Carotid Stenting Technique: Tough Arches, Tough Access, and Alternate Access

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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.

Affiliation/Financial Relationship	Company
• Consulting Fees/Honoraria	• Biotronic • Boston Scientific • Medtronic • Meril

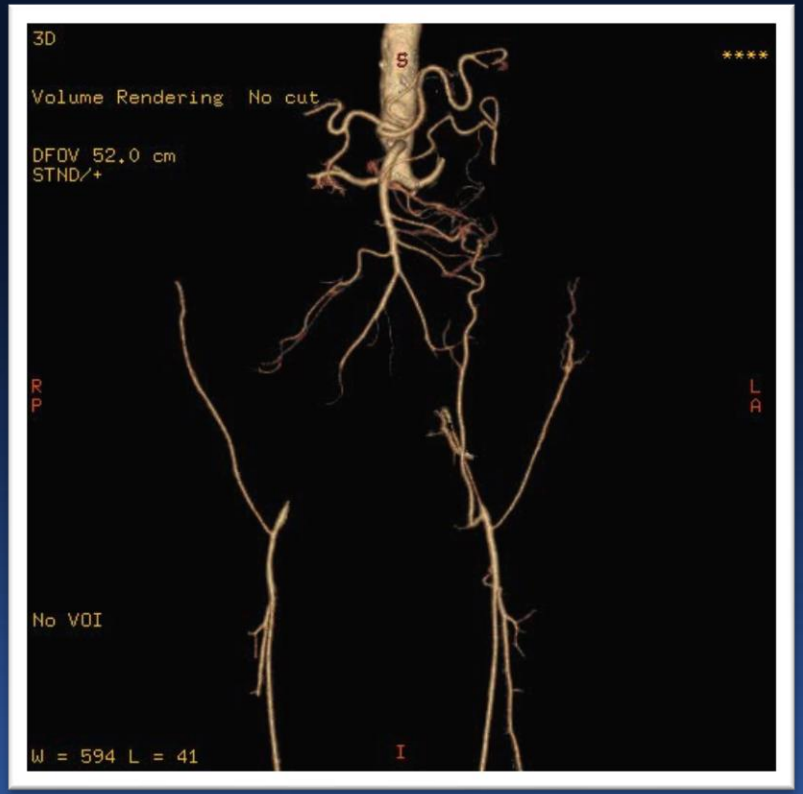
Why alternative access for CAS ?

Femoral approach limitations

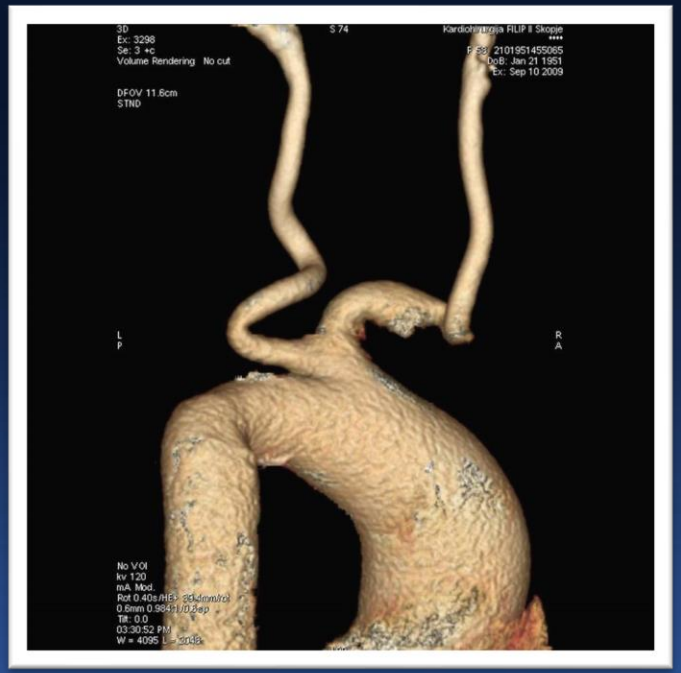
- Aorto-iliac disease or occlusion
- Previous surgical bypass at this level
- Diseased and Complex aortic arch with
- Tortuous SAA originating from elongated,

  or type II, III, or bovine aortic arch

Aorto-iliac disease or occlusion



Tortuous SAA originating from elongated or bovine aortic arch



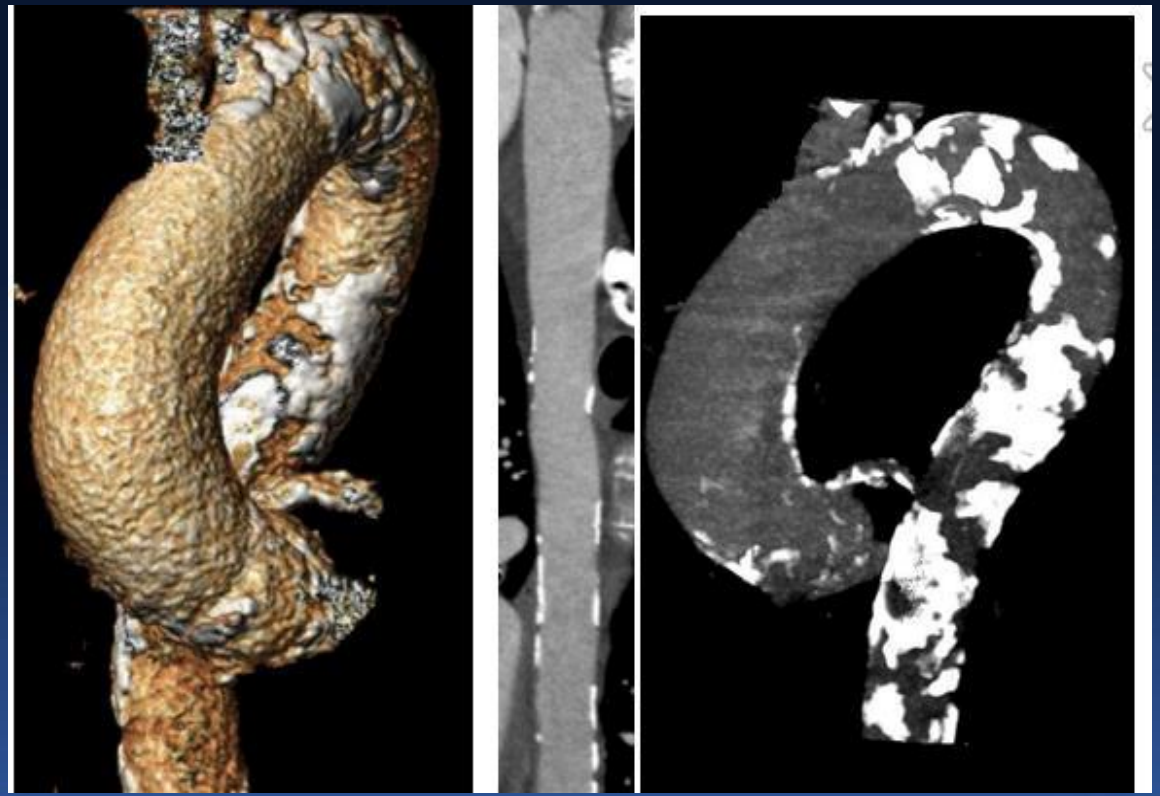
Access site complications

The most common adverse event after CAS from the femoral approach

MOST TECHNICAL FAILURES ARE

RELATED TO A COMPLEX ARCH

Risk of catheter-related emboli from aortic atherosclerotic debris



Karalis DG et al. Am Heart J. 1996 Jun;131(6):1149-55.

Alternatives to femoral access for CAS

- *Brachial*
- *Radial / Ulnar*
- *Direct puncture of carotid artery*

Transradial CAS

Tailored approach

- **Radial artery**
- **Aortic arch, CCA takeoff**
- **Carotid lesion**

Wrist access (radial & ulnar) for CAS

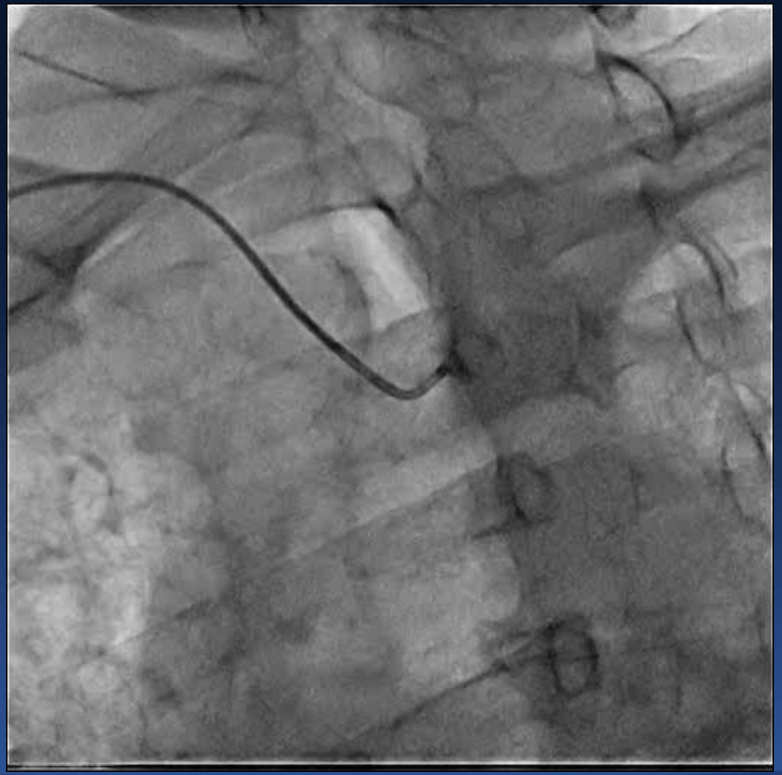
- Tortuous Internal Carotid Artery
- String Sign
- Contralateral Occlusion
- Acute Carotid Syndrome

Transradial CAS

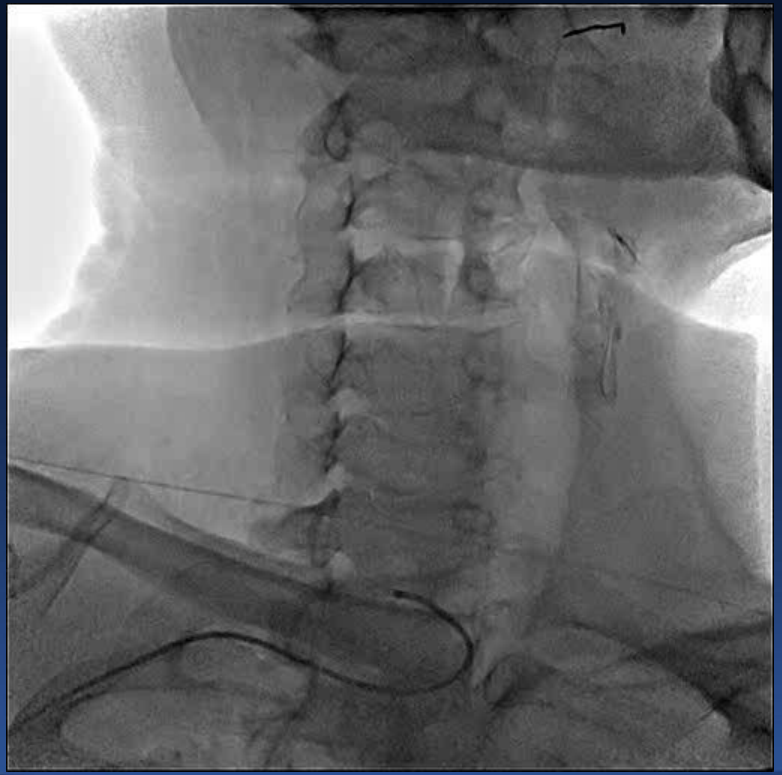
- Anchoring technique
- Telescopic approach

Case 1.

