

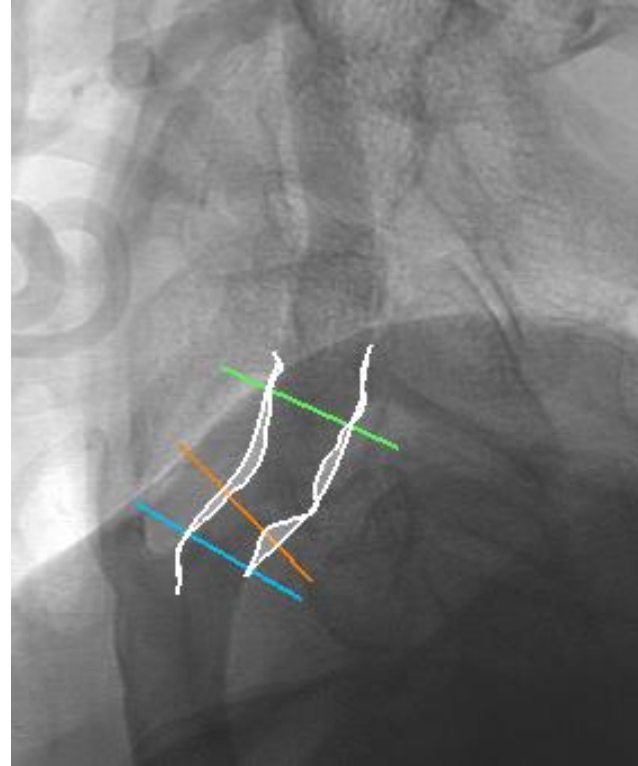
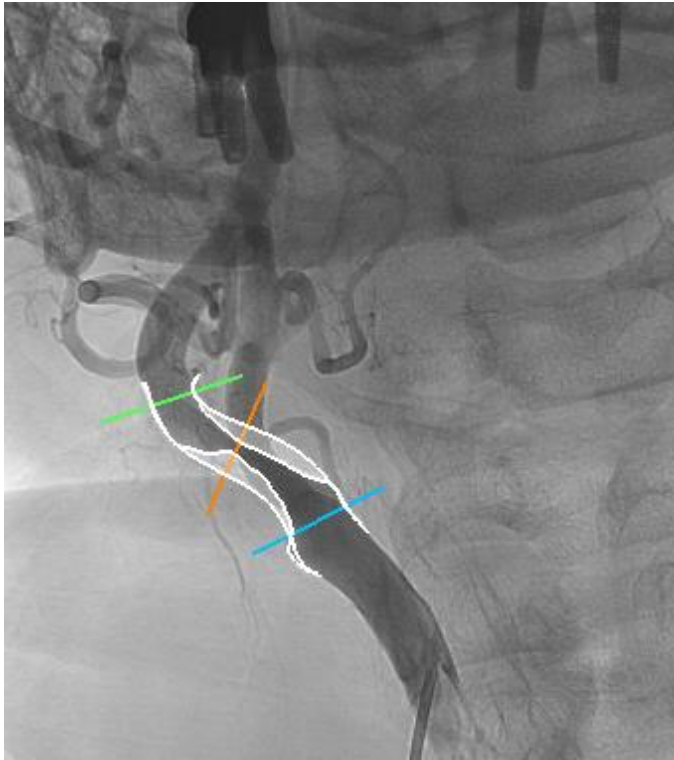


# Supra-aorticus nagyér CTA

Dr. Hausinger Péter



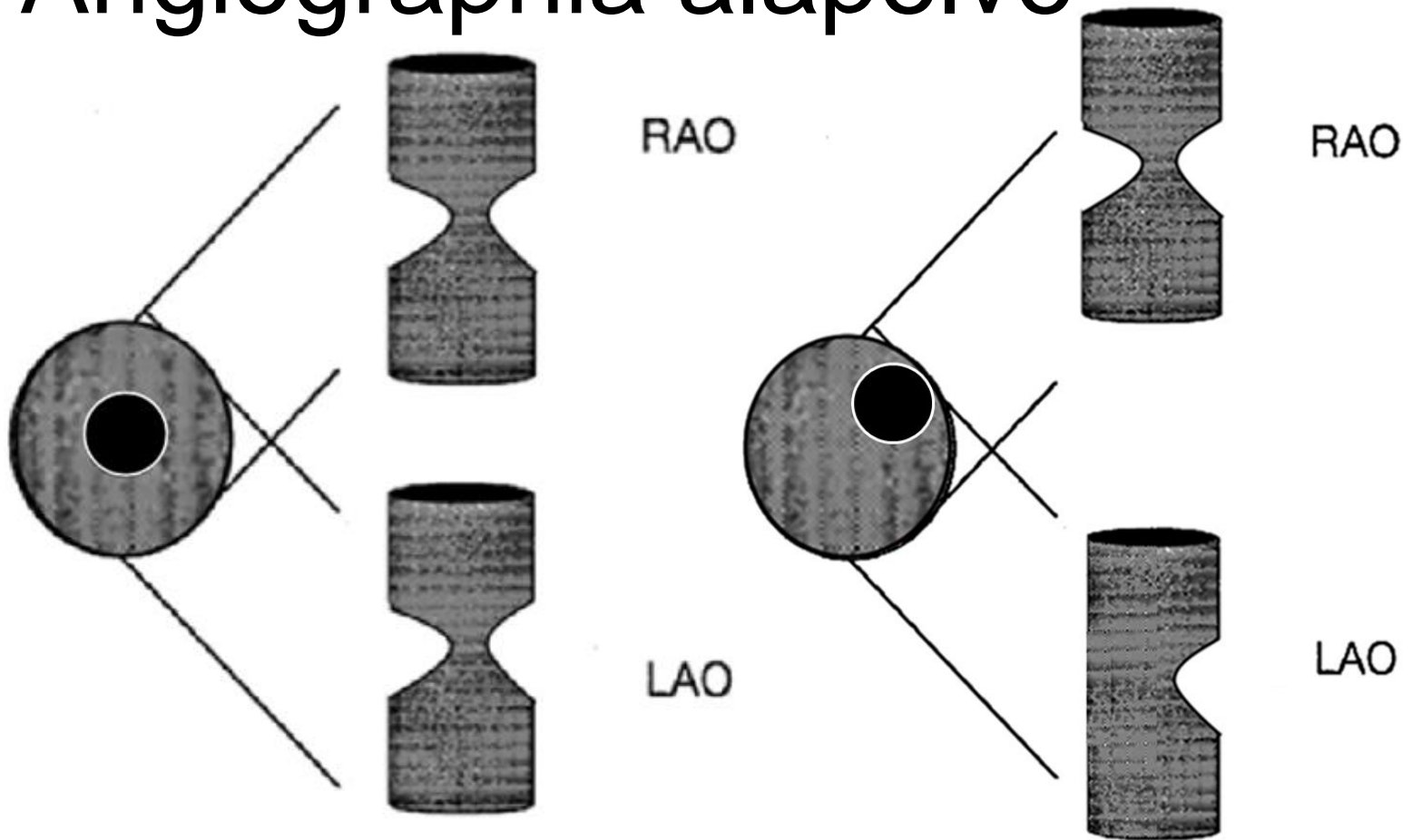
# Angiographia alapelve



Leképezés legalább két egymásra merőleges (orthogonális) síkból



# Angiographia alapelve



Leképezés legalább két egymásra merőleges (orthogonális) síkból



# Ionizáló sugárzást használó angiographiás eljárások

## Invazív angio + DSA (1927, 1980)

2-3 projectio  
7ml kontraszt/projectio x2  
1.3% neur. compl. – 0.5%  
permanens (Willinsky et al.)  
1.2% stroke rate (ACAS study)

