21st CARDIOVASCULAR SUMMIT

TCTAP2016

April 26-29, 2016

coex, Seoul, Korea

Radial Access for Carotid Stenting:

Why Do We Need to Develop This Technique

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Potential conflicts of interest

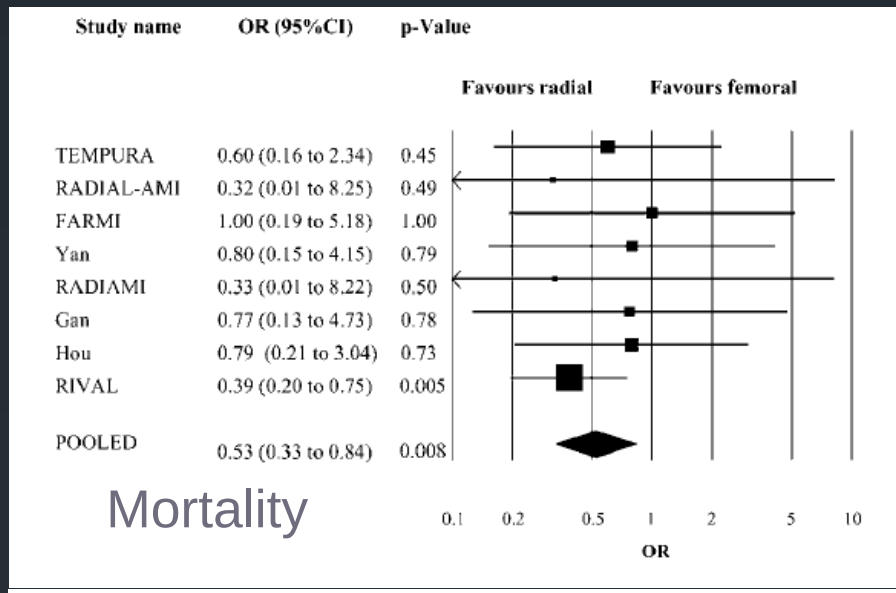
Piotr Pieniazek, MD, Ph.D.

- **I have the following potential conflicts of interest to report.**

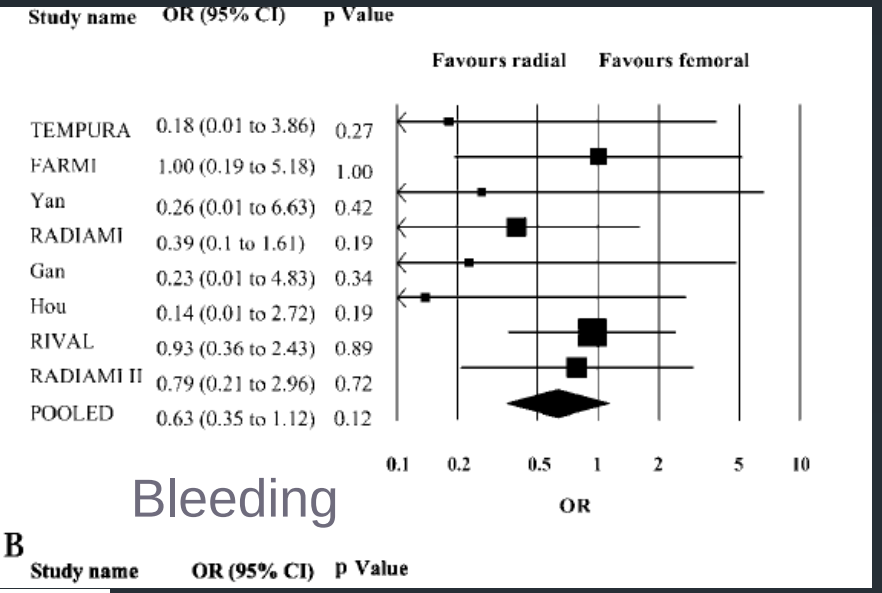
Consulting; Study Honoraria; Travel Expenses; Trials Involvement:

- **Boston Scientific**
- **Abbott**
- **Medtronic**
- **Terumo**
- **Cordis**
- **Astra Zeneca**

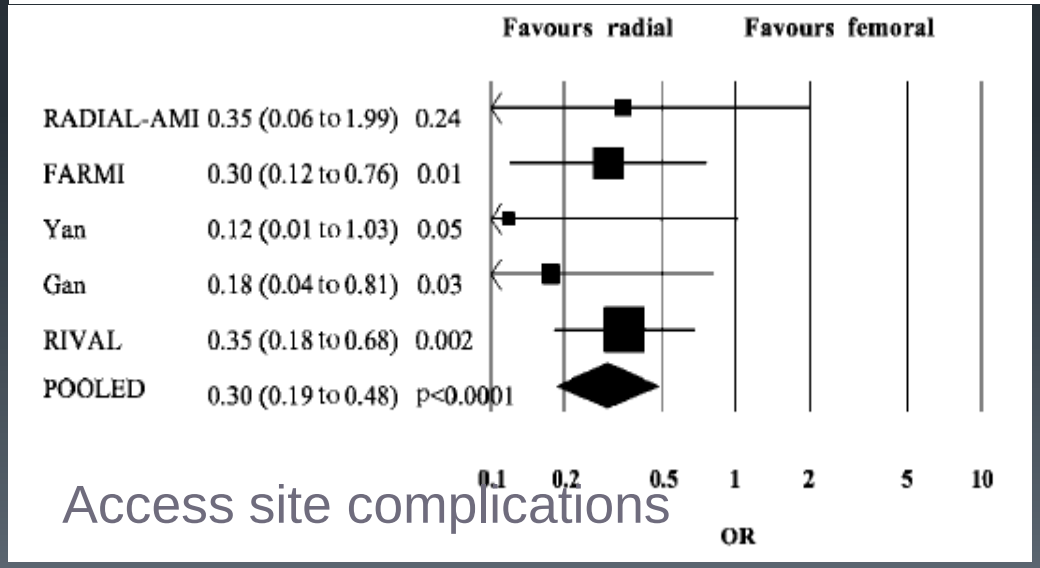
Why Do We Need to Develop CAS via Radial Access ????



Mortality



Bleeding



Access site complications

Meta-analysis of Radial vs. Femoral in STEMI pts

Mamas et al Heart 2012

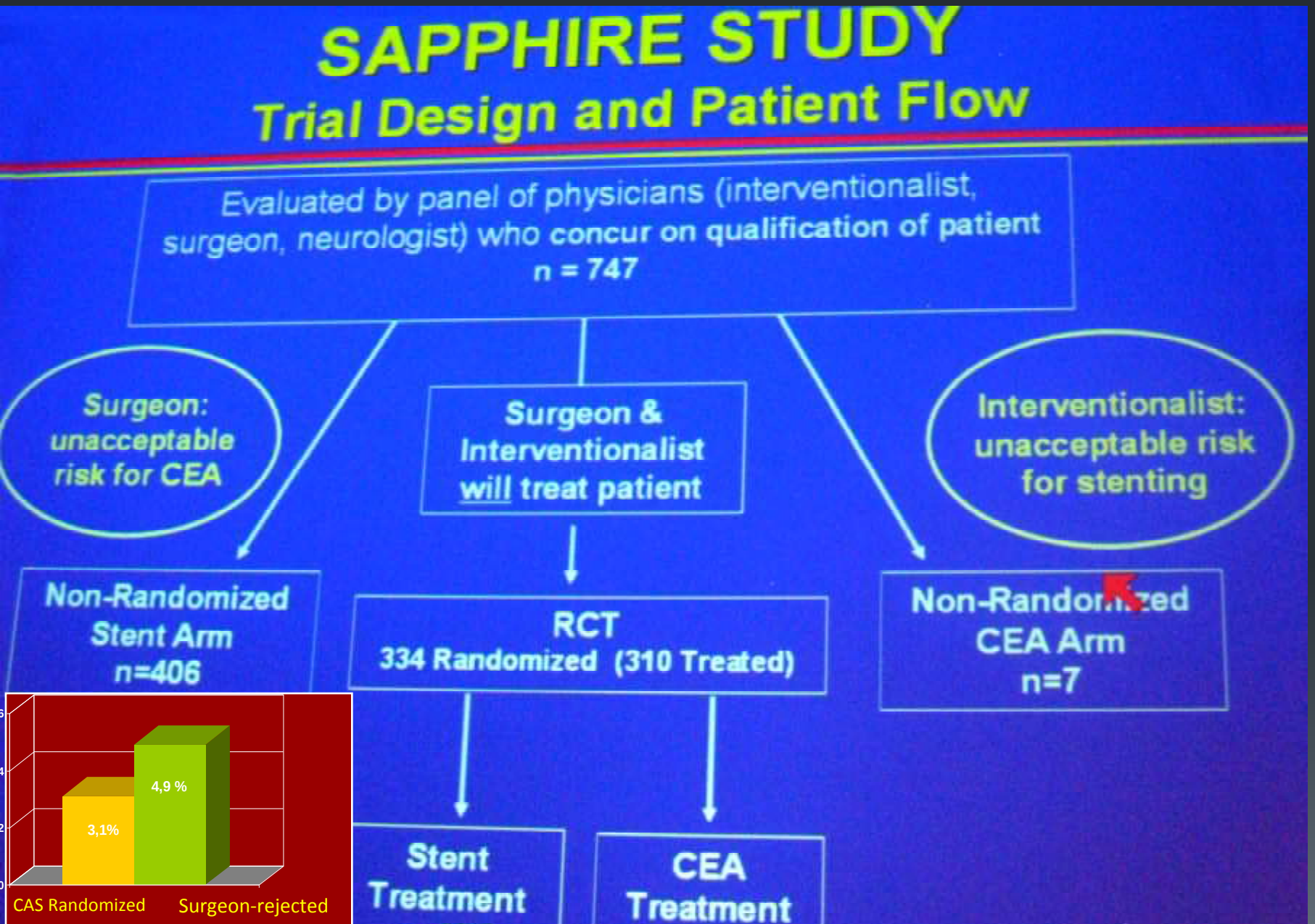
High risk criteria for CEA

Anatomical Criteria	Medical Comorbidities
Lesion at C-2 or higher	Age ≥ 80 yrs
Lesion below clavicle	Class III/IV congestive heart failure
Prior radical neck surgery or radiation	Class III/IV angina pectoris
Contralateral carotid occlusion	Left main/≥2 vessel coronary disease
Prior ipsilateral CEA	Urgent (<30 days) heart surgery
Contralateral laryngeal nerve palsy	LV ejection fraction ≤30%
Tracheostoma	Recent (<30 days) myocardial infarction
	Severe chronic lung disease
	Severe renal disease