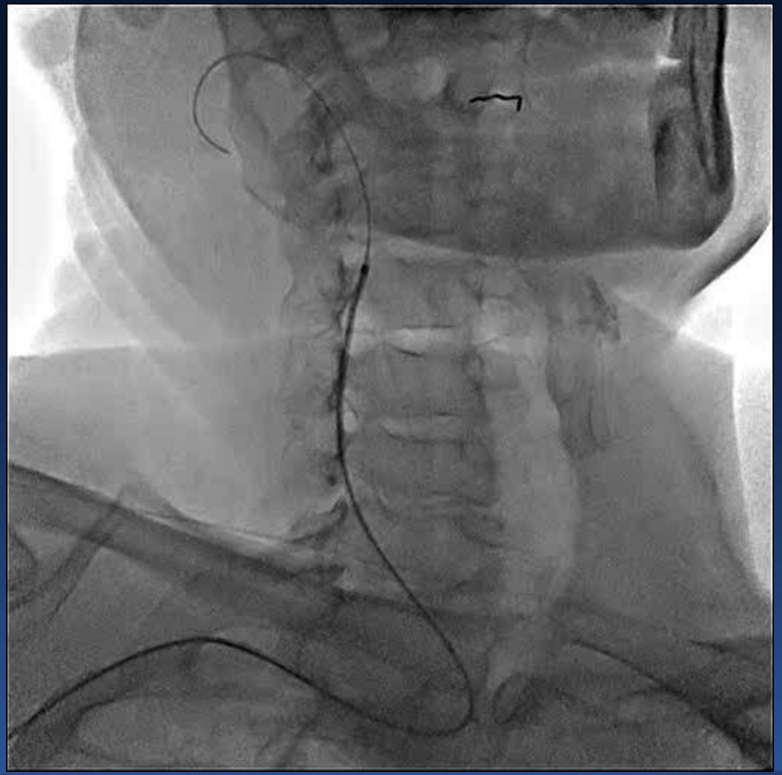
Left ACC 100%



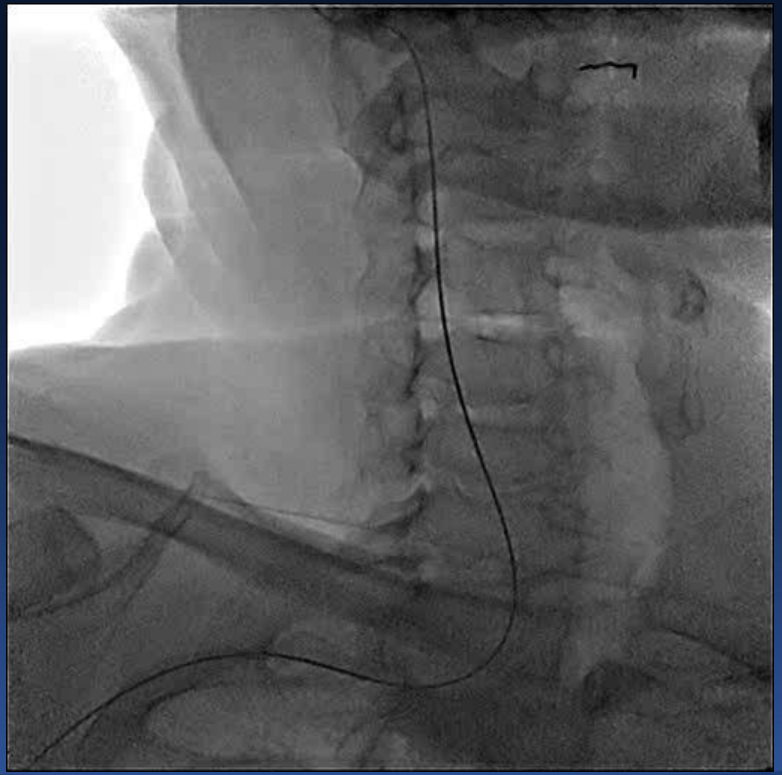
RICA



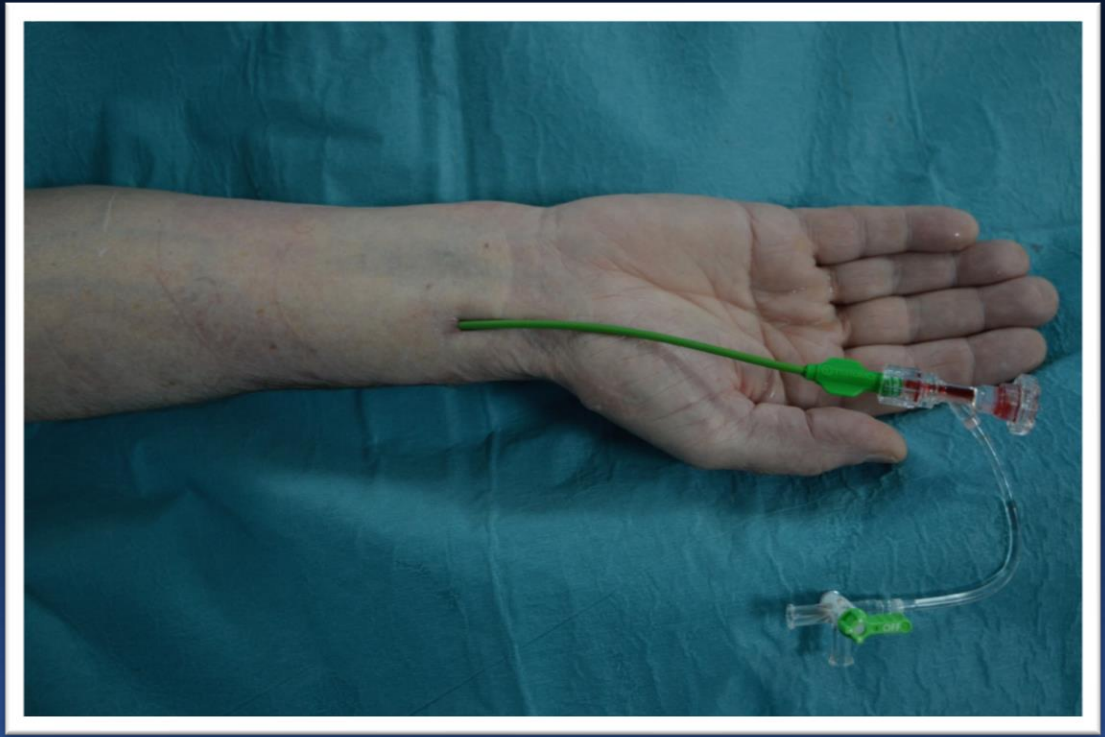
Terumo advantage wire in RECA



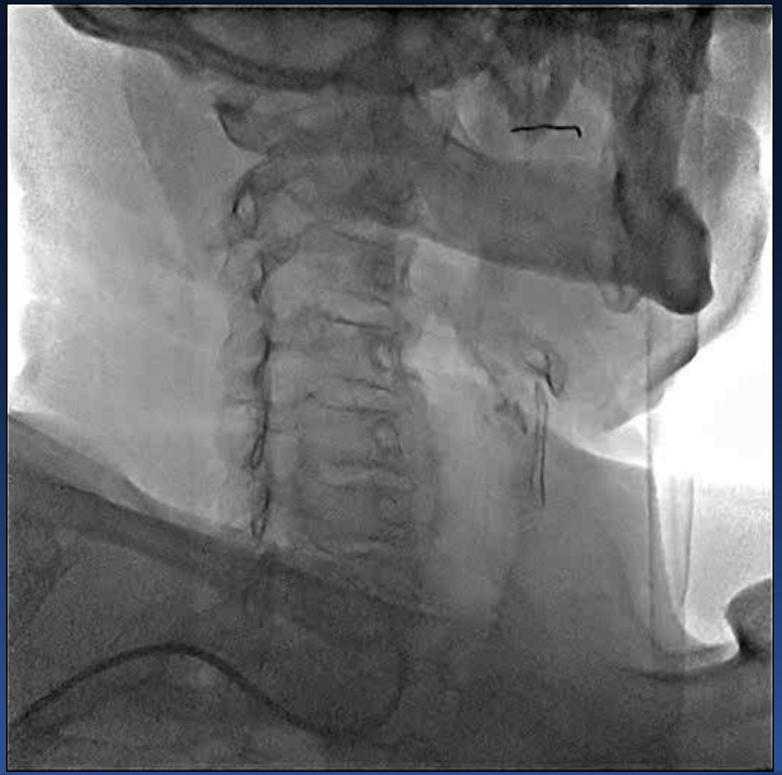
Amplatz stiff wire in RECA



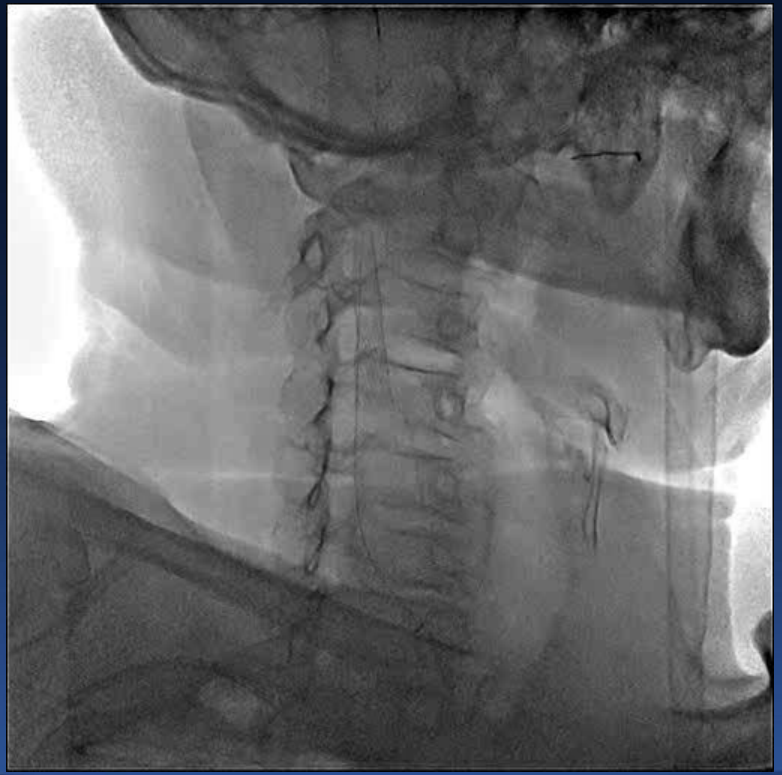
Destination sheath 6Fr



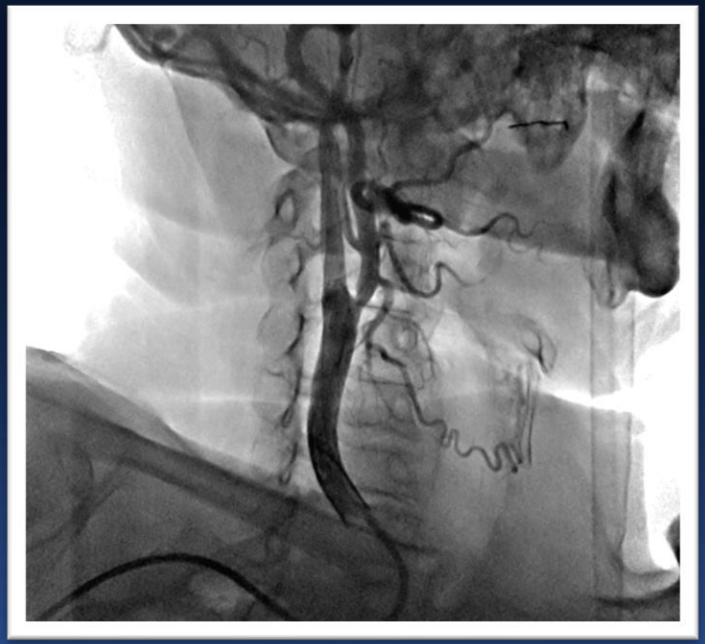
Destination sheath 6Fr



Final result



Before / After



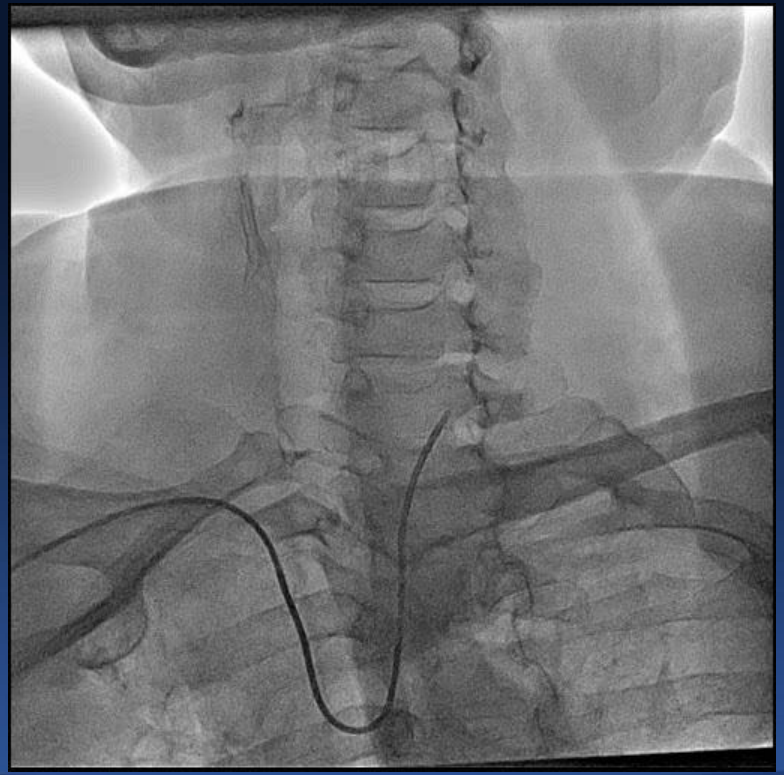
RRA CAS of LICA in highly symptomatic patient with amaurosis fugax

Male

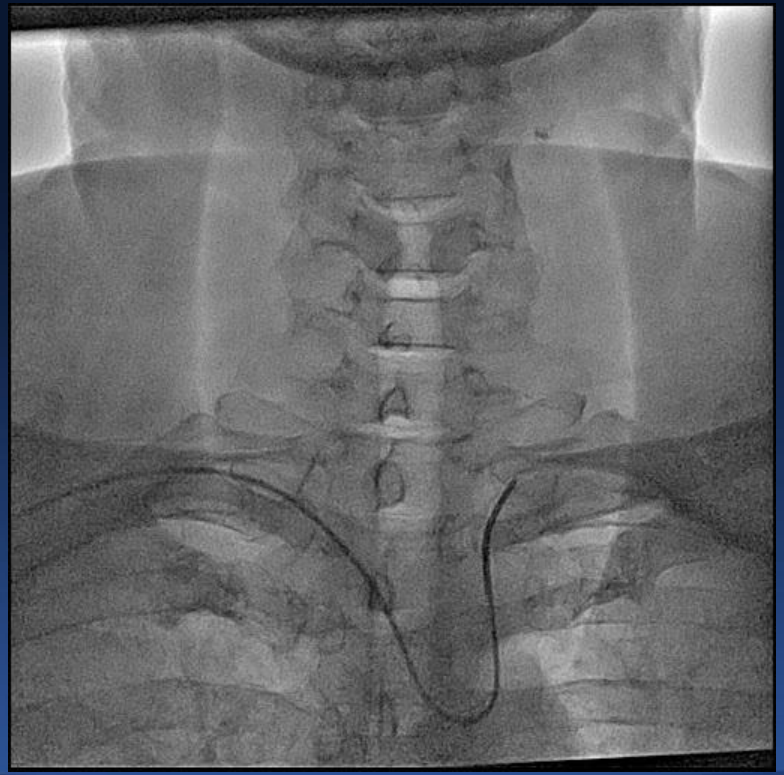
K. G.

64 y.o.

