

New Frontiers In Neuro- Imaging

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What to ask for?

- Depends on:
 - What is available (24/7 MRI)
 - What you want to see
 - treatment you can offer (time, service)
 - What makes sense

Stroke

Therapy options

- iv Lysis < 3 (4.5) h (ECASS, NINDS)
- ia Lysis 3 - 6 h (PROACT)
- Bridging therapy i.v. +i.a.
- mechanical Recanalization
- Intensive Care
- Craniectomy



Sekundary

- Risk factors (Diabetes etc.)
- Carotidstenosis



i.v.

endovascular

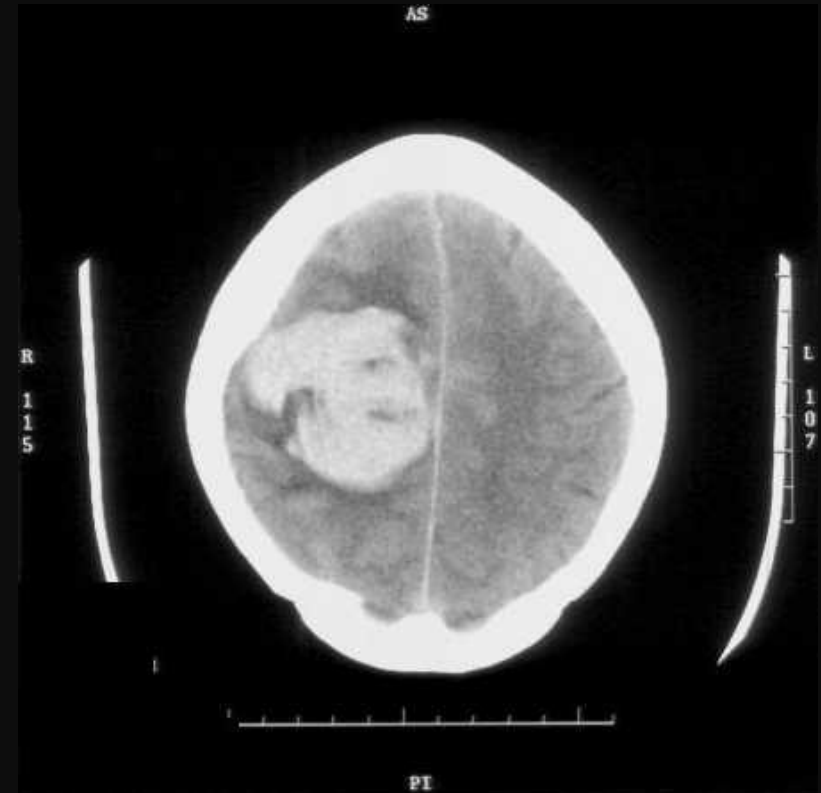
conservative

Imaging should answer:

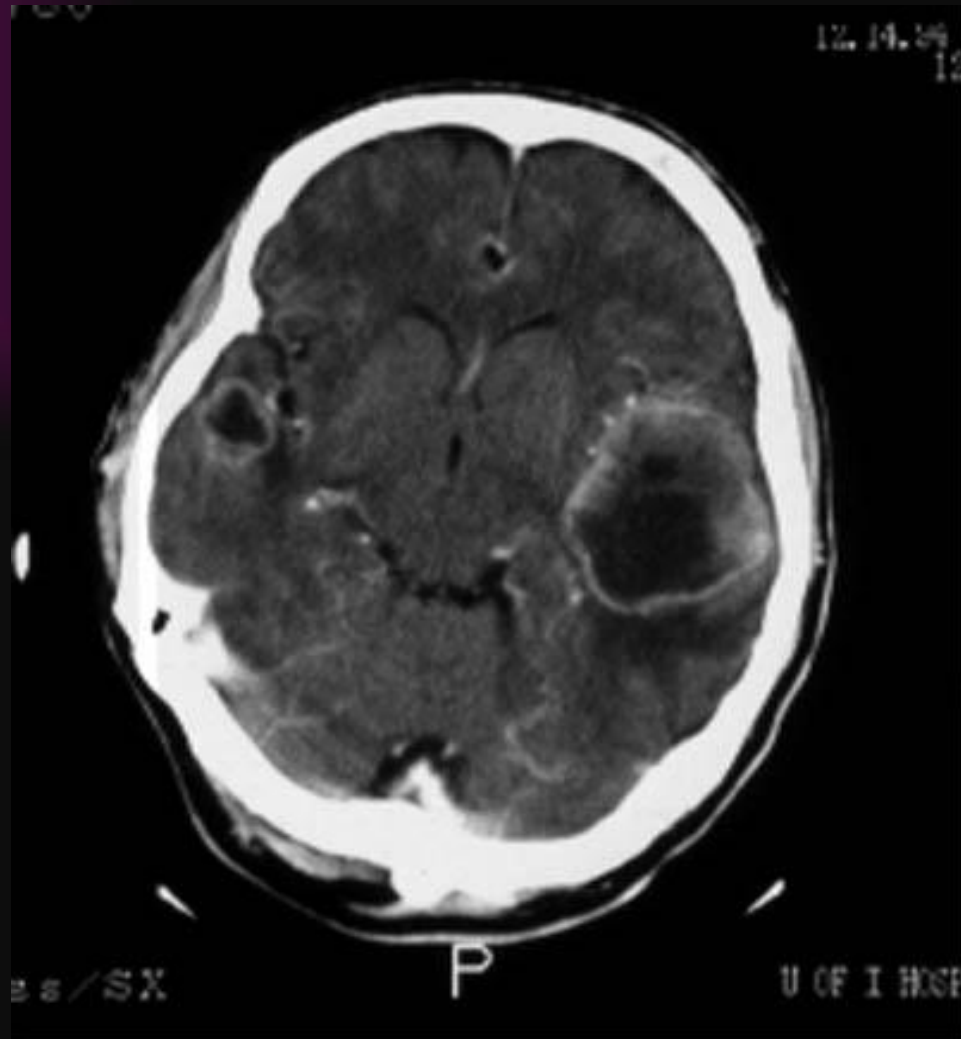
- Is there intracranial hemorrhage
- Where and how big is infarction?
- What age is infarction?
- Is there „tissue at risk“ ?
- Is a vessel occluded- which one ?