Bates et *al.*
ACCF/SCAI/SVMB/SIR/ASITN
Clinical Expert Consensus Document

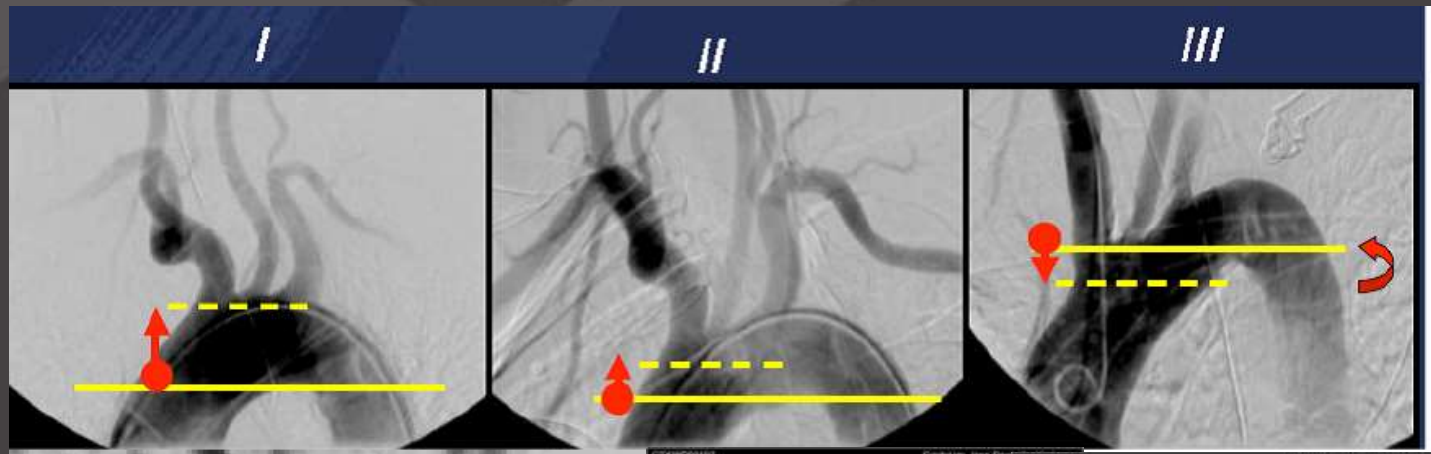
JACC Vol.49, No. 1,2007 January 2/9, 2007:126-70

Real world : VS too easily disqualify pts from the CEA

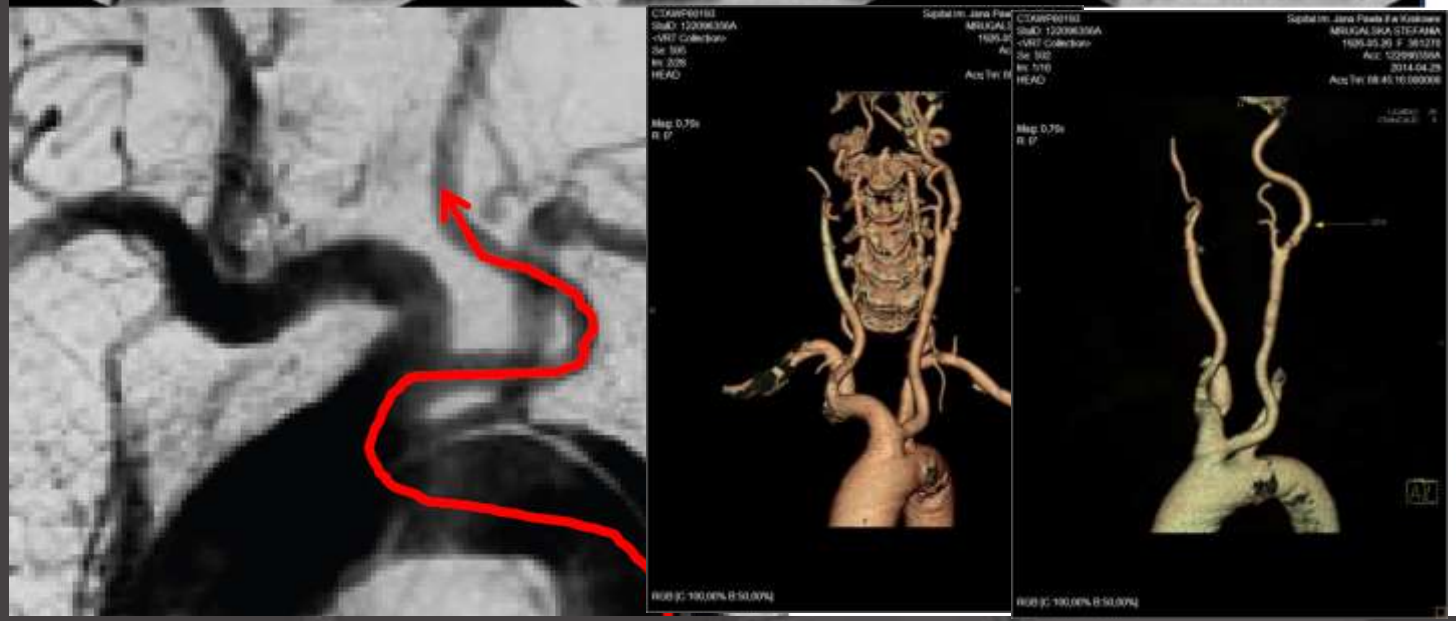


Access Site Complications:

Most Technical Failures are related to complex arch !!!



Aortic arch



Bovine arch

Caniulatiom difficulties of CCA during CAS

Why Do We Need to Develop CAS via Radial Access ????

Femoral Approach Limitations !!!

Aorto-Iliac disease or occlusion
(Lerishe'a Syndrom)