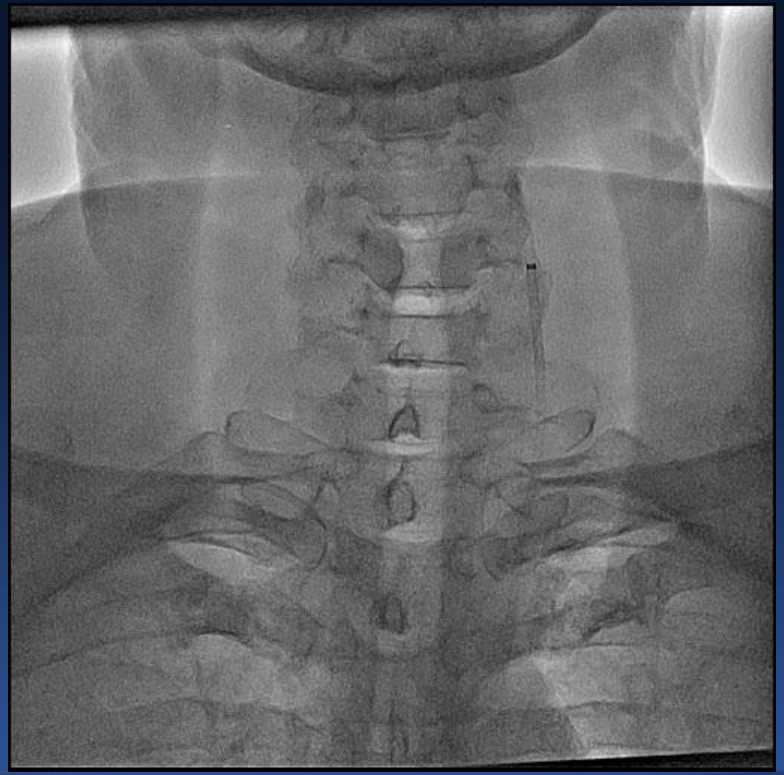
LICA 99% + dissection/ thrombus



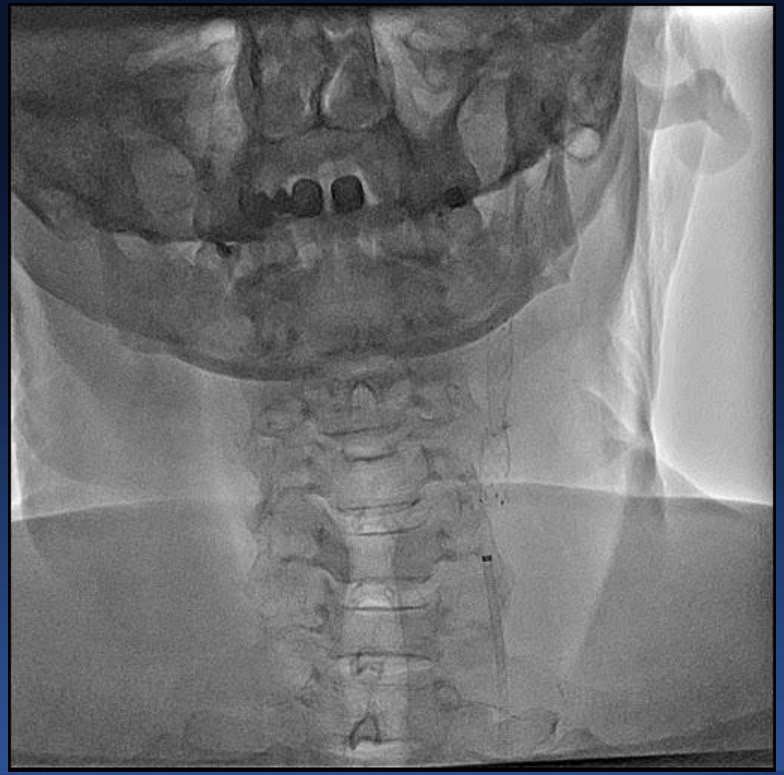
"Wireless" telescopic approach



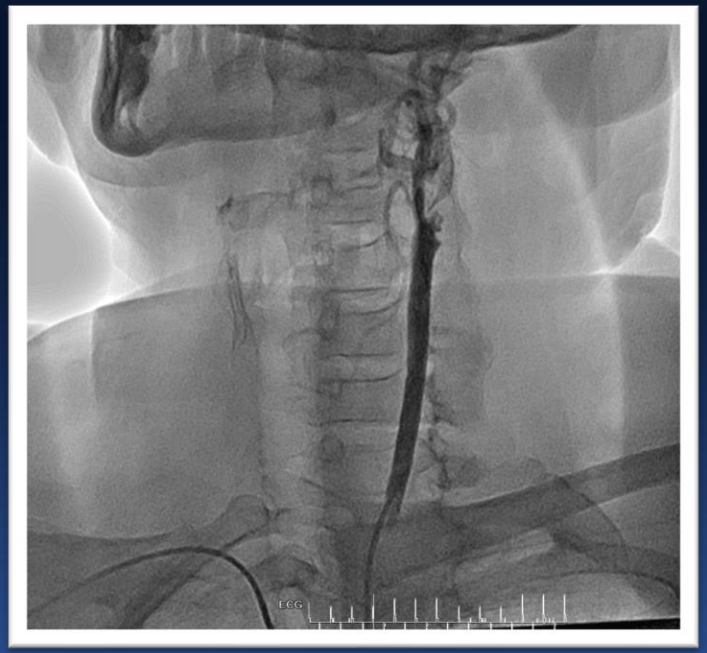
Shuttle sheath 5F



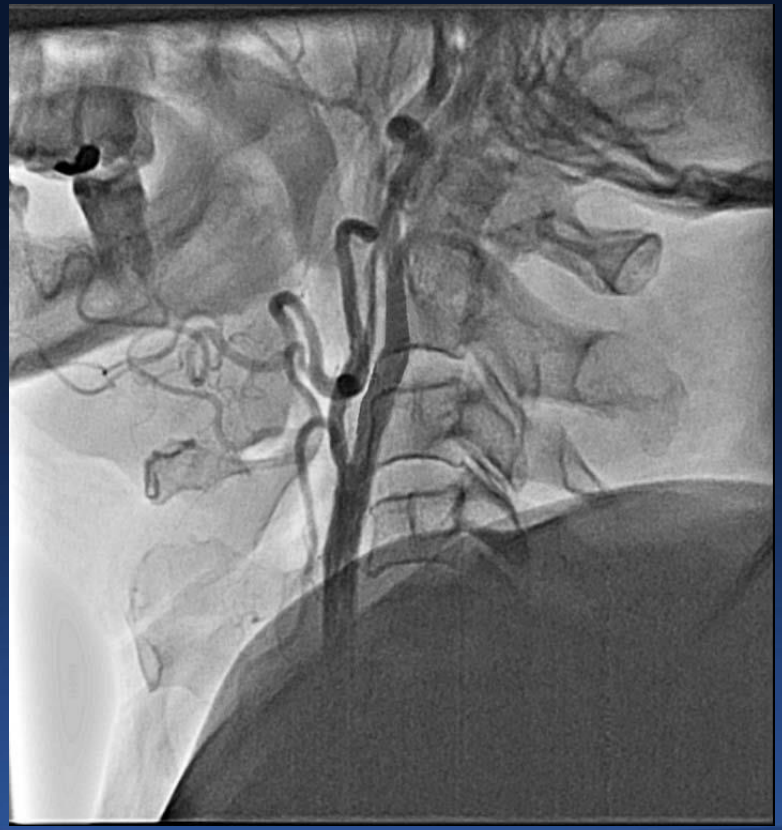
Final result



Before / After



1 Month follow up



Transradial CAS

- Right wrist access
- Left wrist access

LRA CAS of RICA with contralateral occlusion