Stroke mimics:

- intracranial hemorrhage
 - Migraine
 - Epilepsy

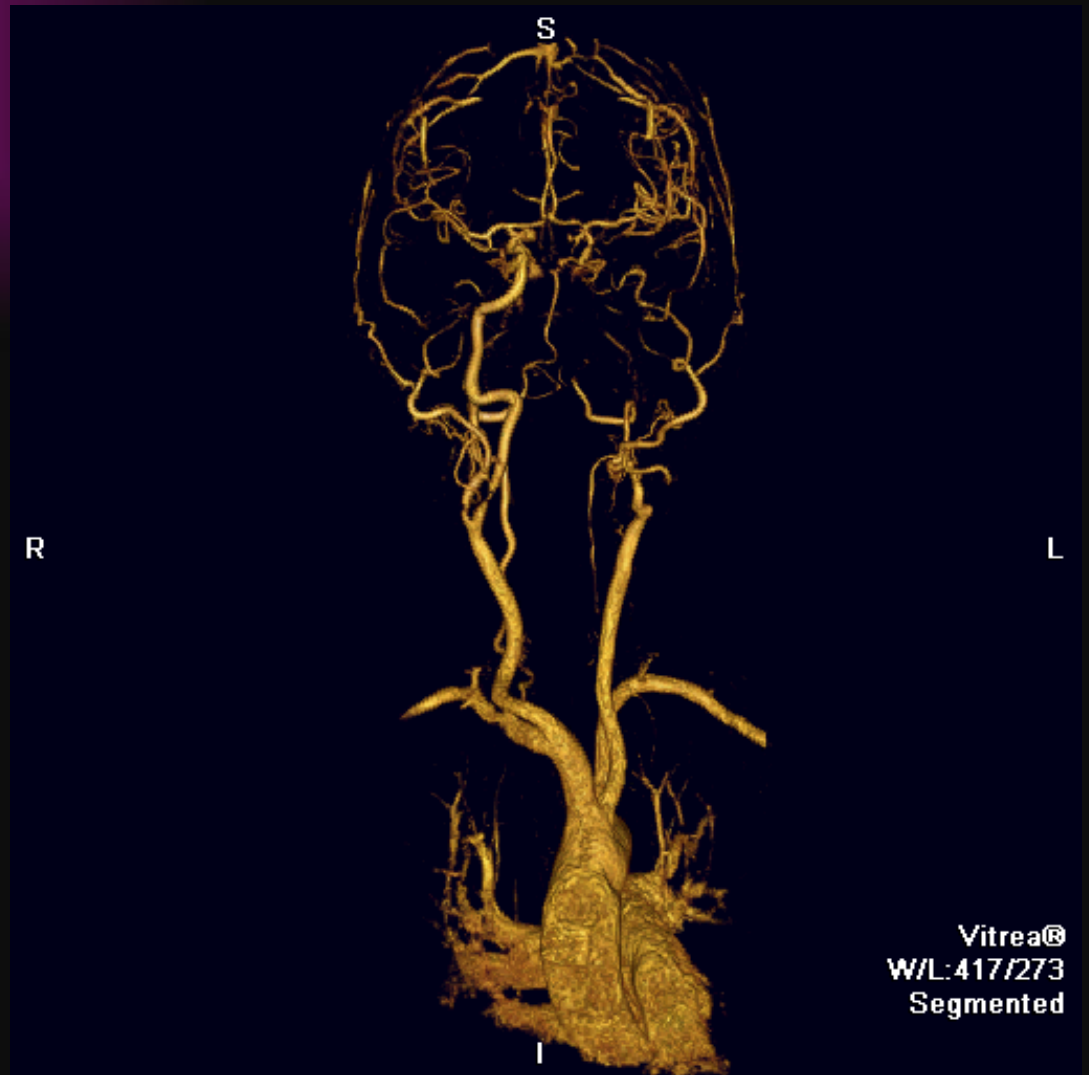


- Tumour



Imaging modalities

