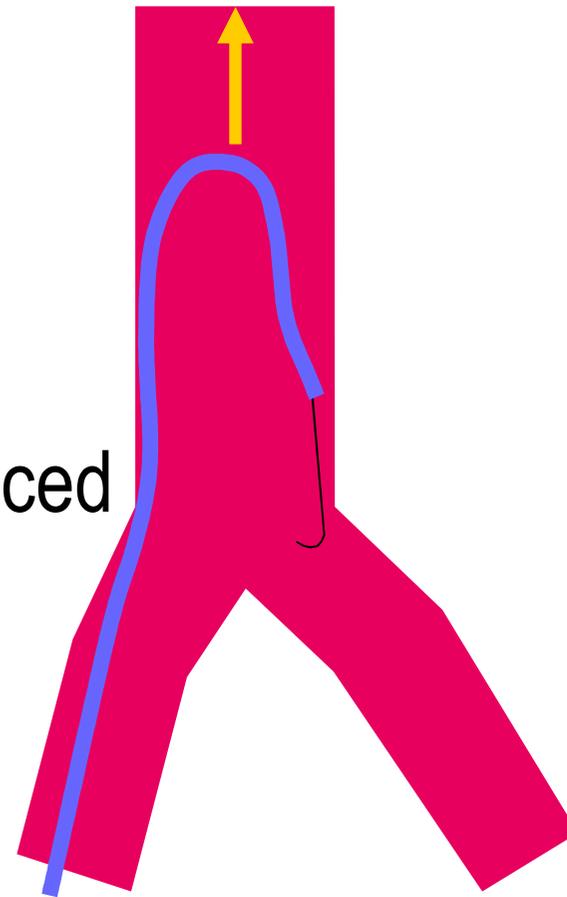


# Type III Aortic Arch

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## Sidewinder guiding catheter