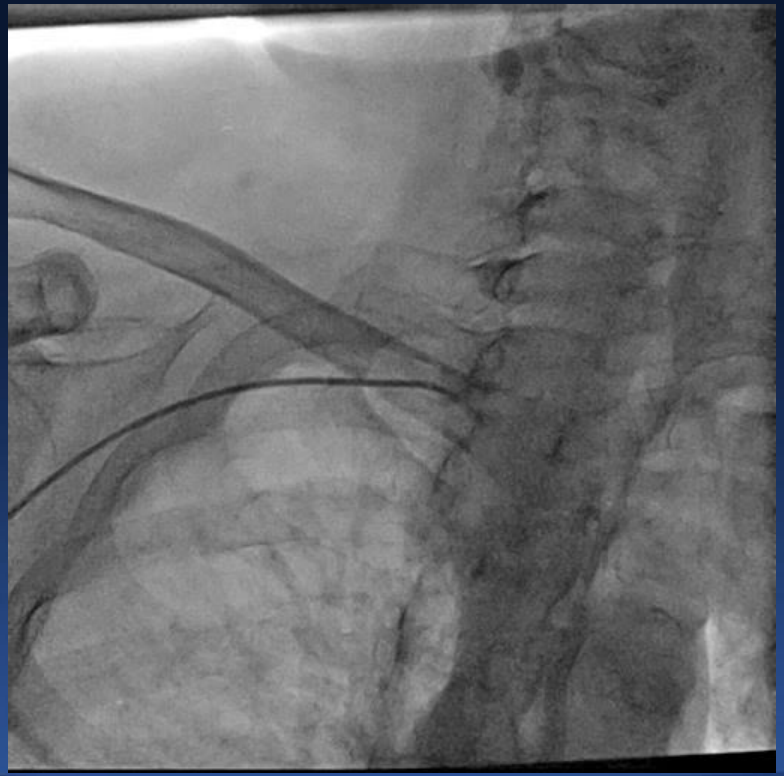
Male

T. B.

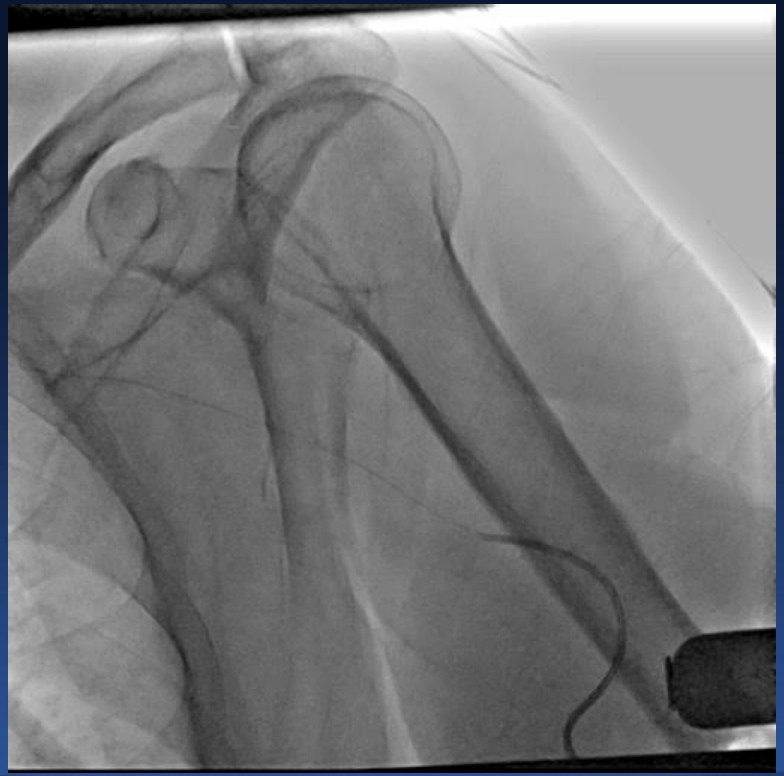
80 y.o

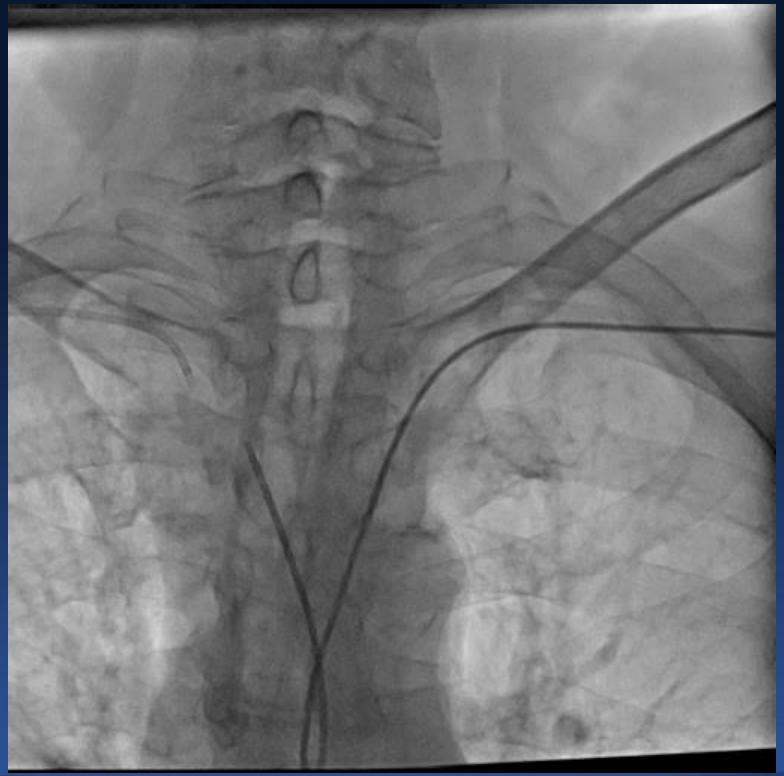
Right RA

Occlusion of right subclavian artery



Left RA





RCCA/ RICA 99%

Final result

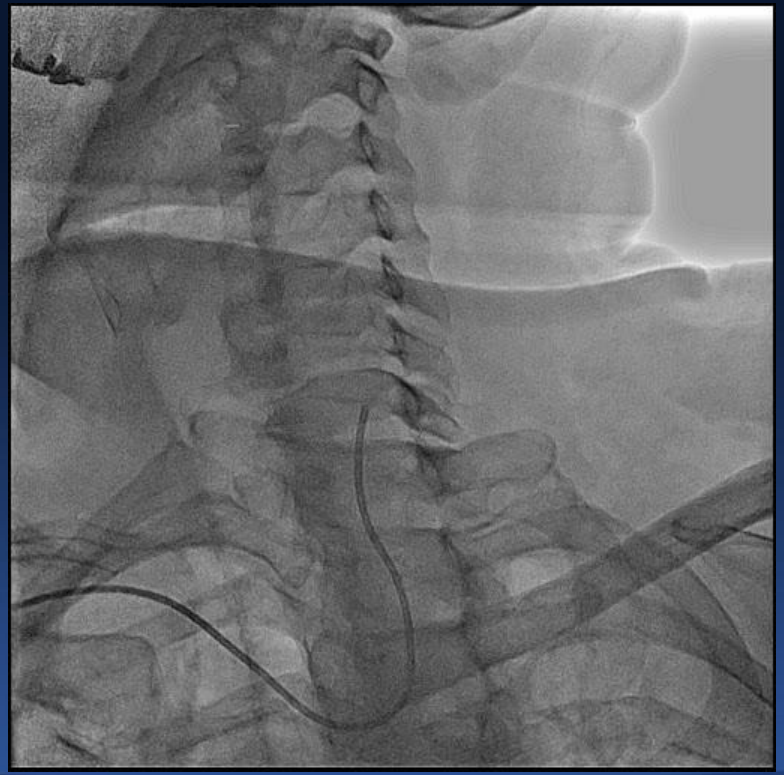
RUA CAS of RICA with contralateral occlusion

Male

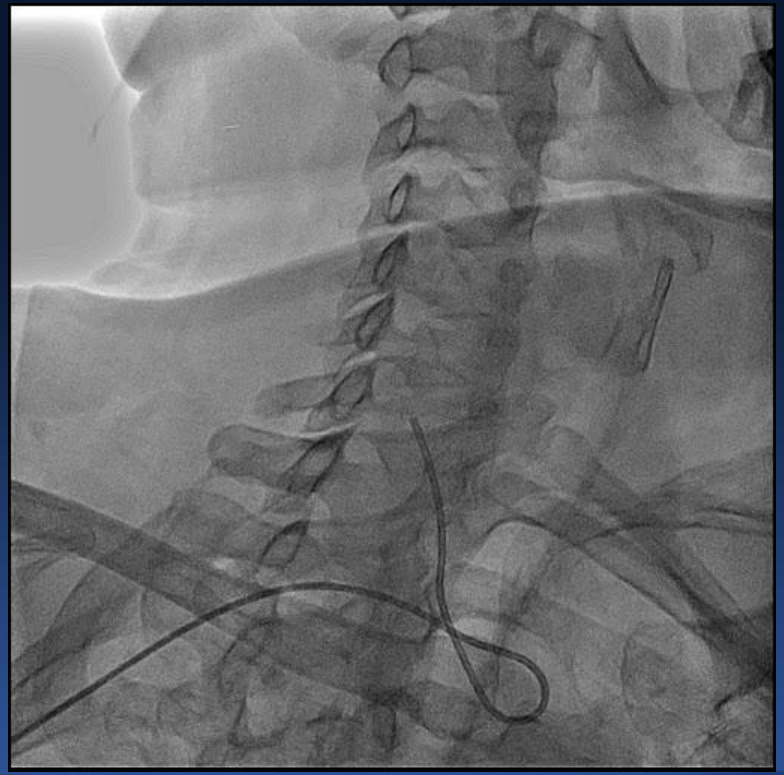
C. T.