## CTA

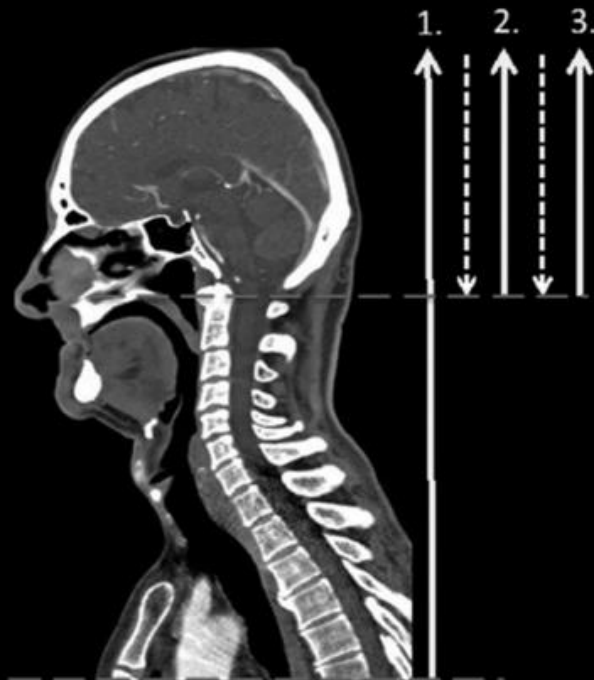
(1972, Hounsfield – CT, 1990 – spirál CT)

360°-ban számos projectio

**Monofázisos:** 60ml kontraszt, 0.625mm  
szelet, DLP: 200-300mGyxcm

**Multifázisos:** ua, csak 3 run, 3x  
sugárdózis

**Perfúziós:** 40-50ml kontraszt, 5mm  
szelet, DLP: 500-1000mGyxcm



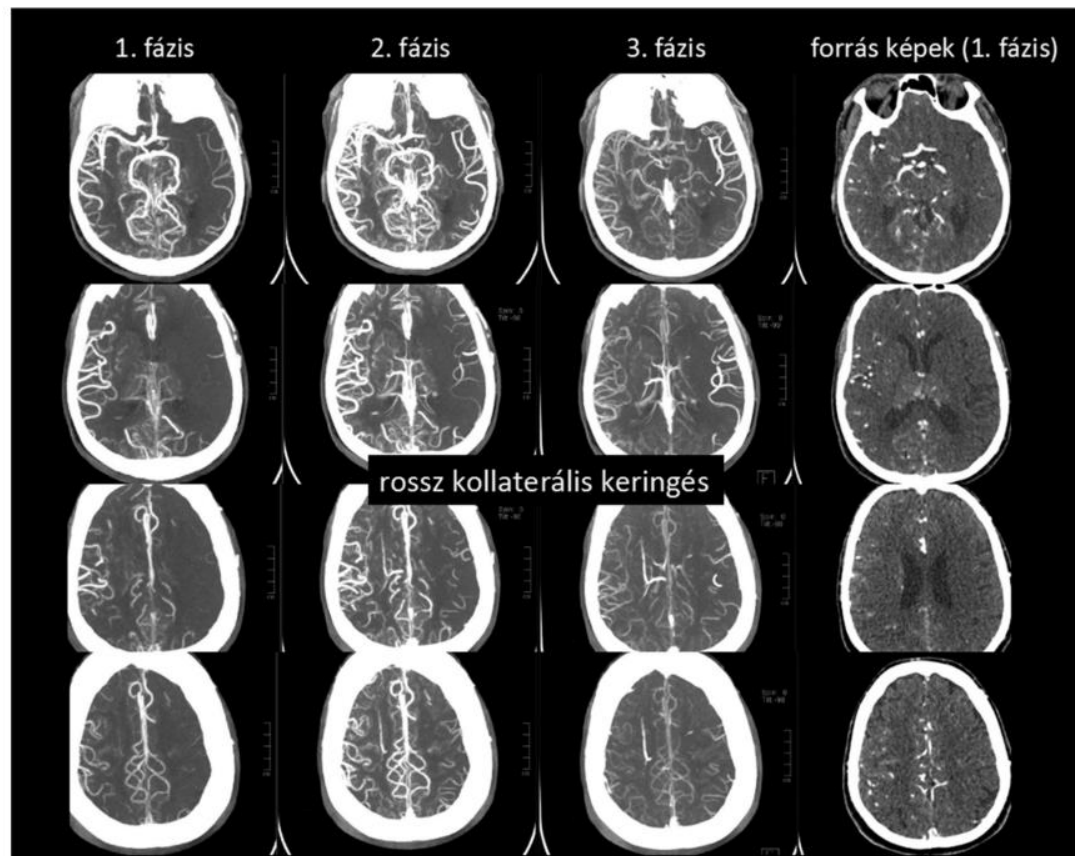
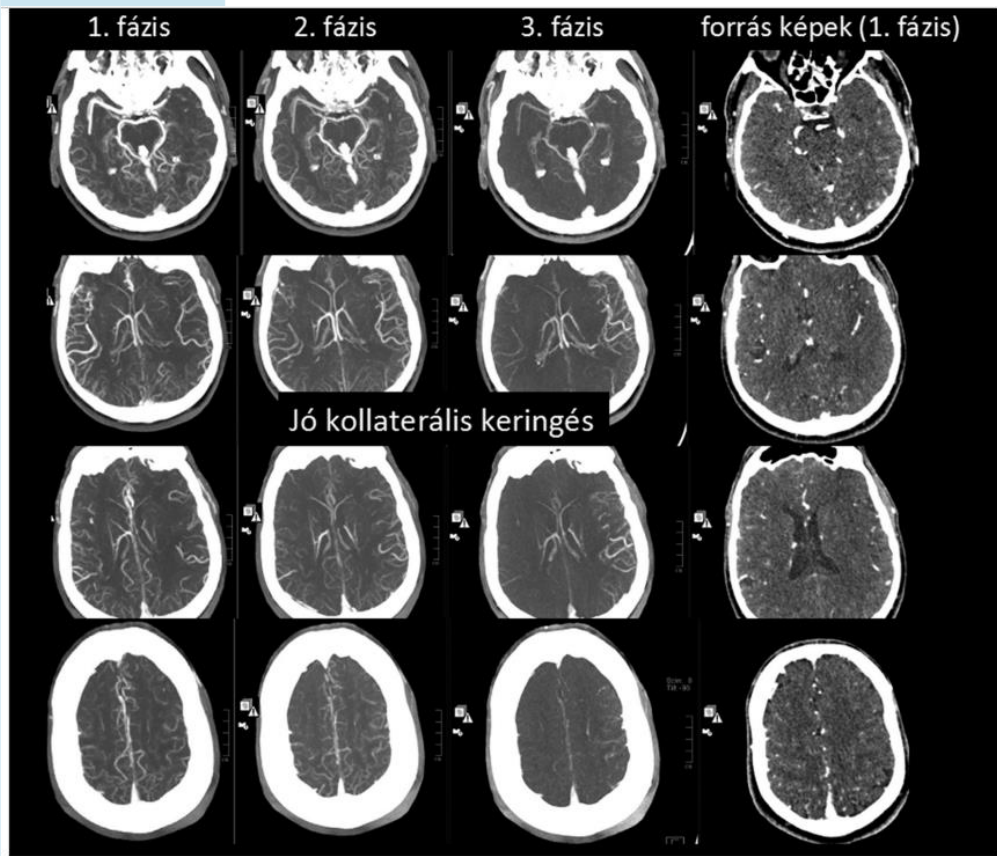
## Multifázisos CTA