Previous surgical bypass at peripheral field

After stent graft implantation

Significant overweight

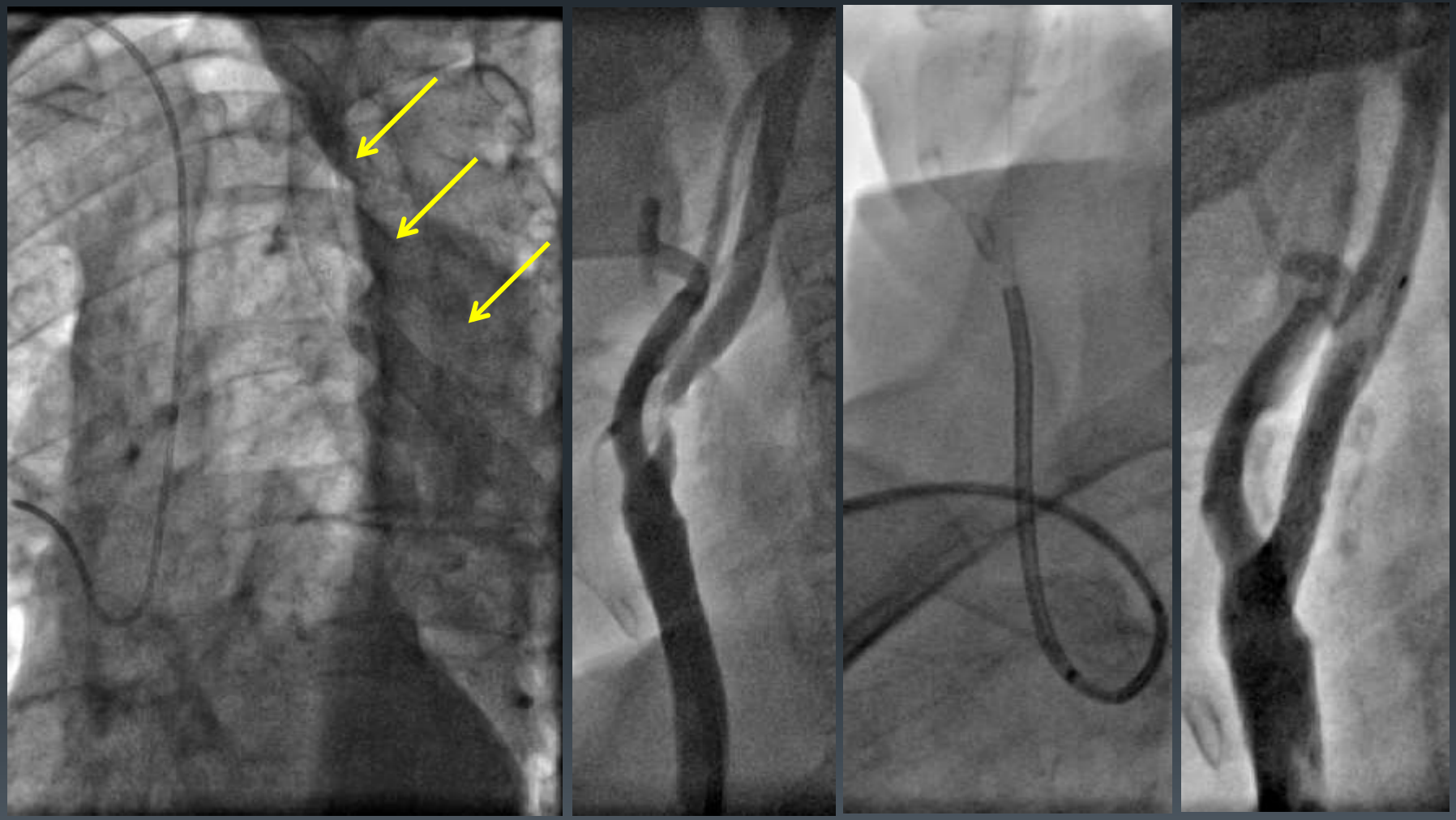
Large hernia

Spine disease difficulty in lying after CAS

Haematological disease or Coumadin therapy

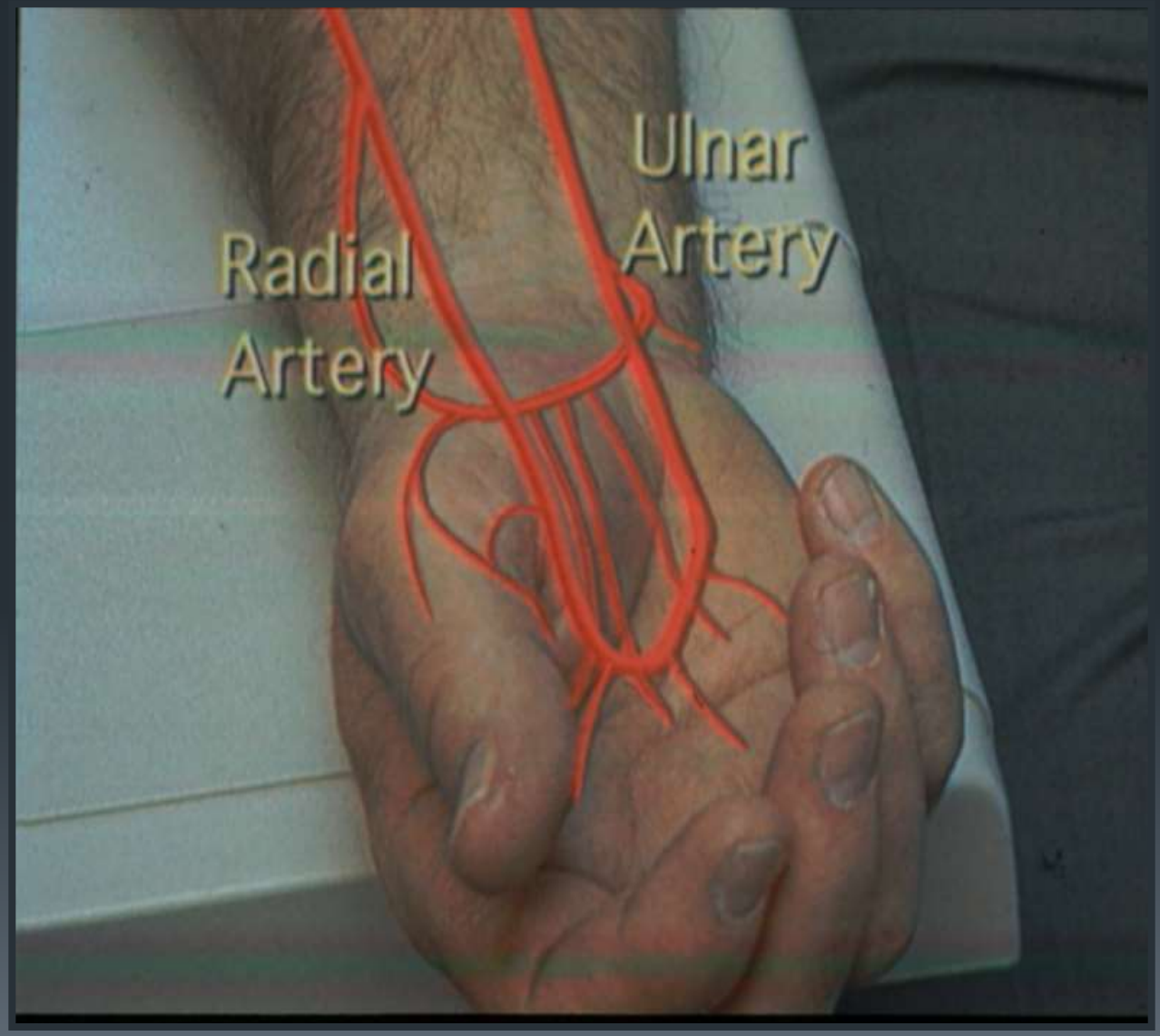
Unusual situation !!!!

RICA – symptomatic stenosis 90% + hanging 60mm stent who was moved to the descending aorta during LSA angioplasty!!!

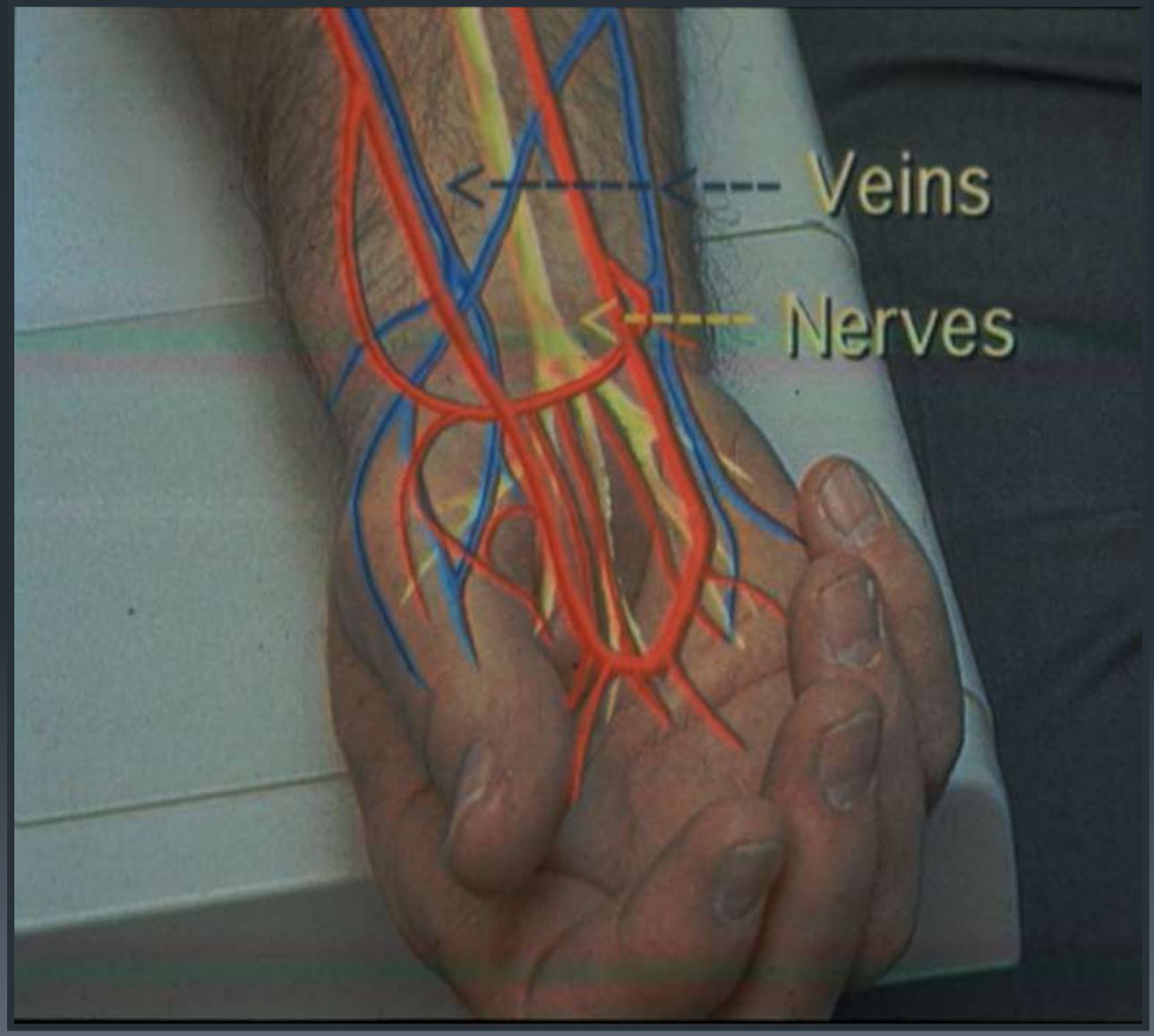


Patient Rejects any Possibility of Surgical Treatment . Very Gently RCCA Intubation and RICA Stenting via Right Radial Access !!!!

The Anatomy



The Anatomy



Allen's Test - Can be performed ± Oximetry test

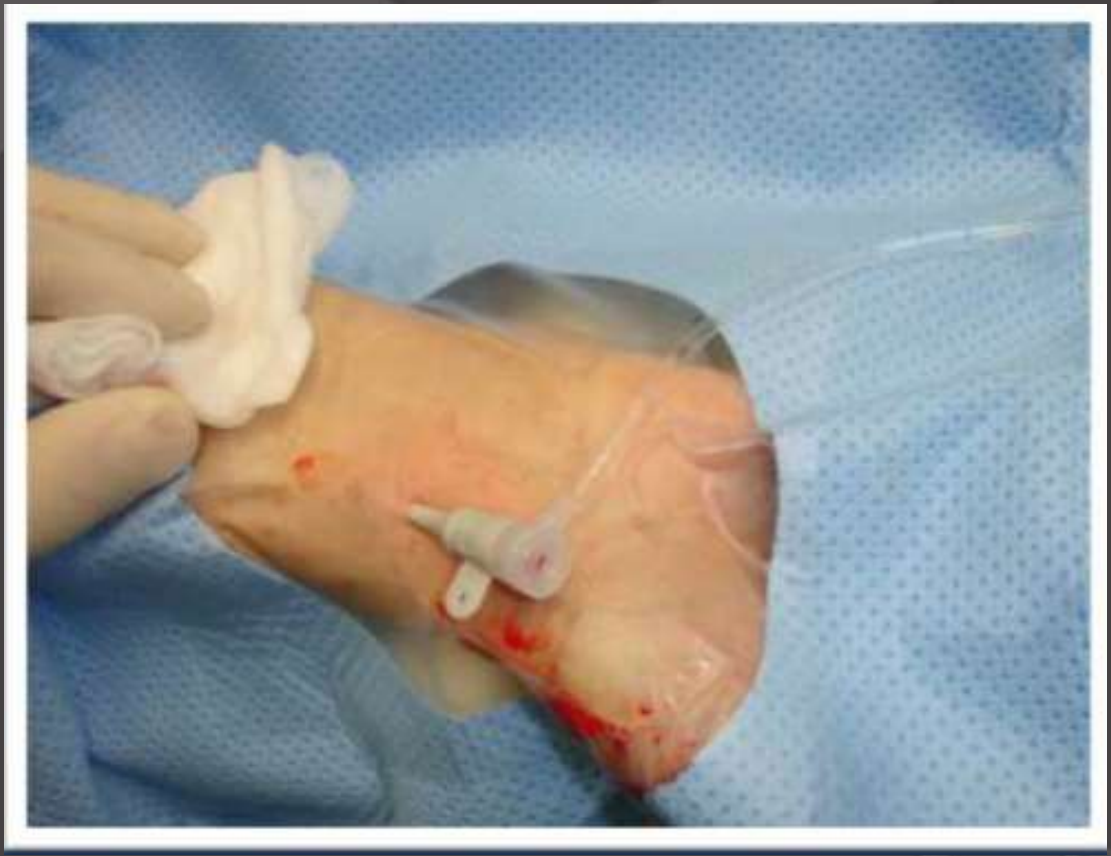
Peripheral vascular diseases. Edgar van Nuys Allen, MD and others with associates in the Mayo Clinic and Mayo Foundation; 2nd edition, Philadelphia, Saunders, 1955.

Allen's Test - Can be performed ± Oximetry test

- We recommend that, in the presence of an abnormal AT, the RA should not be used for cardiac catheterization unless the risk of using the femoral approach is excessive. Greenwood et al. JACC Vol. 46, No. 11, 2005, 2005:2013–7

Radial access - special transradial sheath 6F or 7F/11cm

Widespread use by cardiologists (6-8% radial artery occlusion)