reversed catheter is advanced to the aortic arch  
*push*



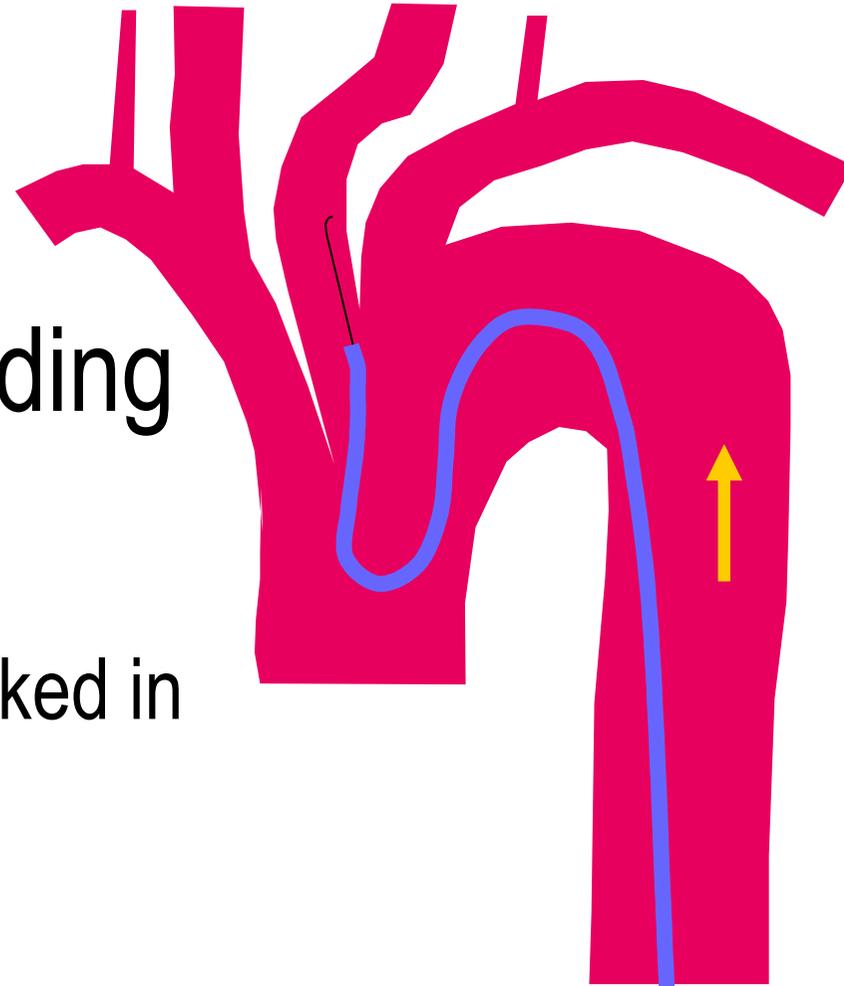
# Type III Aortic Arch

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Sidewinder guiding catheter

guiding catheter hooked in left CCA

*push*



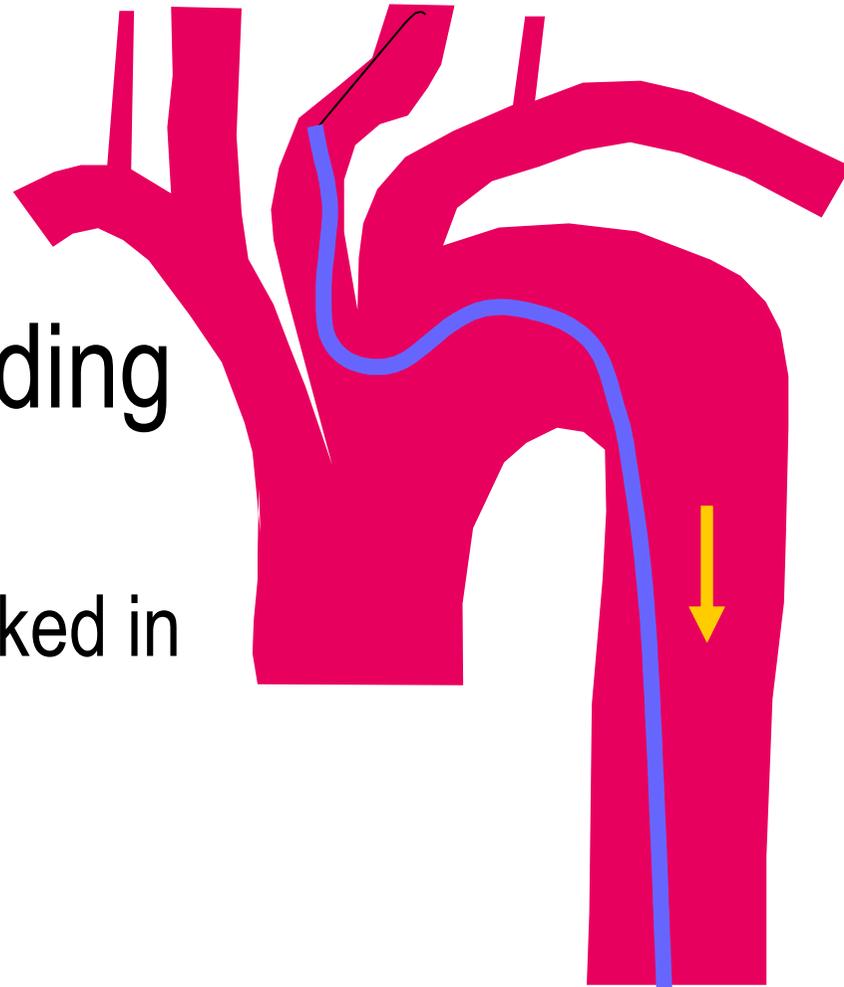
# Type III Aortic Arch

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Sidewinder guiding  
catheter