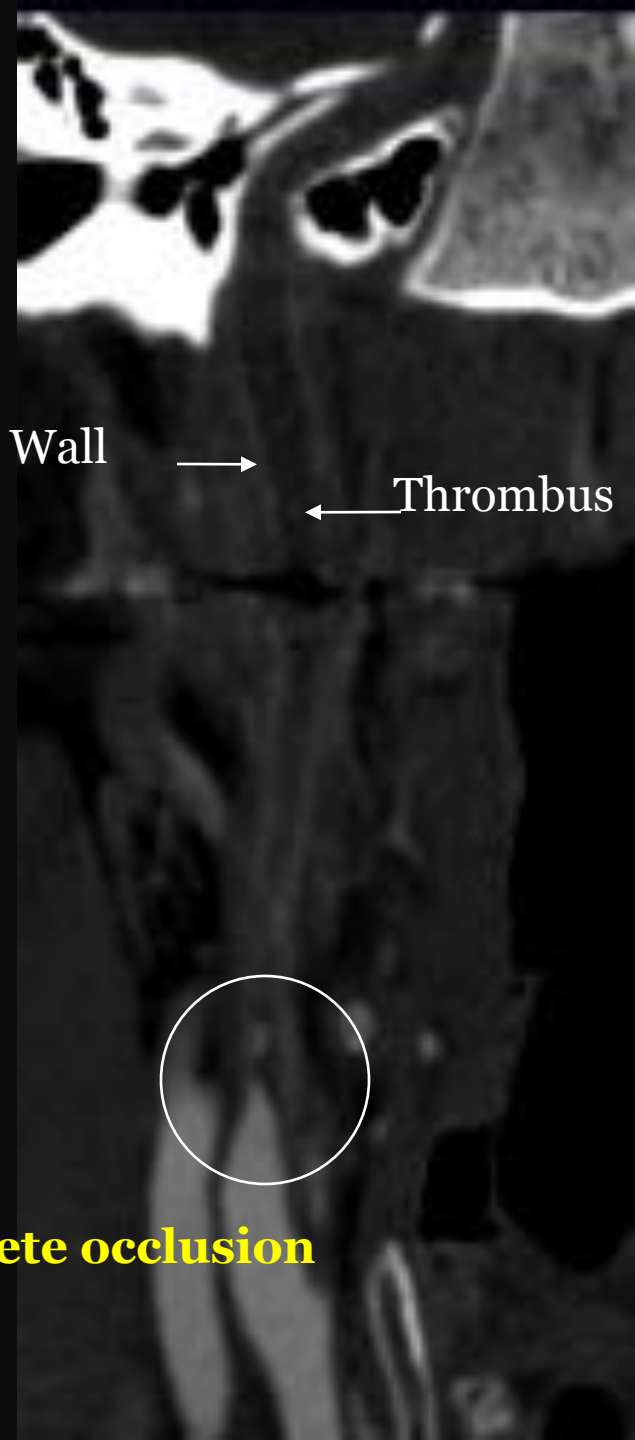
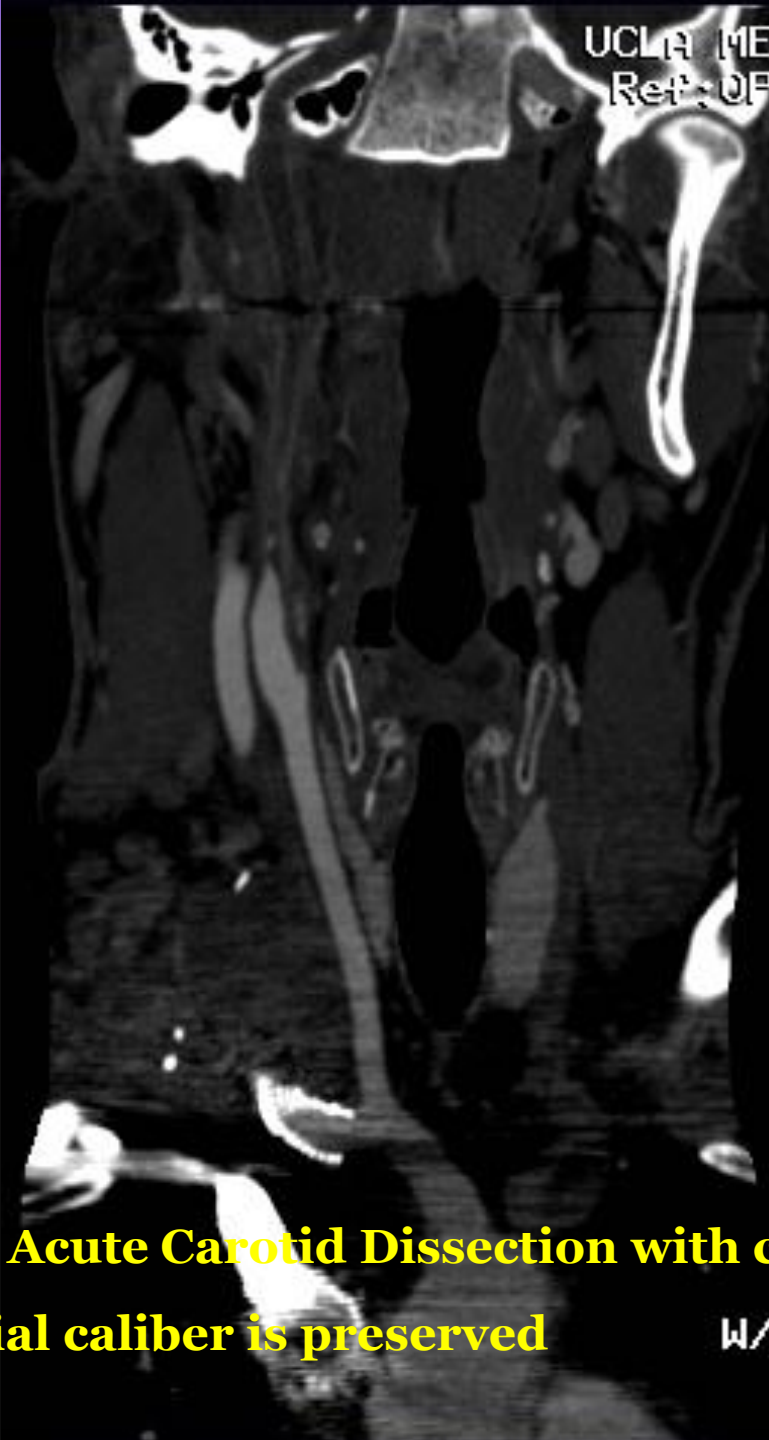
- CT
- MR
- DSA



When is Imaging needed?

