

Utilisation du CT, CTA et CTP dans l'évaluation de l'AVC aigu avec l'emphase sur la sélection des candidats appropriés pour la thrombectomie.

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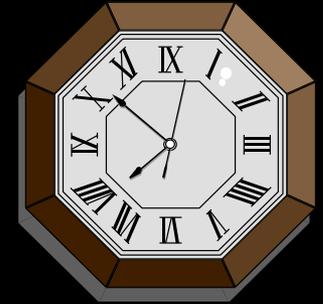
Disclosure

- I have no conflict of interest to disclose for the content of this lecture.

Learning Objectives

- 1) Review the CT and CTA findings in acute stroke;
- 2) Review the imaging inclusion criteria for Thrombectomy candidates;
- 3) Optimize the use of CT and mCTA to provide rapid decision for Thrombectomy;
- 4) Discuss management of exemplary cases.

TIME IS BRAIN!!!!

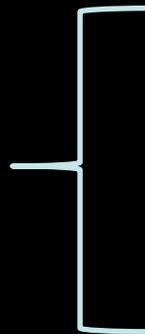


- 1.9 million of neurons 13.8 billion synapses, and 12 km of axonal fibers are lost every minute following an ischemic stroke in a large supra-tentorial artery territory

Saver J. Time is brain- Quantified, Stroke 2006;37:263-266

Cincinnati Stroke Scale

F **FACE**
A **ARM**
S **SPEECH**
T **TIME**



**If the 3 findings are present
85% probability of a stroke.**

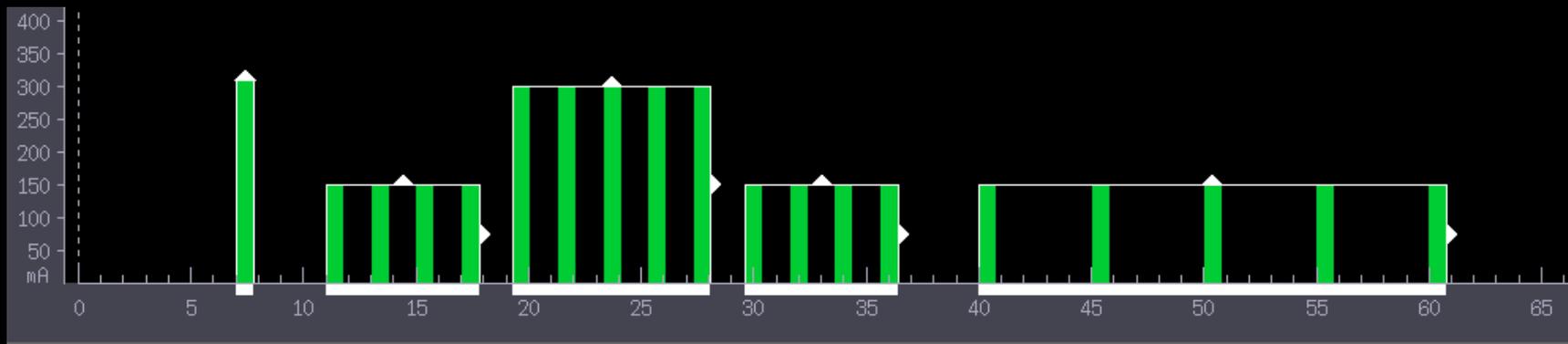
Summary Results of Trials

	MR CLEAN		ESCAPE		EXTEND-IA		SWIFT-PRIME		REVASCAT	
Pts	500		316		70		196		206	
Circulation	Anterior		Anterior		Anterior		Anterior		Anterior	
Imaging	CT-CTA		CT-CTA dynamic		CT-CTA-CTP		CT-CTA-CTP		CT-CTA	
Time Window	6		12		6		6		8	
Pt's Age	65		70		69		66		66	
RANDOMIZATION	ENDO	CTRL	ENDO	CTRL	ENDO	CTRL	ENDO	CTRL	ENDO	CTRL
NIHSS	17	18	16	17	17	13	17	17	17	17
IV-TPA (%)	87.1	90.6	72.7	78.7	100%		100%		68	77.7
Perfusion Delay (h)	5.5		4.0		4.1		4.2		5.9	
mRS 0-2 at 90days (%)	32.6	19.1	53	29.3	71.4	40	60.2	35.3	43.7	28.2
NNT	7		4		3		4		6	
Symptomatic ICH	7.7	6.4	3.6	2.7	0	6	0	3	4.9	1.9
Death at 90 days(%)	18.9	18.4	10.4	19	9	20	9	12	18.4	15.5

Volumetric Multiphase CTA

VmCTA Goal of imaging: (72 secs acquisition time)

