

Prevention, Recognition, & Management of Complications of Carotid Interventions

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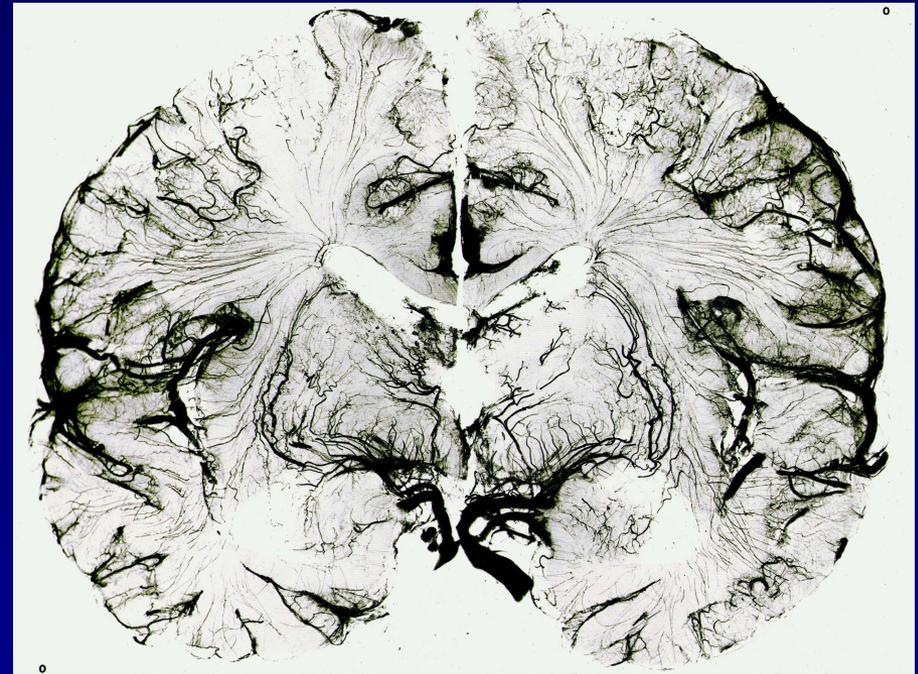
Department of
Neurosurgery



**TOSHIBA
STROKE
RESEARCH
CENTER**

I am Very Conflicted

- Participated all carotid stent trials
- Research support all major device companies
- Medical advisor
 - MTI, EKOS
- Niagara Gorge Medical Device LLC
- Primus Medical LLC
- Sapient capital, Pequot capital