1. fázis: aorta ív – vertex  
scan time 6 sec  
vissza a bázisra
2. fázis: basis – vertex  
4 sec delay  
scan time 3.5 sec  
vissza a bázisra
3. fázis: bázis vertex  
4 sec delay  
scan time 3.5 sec

Az egyes fázisok vége között ~ 8 sec

- 80 ml nem-ionos kontrasztanyag, 5 ml/sec flow
- 50 ml só, 6 ml/sec flow
- Monitoring az aortaívben
- Trigger 100 HU

STROKE: kollaterálisok megítélésére



Leptomeningeális kollaterálisok = viabilitás



# Perfúziós CTA

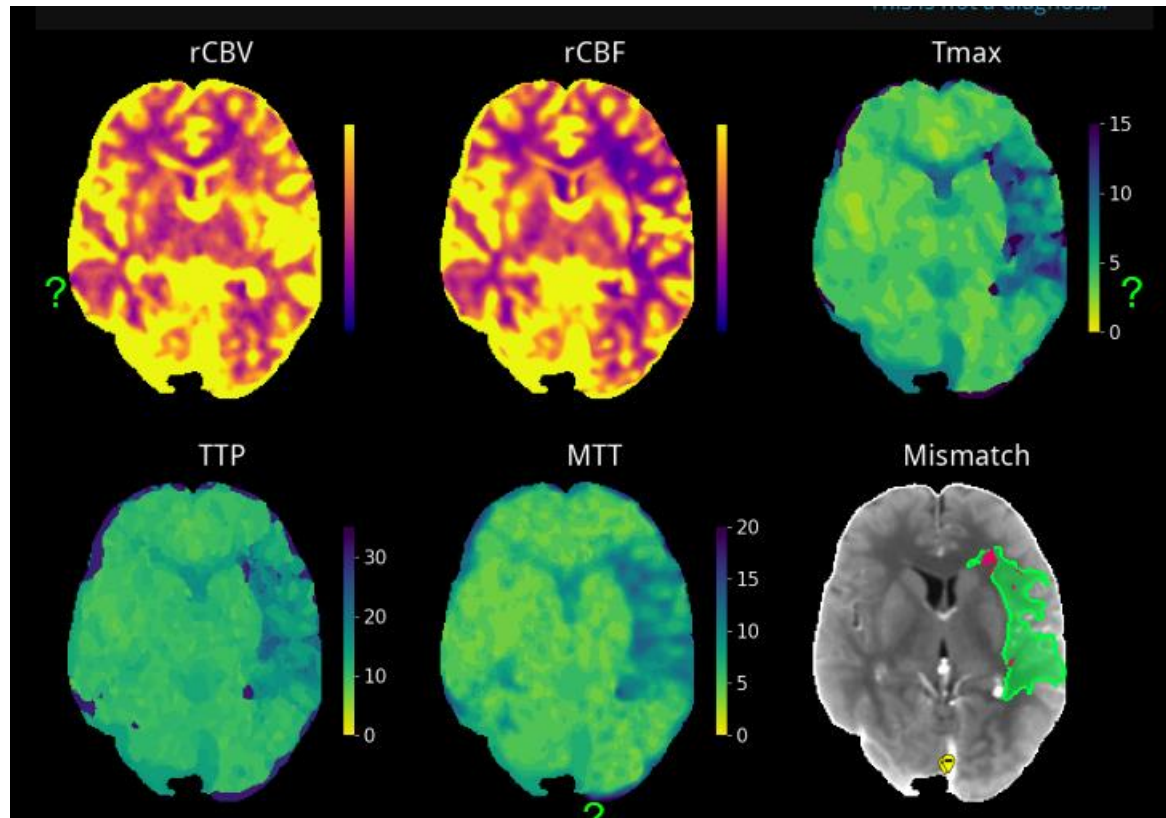
MTT < 7s

Hypoperfúzió = MTT > 7s

Core:

CBV < 2ml/100g  
CBF < 10ml/100g/min

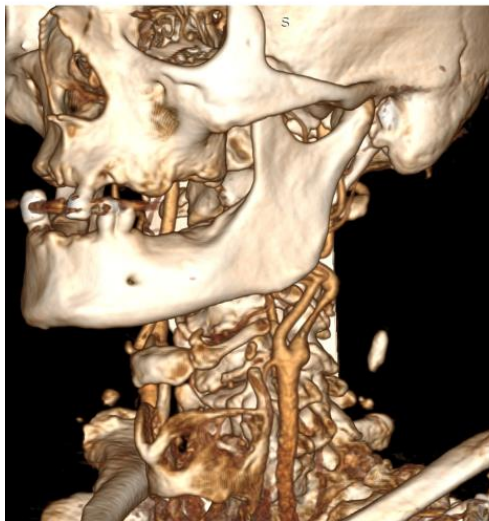
penumbra



Cél: hypoperfundált területek kimutatása, azon belül a core és penumbra elkülönítése