63 y.o

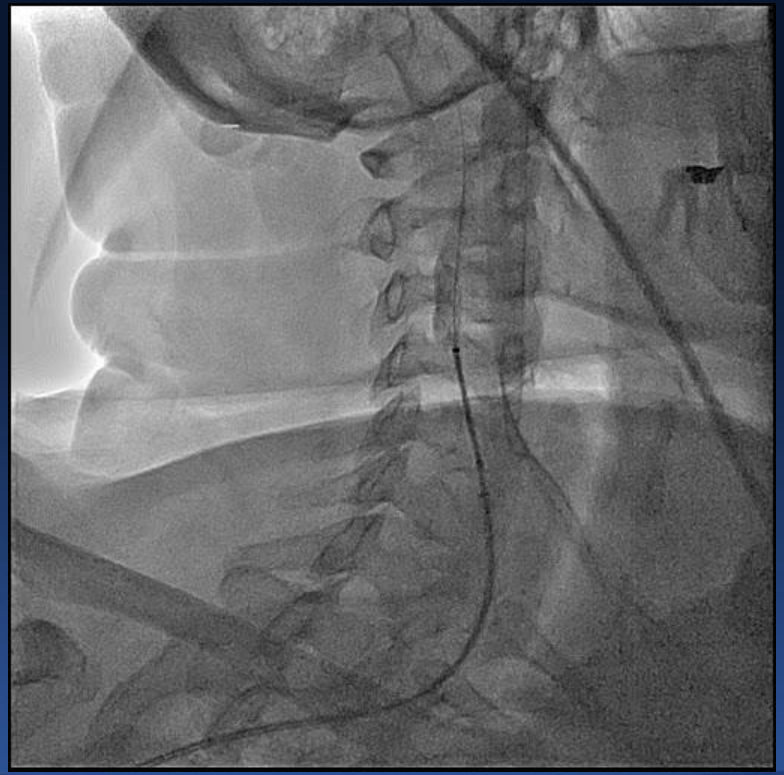
LICA occluded



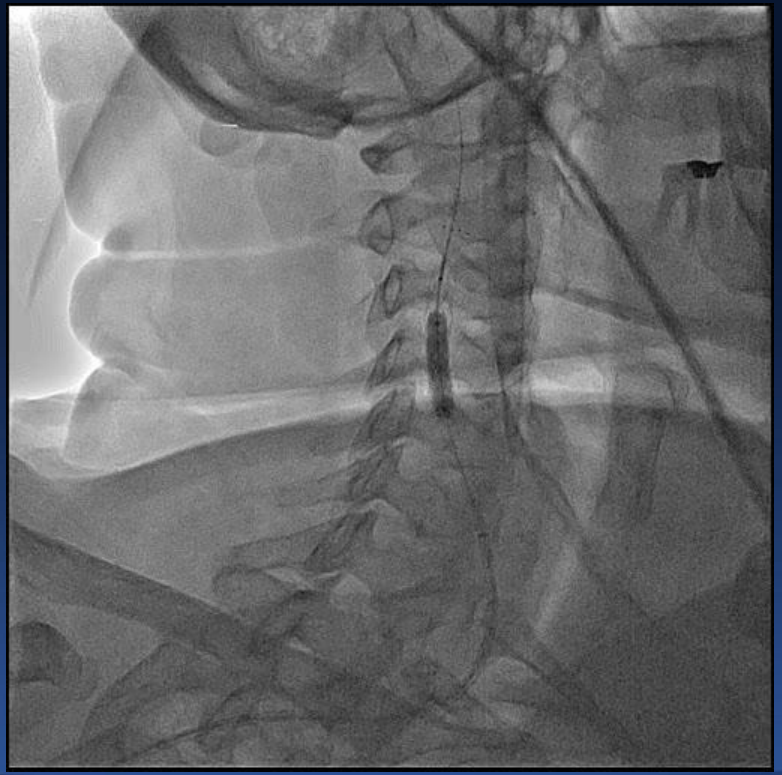
RICA



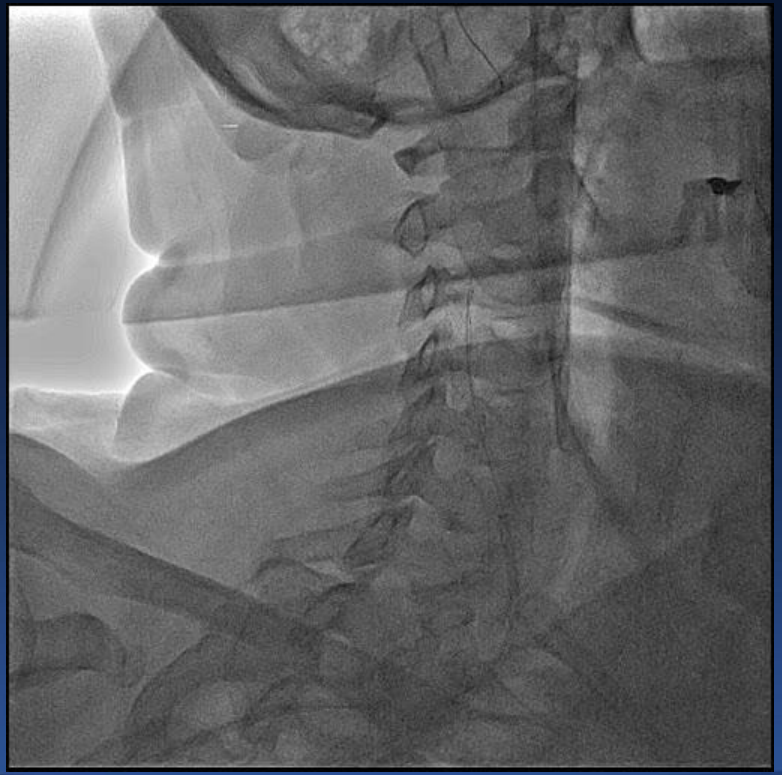
Stent Roadsaver 8.0/25

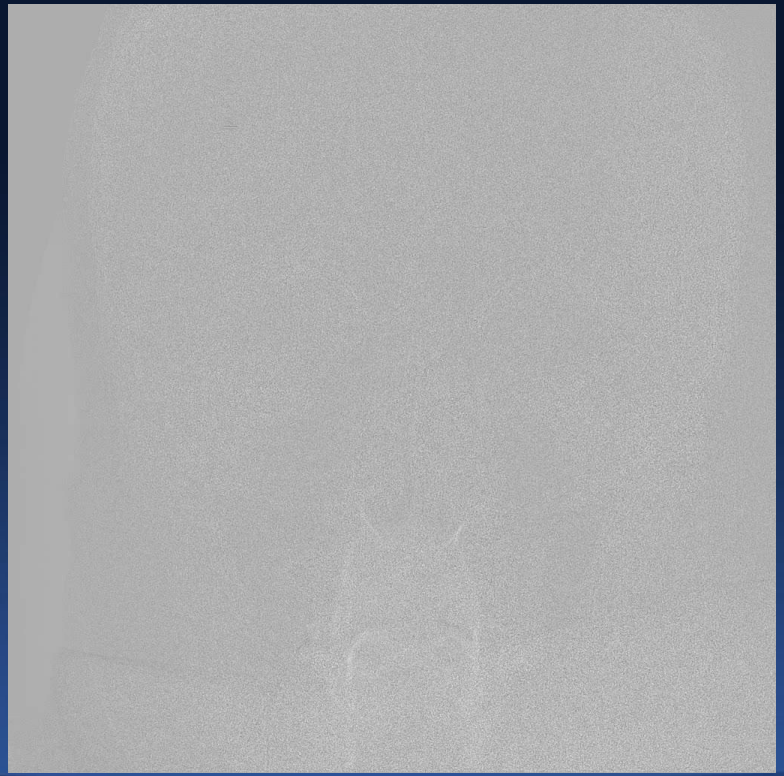


Paladin system



Final result





Case 5.

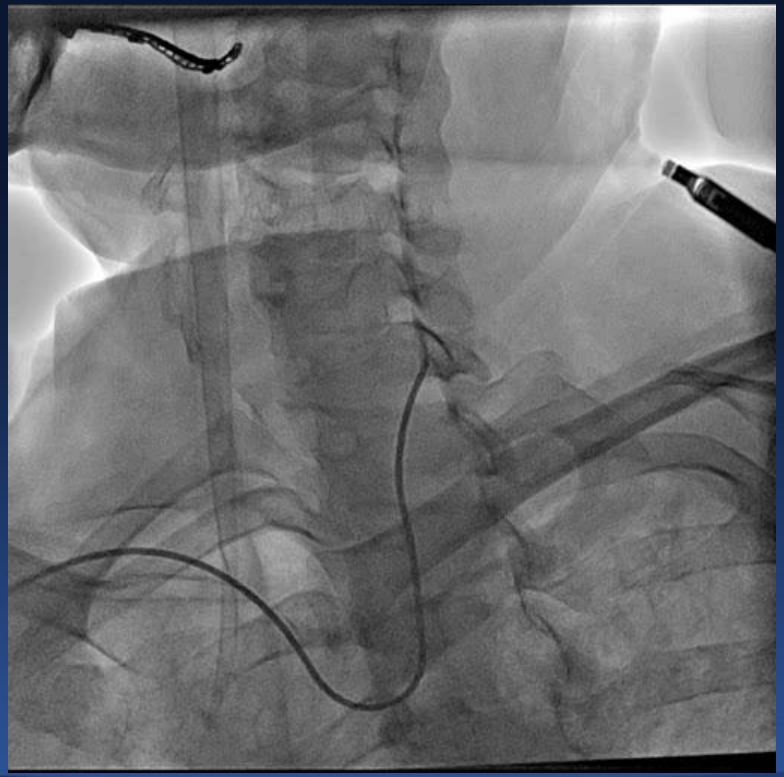
TRA CAS of LICA in patient with Acute Carotid Syndrome

Male
K. A.
58 y.o.