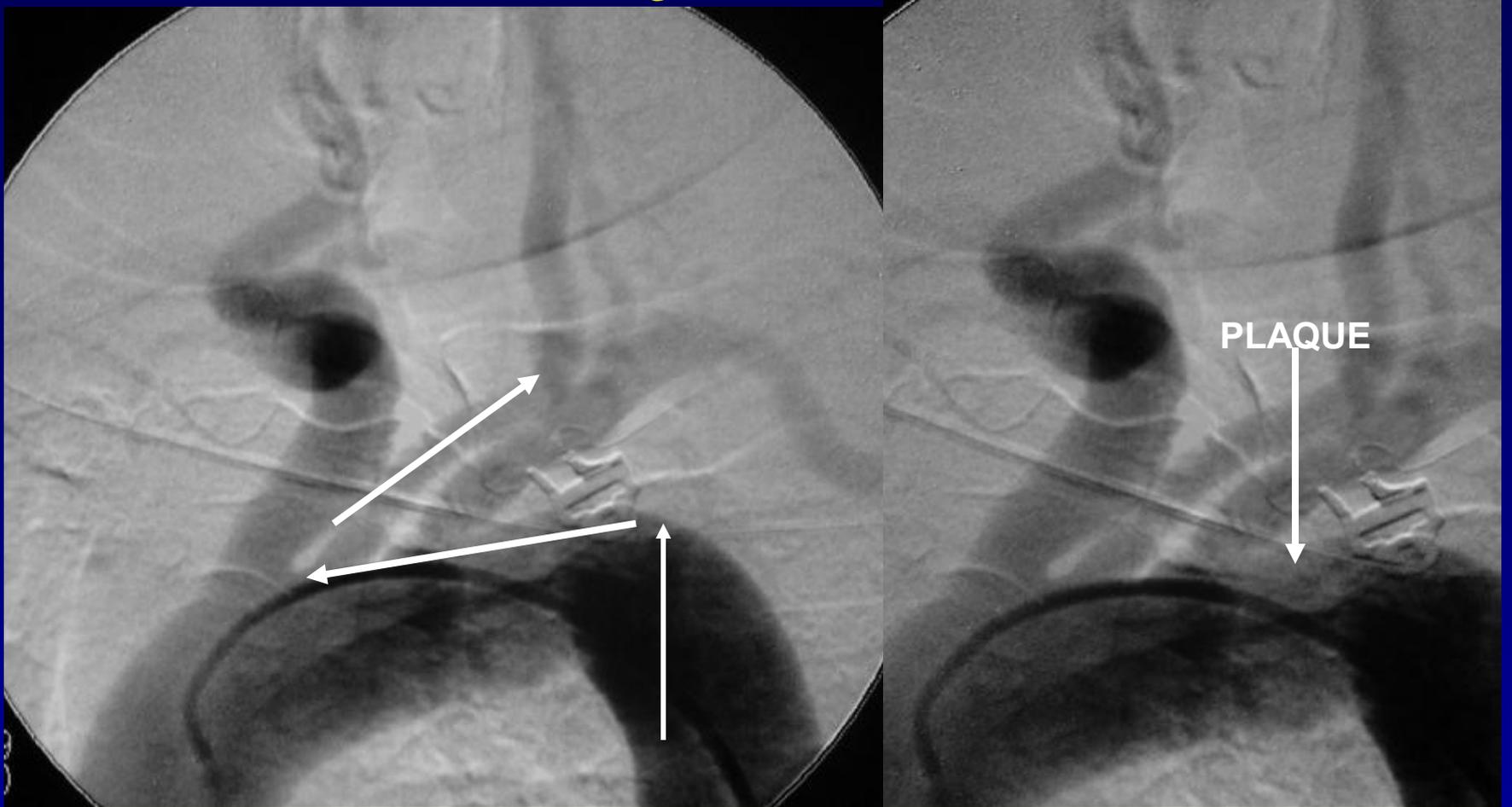


Avoid Complications

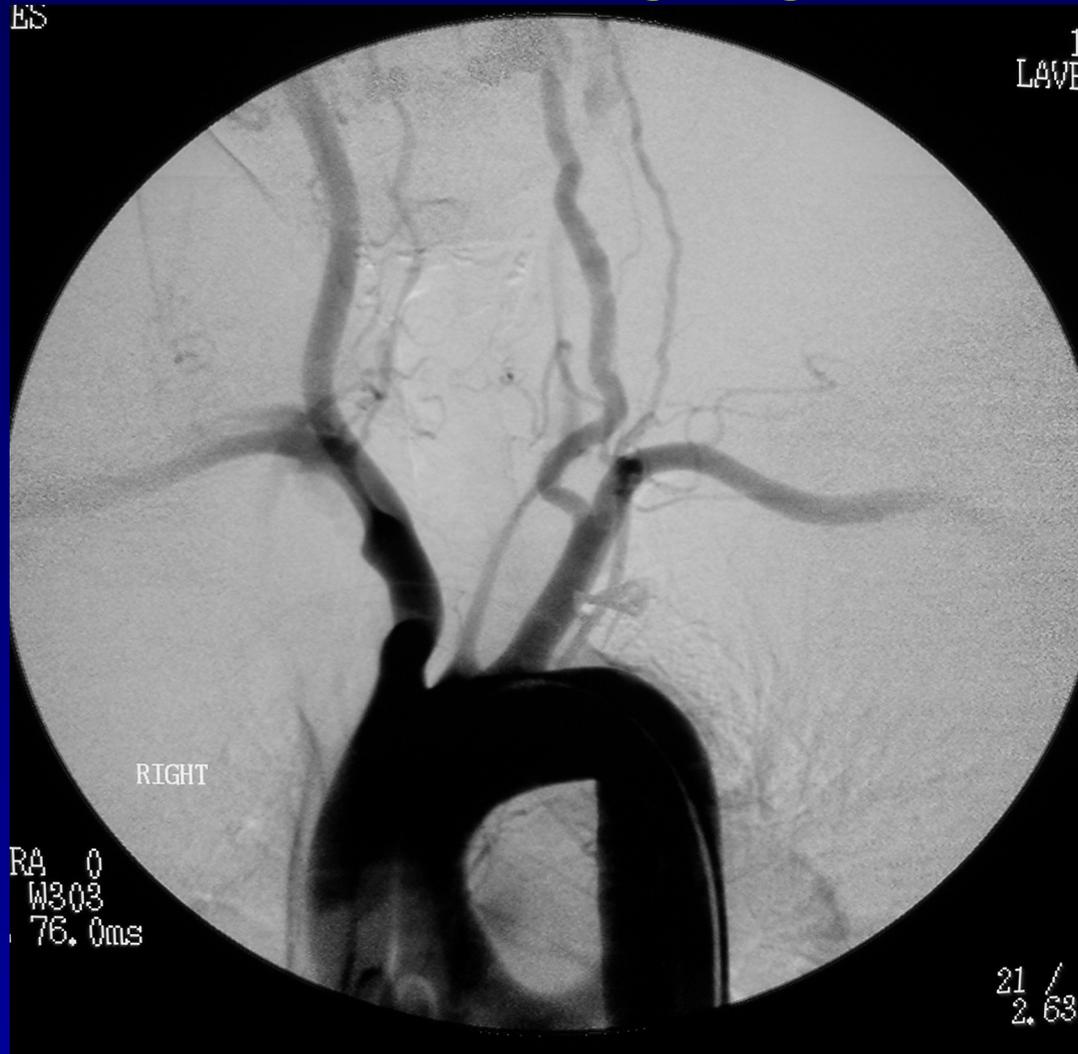


Trongsa Dzong Bhutan

Severe Arch Disease *Potential for Dissection*

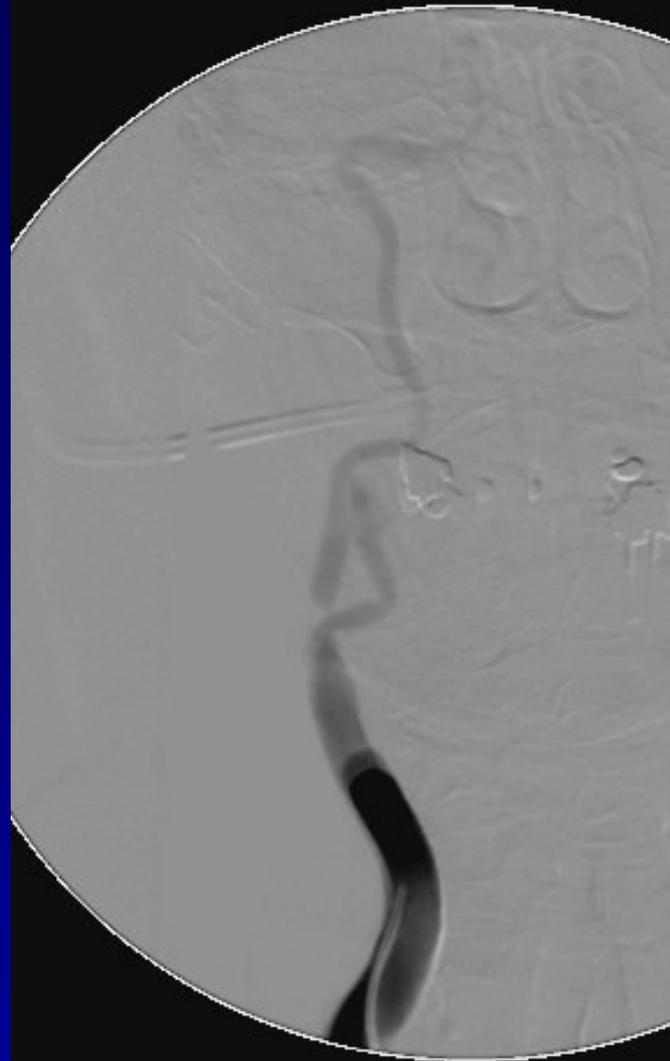


54 yr female nurse presents after cerebral angiogram



Access Complications

- Common carotid artery dissection during diagnostic angiogram in preparation for CAS



Search For the True Lumen



Dissections

- **Must find true lumen**
- Place microcatheter through the dissection distal into normal vessel and perform angiogram, prove you are in the true lumen
- Tack down flap with stent OR
- **If asymptomatic**
 - Heparin/coumadin it will heal
- Perfusion study?

Symptomatic Stenosis



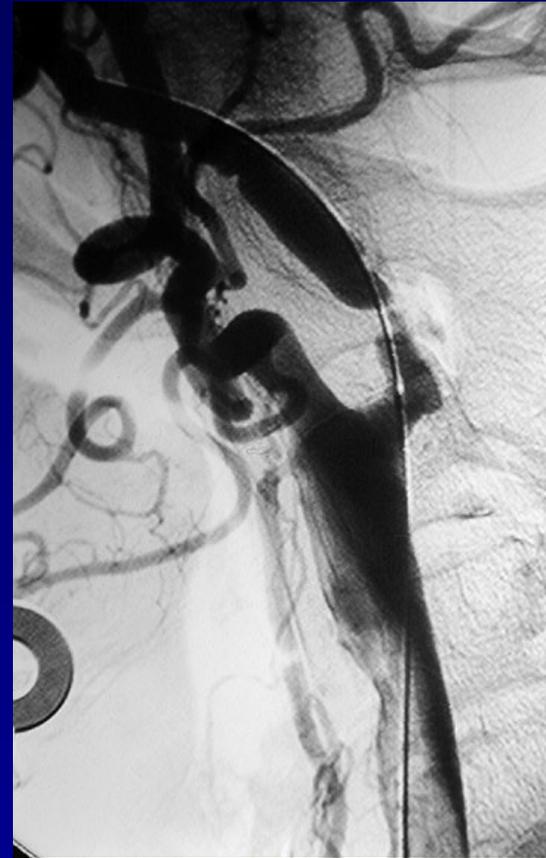
AccUNET Filter in ICA



Proximal ICA

- Best way to manage complications
 - establish stable purchase with the guide
 - 6 Fr guide catheter
- If filter pulls through
 - Check lesion for dissection
 - Look at intracranial circulation for vessel drop out from emboli
 - Try again

72 yr female hemiplegic crescendo TIAs



Acute Neurologic Change

- Don't Panic
 - **William Osler**
- Digital run of the CCA/ICA
- Intracranial DSA
- Examine the Patient
- Identify the cause

FILTER COMPLICATIONS

Full Filters



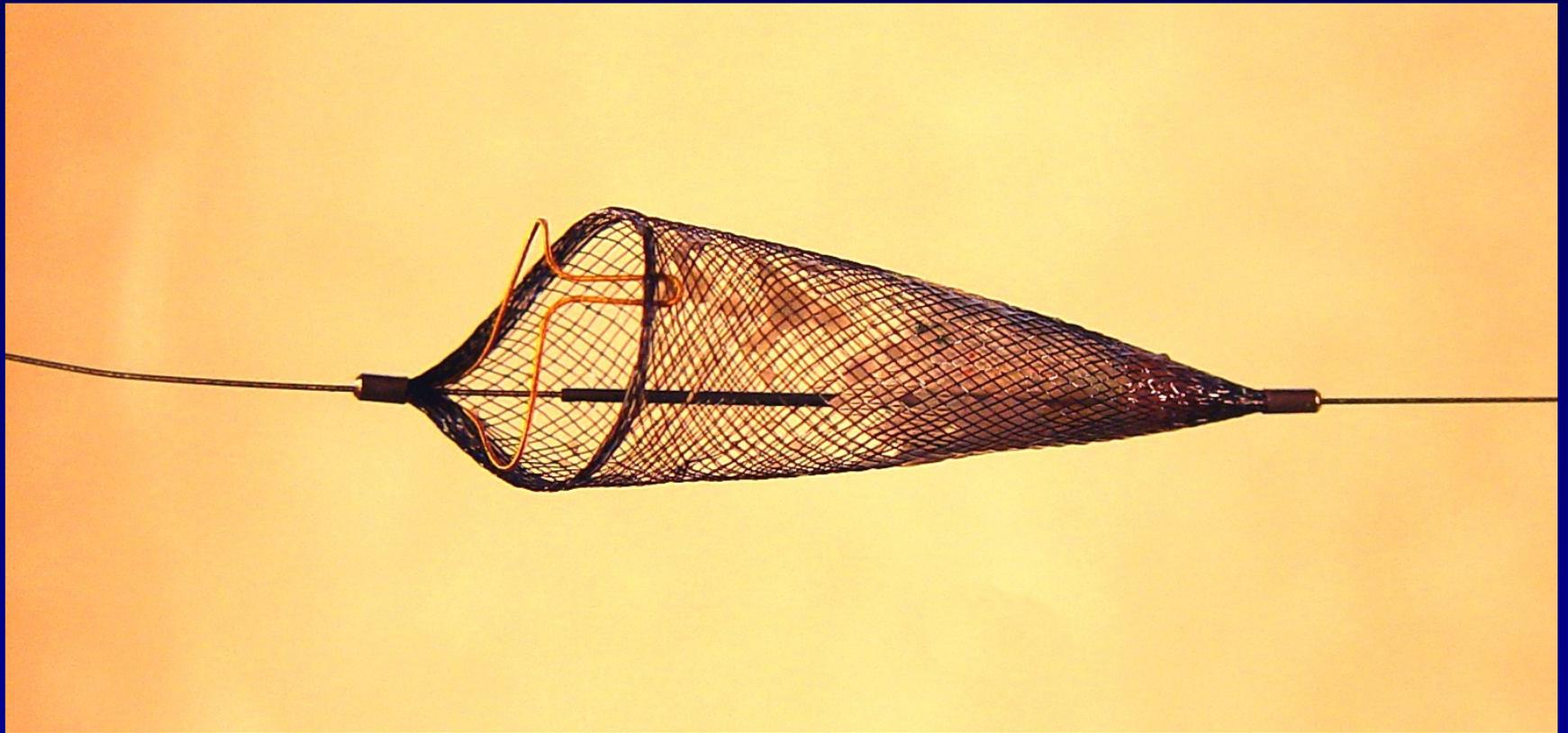
Carotid Occluded after Angioplasty

- Can suck out contents of filter with monorail catheter over wire
- **Examine Patient**
- Neurologically Stable?
- Finish the case
- Withdraw the filter carefully, don't fully withdraw into the capture sheath