Acute Phase

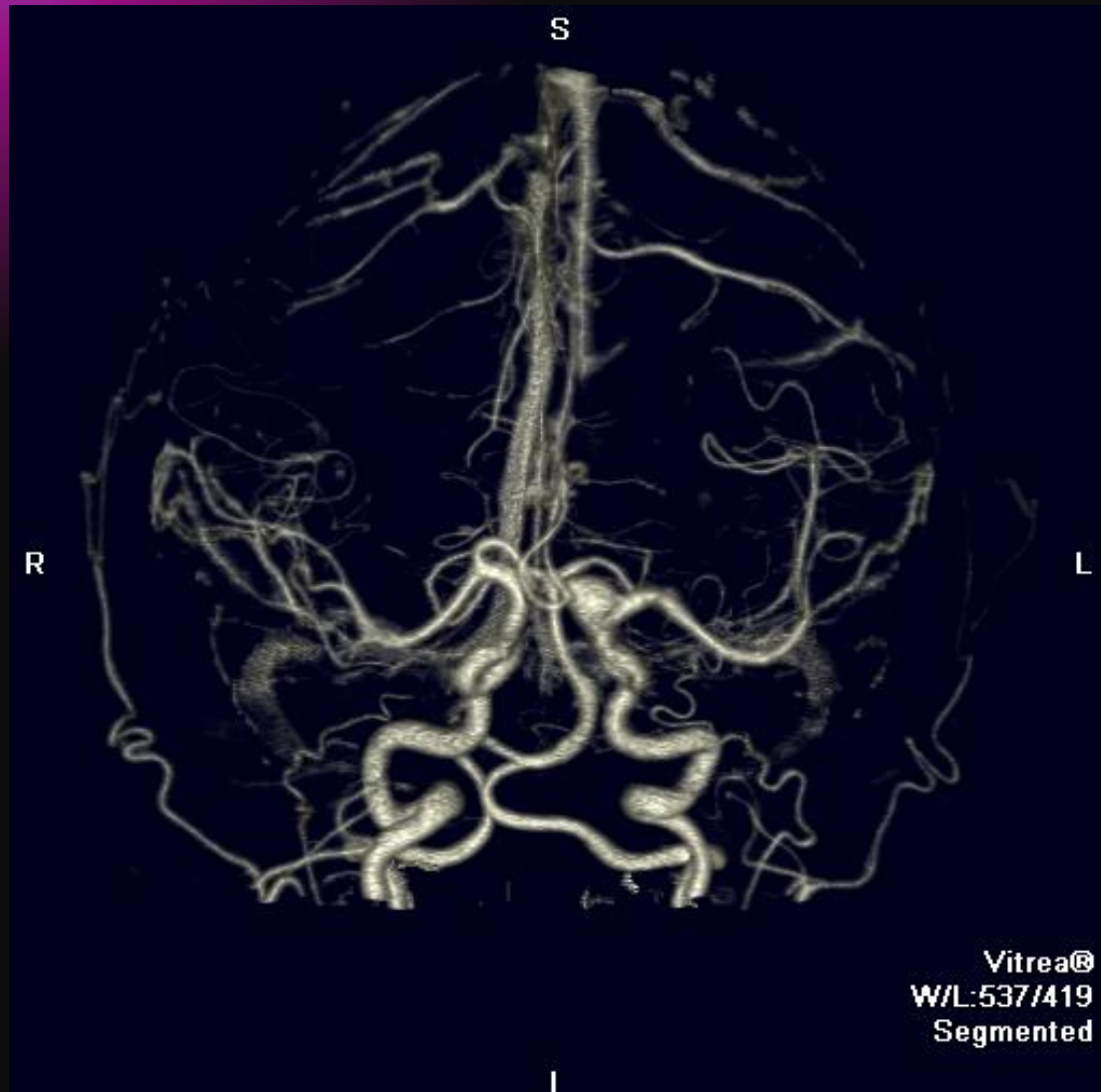




CTA in Acute Carotid Dissection with complete occlusion
– arterial caliber is preserved

W/L

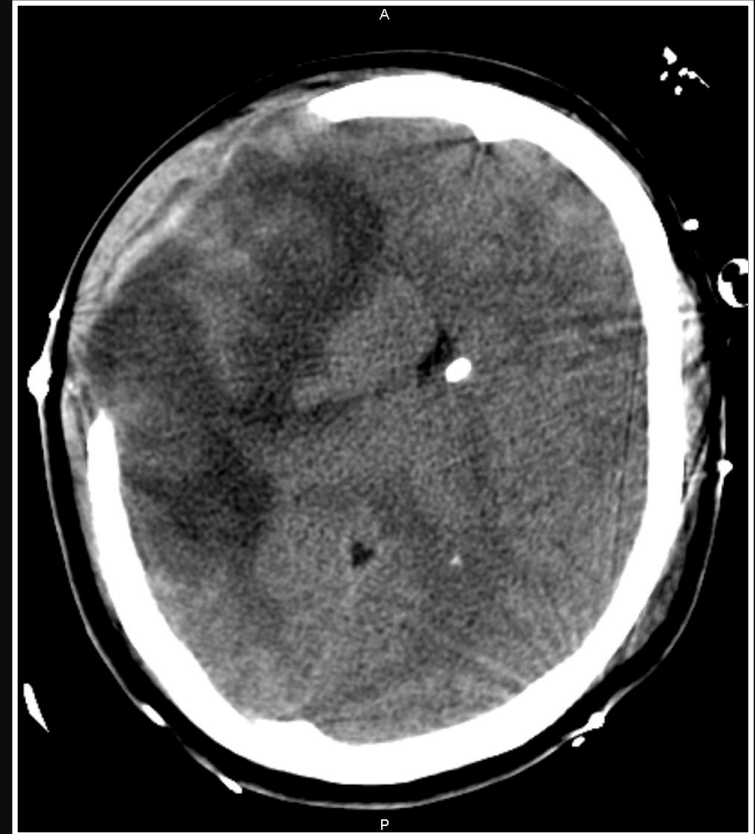
Bone Subtracted CT Venography



CT for Monitoring



Hemorrhagic transformation



Hemicraniectomy for malignant cerebral edema

Is it a stroke??