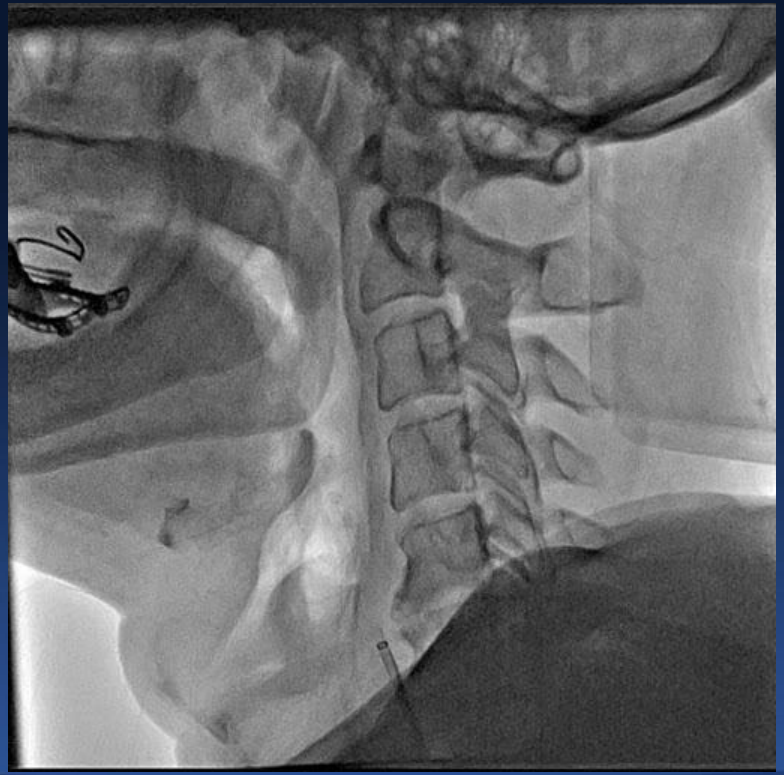
Right RA

After additional vasodilators

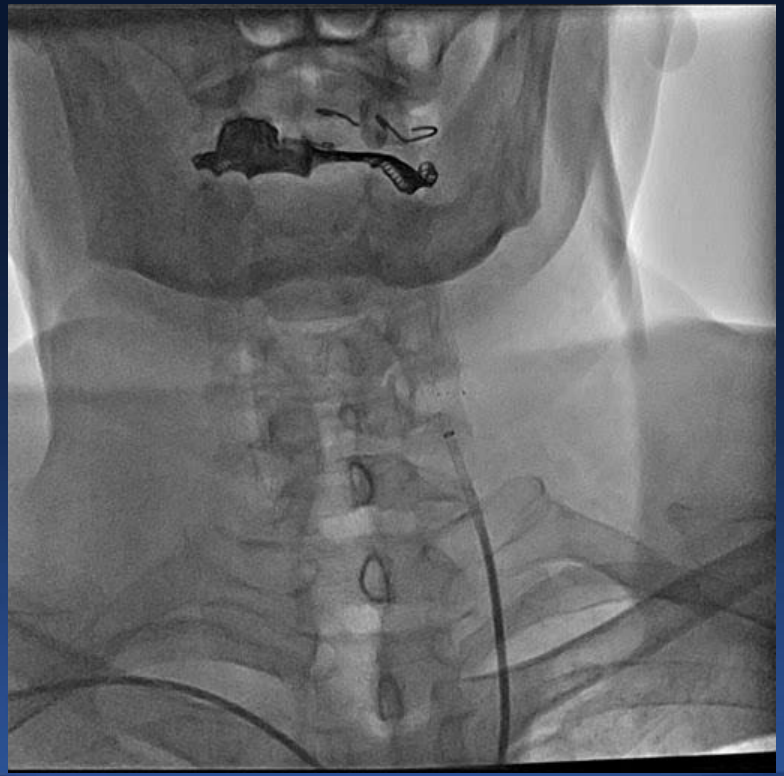
Thrombotic subocclusion of LICA



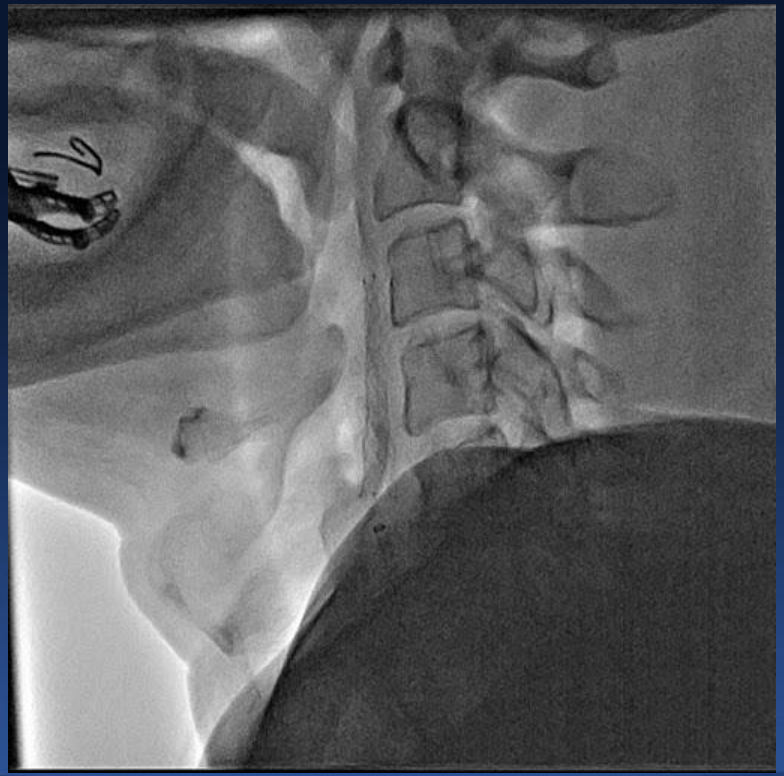
Destination 5F



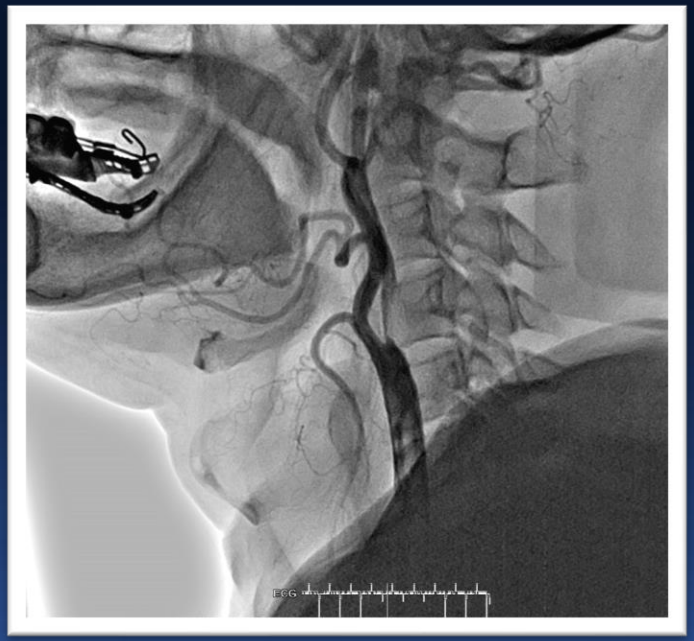
Final result

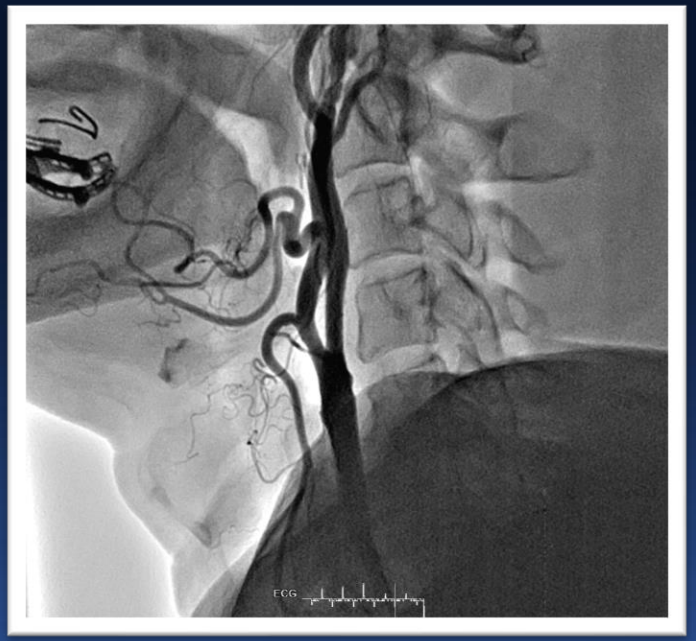


Final result



Before / After





RRA CAS of LICA
in symptomatic patient

- Triple protection

Male

K. P.

79 y.o.