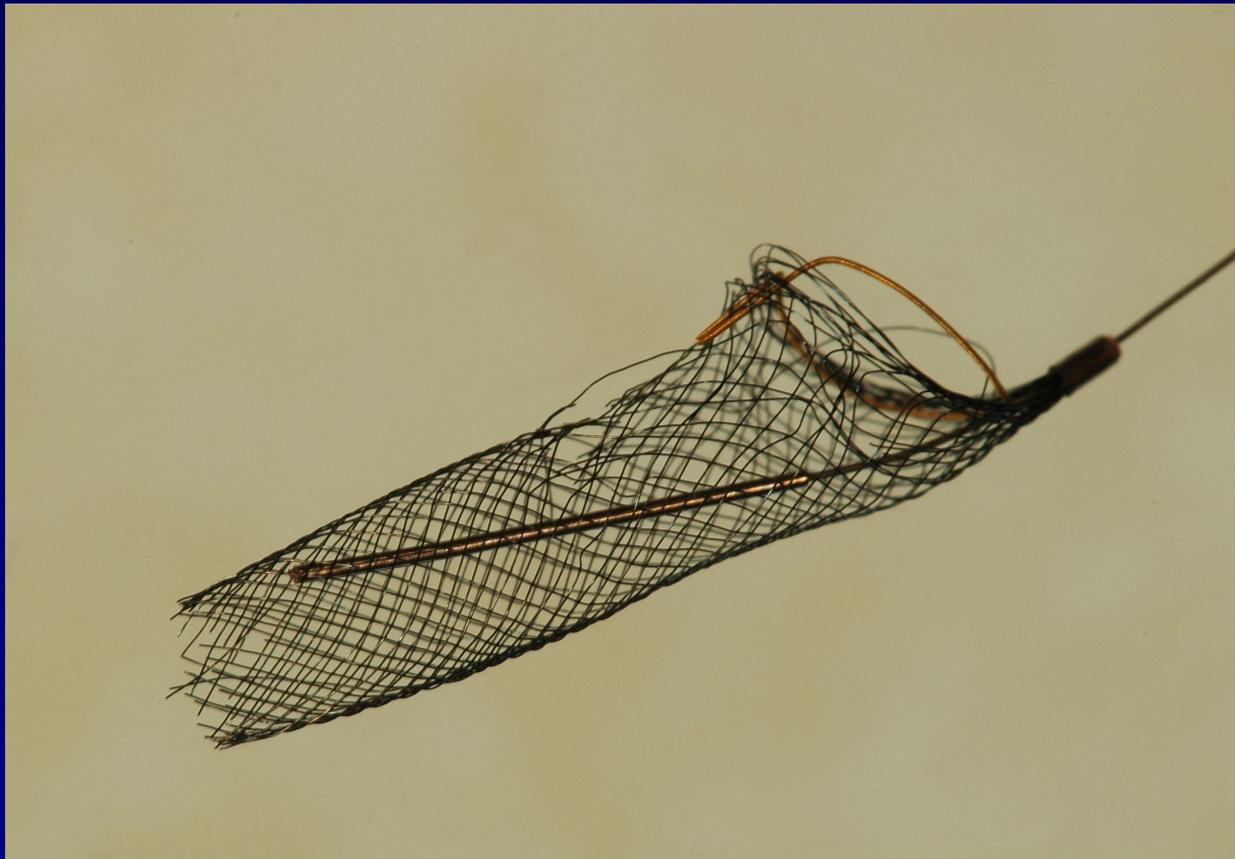
Shearing



Overflow



ICA with Teeth

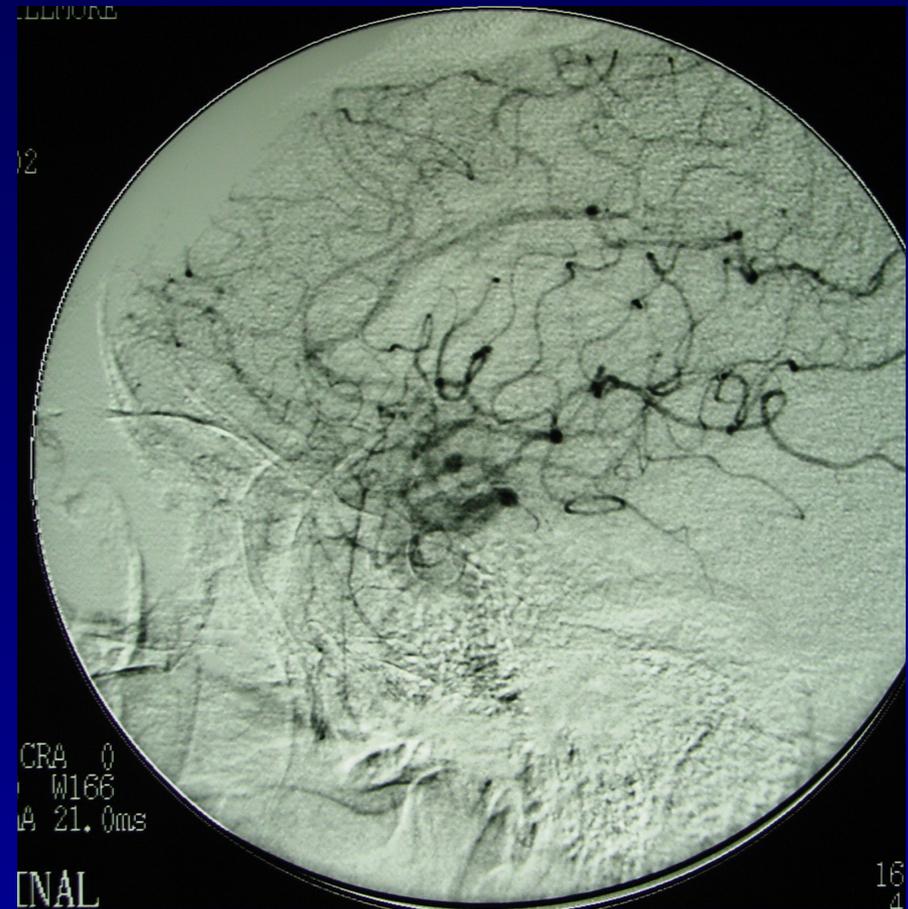
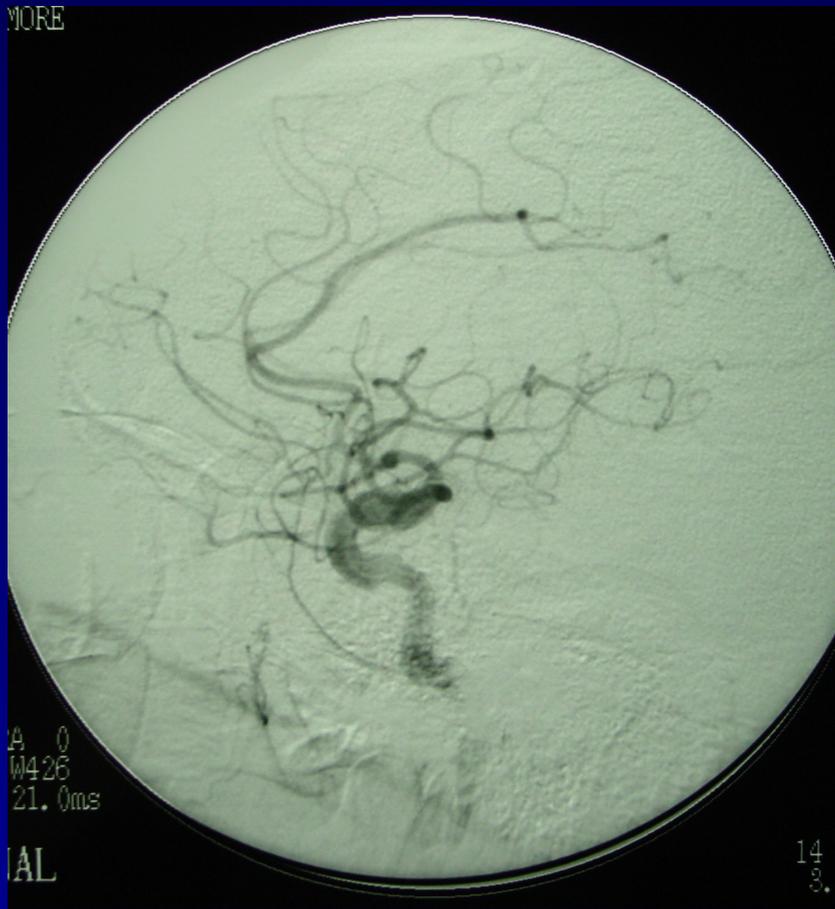