# Szűkület meghatározás



MLD < 1,5mm

A-Ching Chao et al 2007

**CTA/DSA**

North American Symptomatic  
Carotid Endarterectomy Trial

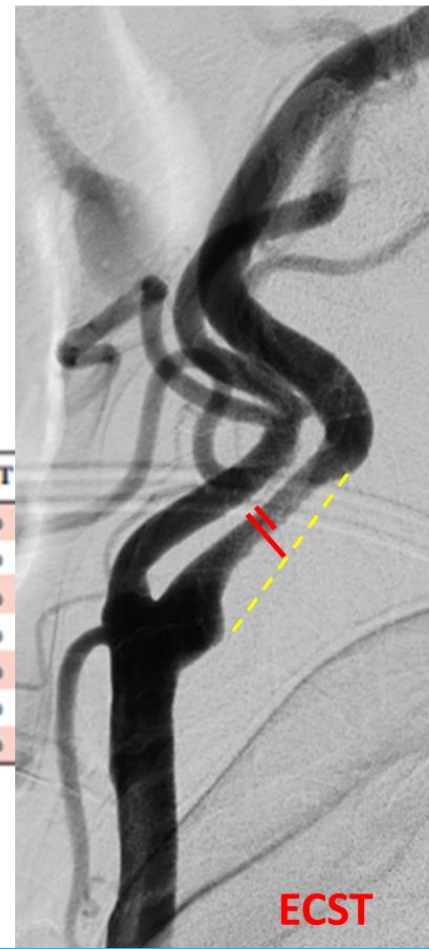


**NASCET**

Szignifikáns  
60% ≤  
(tünetmentes)  
50% ≤  
(tünetes)

NASCET	ECST
30%	65%
40%	70%
50%	75%
60%	80%
70%	85%
80%	91%
90%	97%

European Carotid  
Surgery Trial



**ECST**





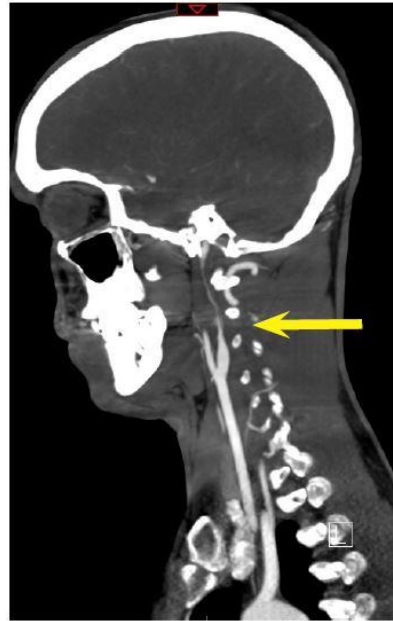
# String sign = subocclusio

Sensitivitás: CTA: 97%

DSA: 100%

Subocclusio= CEA/CAS

Occlusio= EC/IC bypass

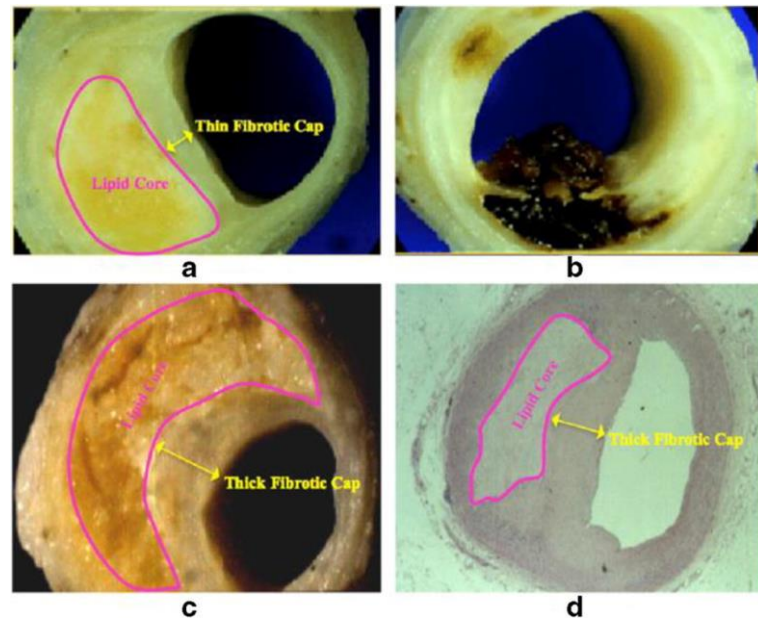




# Plakk karakterizáció ( $\leftrightarrow$ DSA)

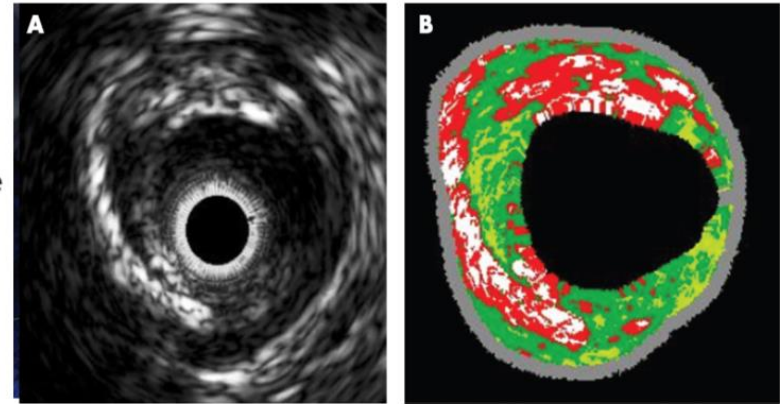
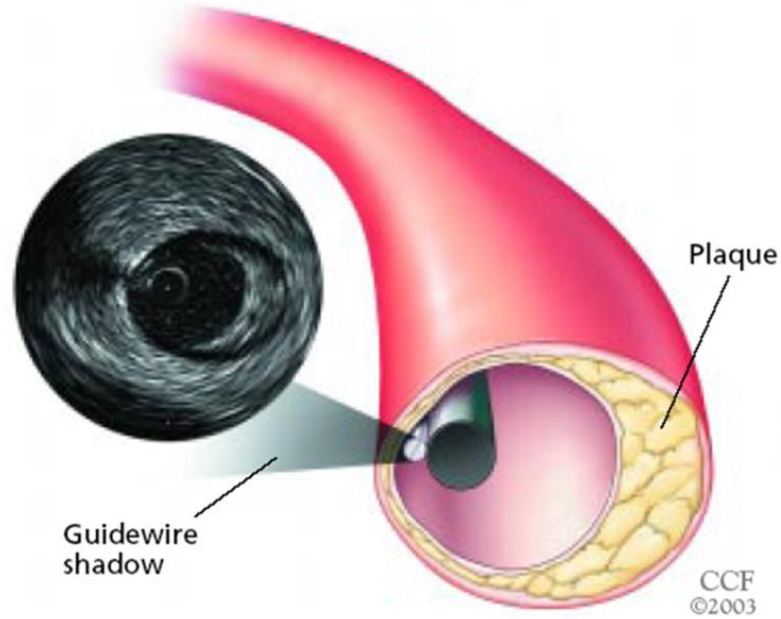
A stroke-kal legjobban a szűkület foka korrelál, de nem szignifikáns szűkület mellett is lehet stroke-ot kapni