Antispasmolitic coctail

2.5mg Verapamil

200ug Nitrologliceryn

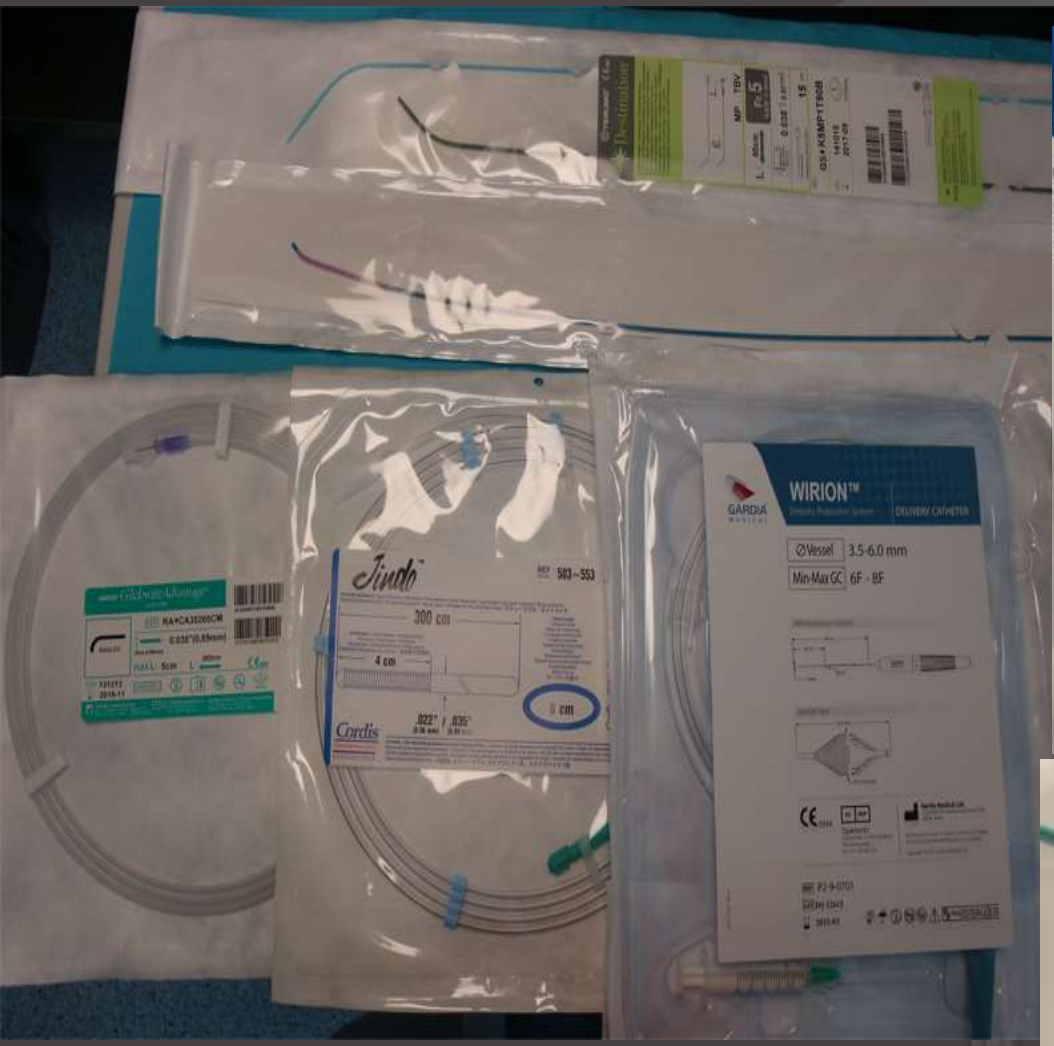
5000 IU Heparin

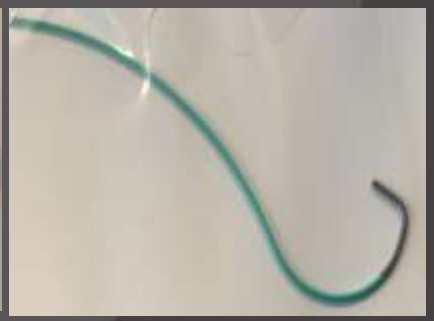
In pts with carotid artery stenosis the coexistance of CAD was observed in 69% pts.

Pieniążek P i wsp. Kardiol. Pol. 2004;61:II-48-56

I do not recommend 8F sheath and proximal protection !

Special devices is crusial for radial access CAS





Special dedicated diagnostic cath (Cobra 1&2 5F.)Flexibile Guiding Cath 6/7F or 5F sheath, Dura Glide Jindo or Glidewire Advantage, Independent Filter (Spider RX or Wirion)

Unique solution for transradial access intervention !!! Glidesheath SLENDER !

Save radial and ulnar artery to the next intervention

Competition Carotid Stents

"Mesh" Stents







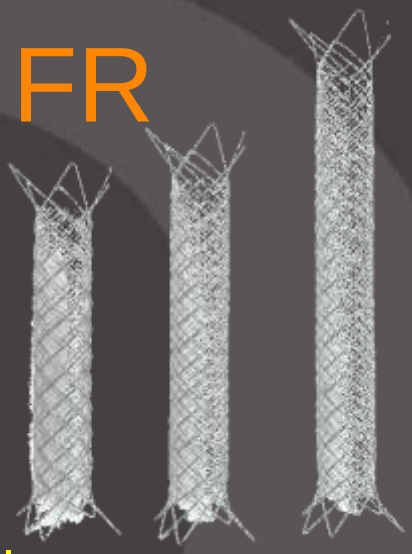


Terumo/ Microvention	Inspire MD	W.L. Gore	Abbott Vascular		Boston Scientific	Ev3/ Covidien/ Medtronic	Cordis/ Cardinal Health	Invatec/ Medtronic
Roadsaver	CGuard	Gore Carotid Stent	Acculink	XACT	Carotid Wallstent	Protégé	Precise Pro	Cristallo Ideale
0.38 mm²	0.15 mm²	0.44 mm²	2.36 mm²	1.89 mm²	1.397 mm²	4.93 mm²	2.36 mm²	3.23 mm²
Bench marking by Microvention								
375-500µm	150-180µm	500µm						
Advertising by Inspire MD								

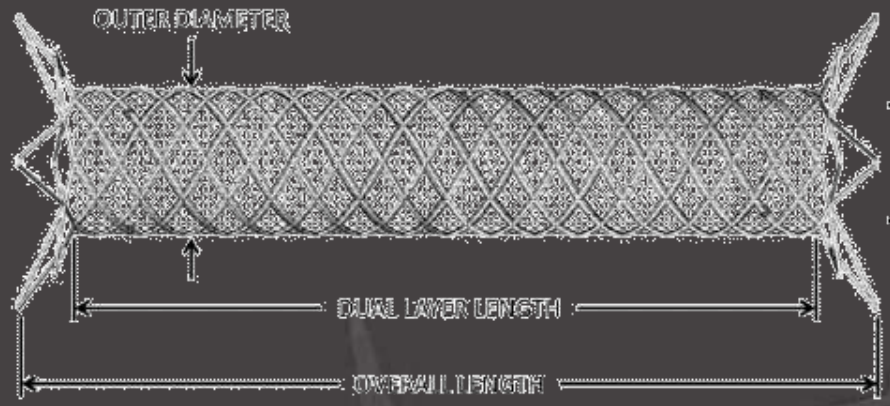
TERUMO INTERVENTIONAL SYSTEMS

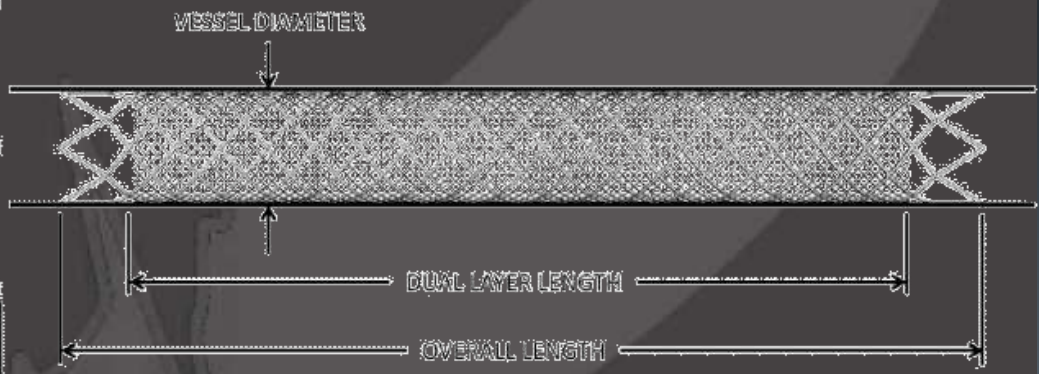
Table by Terumo, used with permission

RoadSaver Carotid Stent-All 5 FR

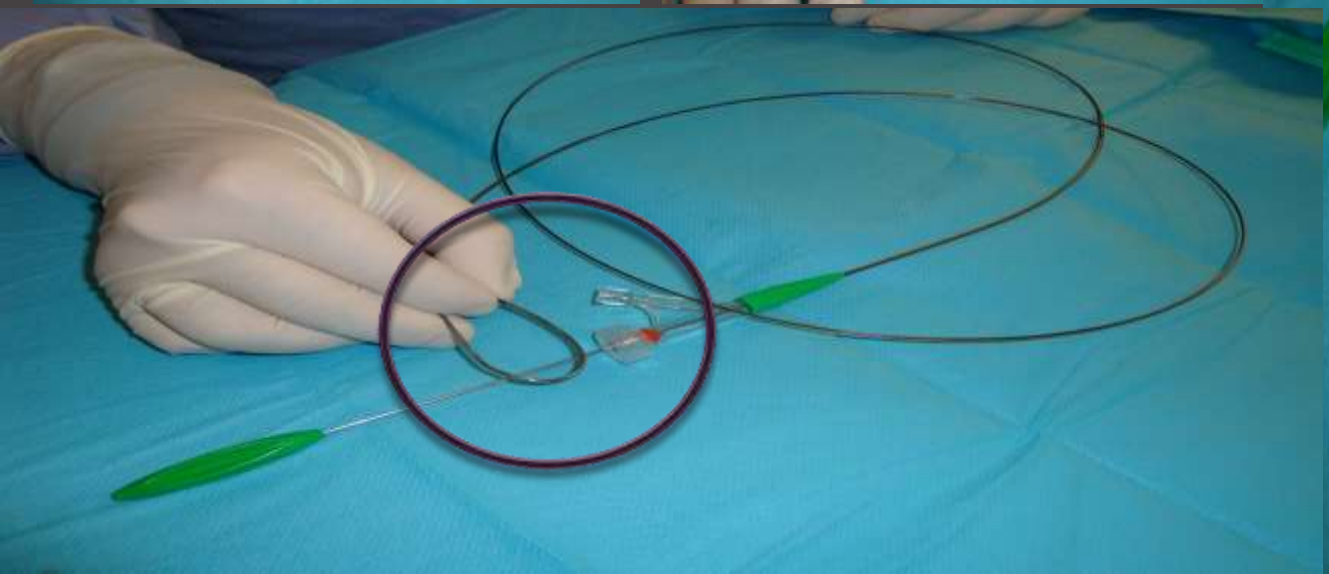


- double layer micromesh scaffold
- enabling sustained embolic protection by very tight plaque coverage
- embolic protection starts with implantation of the stent into the lesion and continues throughout the process of neointimalization
- up to 50% deployment full re-sheathable and repositionable