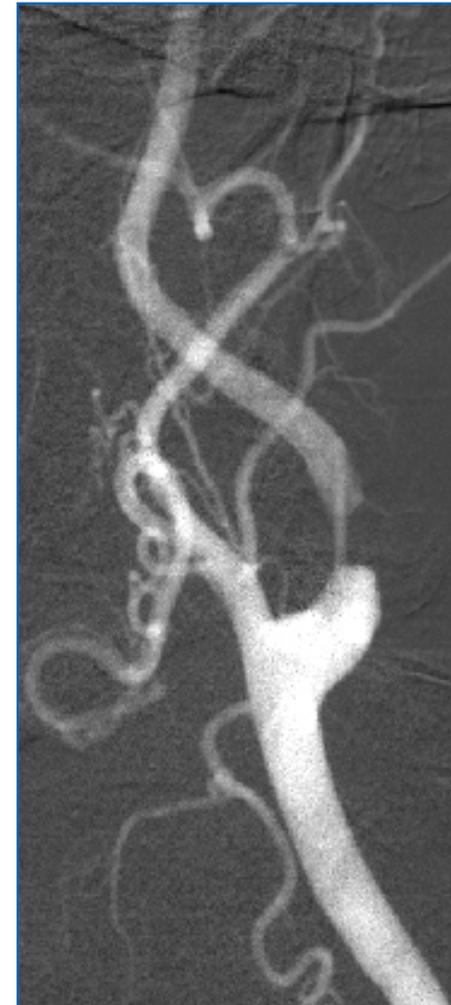
guiding catheter hooked in  
left CCA

*pull*



# Type III Aortic Arch

B. H. (m) 68y  
-symptomatic ICA stenosis 85%



# Type III Aortic Arch

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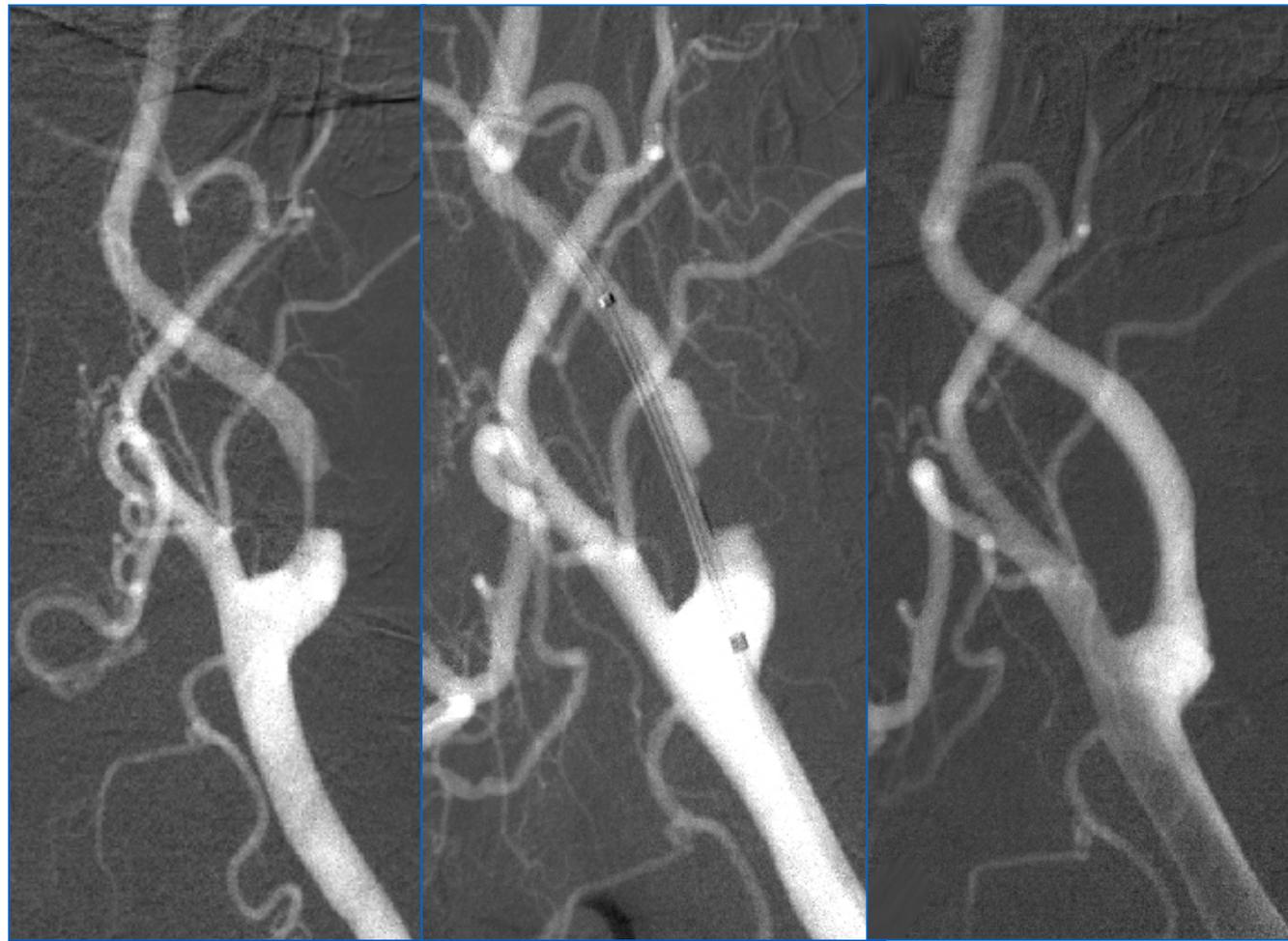
B. H. (m) 68y  
-symptomatic ICA stenosis 85%