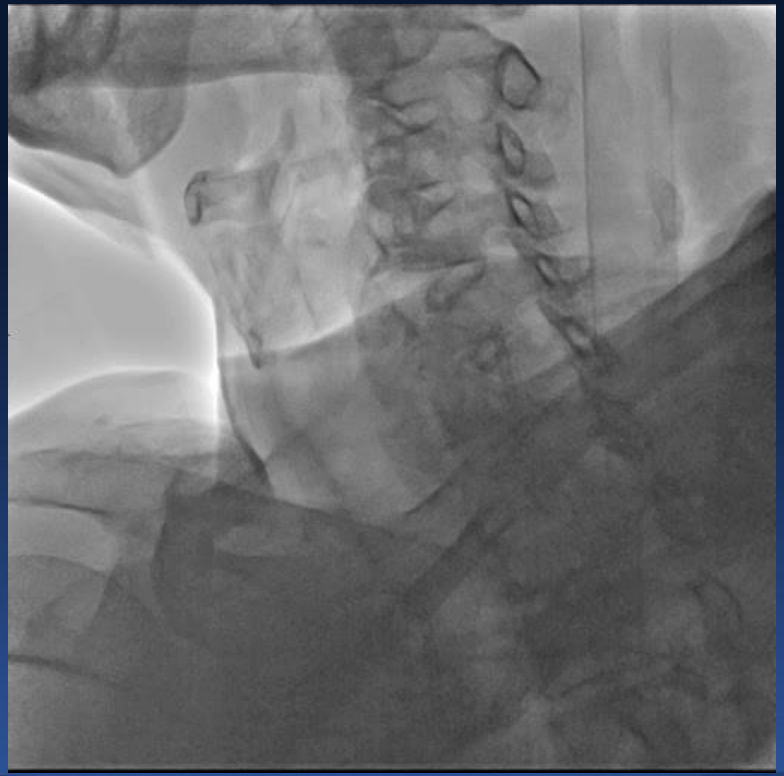
Severe clinical spasm of tortuous RA

Hydrophilic wire crossing

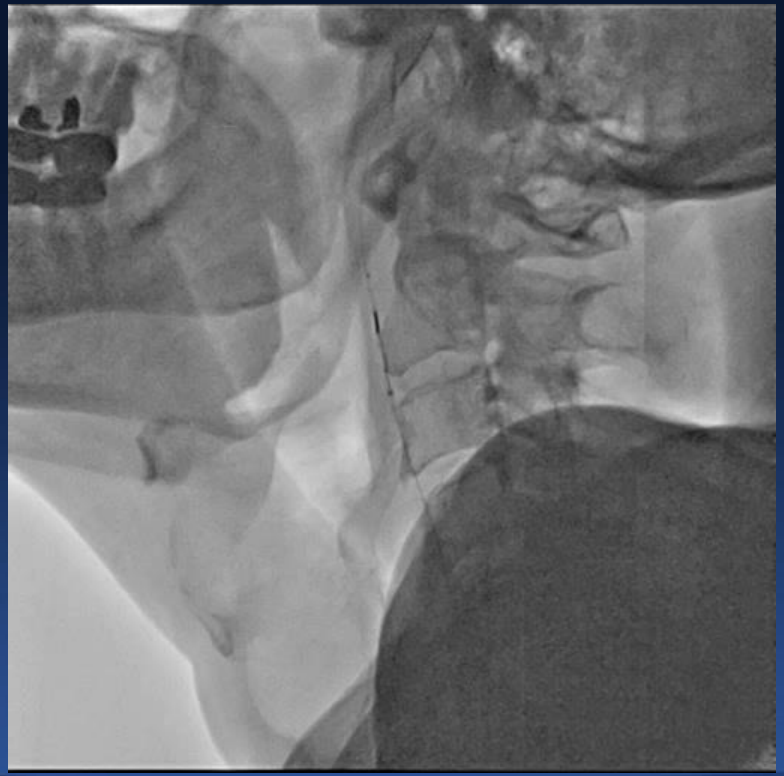
Hydrophilic wire crossing

Catheter crossing

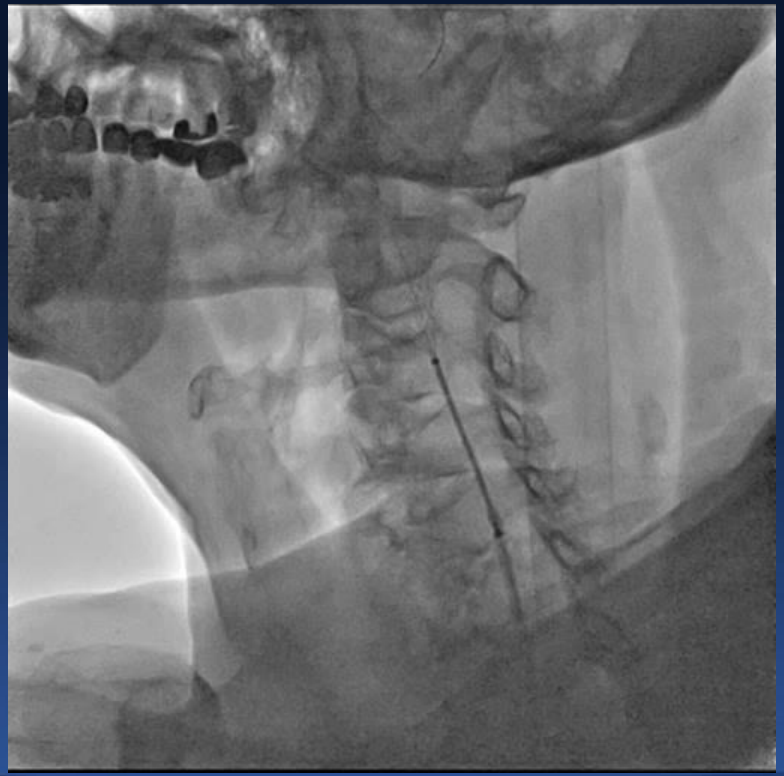
5F Destination: LICA 99%



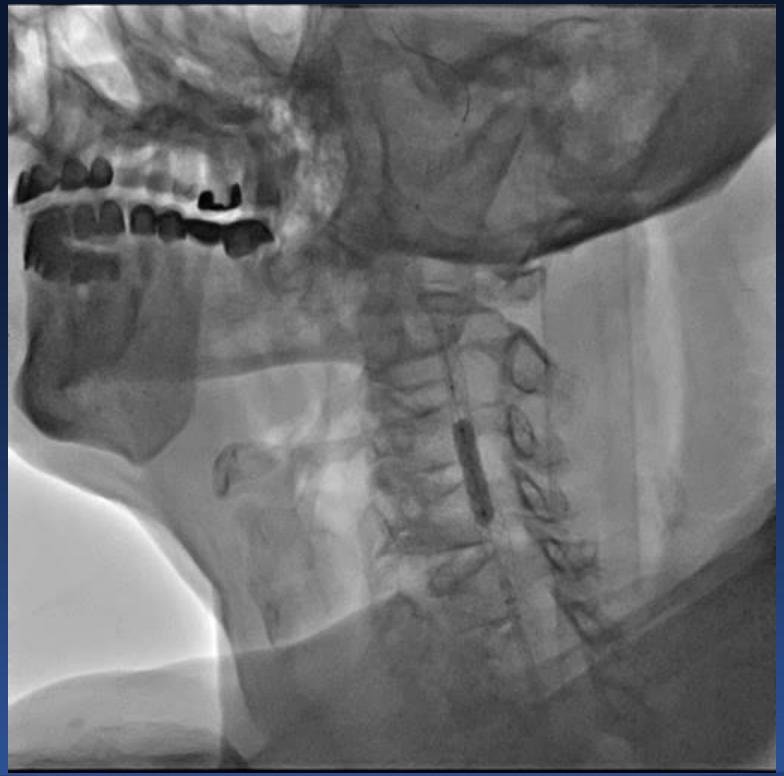
1. NAV 6



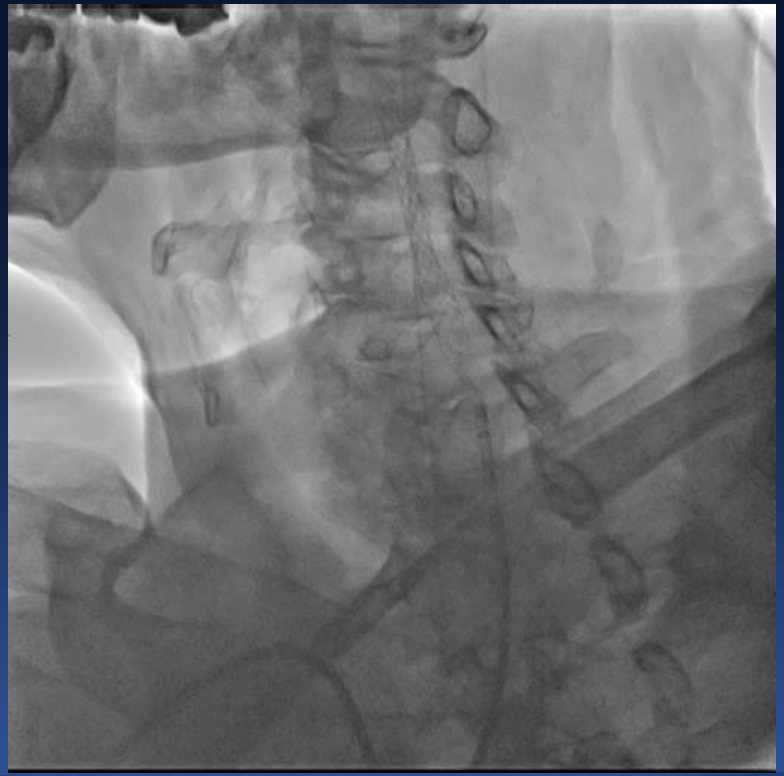
2. Stent: Roadsaver



3. Paladin system



Final result



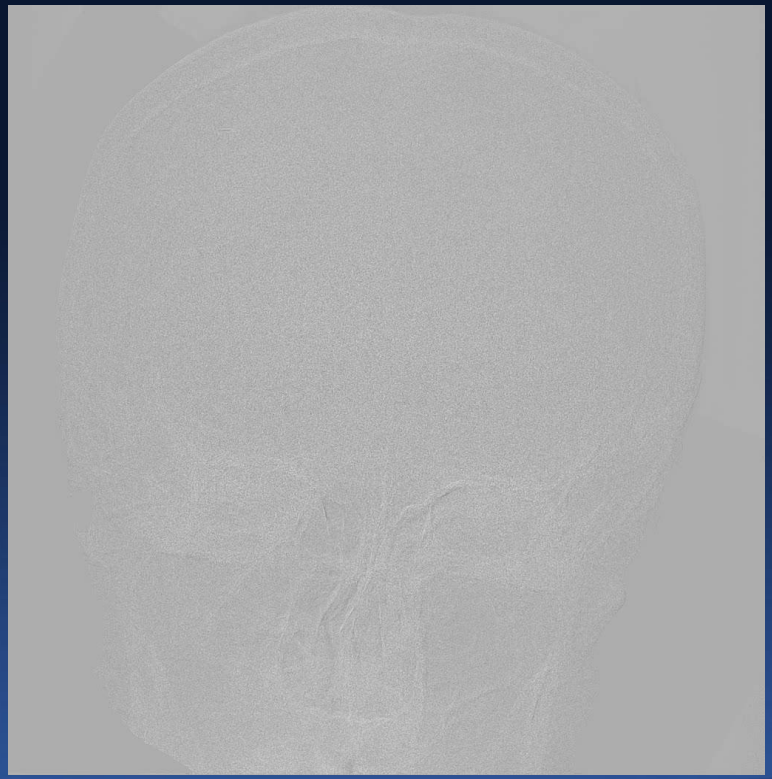
*R*RA CAS of bovine arch LICA and ipsilateral IC aneurysm

Female

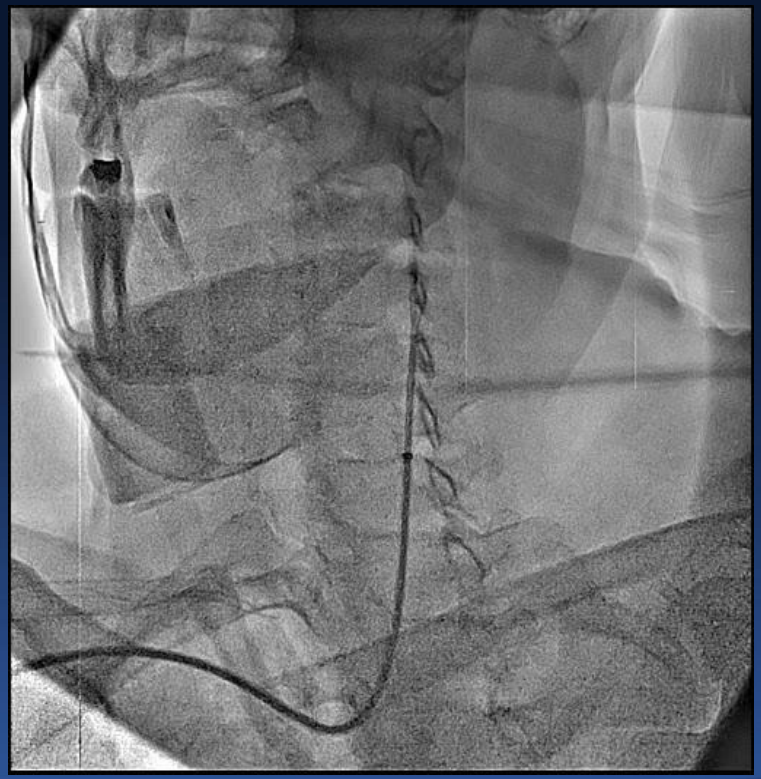
P. G.

49 y.o.