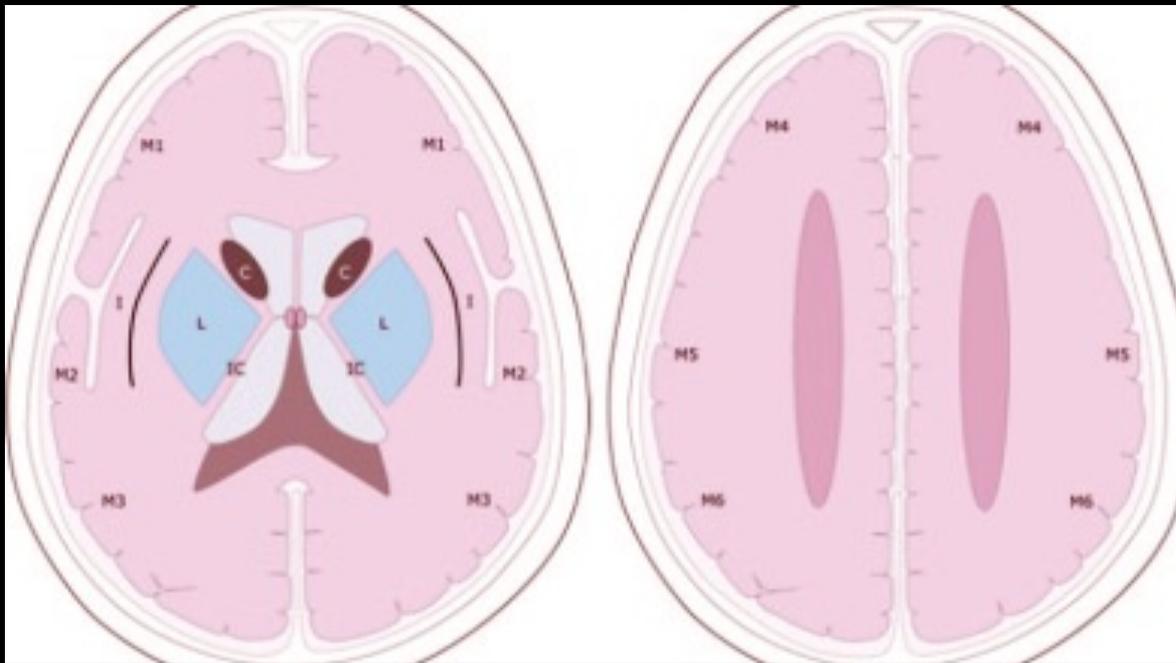
- **P- Parenchyma:** ASPECT SCORE;
- **P- Pipes:** Site of Occlusion;
- **C- Collaterals:** Viability of Collaterals.



P- Parenchyma

Quantification of the Ischemic Area on CT Plain

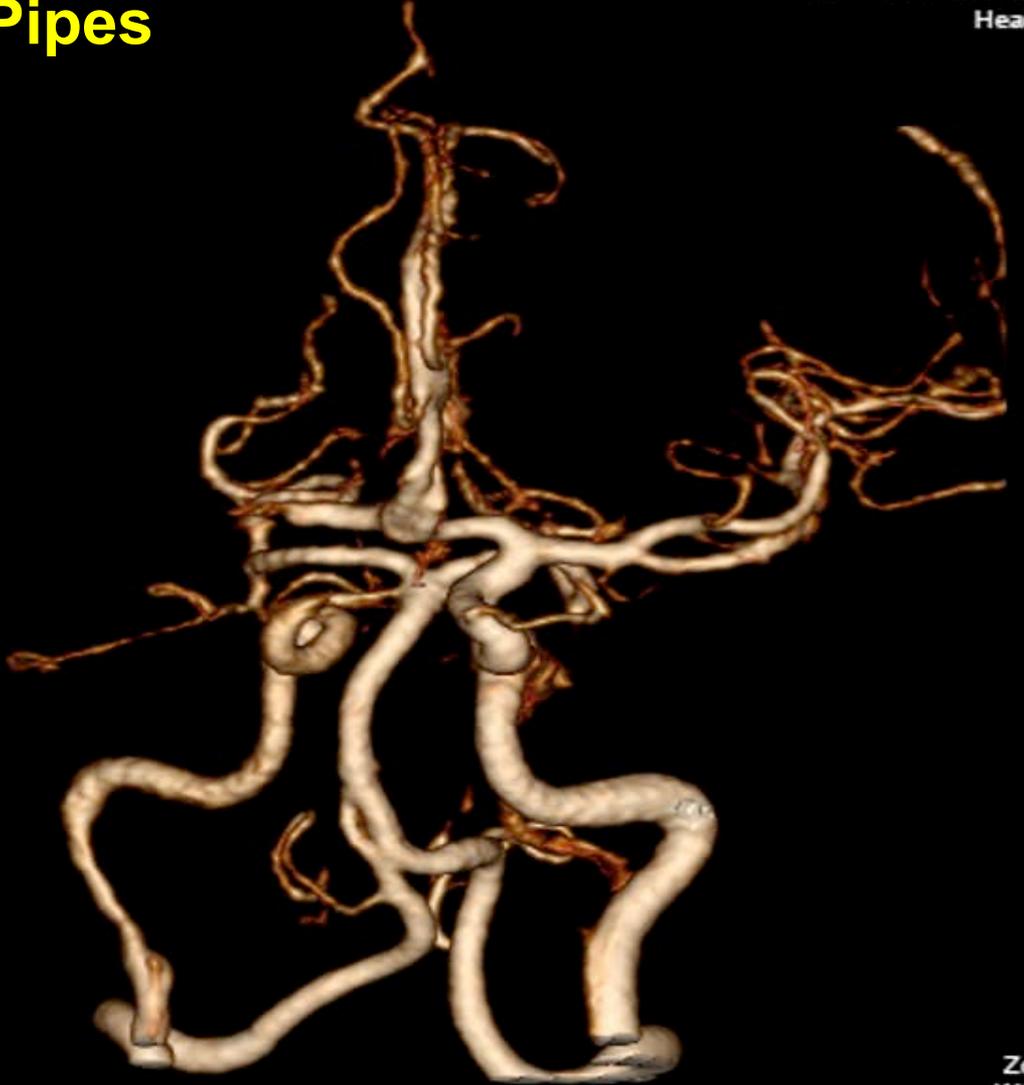
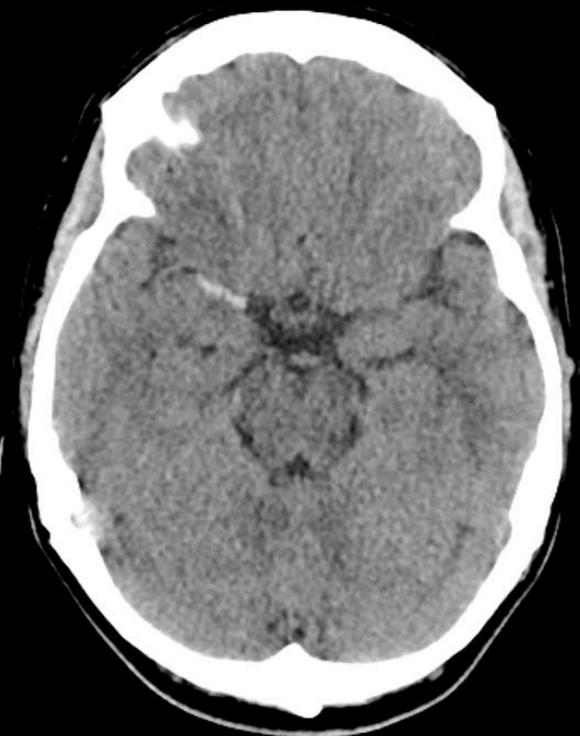
- **ASPECTS: The Alberta Stroke Program Early CT score 2001.**
- 10 points topographic imaging score
- MCA territory divided into 10 regions each of which is given 1 point.
- For each area involved 1 point is **deducted** from that score.