- CT 3-5 h
- MR- DWI

CT Early signs

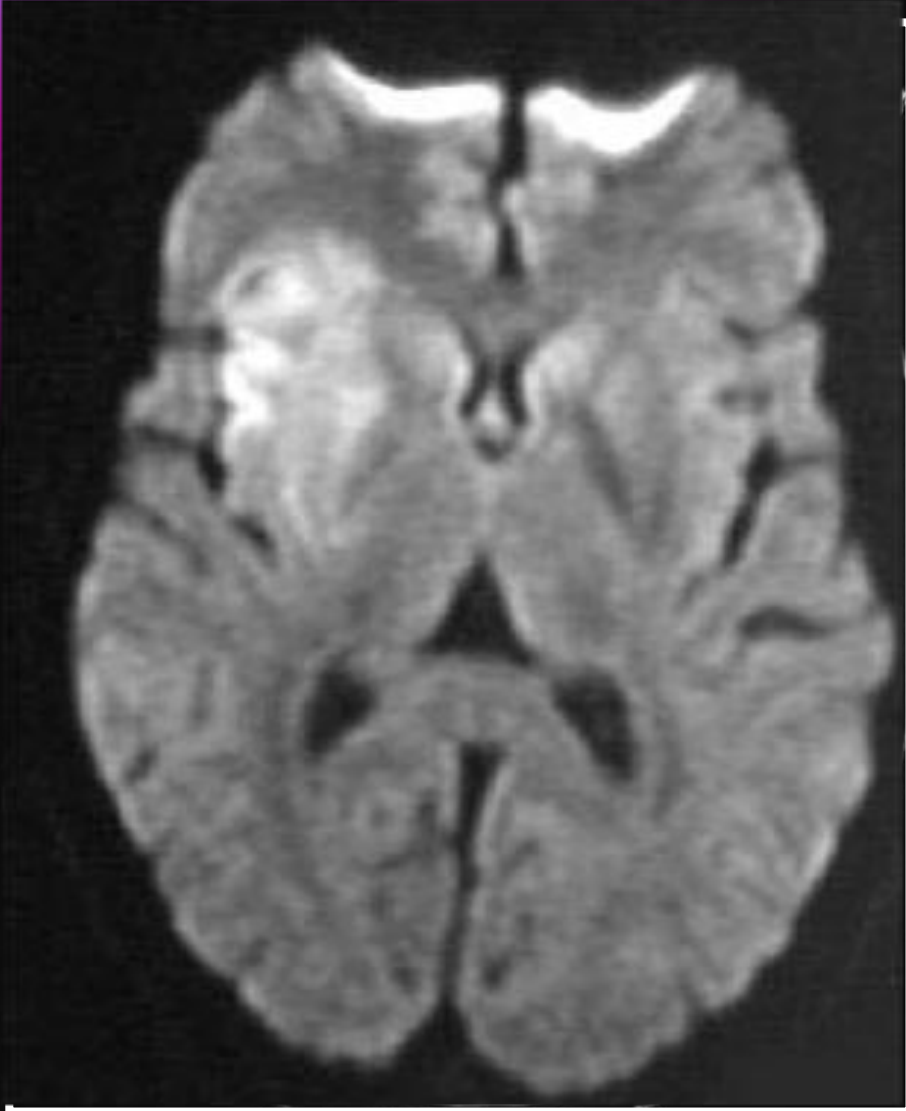
- Early signs:
 - “obscuration” of lentiform nucleus
 - loss of the “insular ribbon” (reflects early ischemic changes in MCA or ICA distribution)

- Normal in >50%

Is it a stroke??



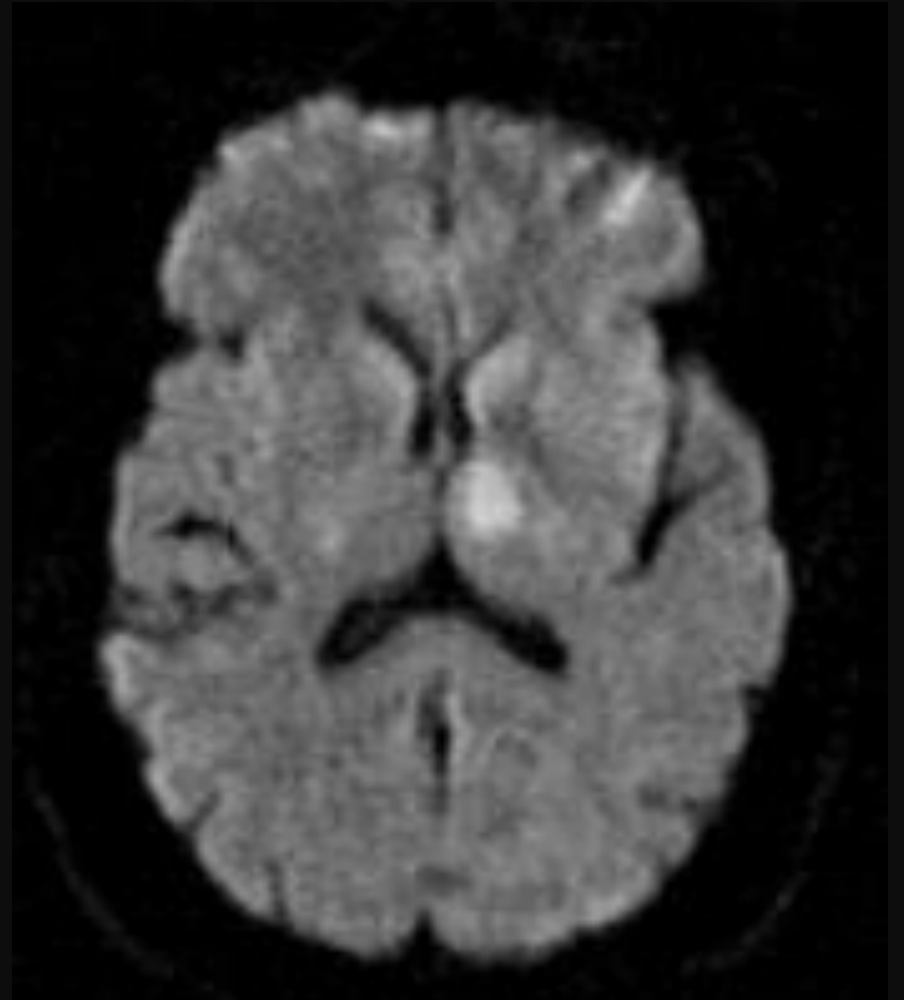
Yes, it is!!