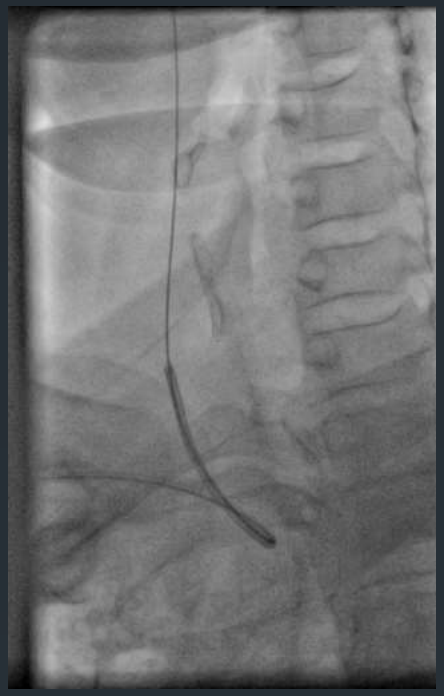




RoadSaver the most flexible carotid stent on the market



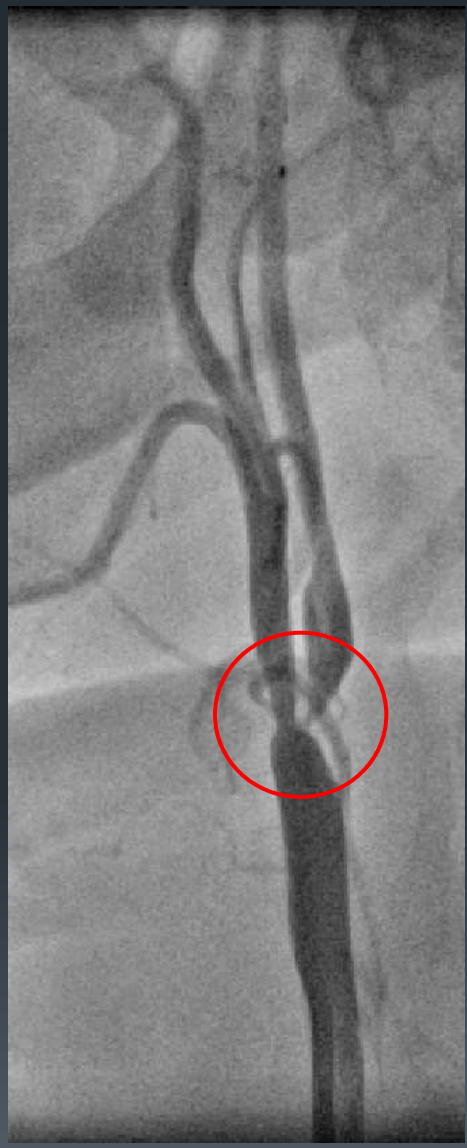
Simmons 1 – 3 5F the most useful diagnostic catheter



We use generaly right radial artery for both RICA & LICA CAS
One long GW 0.035” to ECA
Special Guiding Catheter: Guider Softip XF – 40XF
or 5F long sheath (Destination)
Very gently „ push and pull” technique.

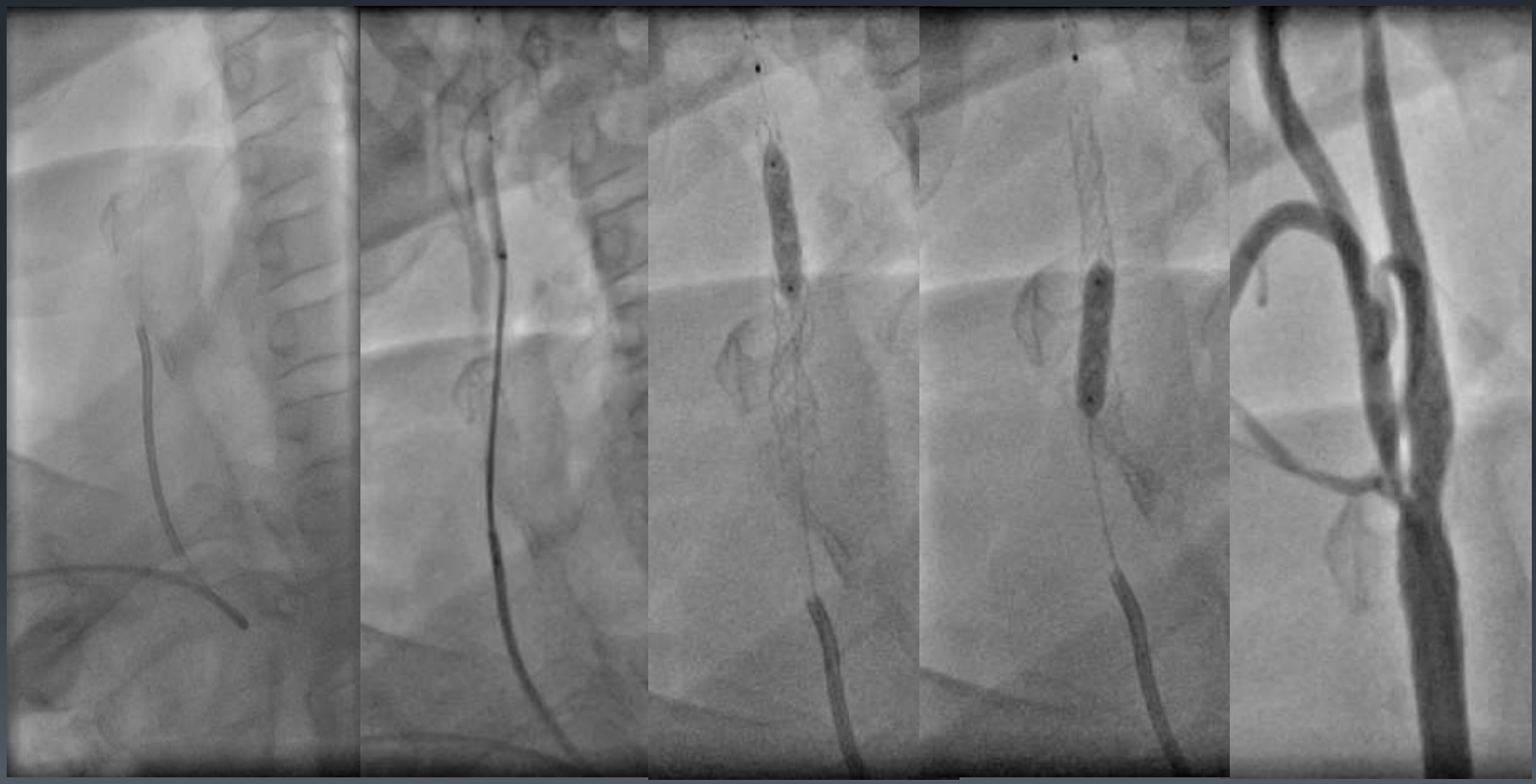
Radial access for CAS is always challenging procedure



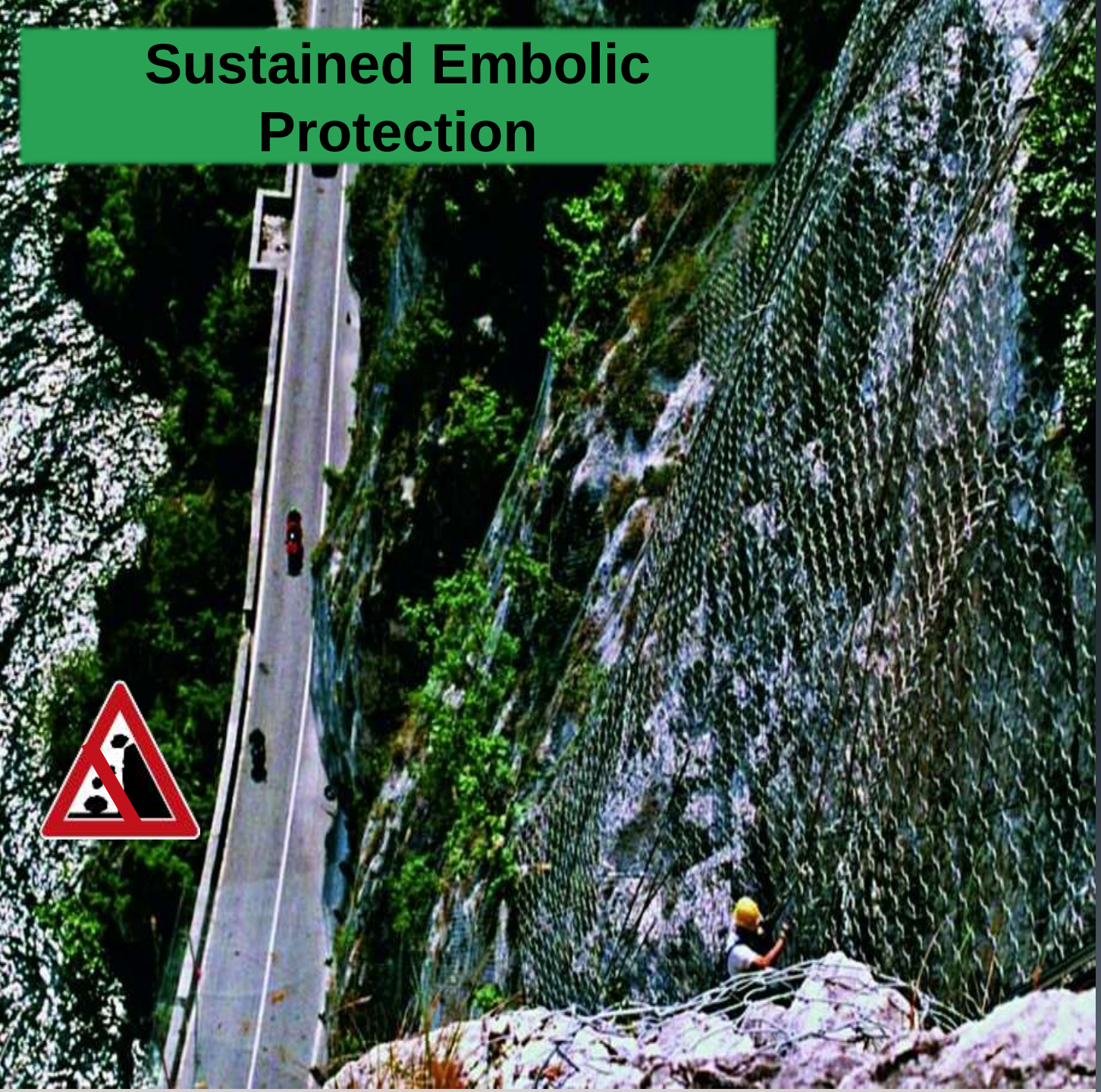



Delivery sheath required 1.5mm balloon predilatation for Spider RX placement

RoadSaver stent can be used for „Direct stenting” in all CAS procedures and should be preferred always from radial access!!