Neuroimaging Clin N Am. 2005 May;15(2):409-19, xii.

P -Parenchyma
P - Pipes

MNH CT HEAD A
Head



Zc

Role of TTP as predictor of Final Stroke territory

- Pilot study including the CTP of a total of 11 patients presenting with anterior circulation stroke referred to our Institution prior to the Escape trial who did not undergo any IV or IA recanalization.
- These parameters were calculated:
 - 1) ASPECT score on initial CT head;
 - 2) Volumetric measurement of the TTP increased area on the CTP obtained on admission;
 - 3) Volumetric measurement of the stroke calculated on the CT follow up.
- The result of the **Pearson Correlation test is = 0.725** , the correlation is significant **p value=0.012**.
- **If a large volume of elongated TTP is present on the CTP in the hyper-acute phase of the stroke, we can expect a large volume of ischemia in the follow up CT**

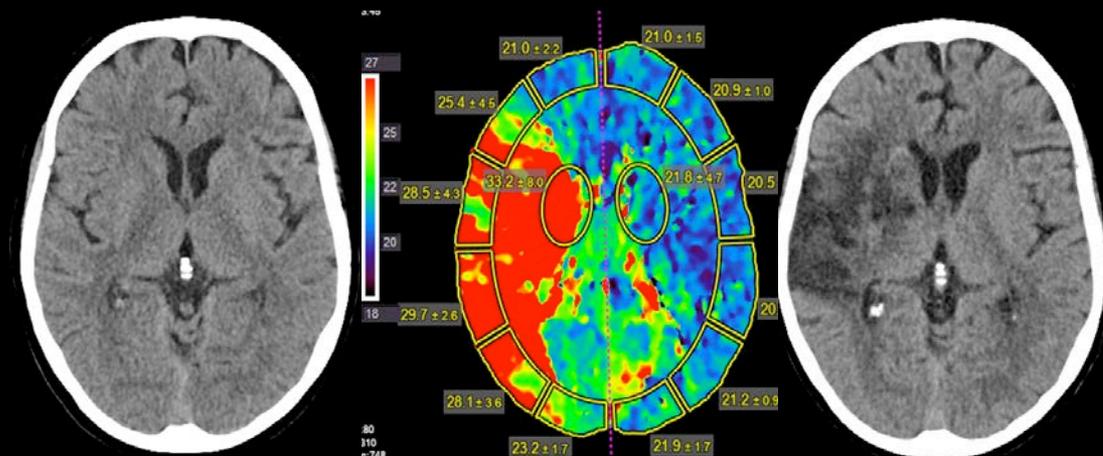
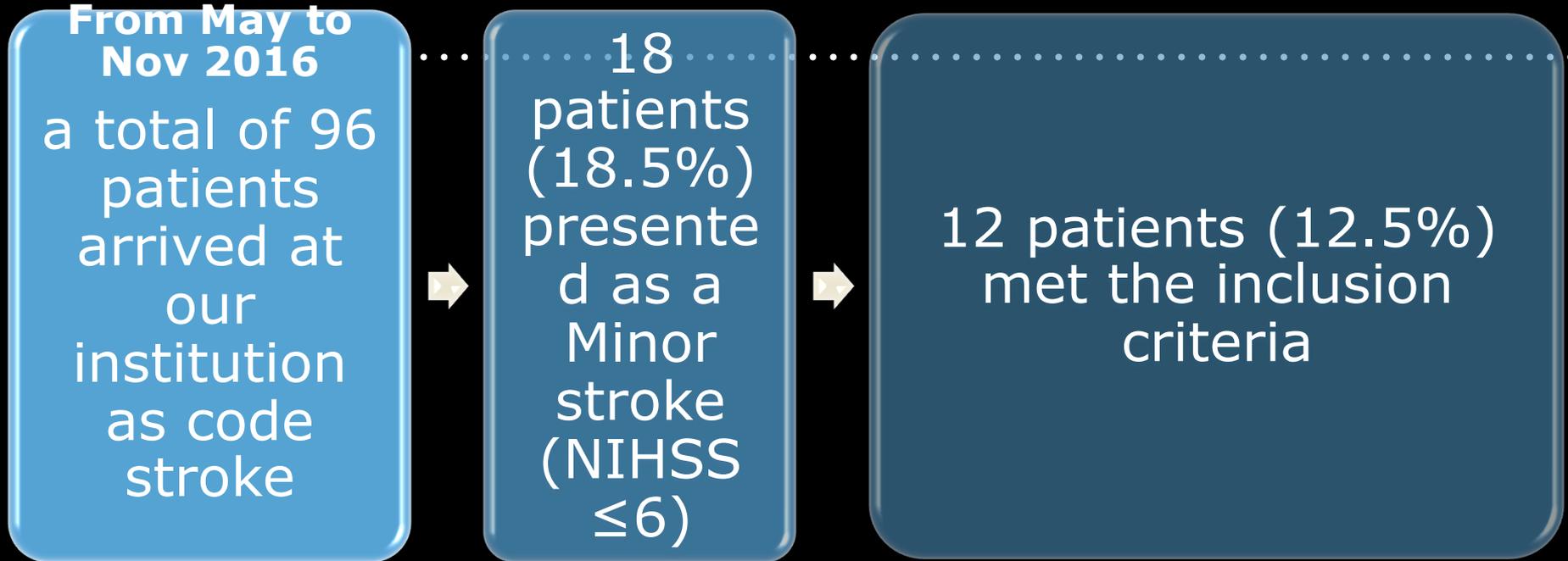