SHOWER OF
EMBOLI

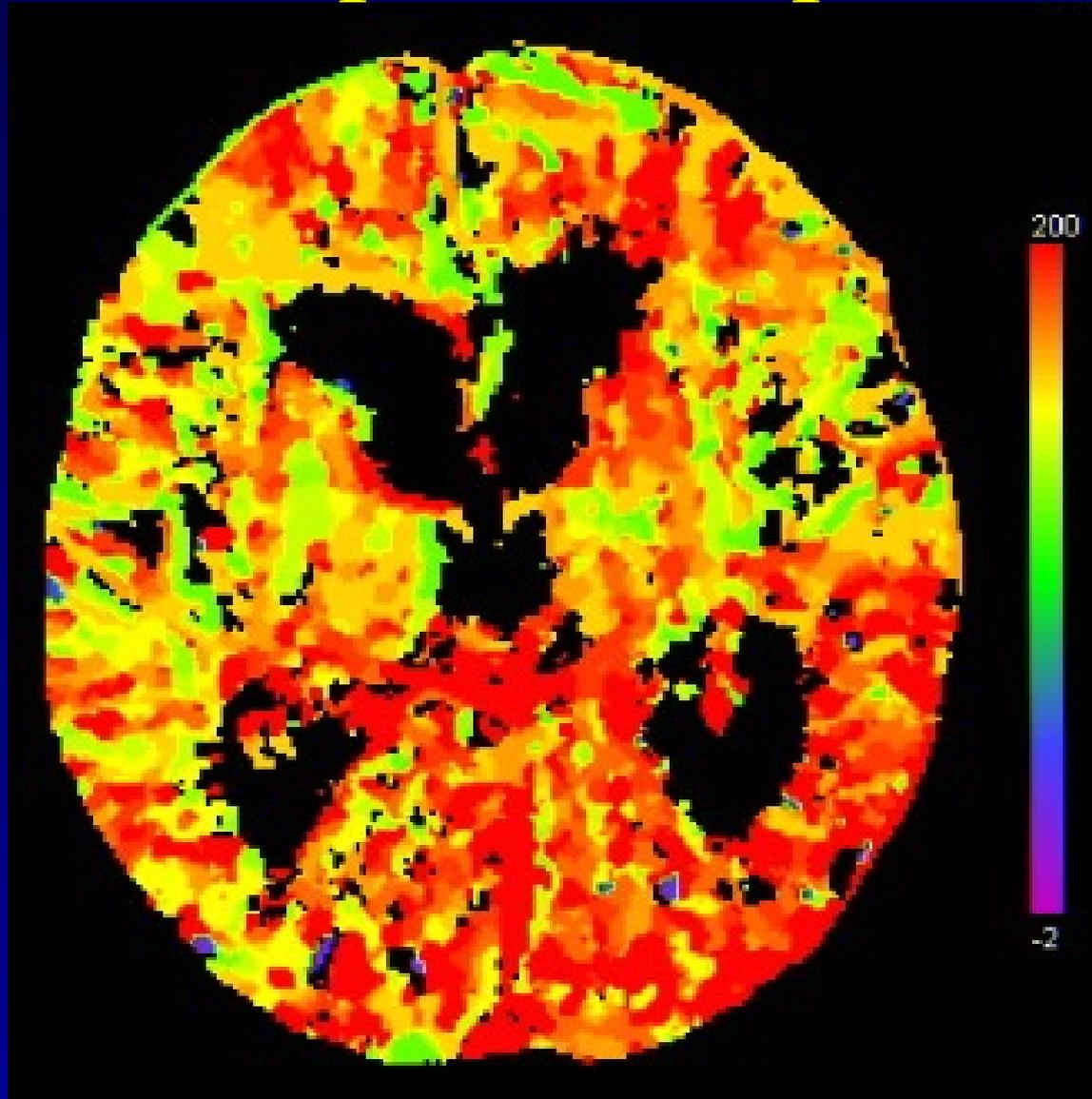
87 yr male symptomatic stenosis



Aphasic/hemiparetic post stent



CT perfusion post



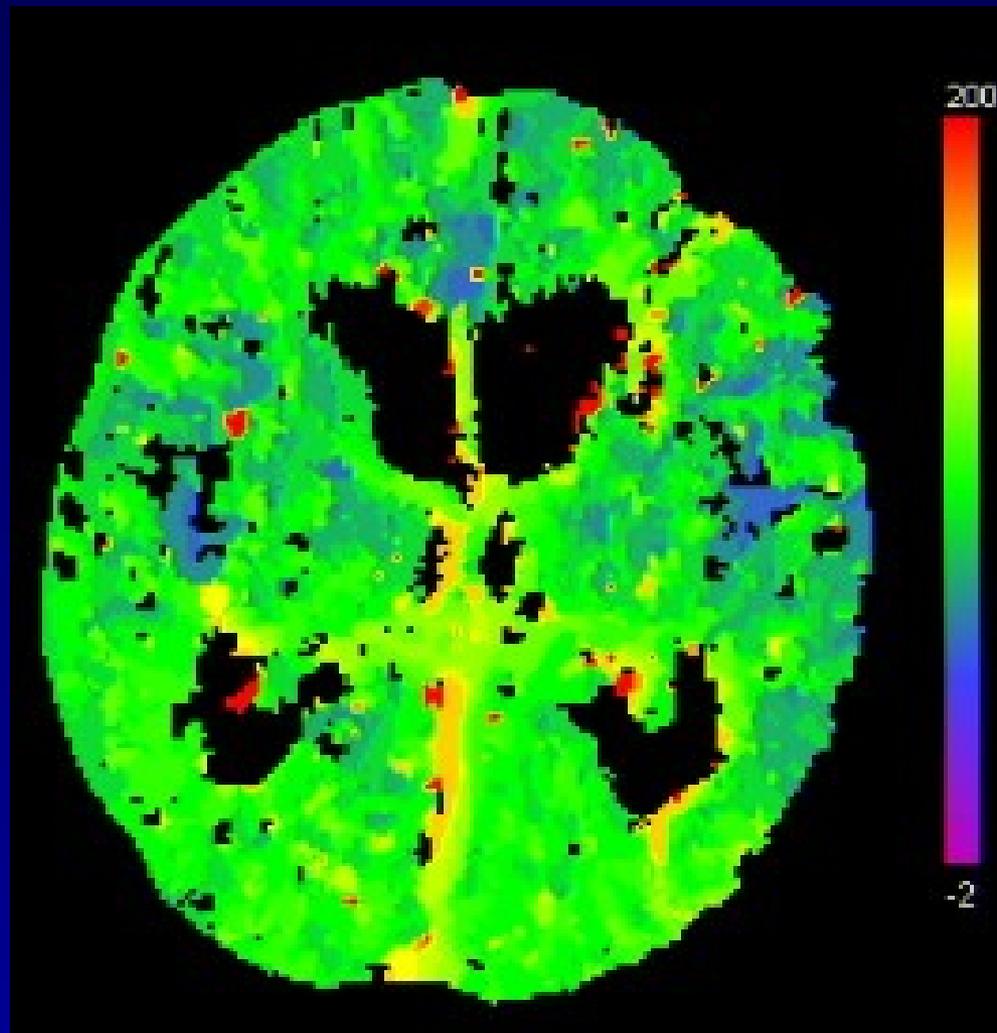
Shower of Emboli Brain Arterioles



Shower of emboli

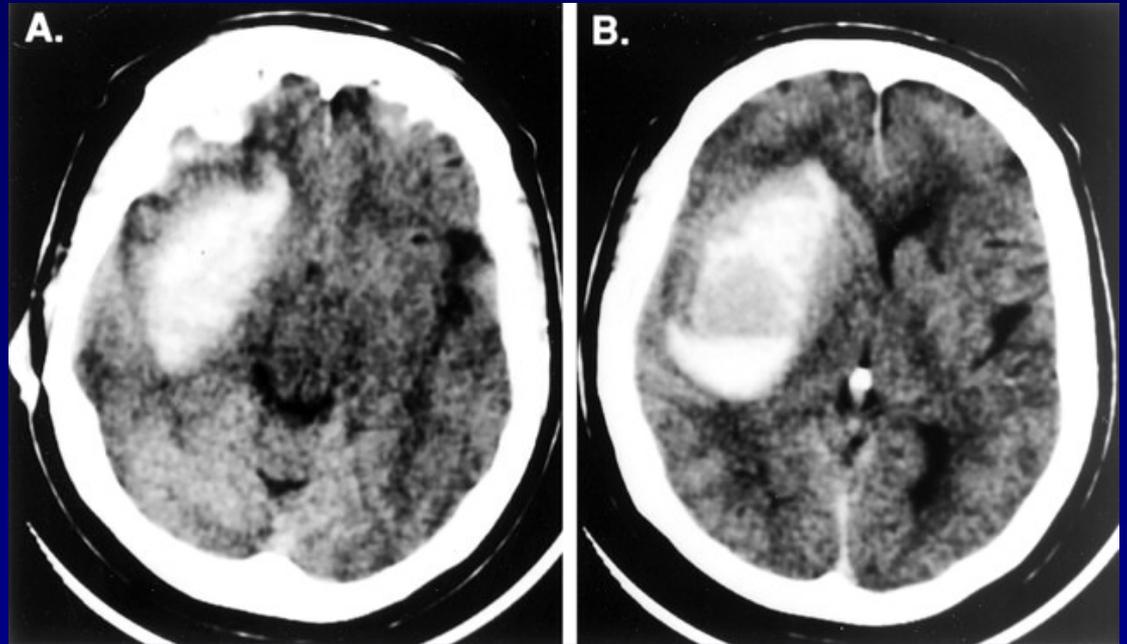
- Symptomatic Patient
- Slow flow intracranially
- No obvious vessel occlusion
- Treatment
 - Volume expansion
 - IIb/IIIa Integrilin
- Majority of patients improve 24-48 hrs