- Vulnerabilis plakk: (hist)
  - large lipid/necrotic core,
  - thin or ruptured fibrous cap, (TICFA)
  - plaque ulceration,
  - intraplaque hemorrhage,
  - dense inflammatory cellular infiltrate



# Intravascularis ultrahang IVUS – plakk karakterizáció

## Intravascular ultrasonography

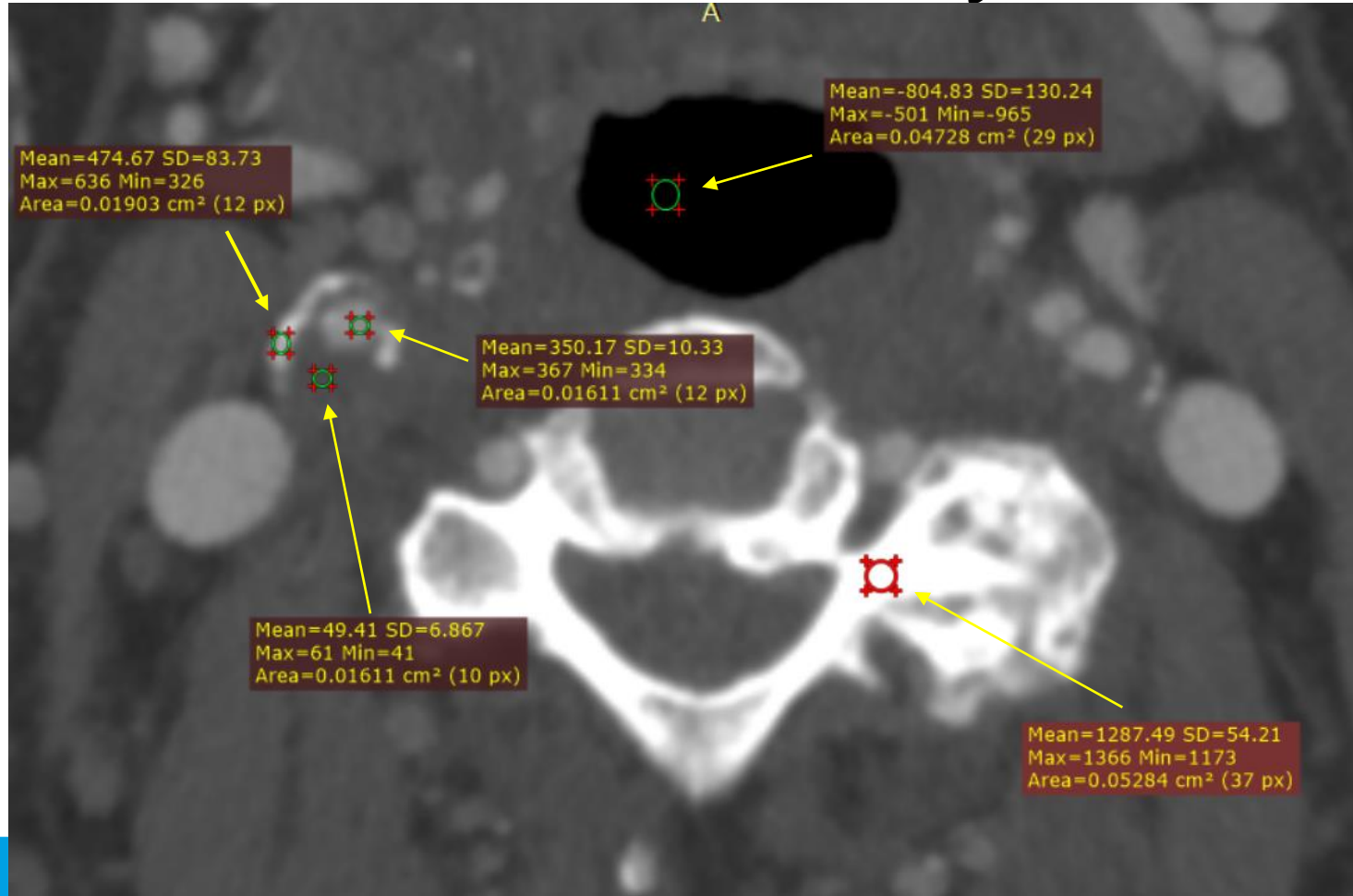


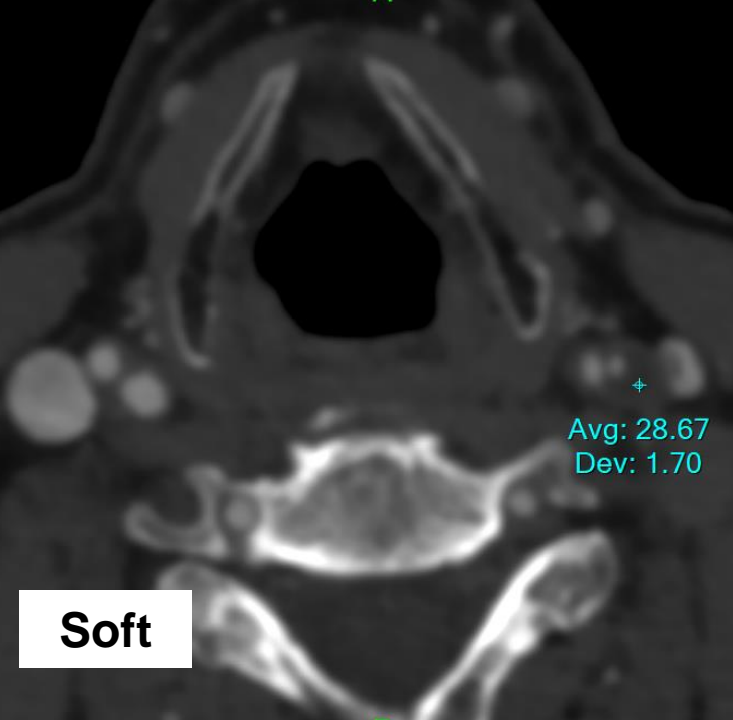
- |                       |                          |
|-----------------------|--------------------------|
| Fibrous tissue ("FT") | Fibrofatty tissue ("FF") |
| Necrotic core ("NC")  | Dense calcium ("DC")     |