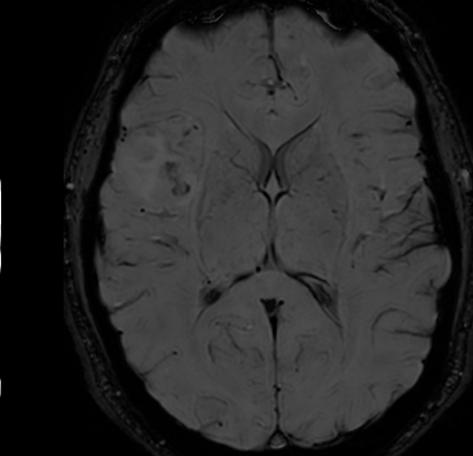
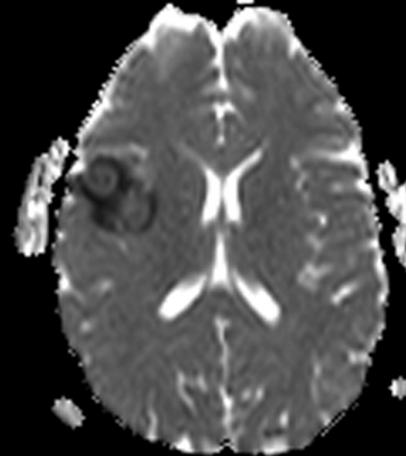
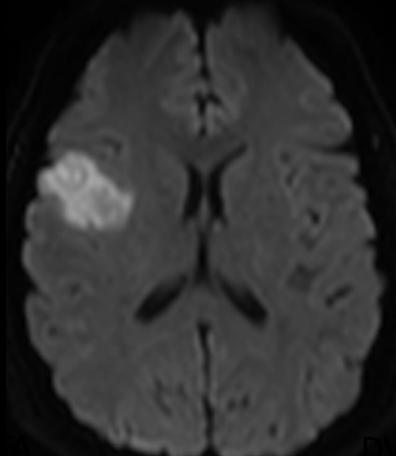
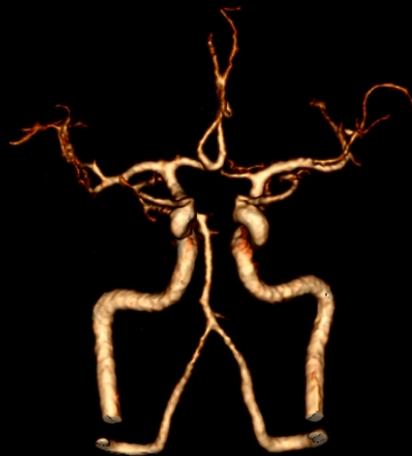
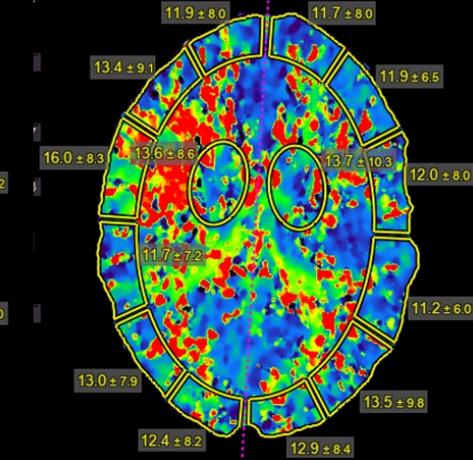
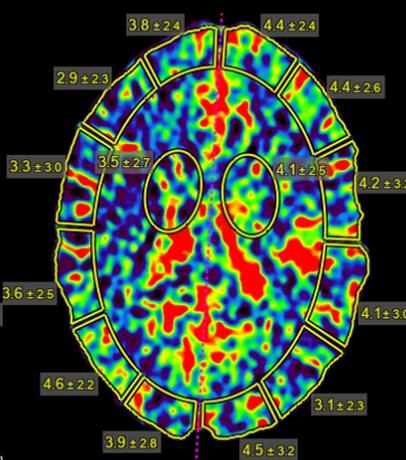
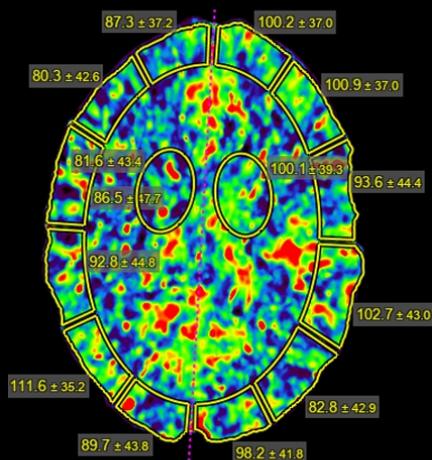
Fig.3A-C: 66yo F, Left hemiparesis. Initial CT ASPECT of 7 (A). Large volume of increased TTP (B). Follow up CT scan at 4 weeks (C).