CT perfusion POD 4 NIHSS 0



Intracerebral Hemorrhage

- Associated with IIb/IIIa admin to ischemic cerebrovascular bed
- Subacute stent thrombosis
- Shower of emboli
- Acute stroke with clot burden ICA

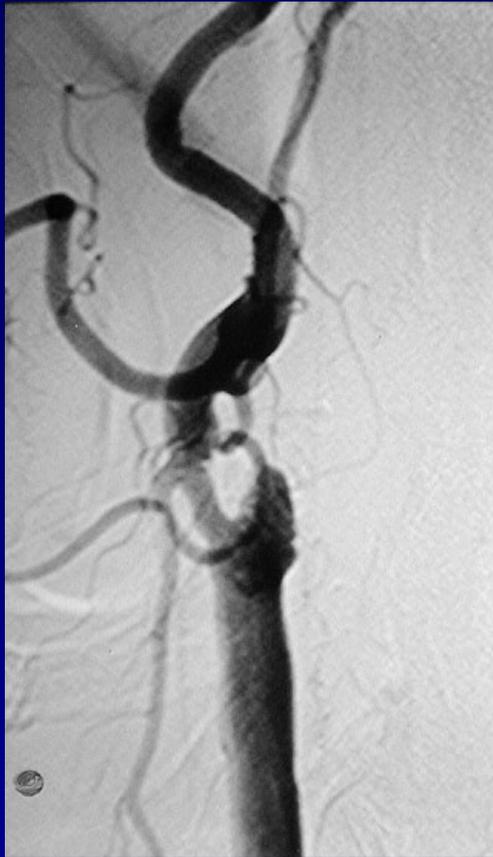


Intracranial Hemorrhage

- Reverse heparin with protamine
- FFP
- Platelets
- Epigen, factor VII
- Evacuation of hematoma
 - Hemicraniectomy vs craniotomy
- Dilantin/mannitol

Beware of
Carotid
Occlusions

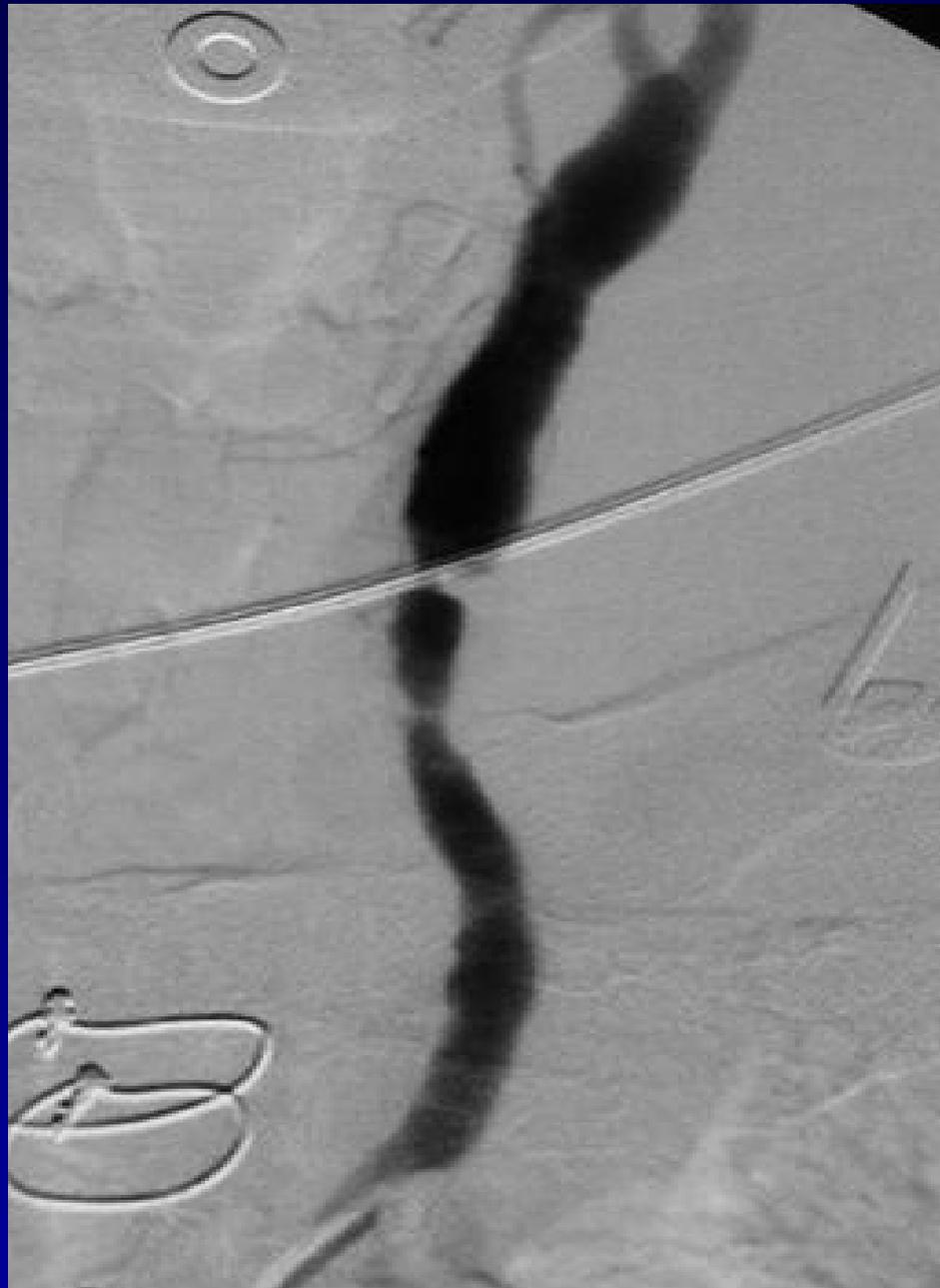
67 yr female acute hemiplegia



Infection

Left CCA origin stenosis





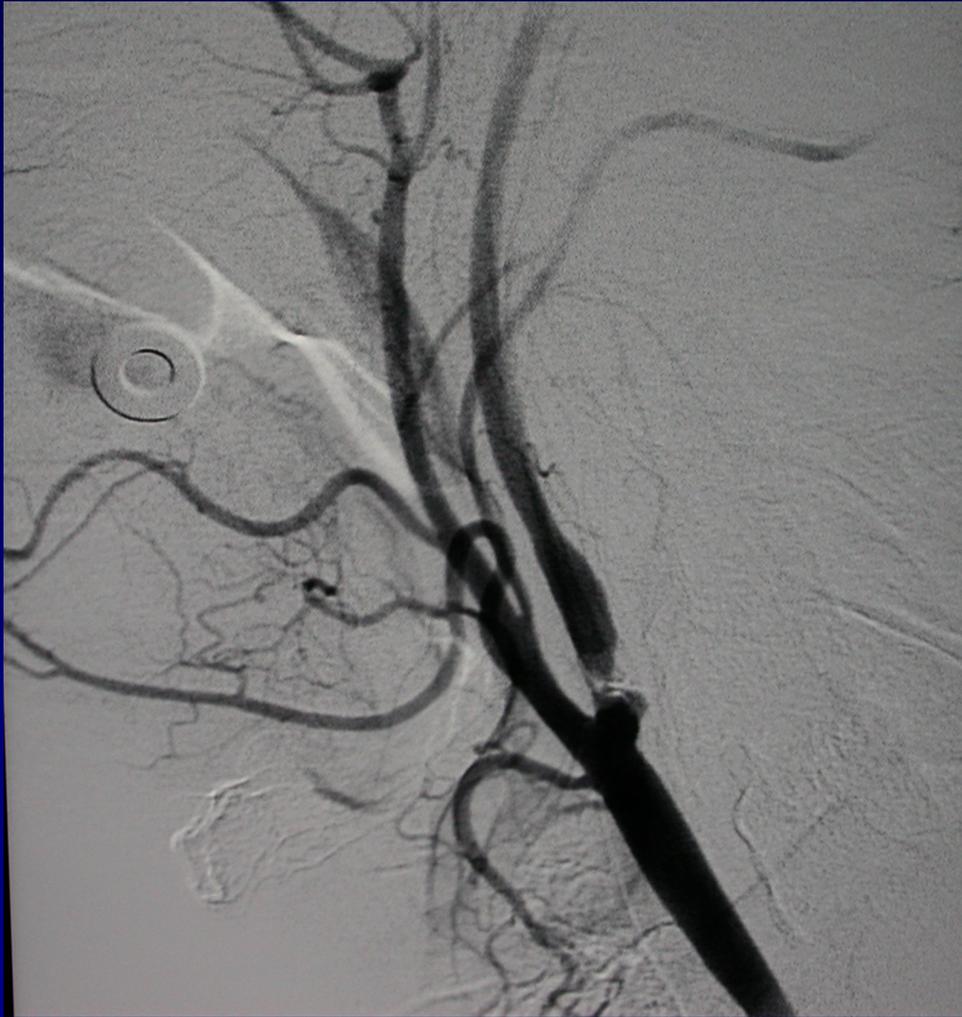
- UTI
- Admitted to rural hospital ICU
- TIA
- Sepsis
- Pseudoaneurysm formation
- Methicillin-resistant *Staphylococcus aureus* infection