Cordis guiding catheter 8-F  
sidewinder tip  
contra-lateral iliac artery  
serves to configure the tip



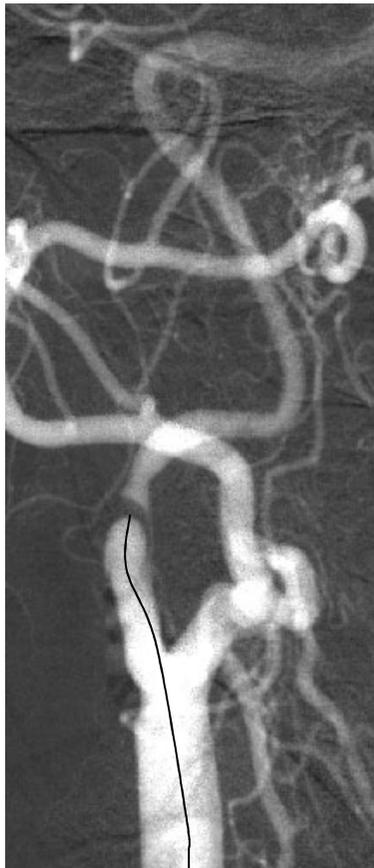
# Type III Aortic Arch

B. H. m-68y



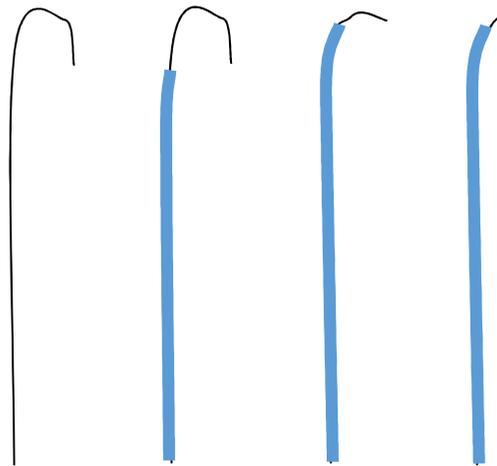
# Crossing the lesion

Excentric and ulcerated lesions: beware of dissection



Shape the wire tip according to anatomy

Combine wire with micro-catheter



# Stenting Strategies

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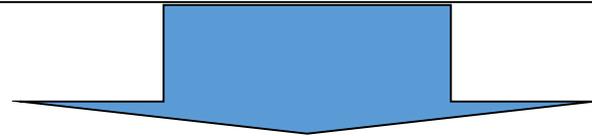
## Key Points