Sustained Embolic Protection



No access

after CAS from

radial approach

no immediately

angiography

in case

of embolic

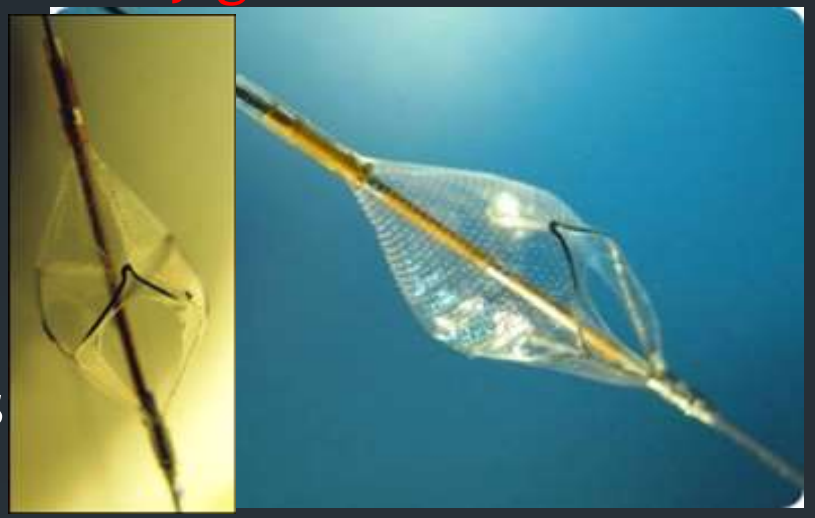
complications

WIRION The Ultimate Solution Recommended for Radial Access For Carotid Stenting

- The embolic filter that can be used with *any* guide wire
- Allows optimal filter positioning:

  anywhere on the guide wire

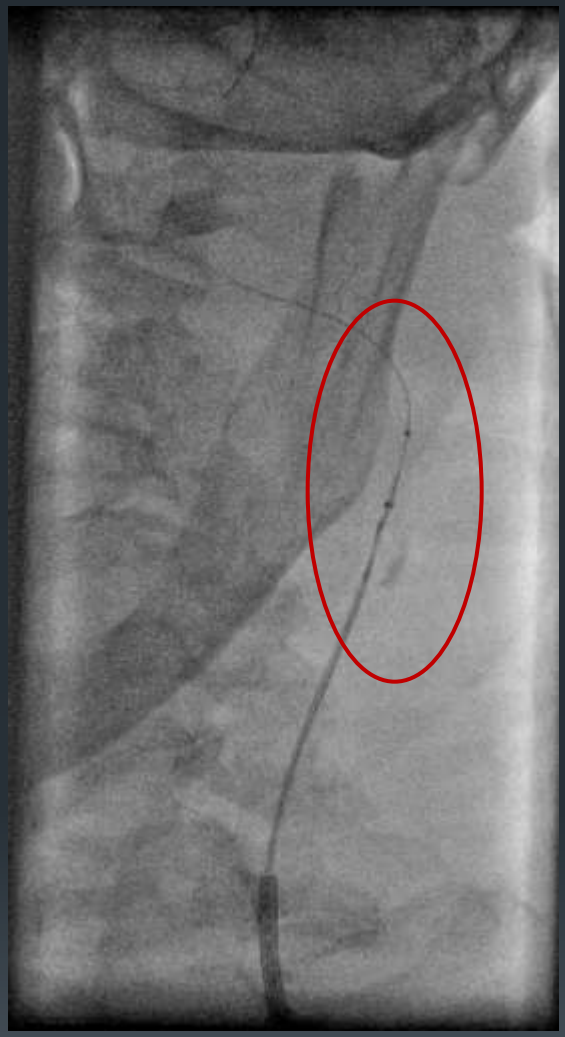
  anywhere along the vessel
- Suitable for a wide range of vessels
- Excellent deliverability
- Excellent support and stability
- Excellent visibility
- Superior retrieval technology !!!!!!
- Ready for use



Excellent feedback from medical community!

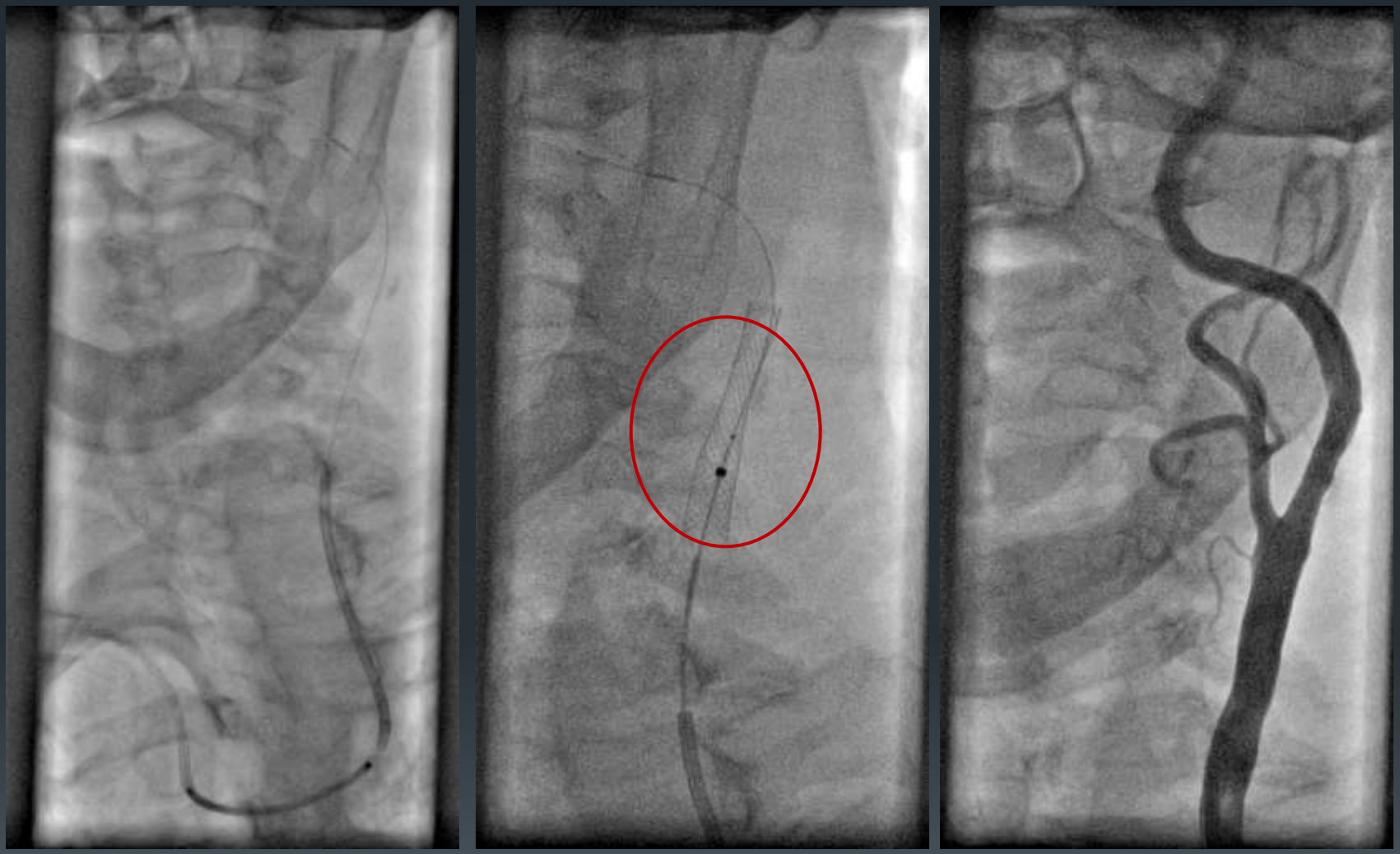
- ✓ Optimal wall apposition
- ✓ Strong capturing ability

Bovine Arch - not a problem with CAS from right radial access



Wiron Filter very easy crossing the lesion on coronary 0.014” wire

Bovine Arch – not a problem with CAS from right radial access



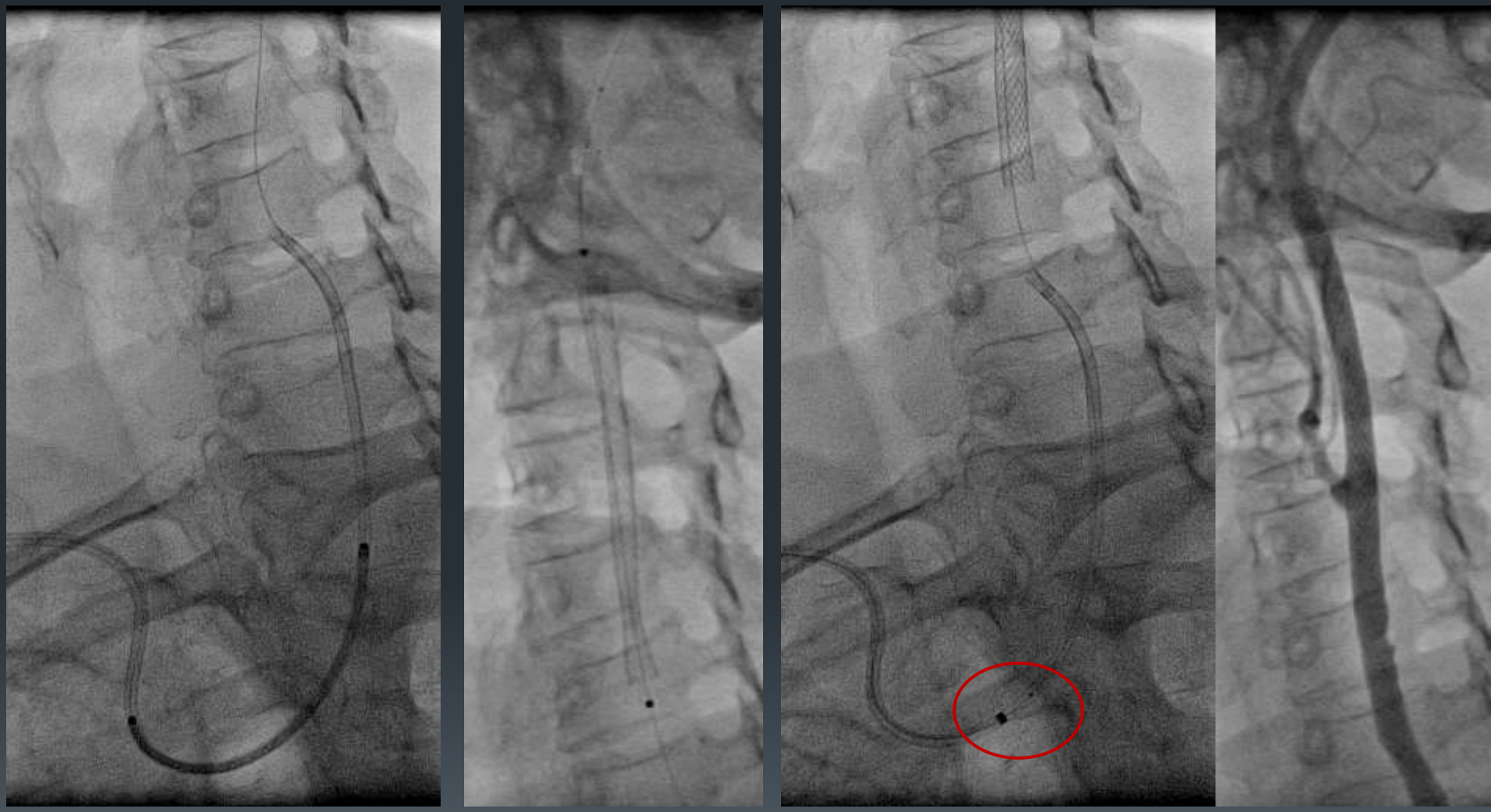
Conic soft tip facilitates easy advancing retriver accross the stent