**Don't Leave
Town**

Surgery Consult

- To Or
- Attempted resection carotid to arch
- Able to sacrifice CCA remove stent
- Artery friable
- Stroke, renal failure, dialysis
- Ventilator Dependant
- Death



62 yr female

Left

Hemispheric

TIA's

PMHx: HTN,

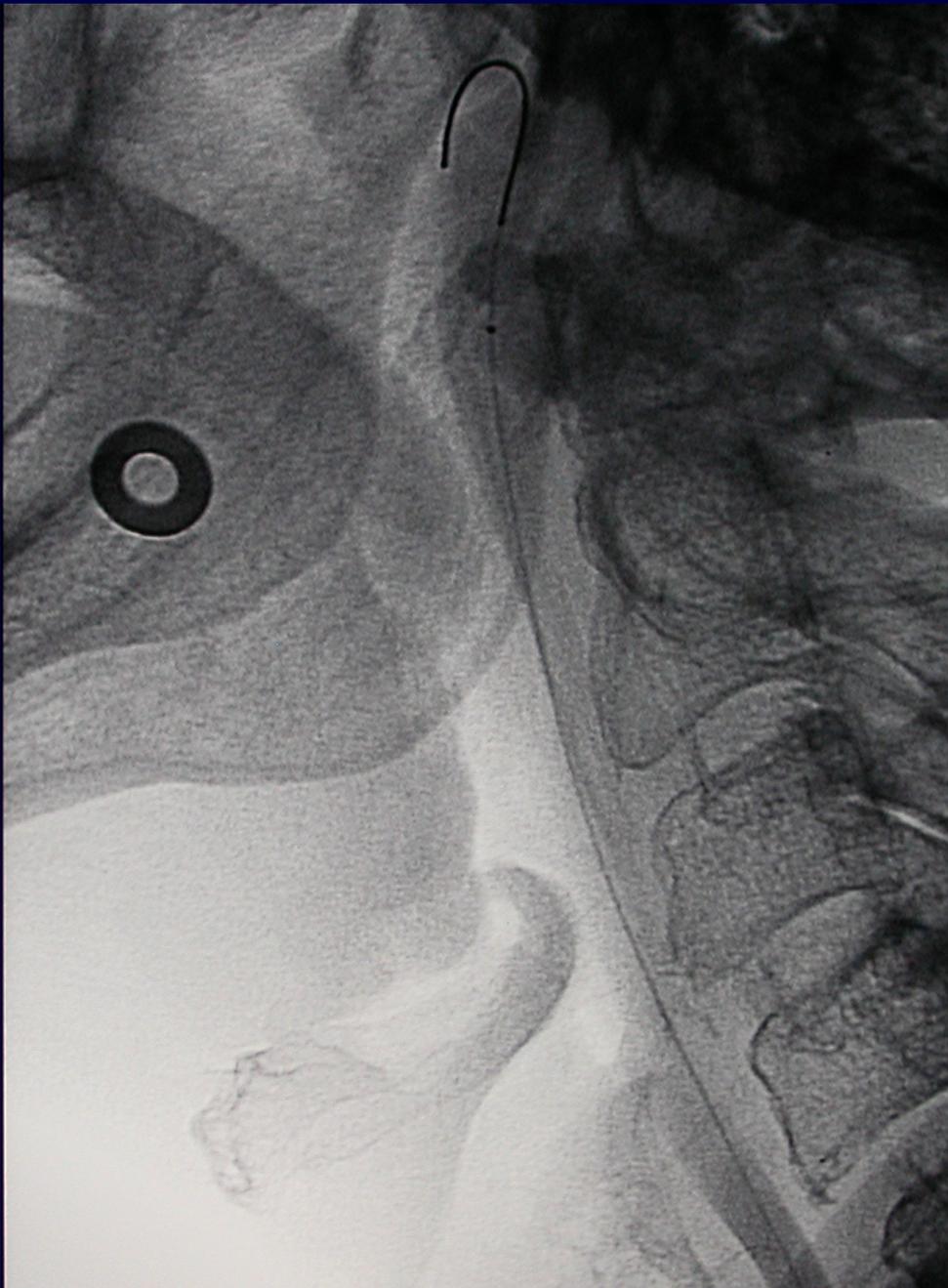
NIDDM, PVD

PSHx:

Thyroidectomy

Carotid Doppler:

PSV 370



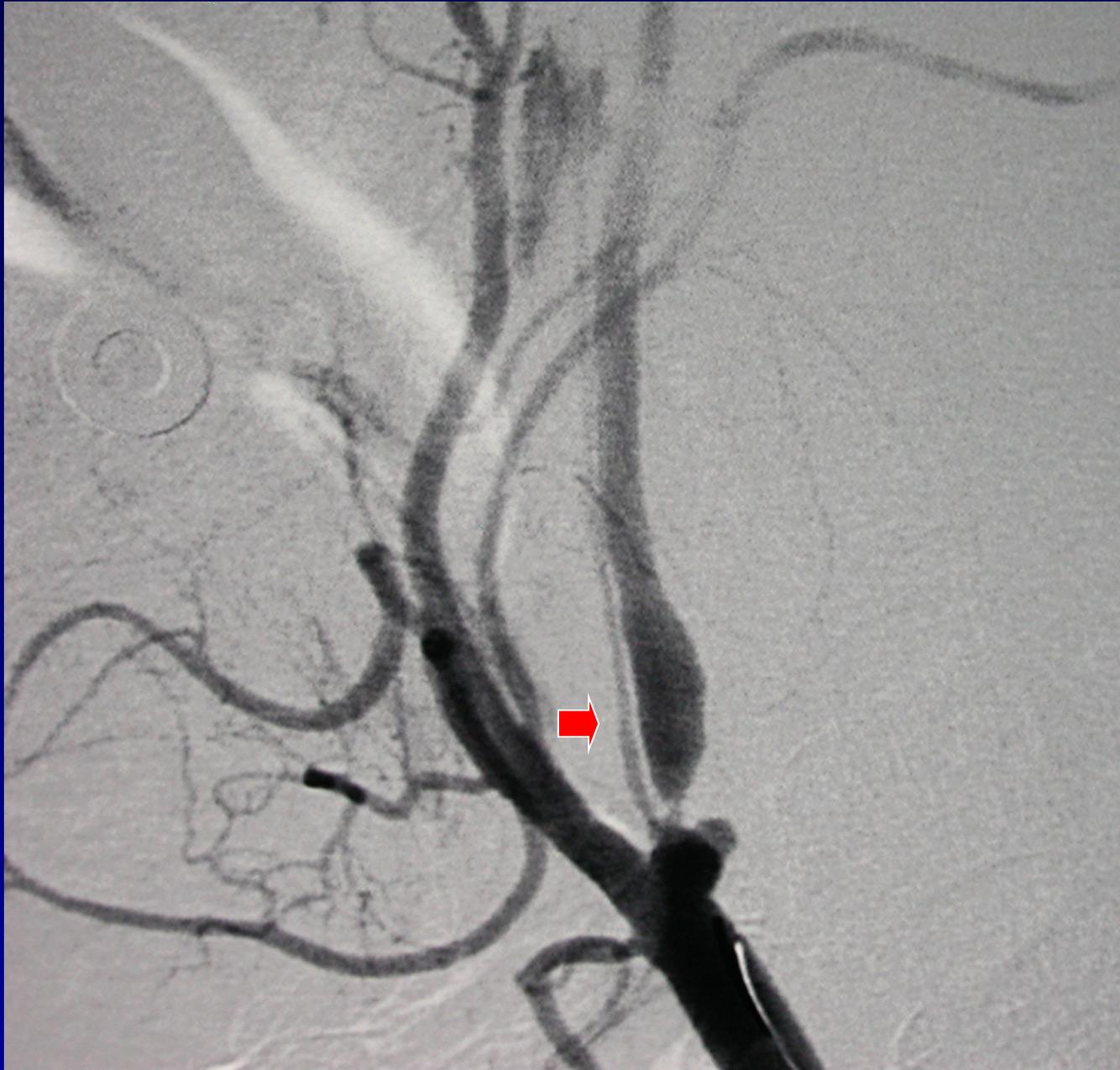
Balloon
Wire
Distal
Protection
placed in
ICA