Role of TTP in Small Strokes: Pilot study



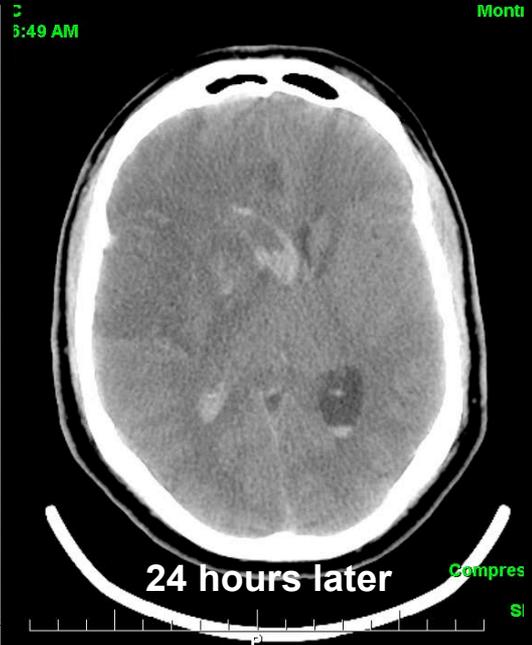
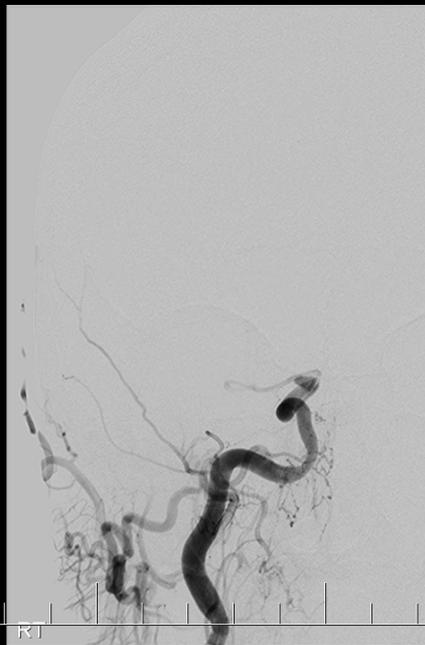
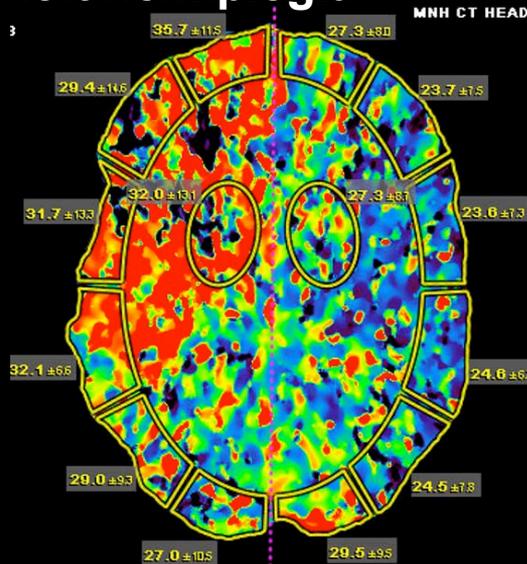
- All 12 patients had whole brain CT perfusion abnormalities and all presented abnormal time to peak. Four (33.3%) patients had concomitant abnormal cerebral blood flow and cerebral blood volume.
- 10 (83.3%) patients had cortical ischemic lesions and 2 (16.6%) had Basal Ganglia ischemic lesions.
- **The results suggest that the time to peak map is a very useful technique in the detection of small ischemic lesions in patients with minor strokes.**