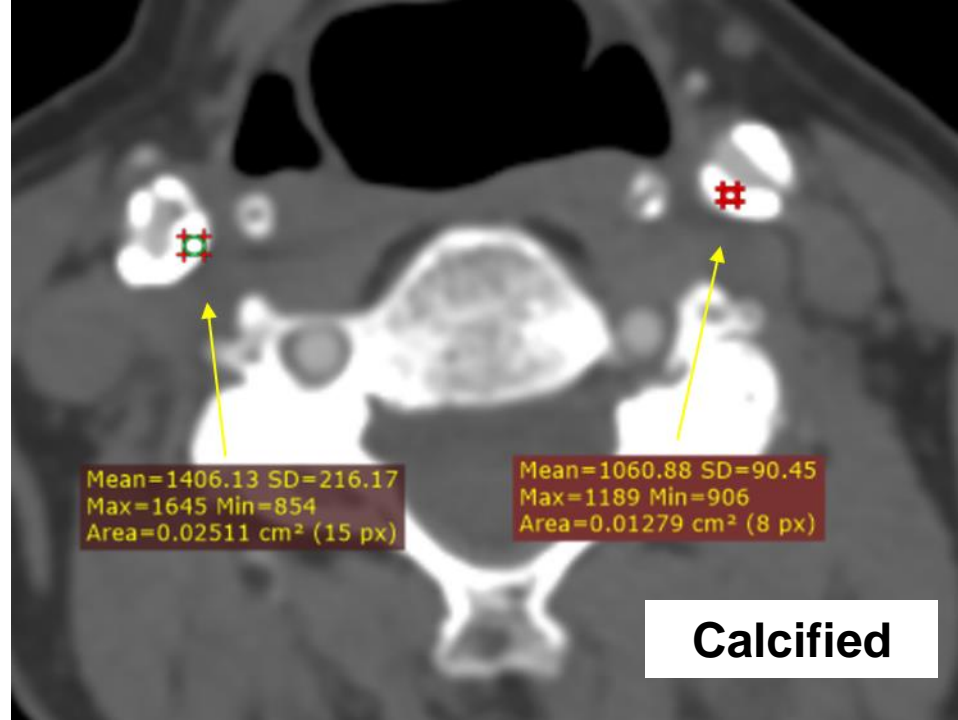
# Hounsfield analysis

-1000 – levegő  
0 – víz  
20-40 lágy  
50-120 fibrotikus  
100-500 kontraszt  
1000 csont, Ca