DSA with Balloon Inflated



Balloon deflated



Don't Panic

- Protamine 30 mg IV given immediately
- Concerned about airway
- Retropharynx soft tissue swelling
- Ask patient to swallow repeatedly
- Converse with patient
- Pulse oximetry

Microcatheter into AP



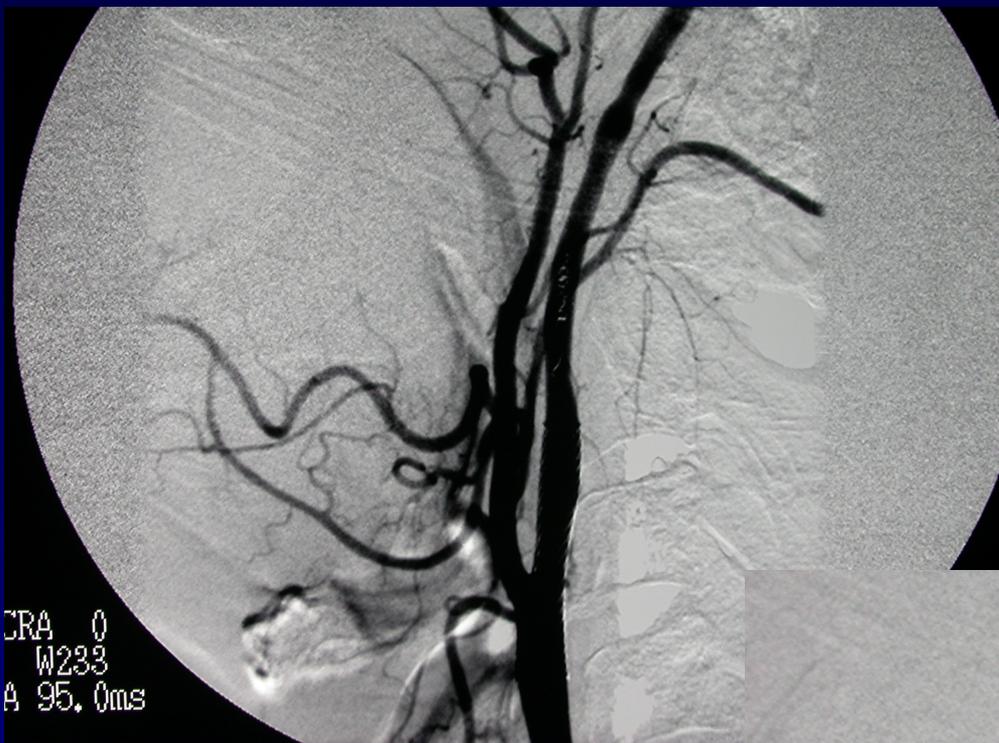


Final Result

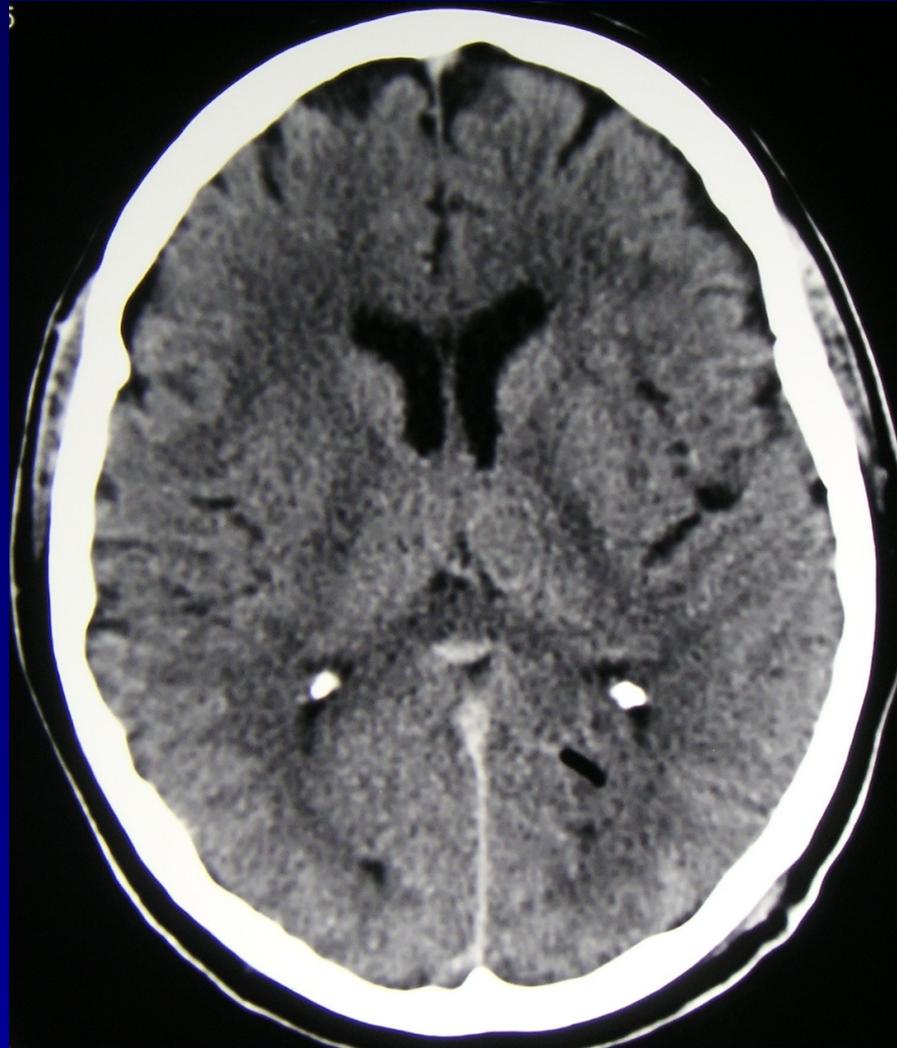
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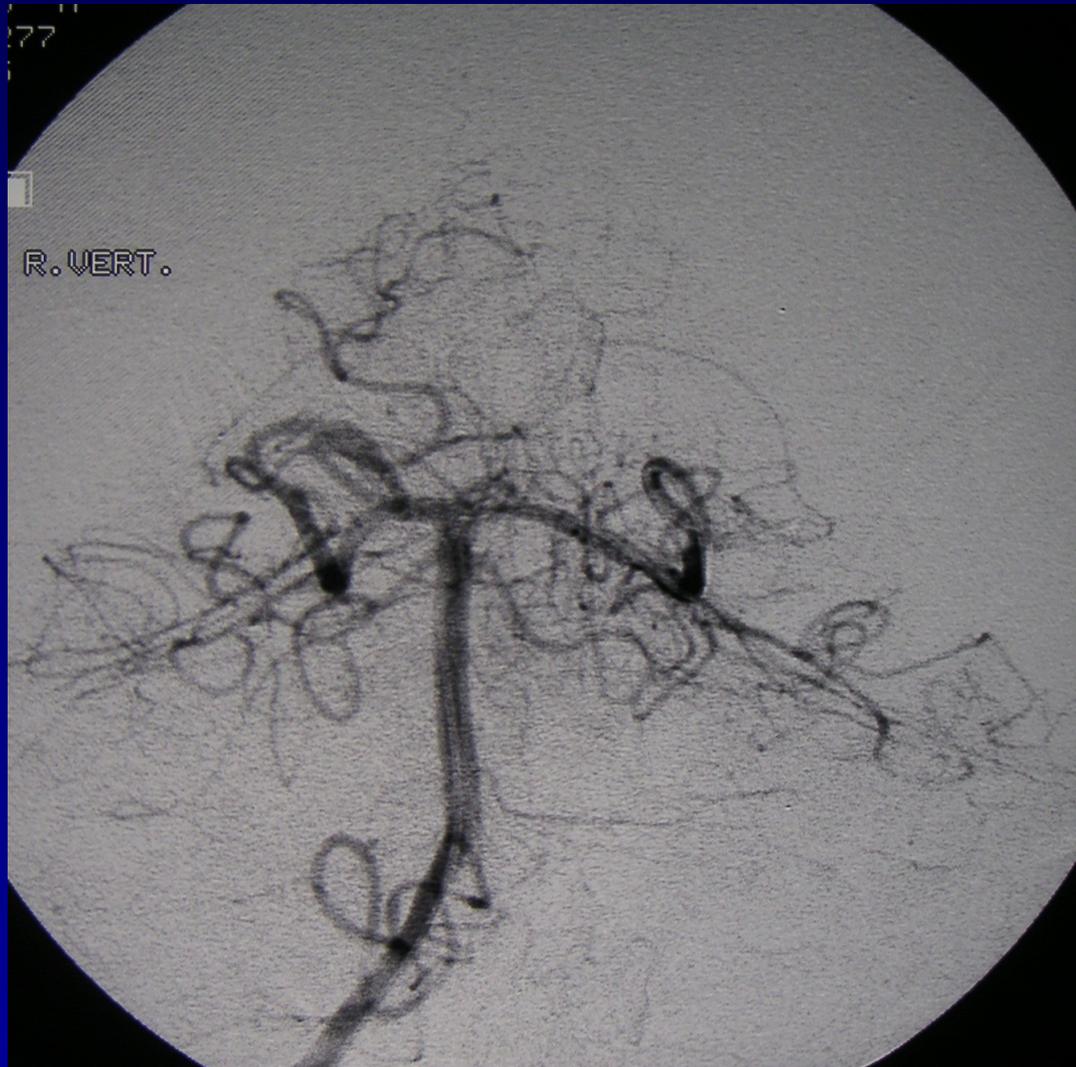
TIMING FOR
TREATING
CAROTID
STENOSIS