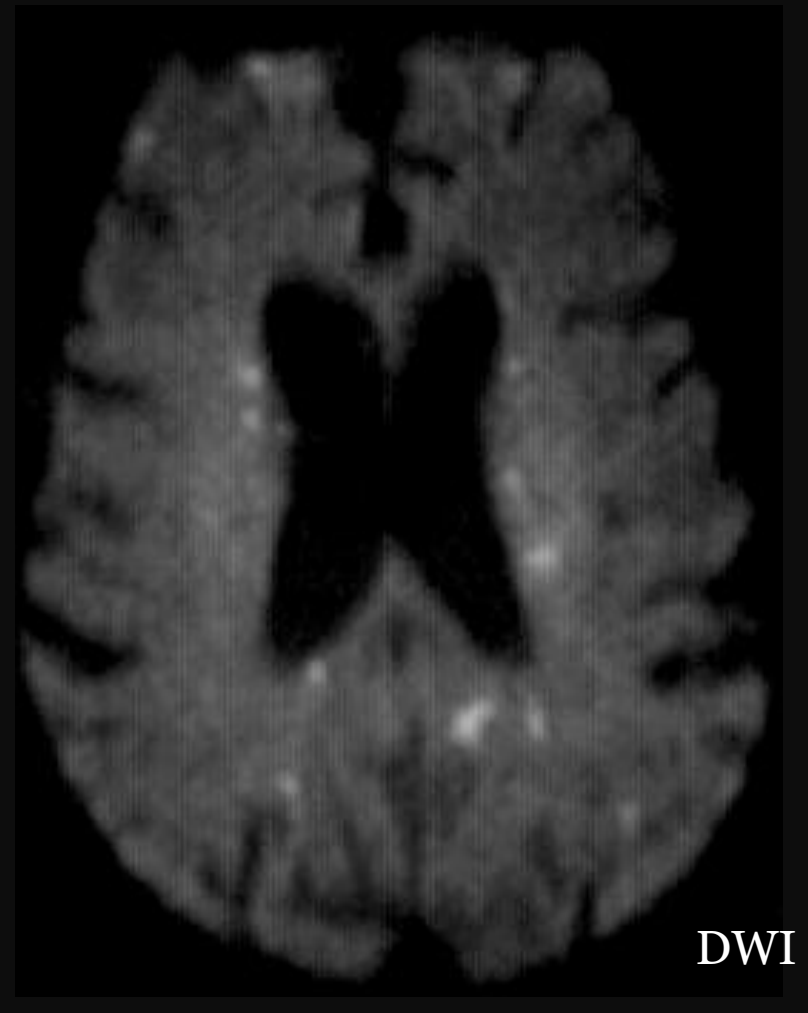
CT and MR with DWI– Sensitivity for Acute Stroke

Study	Sensitivity	Specificity	P-value
CT with suspicion	52%	95%	p=0.008
CT without suspicion	38%	89%	
MR with suspicion	95%	94%	p=0.822
MR without suspicion	94%	98%	

AJR 2002;179:223-229 (n=733)