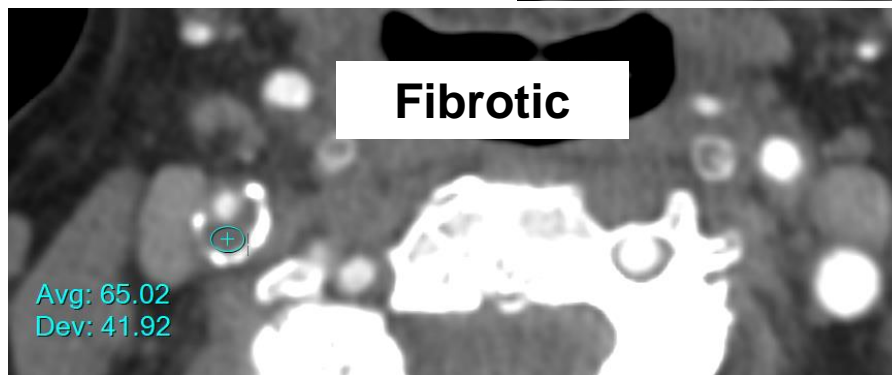




**Soft**



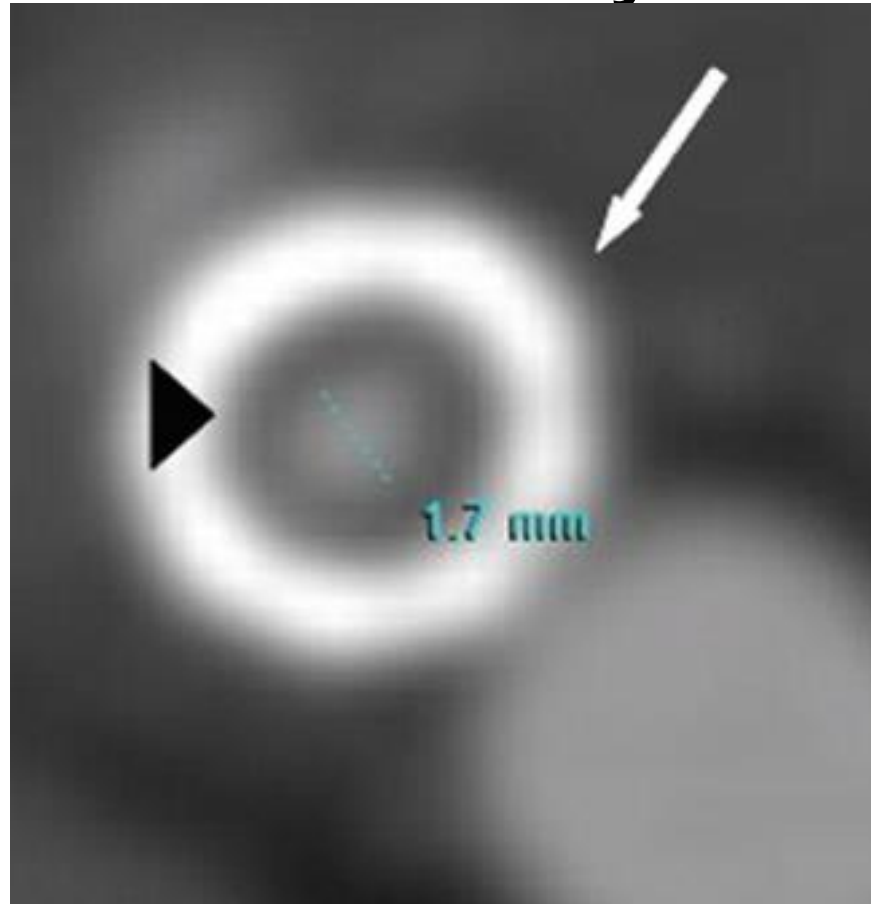
**Calcified**



**Fibrotic**

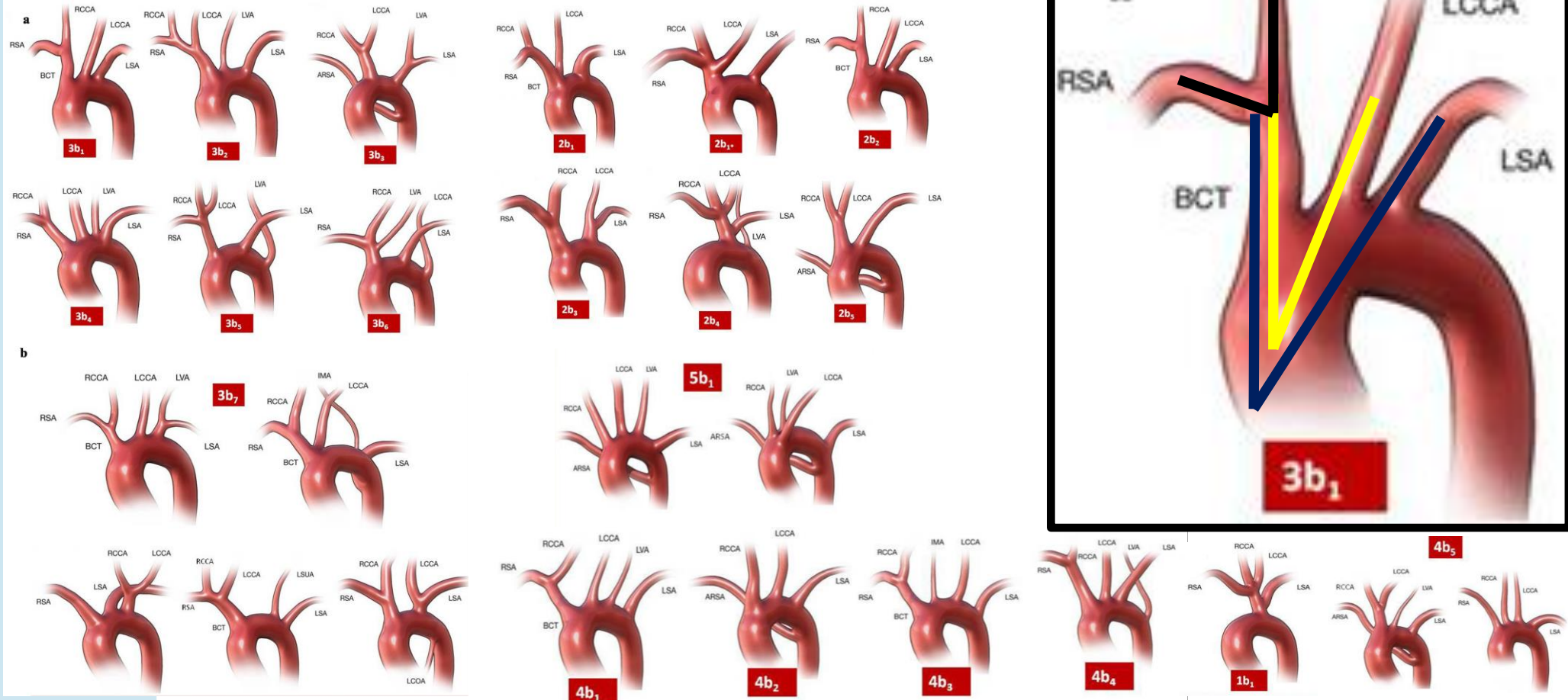


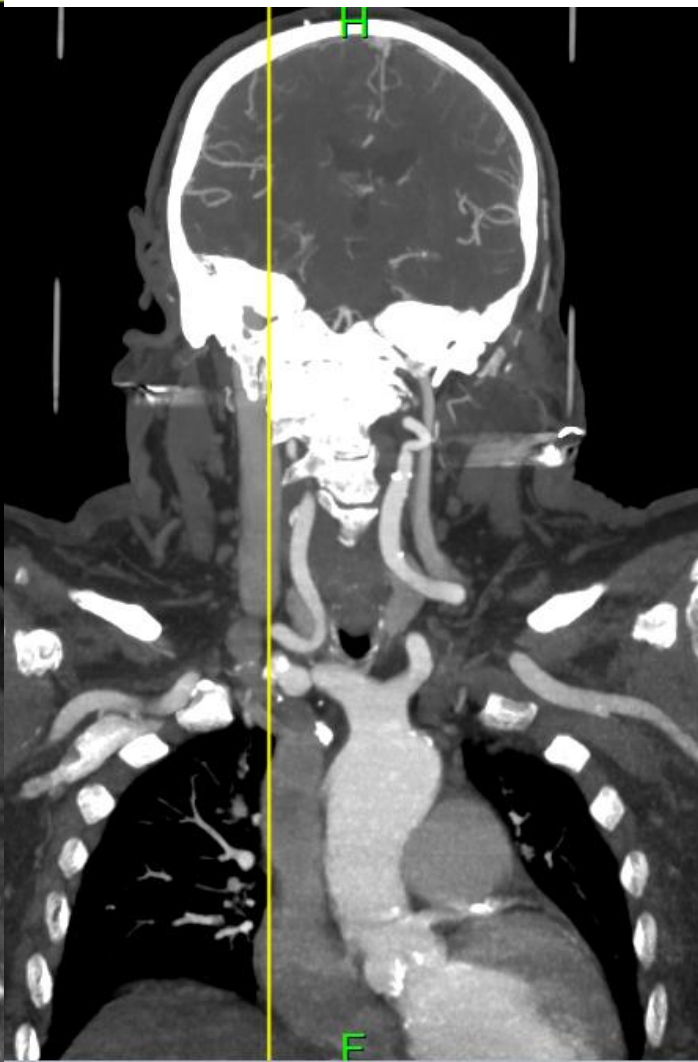
# Stent analysis



Megfelelő ablakolás az intima hyperplázia elkülönítésére

# Intervenció tervezés





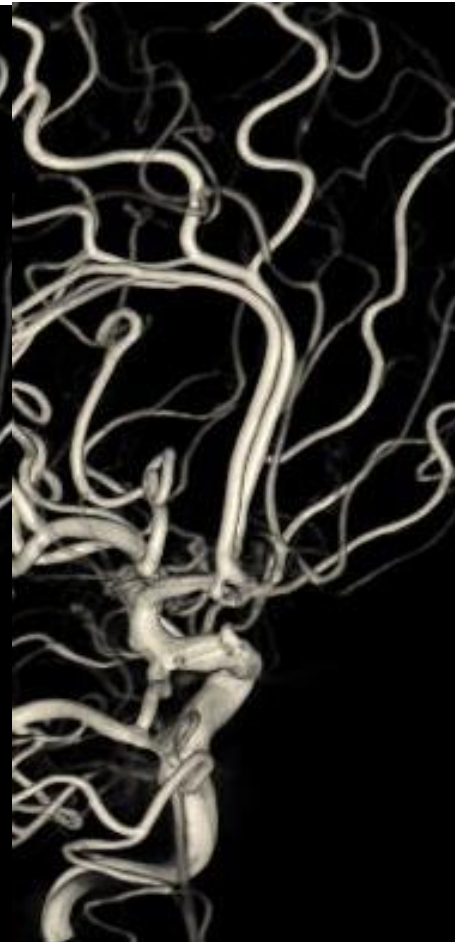




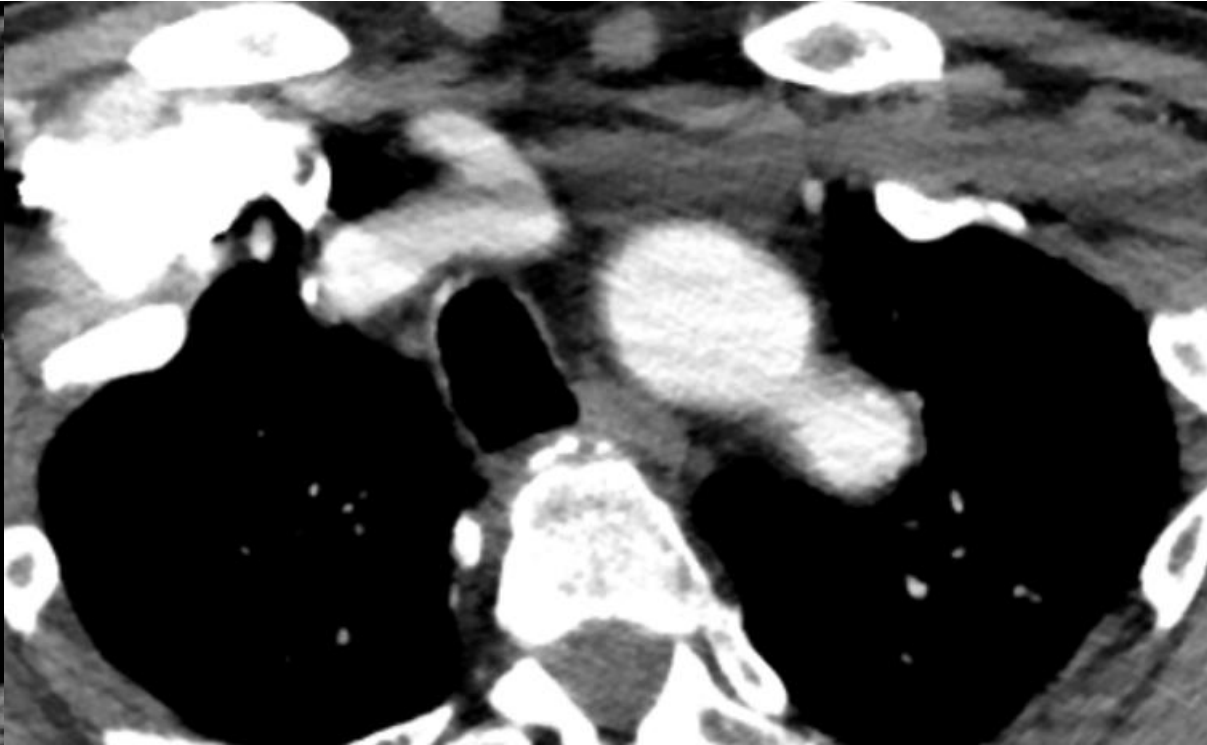
Móricz, Lászlóné  
76642359  
9/27/1967  
1/23/2023  
3:15:11 PM  
- 3/25  
1/2  
1.33 sec

DSA\_Neuro\_SF

cm 42



# Artéria Lusoria



- 3<sup>rd</sup> Pharyngeal arch artery
- 4<sup>th</sup> Pharyngeal arch artery
- 6<sup>th</sup> Pharyngeal arch artery
- 7<sup>th</sup> Intersegmental artery
- Aortic sac
- Truncus arteriosus
- Dorsal aorta

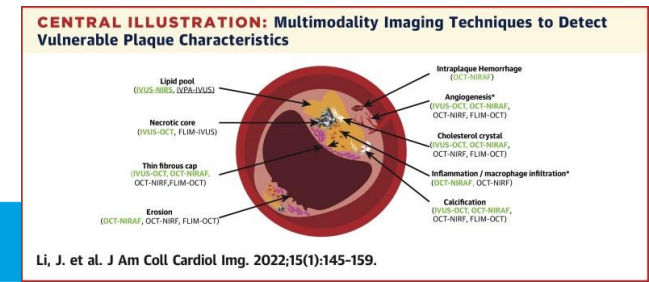
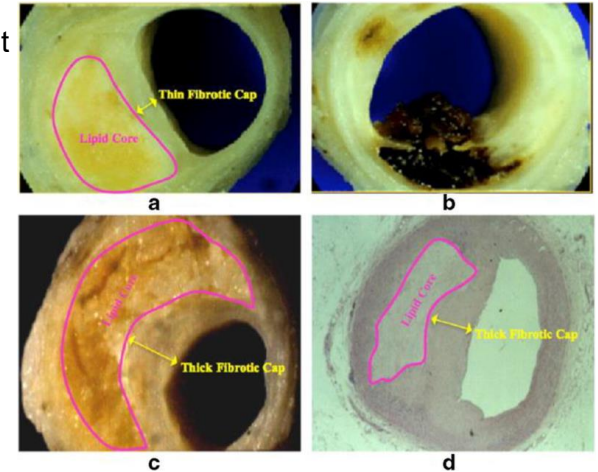


# Köszönöm a figyelmet



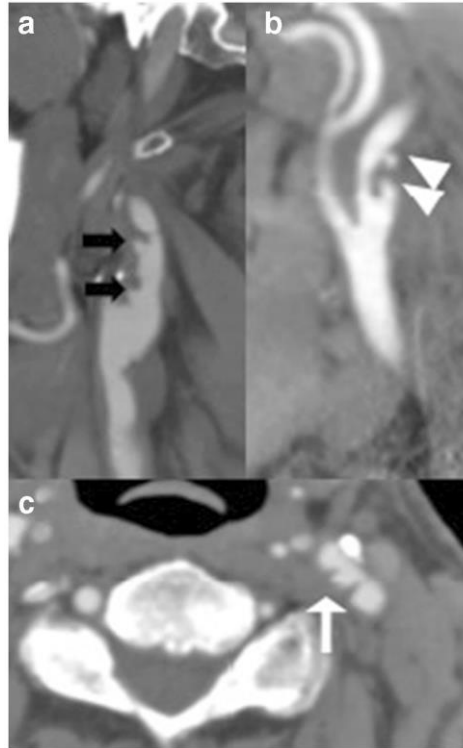
# Plakk karakterizáció (vs DSA)

- A stroke-kal legjobban a szűkület foka korrelál, de nem szignifikáns szűkület
- Vulnerabilis plakk: (szövettan)
  - large lipid/necrotic core,
  - thin or ruptured fibrous cap, (TICFA)
  - plaque ulceration,
  - intraplaque hemorrhage,
  - dense inflammatory cellular infiltrate.
- (Cardi)
- CTA (Hounsfield analysis):
  - CTA leletek döntően a szűkület fokát jelzik, de a plakk karakt!
  - lipid/necrotic core, fibrous component, and calcification
  - Areas of the plaque that have HU similar to muscle have been proposed to likely correspond to fibrous tissue, whereas areas with low attenuation values are thought to represent the lipid/necrotic core.
  - High accuracy in detecting Ca/soft/fibrotikus
  - Nincs RCT arra vonatkozólag, hogy inclusion criteria for surgical revascularization, there are multiple studies demonstrating increased risk of cerebrovascular ischemia associated with high-risk carotid plaque features
- ....





# Ulcerált felszín?





# Aneurysma, AVM