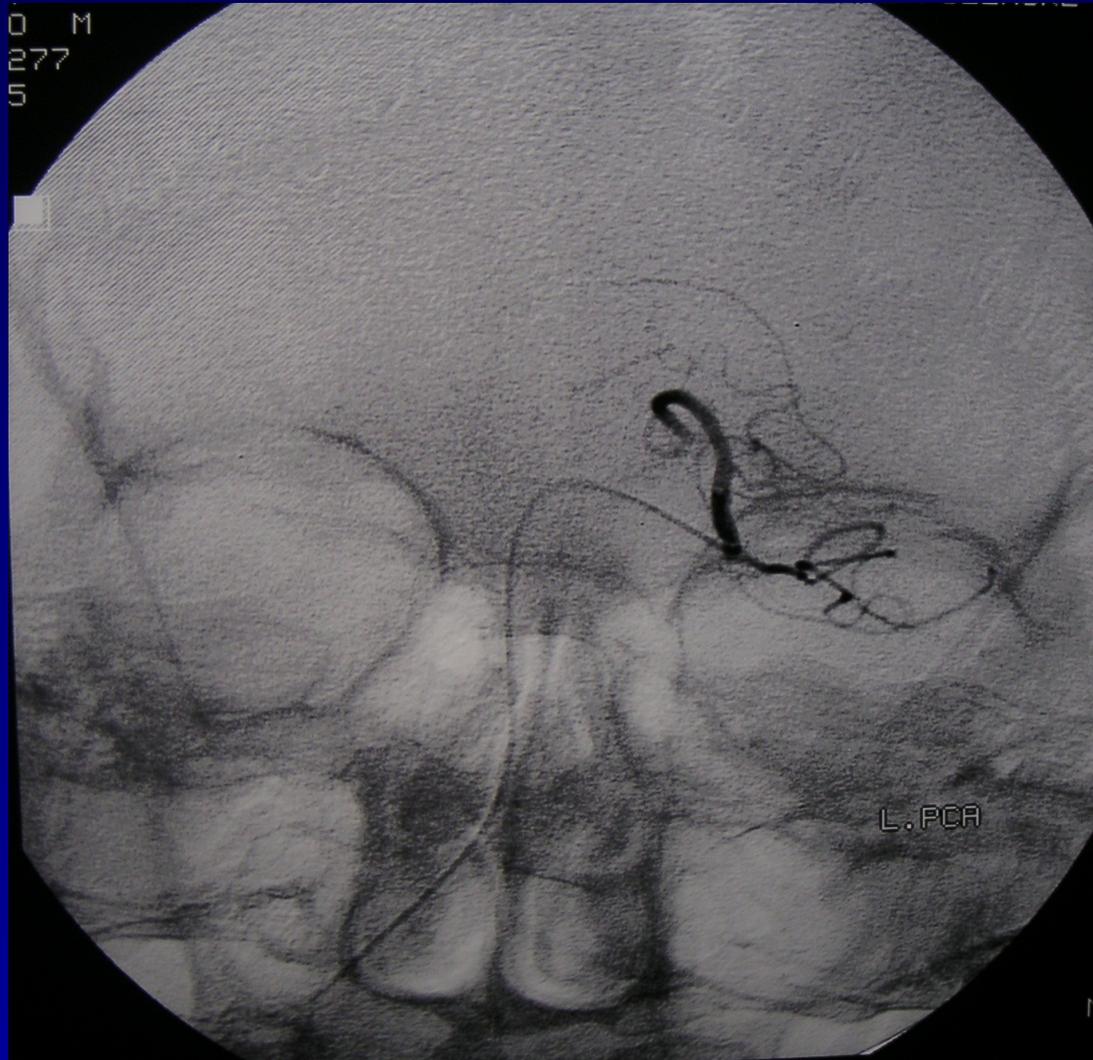
Visual problems and right hemiparesis after Dx angiogram



Right Vert Injection



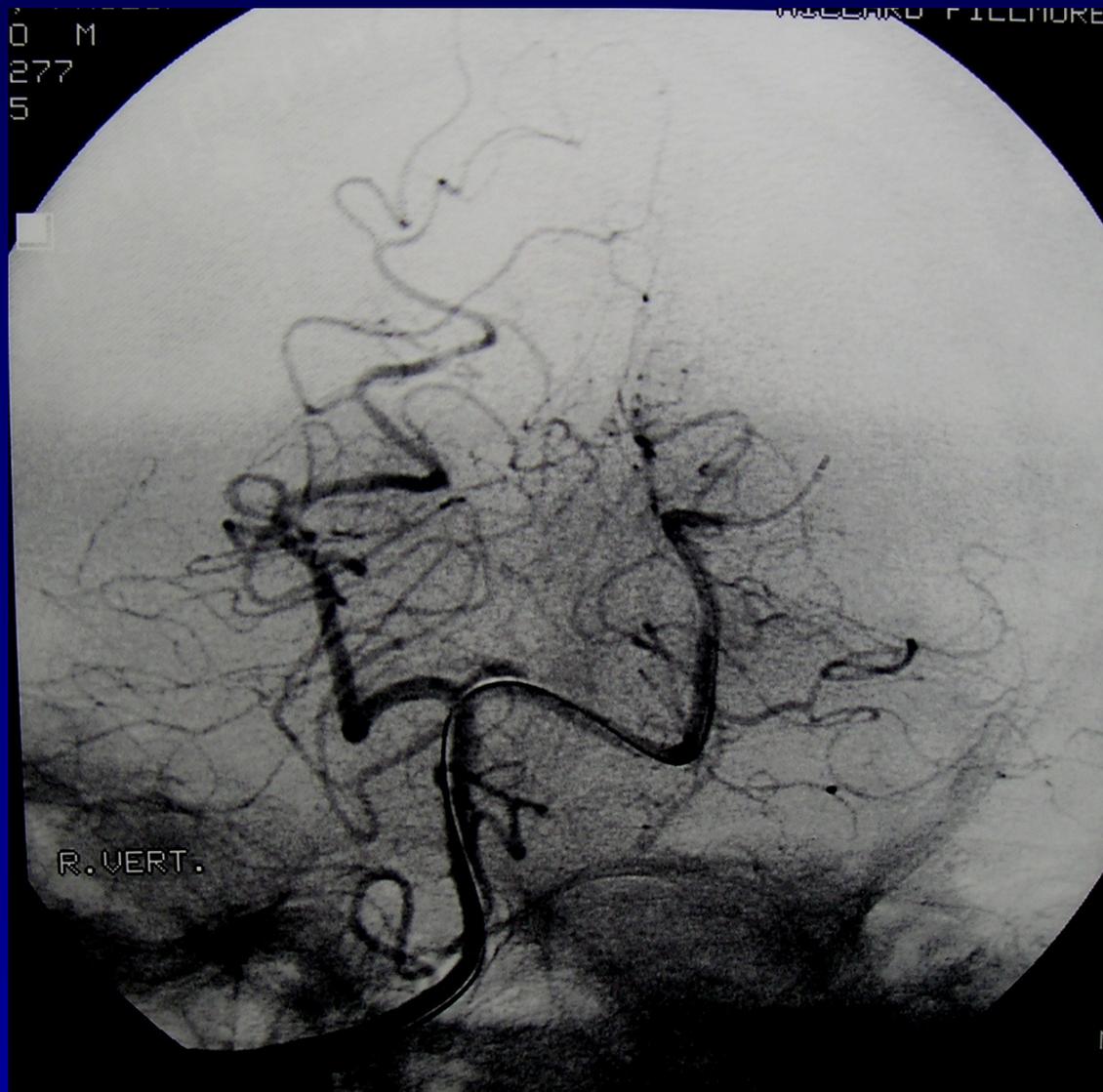
Selective Left PCA Injection



Selective left PCA distal



Final AP



**LARGE
VESSEL
OCCLUSIONS**

MCA Occlusion





**Microcatheter
into
MCA**

Perforators



- Saved cortex
- Proximal M1 segment occluded 3 hours
- Perforators?
- End arteries without collateral supply

Thank you