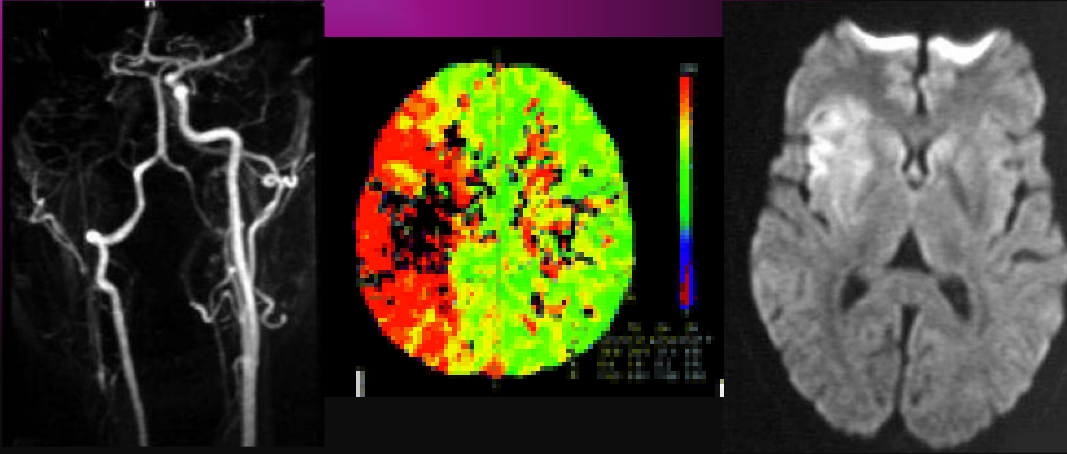
Imaging Findings



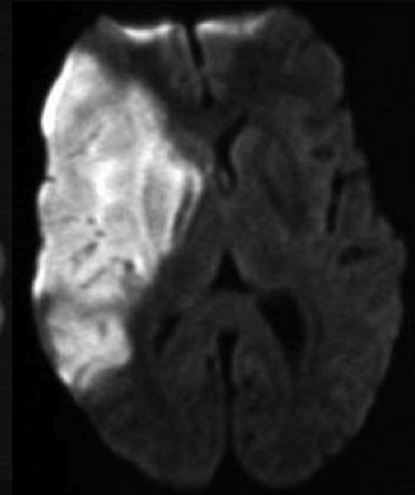
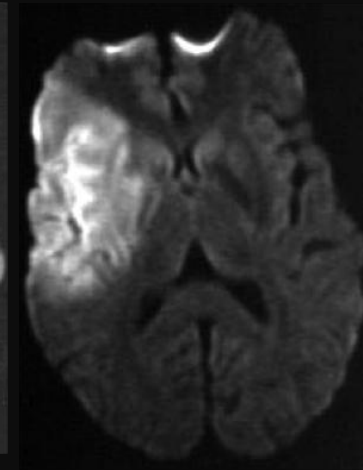
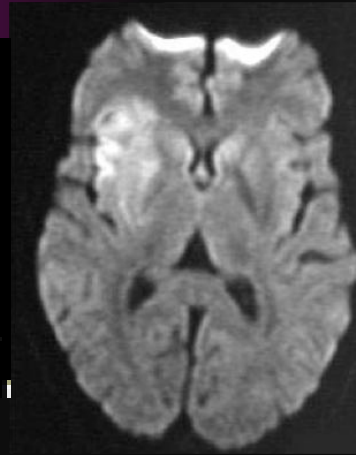
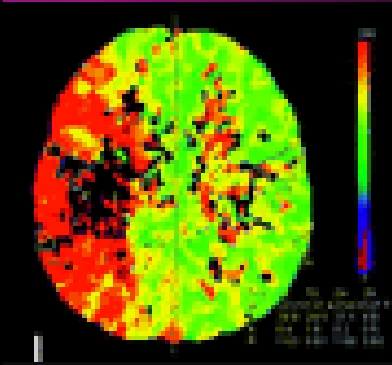
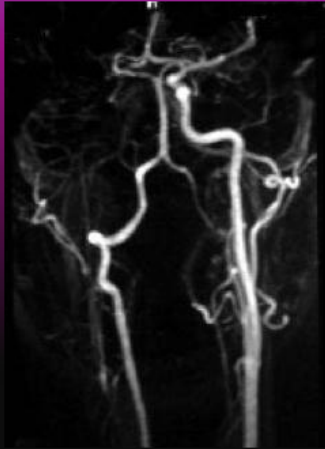
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unclear time window => mismatch



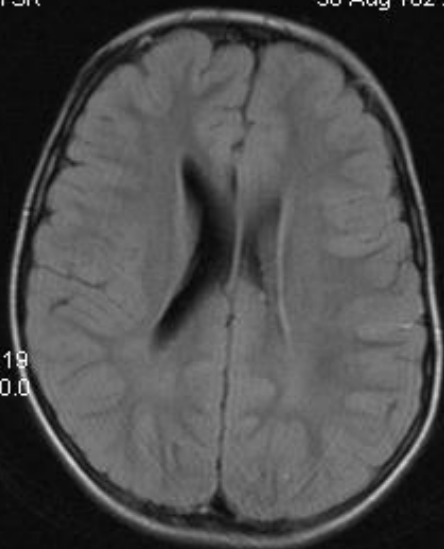
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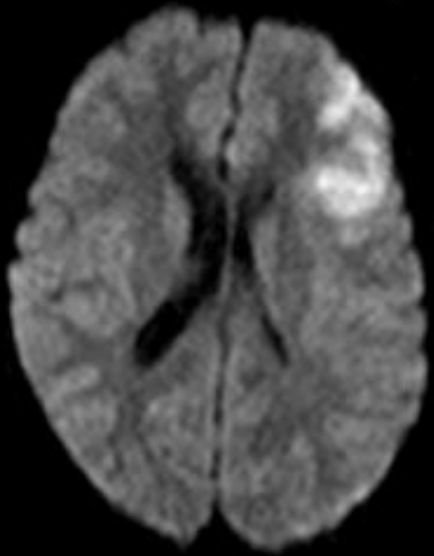
oman
097SR