Restenosis 6 Months After Surgical Carotid Endarterectomy

Pts selected for CEA due to difficult access to LCCA from femoral approach

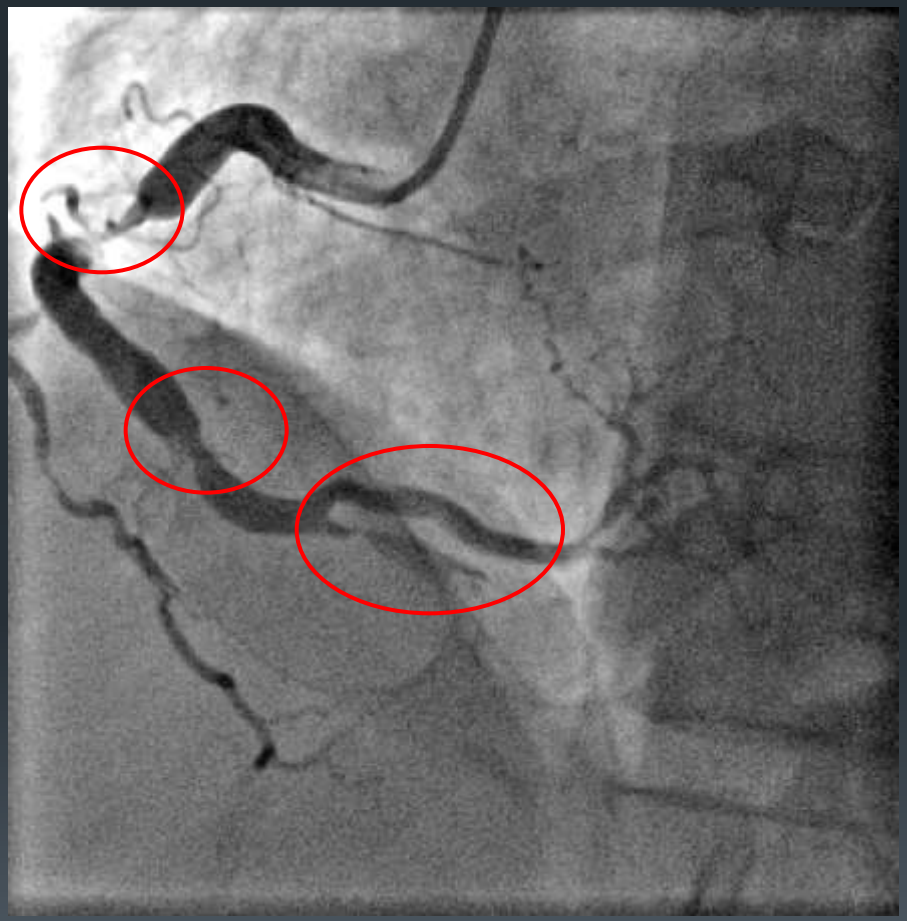
Bovine arch one of main indication for radial access for CAS

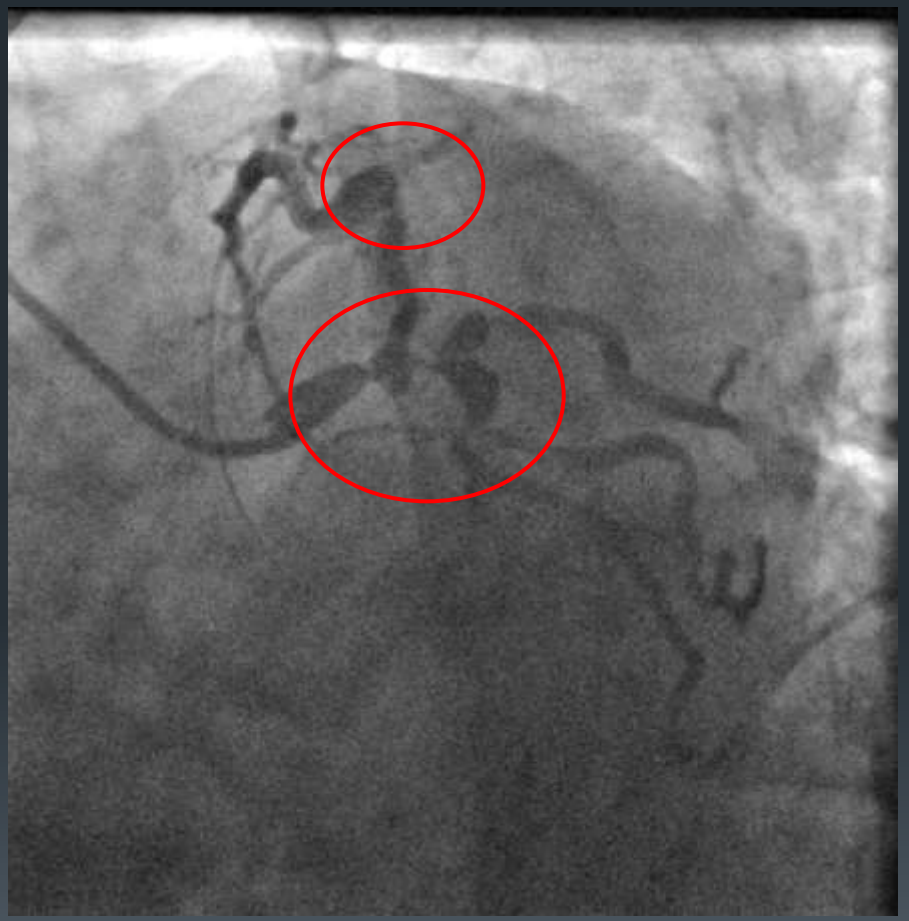
Multilevel restenosis after CEA required stent with good radial force



Most important in radial technique is stent and retrival device deliver

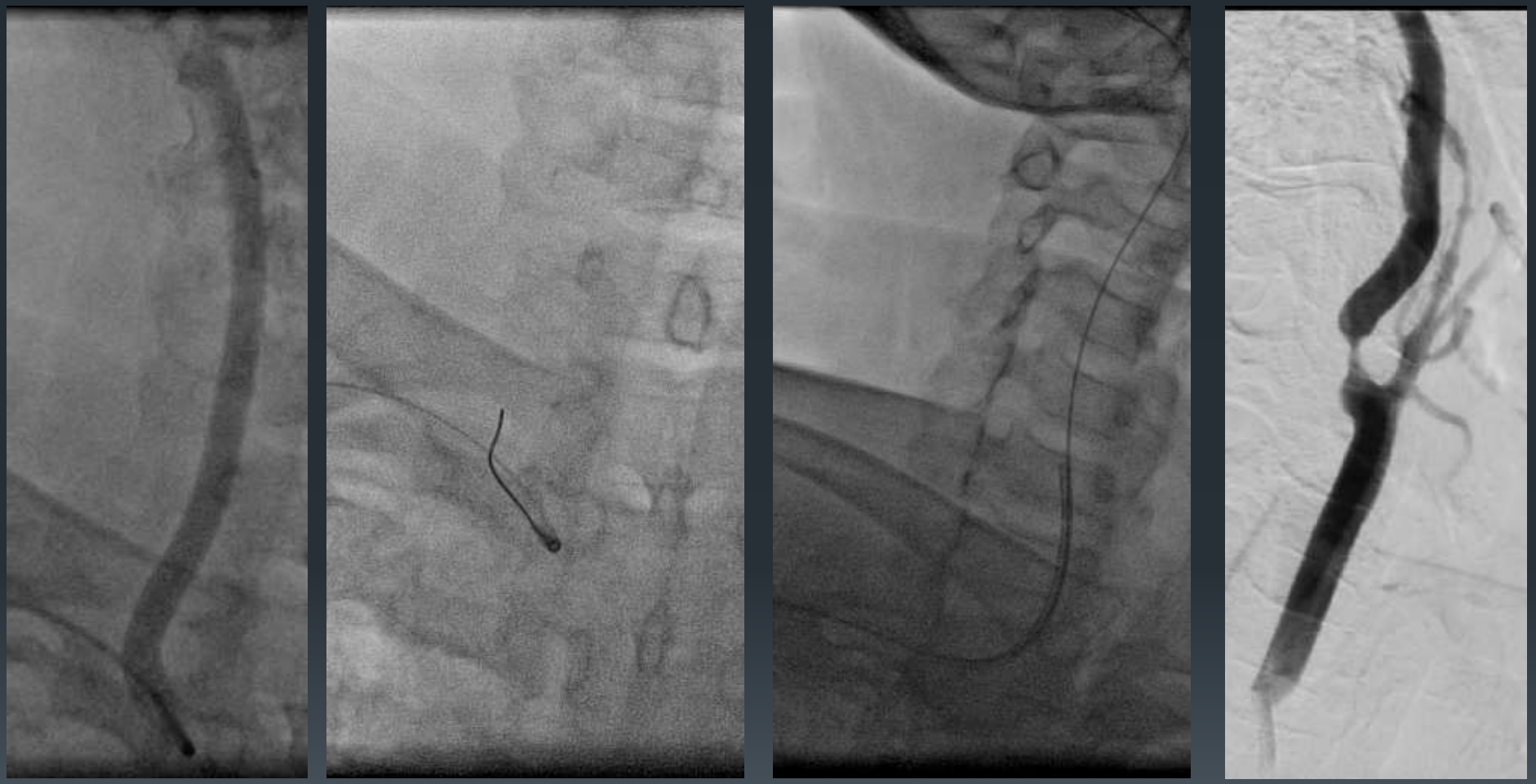
Challenging situation : patients with severe coronary artery disease & symptomatic ICA stenosis & severe PAD ??