Exemplary Case



Collaterals: presence of cortico-cortical anastomosis towards the infarcted area

Case of sept 2013: 49 y.o. M left hemiplegia



15 min later

9:49 AM

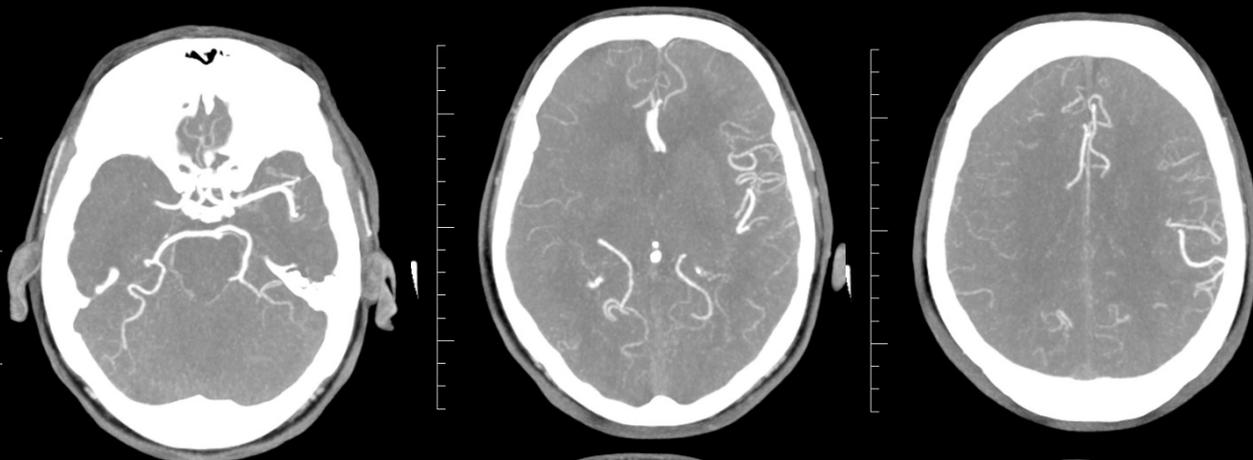
Monti

Compres

Si

C - Collaterals

Rt MCA Occlusion early arterial



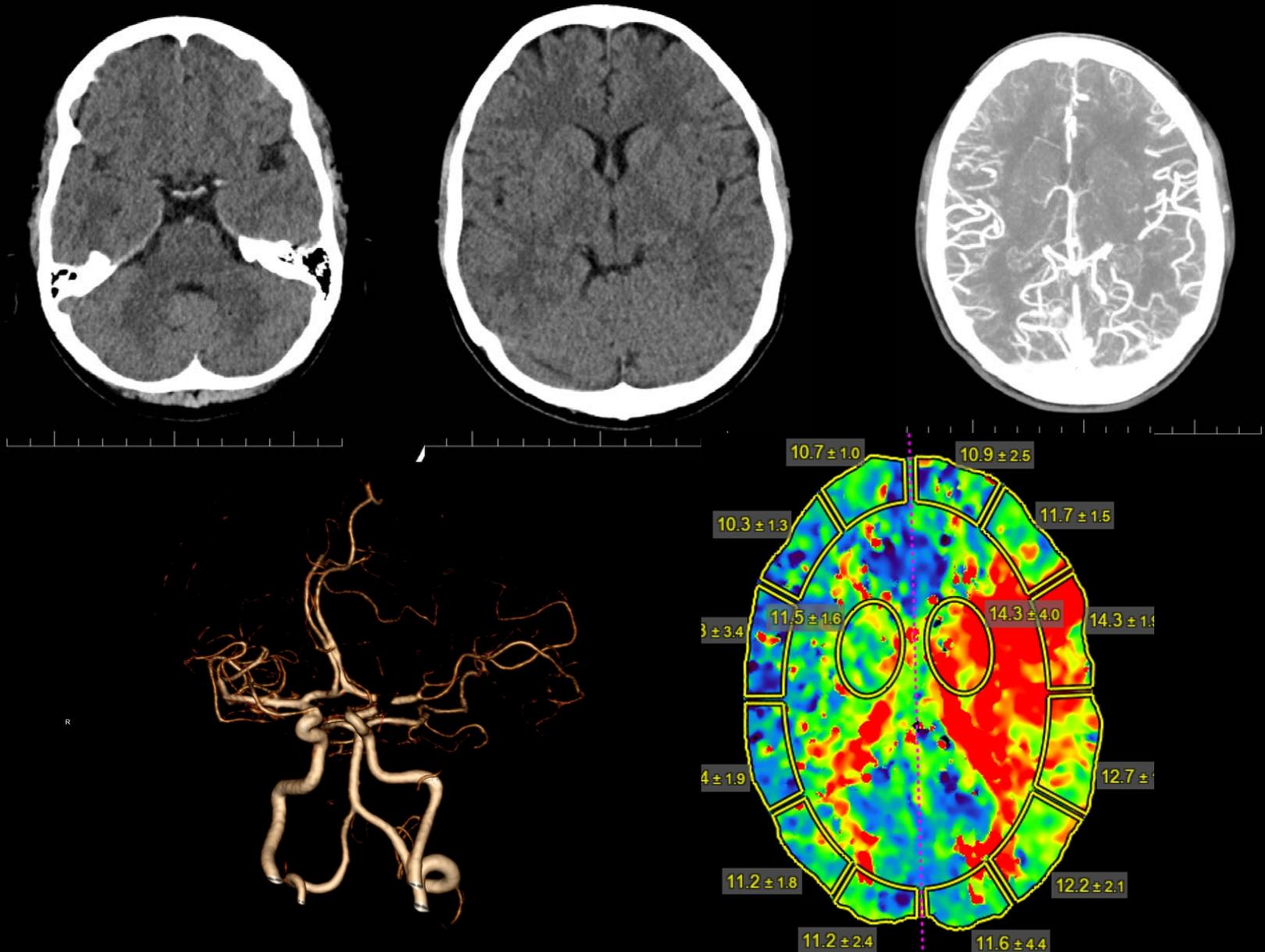
Late arterial: exactly 6 secs later



Late phase exactly 12 secs since early arterial

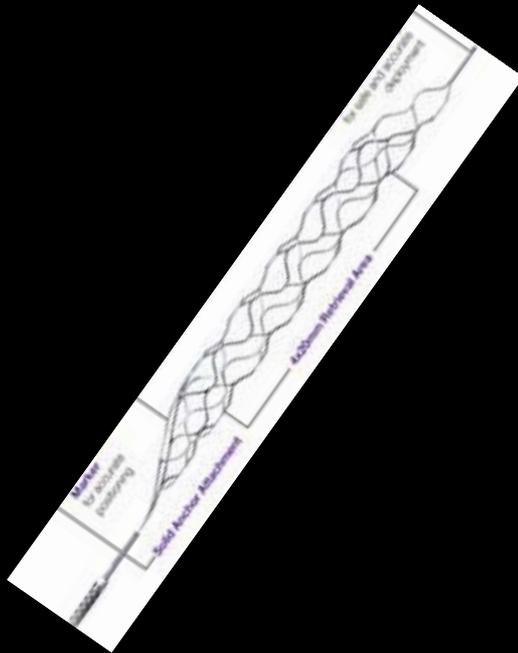


19 year-old female patient with right arm weakness



Mechanical Thrombectomy

- Insertion of a device in the occluded artery that enables to fragment then aspirate or remove the clot.
- Devices:

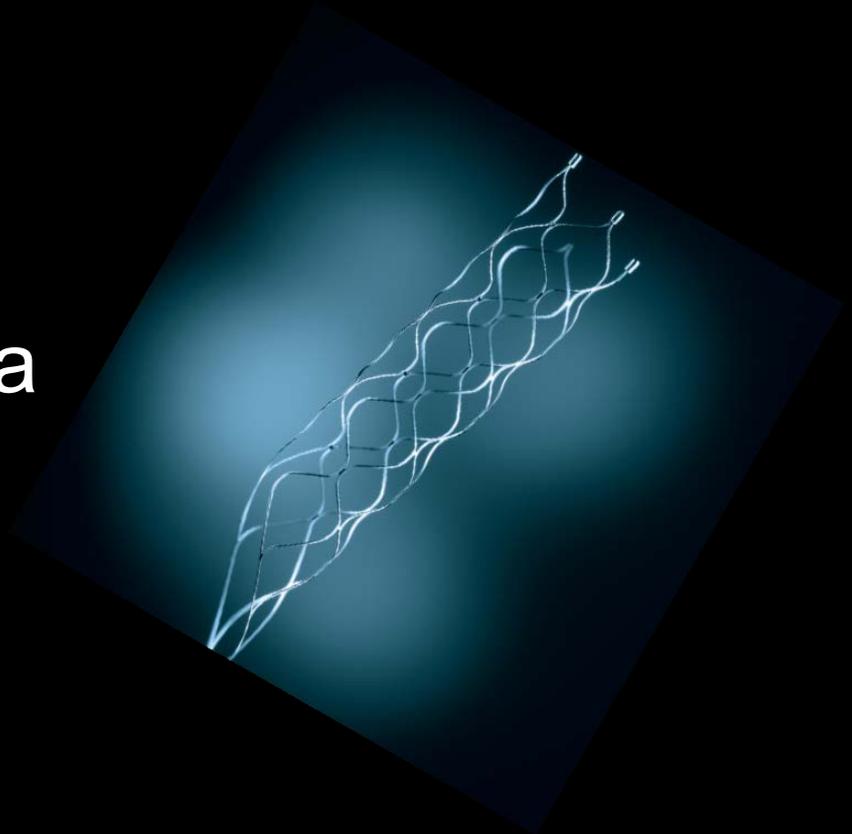


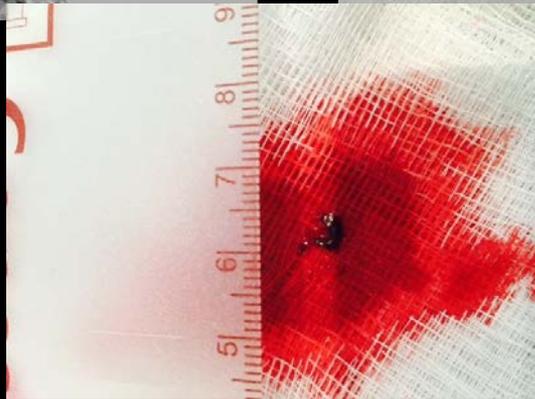
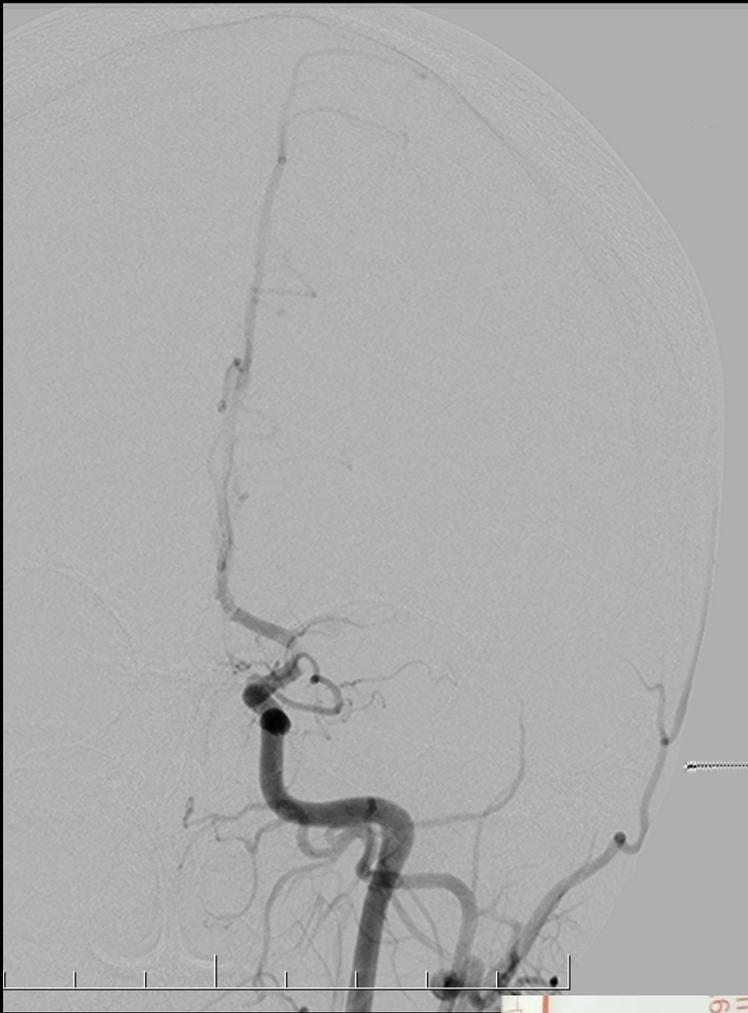
Merci