Neurorac/SR
30 Aug 102 22

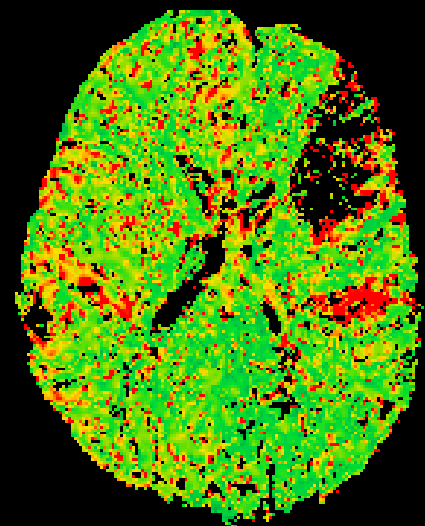
30 Aug 102



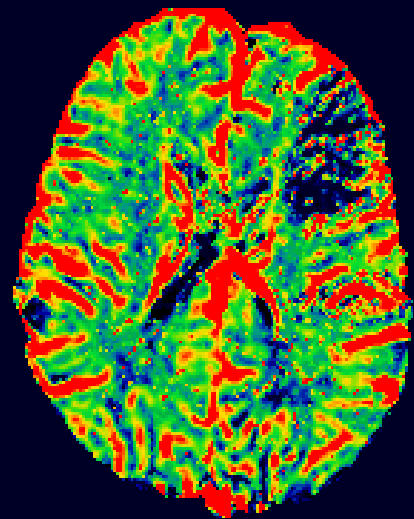
FLAIR



Diffusion



rMTT



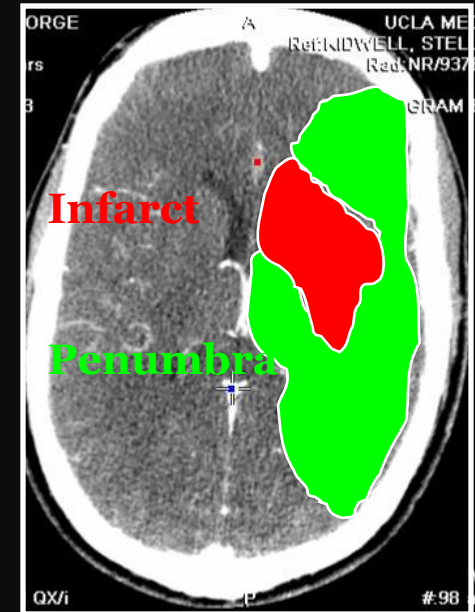
rCBV

5- y boy, Hemiparesis and aphasia 5h

Grunwald I, Reinhard H, Reith W. Stroke in childhood. Radiologe. 2003 Nov;43(11):948-57.

CT Perfusion: Identification of The Ischemic Penumbra

Tissue type	CBF	CBV	MTT	Tissue State
Normal tissue	→	→	→	Normal
Viable, oligemic	□	→	→	Penumbral
Viable, ischemic	□	□	□	Penumbral
Infarcted – bland	□	□	□	Infarct Core
Infarcted, reperfused	□	□	□	Infarct Core



Detection Power of Perfusion CT

Author	Territorial infarcts		Non-territorial infarcts	
	Sensitivity	Specificity	Sensitivity	Specificity
Maruya, 2005	100%	100%	47.4%	91.3%
Mayer, 2000	93%	--	33%	--

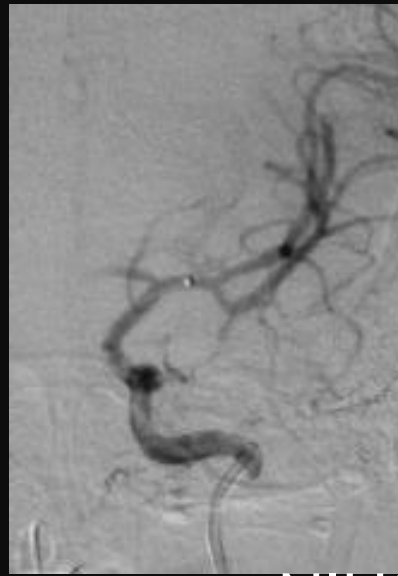
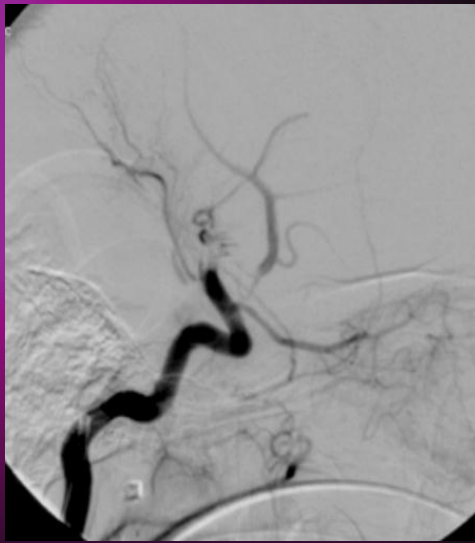
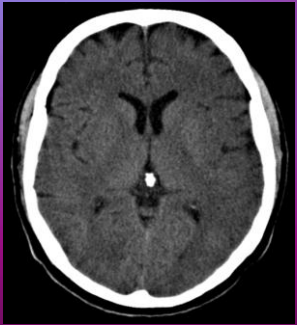
MRI can be first choice



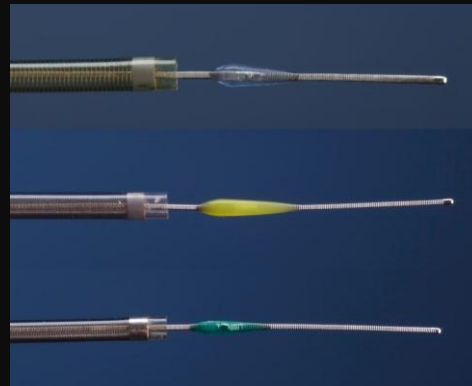
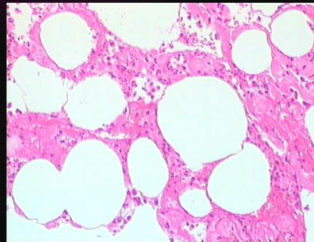
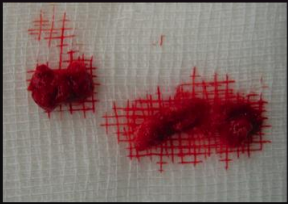
- MRI selection highly cost-effective compared to CT care
- +US\$103 over the patient's life
- +US\$ 1,840

Acute Vascular Imaging Centre University of Oxford





NIHSS 16=> 8



Mobile CT



- Neurologist
- Neuroradiologist
- Mobile lab
- Lysis
- Teleradiology