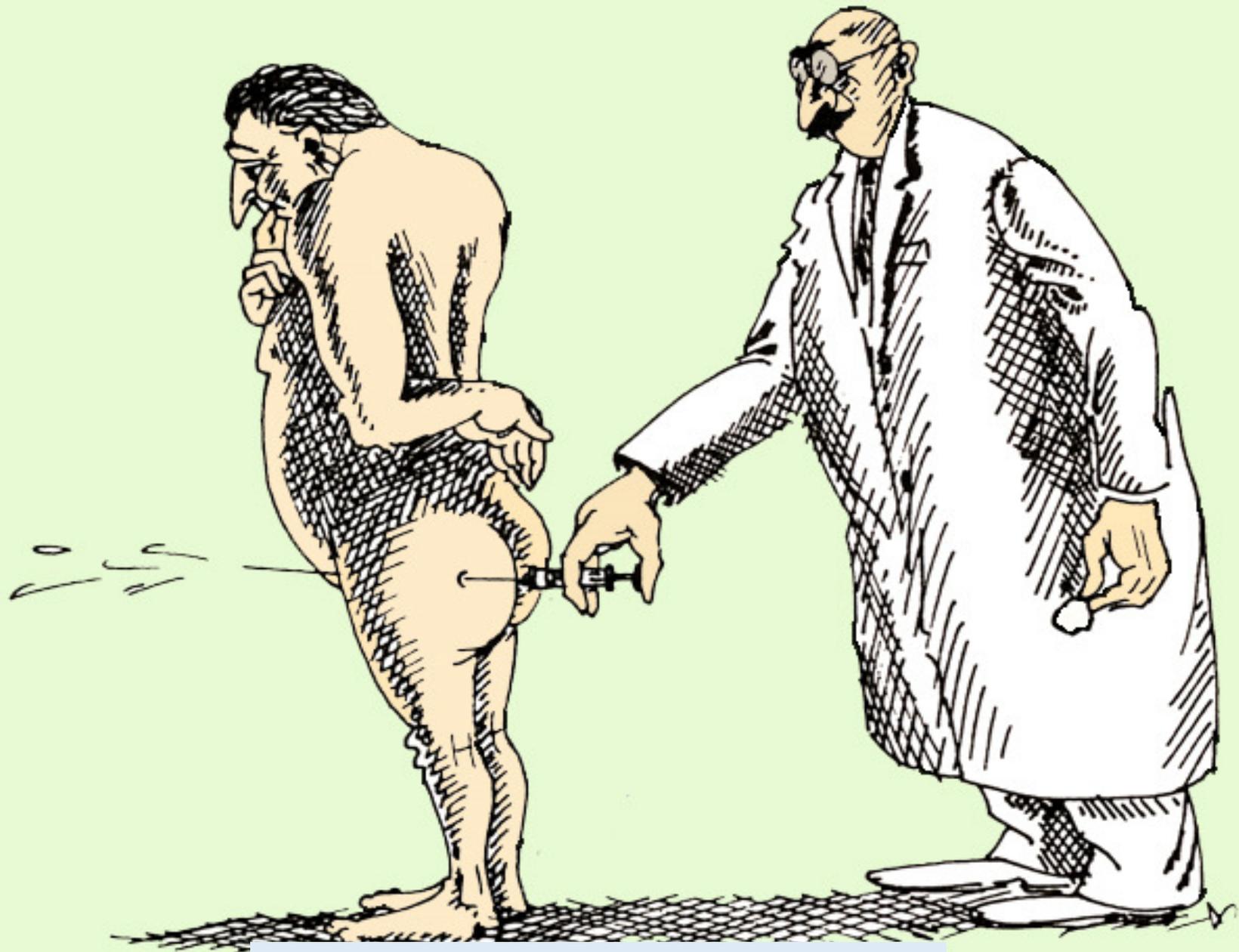
- Stent from “normal to normal” with the lesion in the middle
- Release at least 5mm of stent distally and wait for stent to expand fully and stabilize against vessel wall
- The distal edge of the stent can injure the artery wall if it lands in kinks and tortuosities
- Vessel kinks and tortuosities that are straightened out with the stent can become more exaggerated distally

# Post-dilatation

Post-dilatation is always a critical step, because the greatest amount of emboli are released, and patient is at the greatest risk of stroke



- ❖ To minimize the embolic load we recommend:
  - Using balloons >5mm only in selected cases
  - Inflating to nominal, not high pressure
  - Accepting a 10-15% residual stenosis
- ❖ In presence of continued flow via the stent struts into an ulcer, do not attempt to obliterate communication by using larger balloons



Develop your skills

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**Use intelligence,  
not force!**