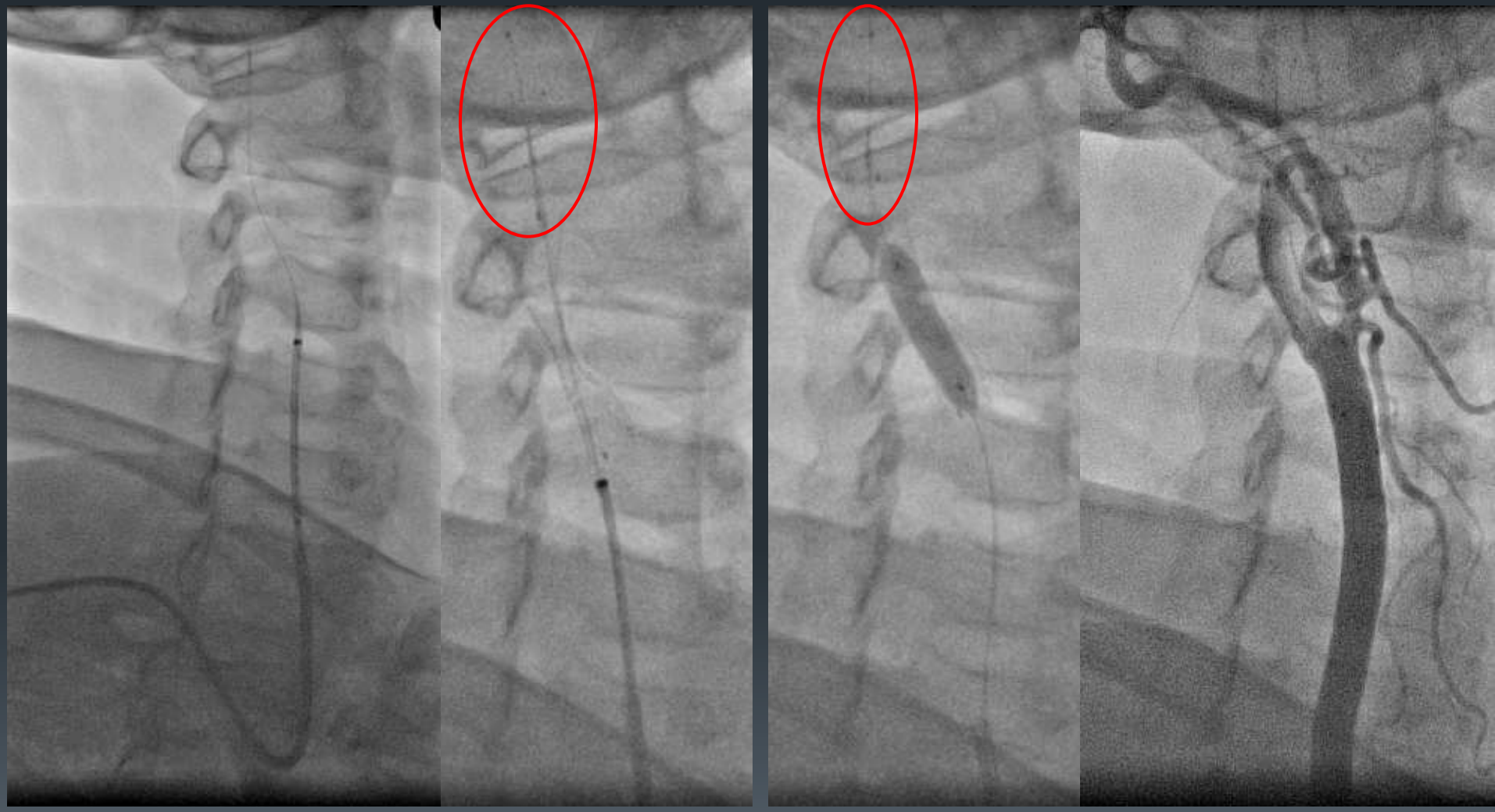
Hybrid prcedure only option: CAS via radial artery + CABG

Severe angulation betwen RSA and RCCA: Diagnostic COBRA cath



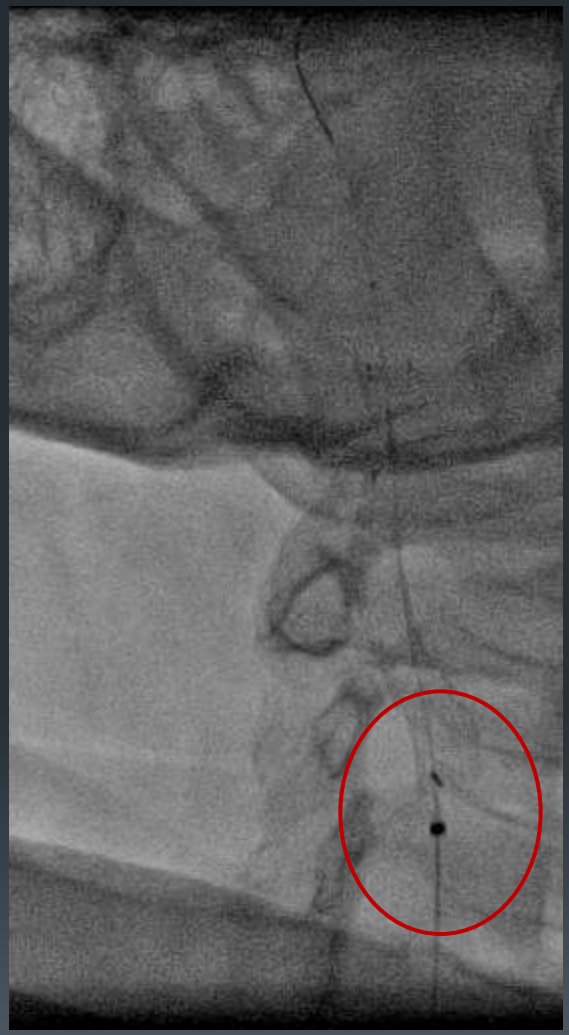
Special dedicated Guiding Catheter for CAS from radial artery :
7Fr. Guider Softip XF - 40mm

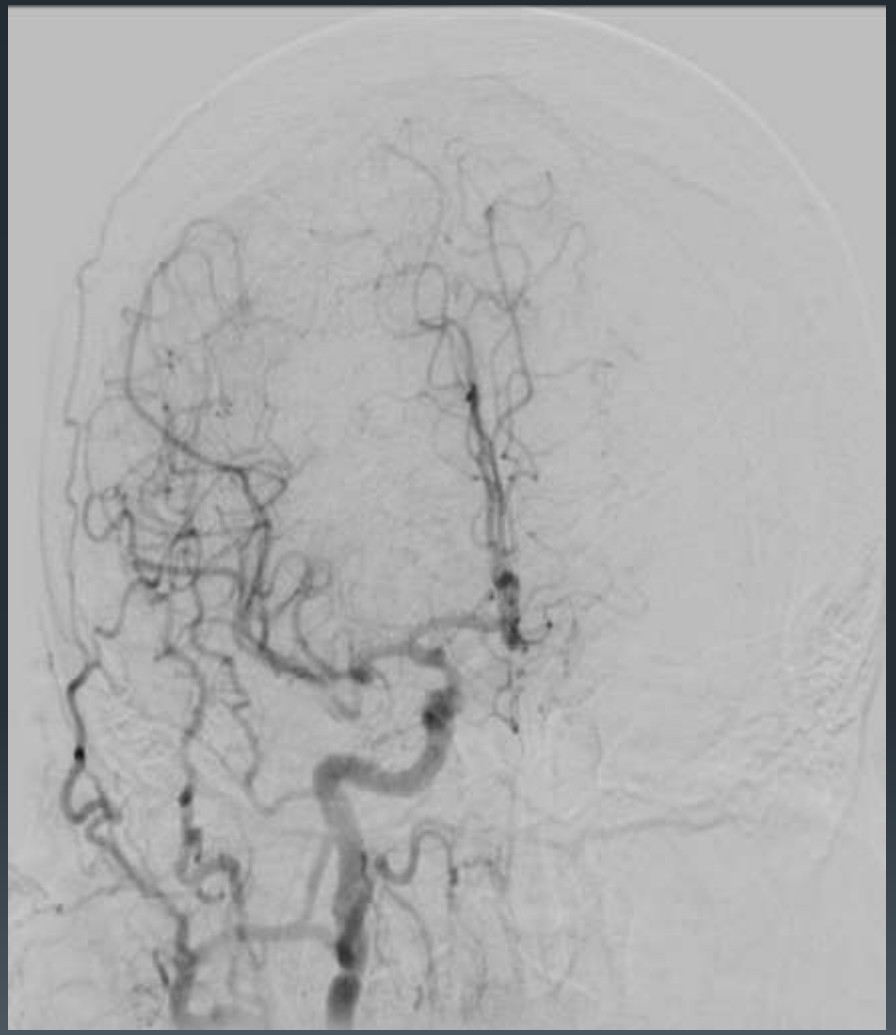
Wirion filter and Cristallo Ideale 5Fr. Hybrid carotid stent



Gentle postdilatation + 0.5mg of Atropine only in pts with severe CAD!Slow flow after postdilatation due to massive filter embolization

Final result with intracranial angiography





After CAS pt. was Instantly Operated in the Same Hybrid Room by Cardiosurgeon team on ASA & UFH only !!!!

A randomised comparison of transradial and transfemoral approach for carotid artery stenting: RADCAR (RADial access for CARotid artery stenting) study

EuroIntervention 2014;10:381-391

Zoltán Ruzsa[1,3]*, MD, PhD; Balázs Nemes[1], MD, PhD; László Pintér[2], MD; Balázs Berta[1], MD; Károly Tóth[3], MD; Barna Teleki[3], CVT; Sándor Nardai[1], MD; Zoltán Jambrik[1], MD, PhD; György Szabó[1], MD; Ralf Kolvenbach[2], MD, DSc; Kálmán Hüttl[3], MD, DSc; Béla Merkely[1], MD, DSc

Conclusions: The transradial approach for carotid artery stenting is safe and efficacious; however, the cross-over rate is higher with transradial access. There are no differences in the total procedure duration and fluoroscopy time between the two approaches but the radiation dose is significantly higher in the radial group, and the hospitalisation is shorter with the use of transradial access by per-protocol analysis. By evaluating the patient data according to intention-to-treat analysis we found no difference in major adverse events and hospitalisation. In both groups, vascular complications rarely occurred.

Carotid Artery Stenting via Radial Access Krakow Data

Between 2001 and March 2016 (2715 CAS procedures)

CAS via radial access 17 patients (69±10,4 years, 71% men, with >70% stenosis),

10 left-side, 6 contralateral carotid occlusion, 9 with history of stroke or TIA

All with peripheral artery disease (PAD) or unsuccessful attempt via femoral access were scheduled for carotid artery angioplasty by radial approach.

Patient (n=17)	
Age [years]	69± 10,4
Sex, men	12 (71%)
Stroke/TIA	9 (53%)
Hypertension	16 (94%)
Diabetes melitus	3 (18%)
Dyslipidemia	16 (94%)
Coronary artery disease	10 (59%)
Previous percutaneous coronary intervention	5 (29%)
Previous myocardial infarction	4 (24%)
Peripheral artery disease	10 (59%)
Contralateral carotid artery occlusion	6 (35%)

Procedural data

The technical success rate was 88%. In two cases attempt via femoral and radial access were unsuccessful and the patients were treated by endarterectomy. In all cases CAS was performed with self-expanding bare metal stents. The mean NASCET carotid artery stenosis was reduced from 85% to 9% ($p<0.001$). No periprocedural & 30 days death, stroke, myocardial infarction or transient ischemic attack occurred.

Left internal carotid artery	**8**
Right internal carotid artery	**7**
Stent • Carotid Wallstent *(Boston Scientific)* • Cristallo Ideale *(Medtronic)* • Precise *(Cordis)* • Roadsaver *(Terumo)*	**15** 6 (40%) 4 (27%) 3 (20%) 2 (13%)
Embolic protection device • Wirion *(Gardia)* • FilterWire EZ *(Boston Scientific)* • Spider FX *(ev3)* • Emboshield *(Abbott)*	**15** 6 (40%) 4 (27%) 4 (27%) 1 (6%)
Angiographic stenosis evaluation [%] Pre-intervention Post-intervention	 84,7±7,9 9±8,5

Advantages of CAS from radial access:

Importance of early ambulations

Patients comfort and satisfaction

Redusing nursing cost

Redusing vagal reaction

Redusing hypotensive response

Redusing bleeding complication

Conclusion:

Carotid artery stenting with EPD can be safely and effective performed using radial access

In severe PAD difficult aortic arch transradial CAS can be more save then transfemoral access.

New generation of GW, Filters and Stents cause that the CAS procedure is fast and safe.

Due to immediatelly mobilization the patients comfort is much better

All centre performing CAS should know the radial access technique


Thank you


John Paul II Hospital Krakow PL