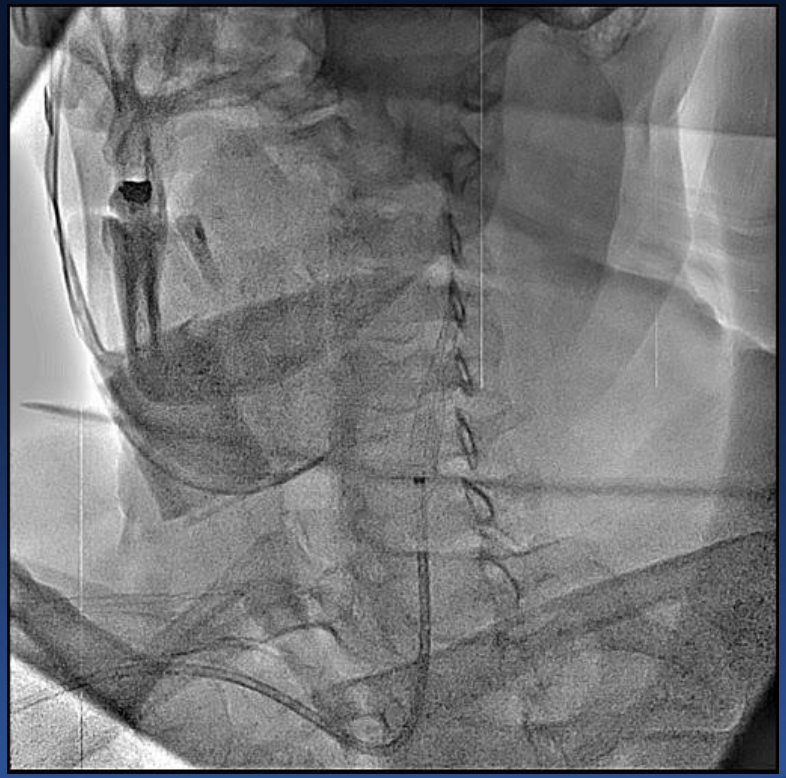
RRA: 6F Shuttle sheath

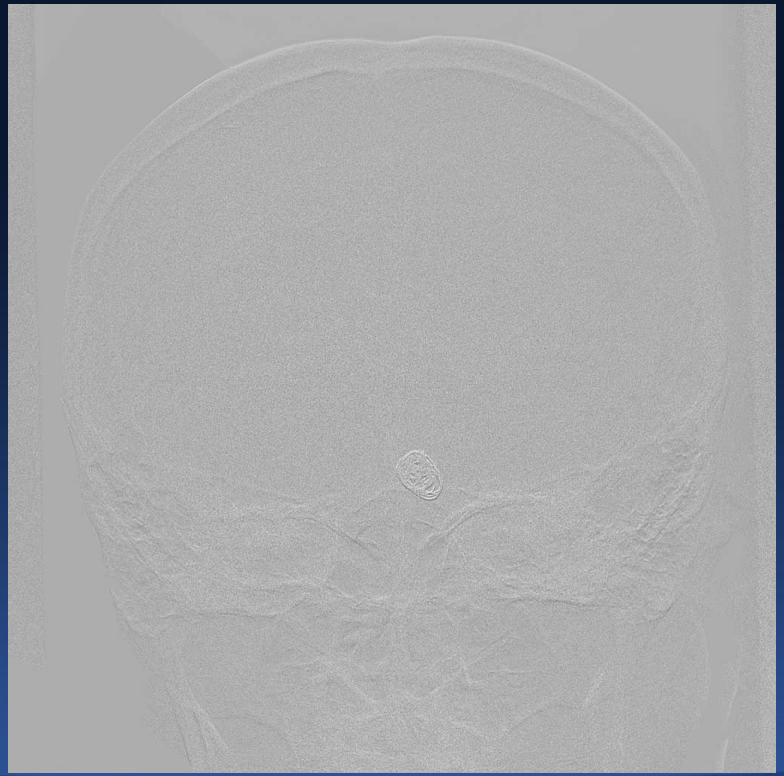


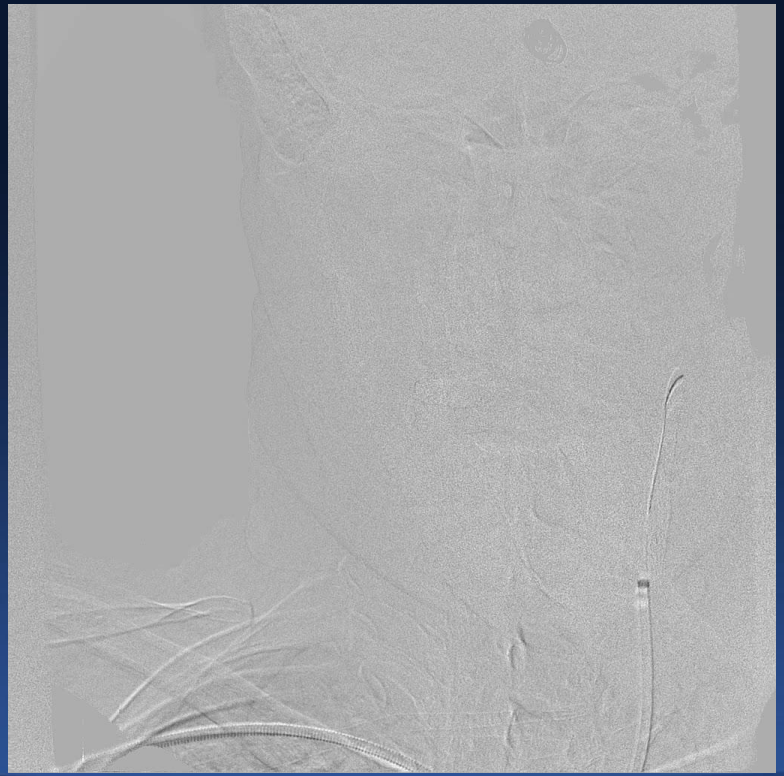
Xact 8-6/30



6F soft GC





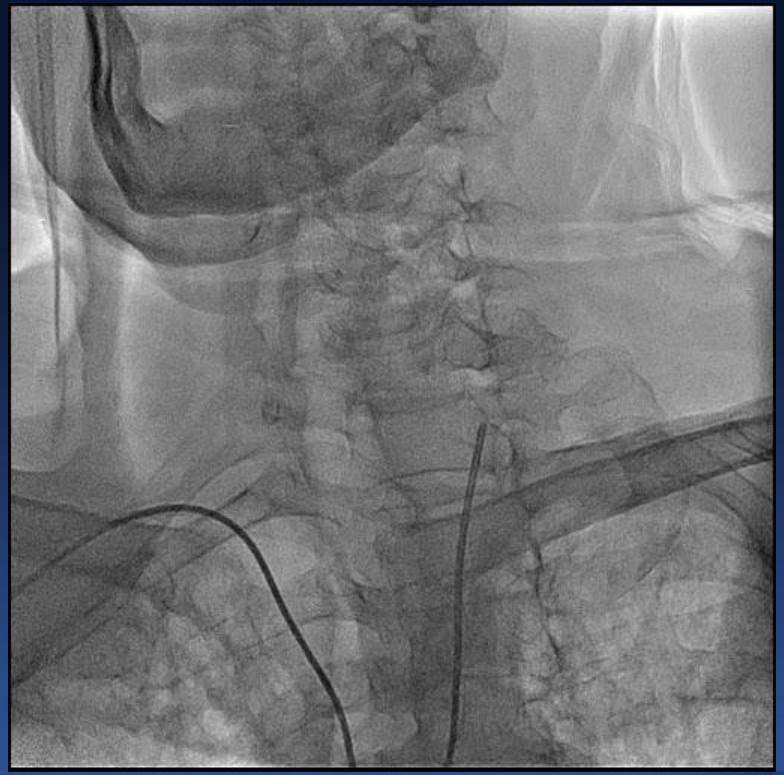


Right RA CAS of LICA With MoMa Proximal Protection

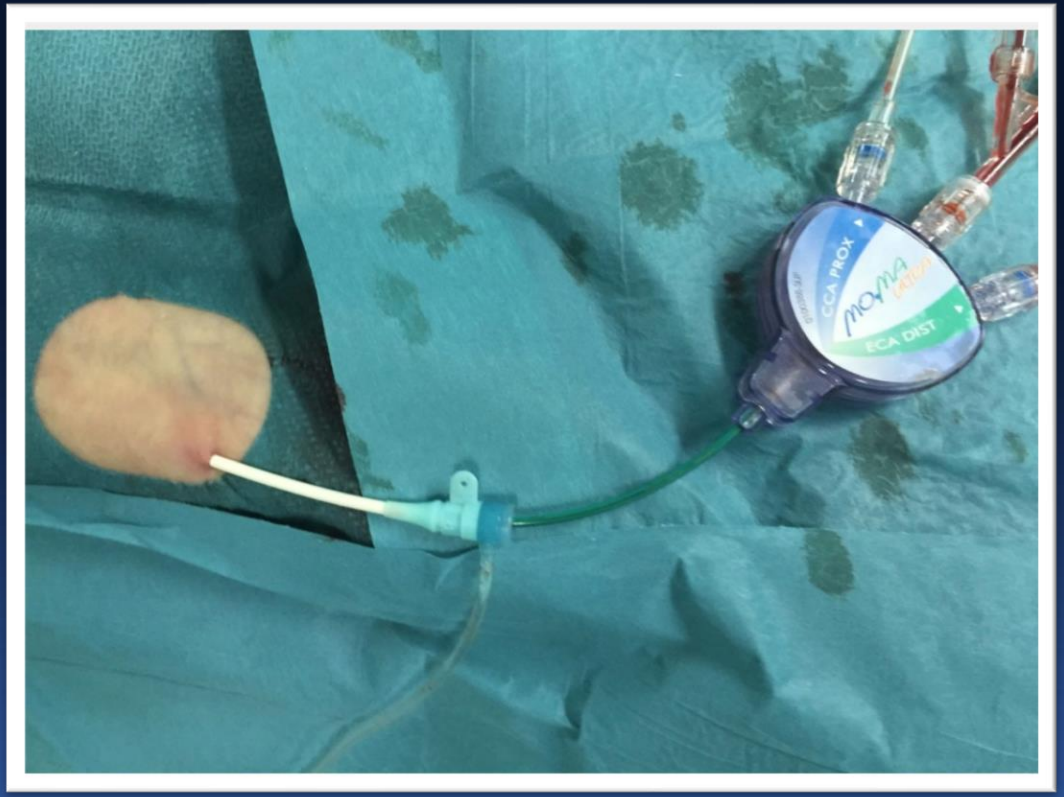
Male
S. P.
59 y.o.

Right RA

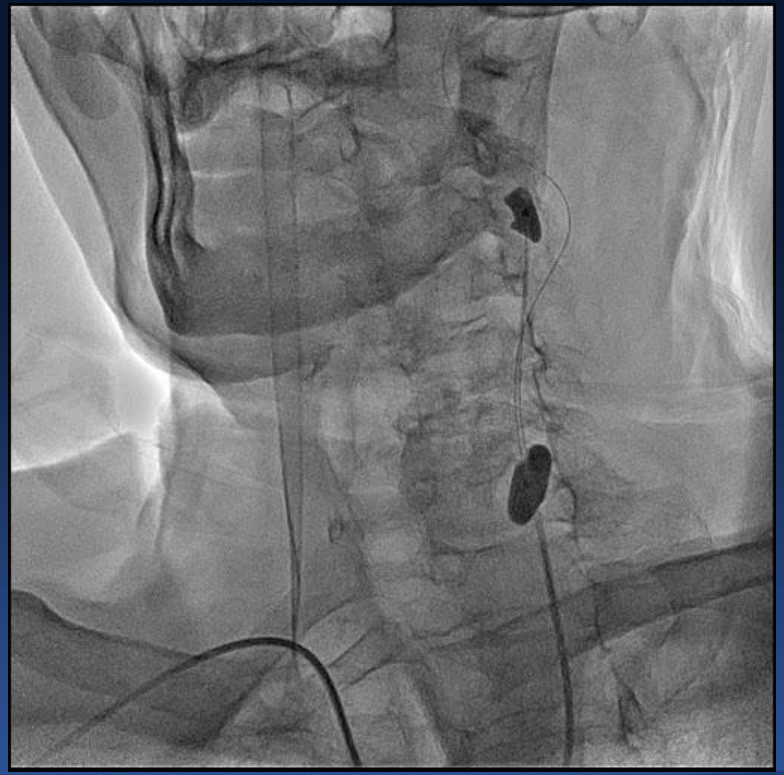
LICA 95%

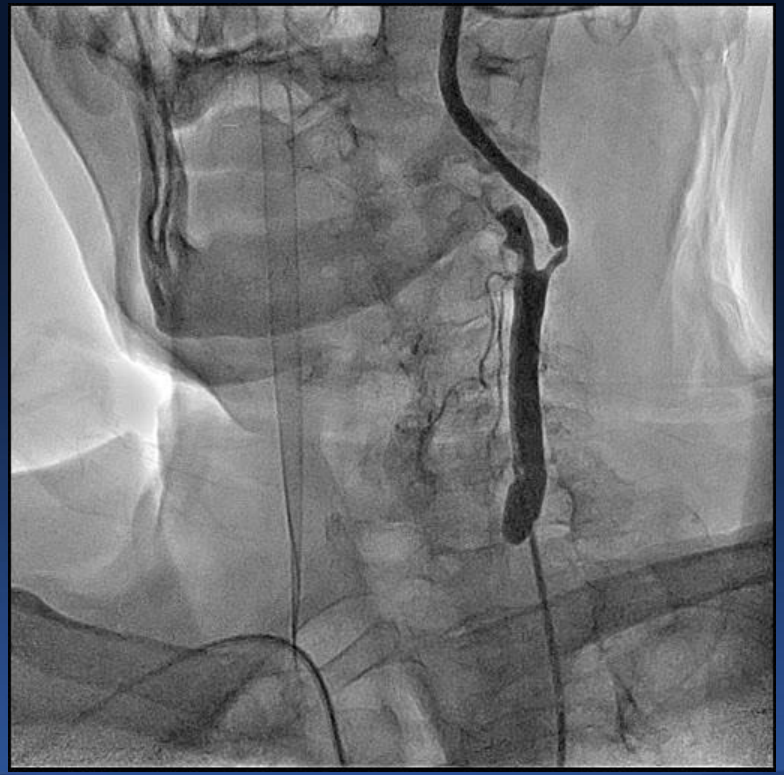


8F - MoMa PPD



MoMa PPD





Final result

Wrist access (radial & ulnar) CAS

DISADVANTAGE

- Significant learning curve for new TRA operators
- Sometimes longer procedure for “easy case” with type I aortic arch
- Proximal PD and larger devices could not be used freely in all cases
- Radial artery occlusion ≈ 10 %

Wrist access (radial & ulnar) CAS

MISTAKE

- ***Perform TRA occasionally!***
- ***Perform TRA only when FA is not possible!***

Conclusions

- Wrist access for CAS is feasible and safe when performed by experienced RA operator
- Easy access for CAS in in complex aortic arcs- bovine arch LCCA and most of the innominate artery take offs
- Allows early patient mobilization
- Eliminates access site bleeding complications
- Further studies are needed before recommending wrist access for CAS as primary approach