Penumbra

Solitaire

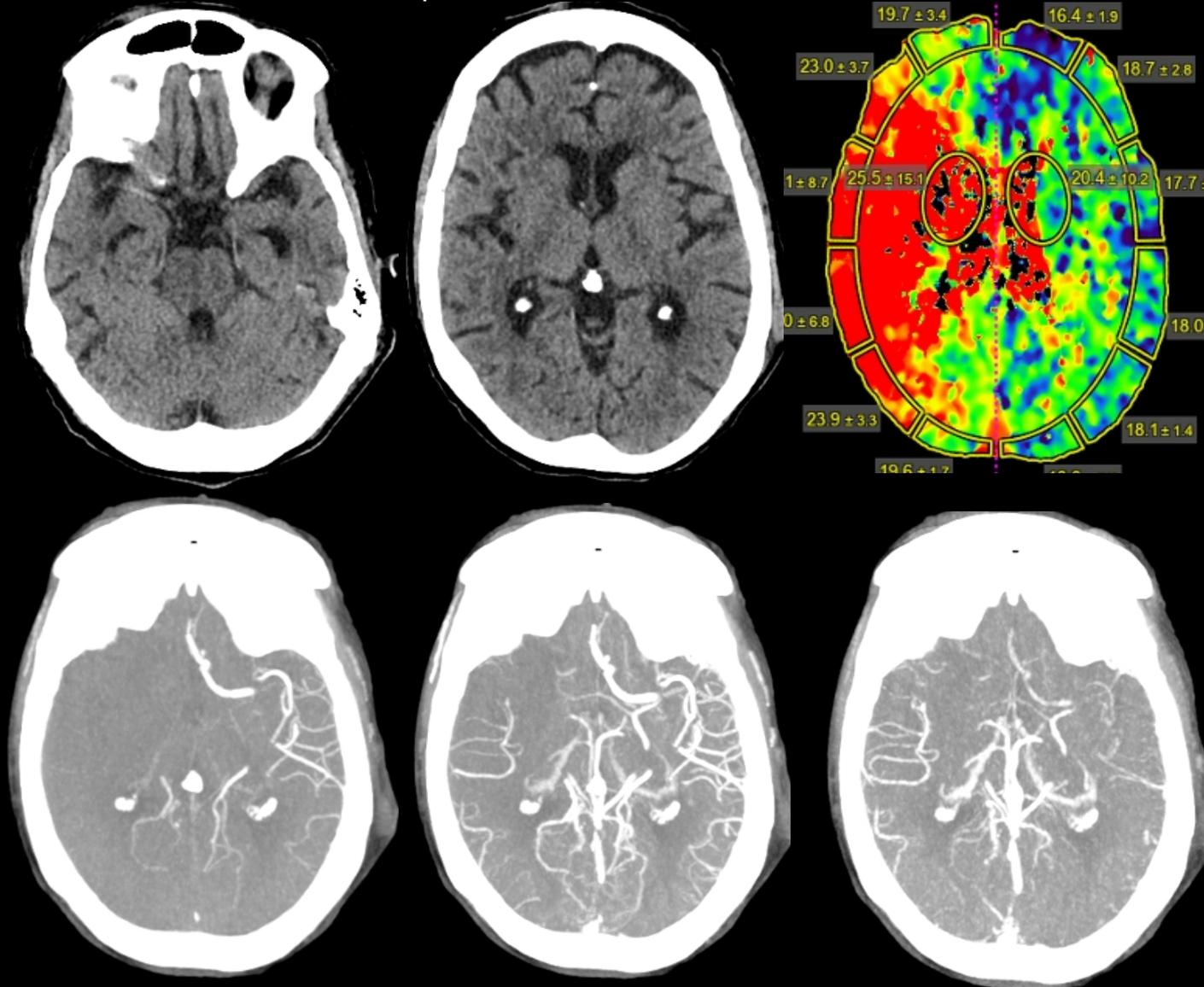
Trevo



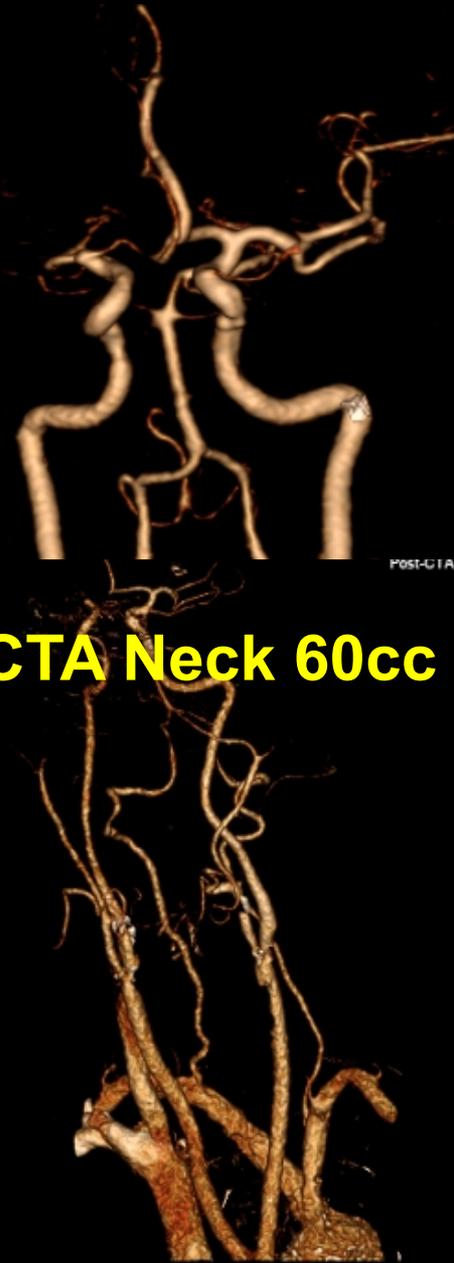


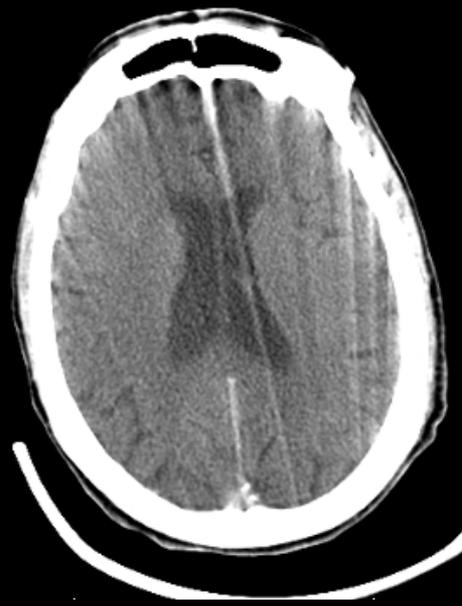
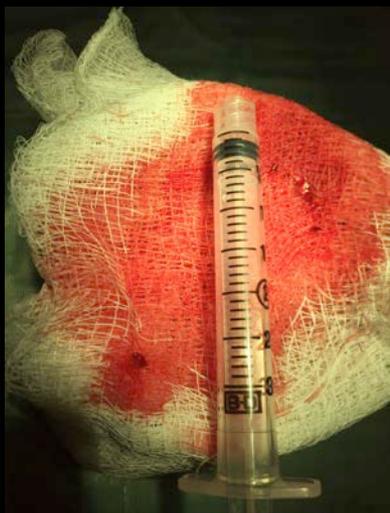
Conclusions: Rapid Imaging Selection VmCTA

- P –Parenchyma : ASPECT 6 or more;
- P –Pipes: ICA,M1,may consider M2;
- C –Collaterals: present.



CTA Neck 60cc





Thank You !



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