

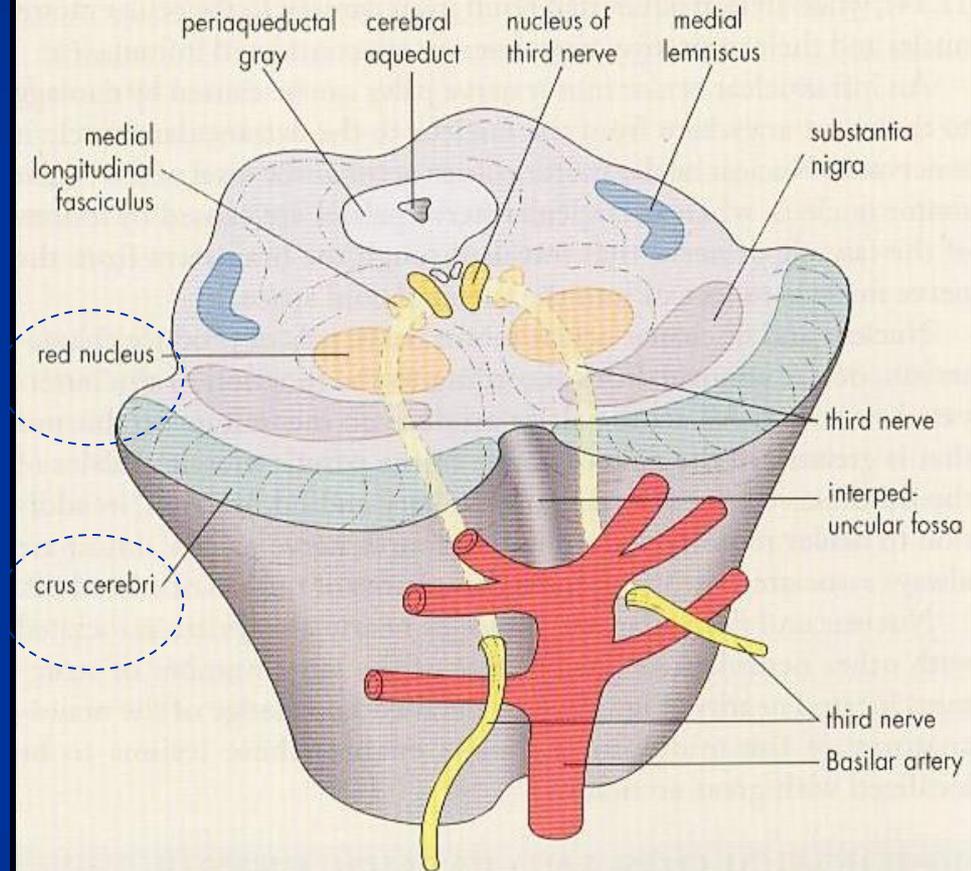
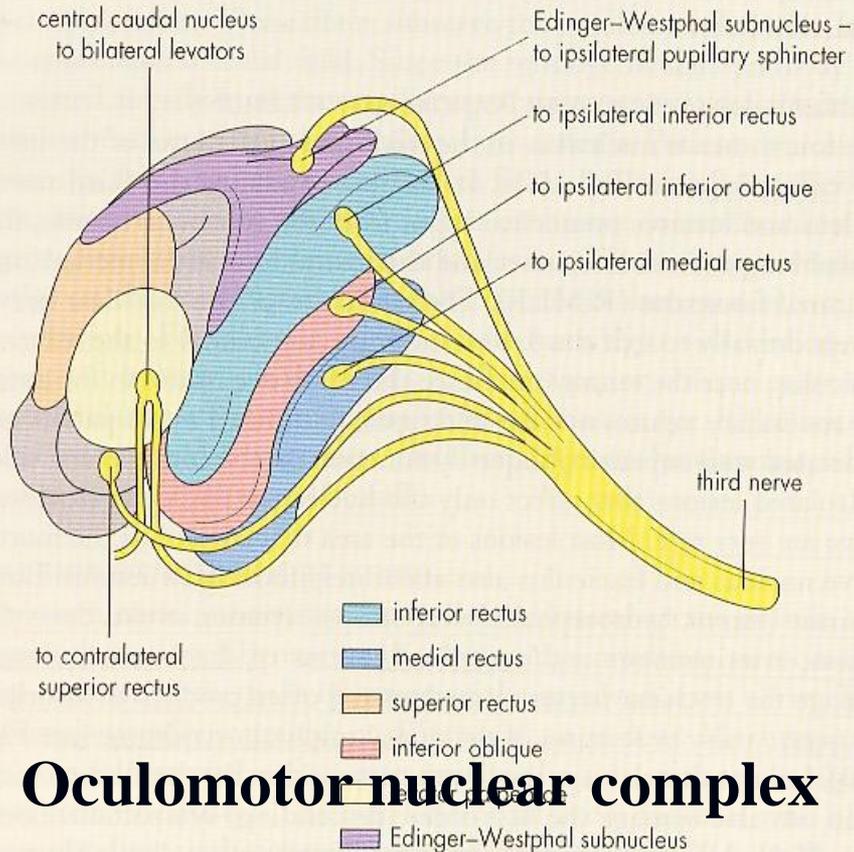
# Neuro-Ophthalmology Symposium

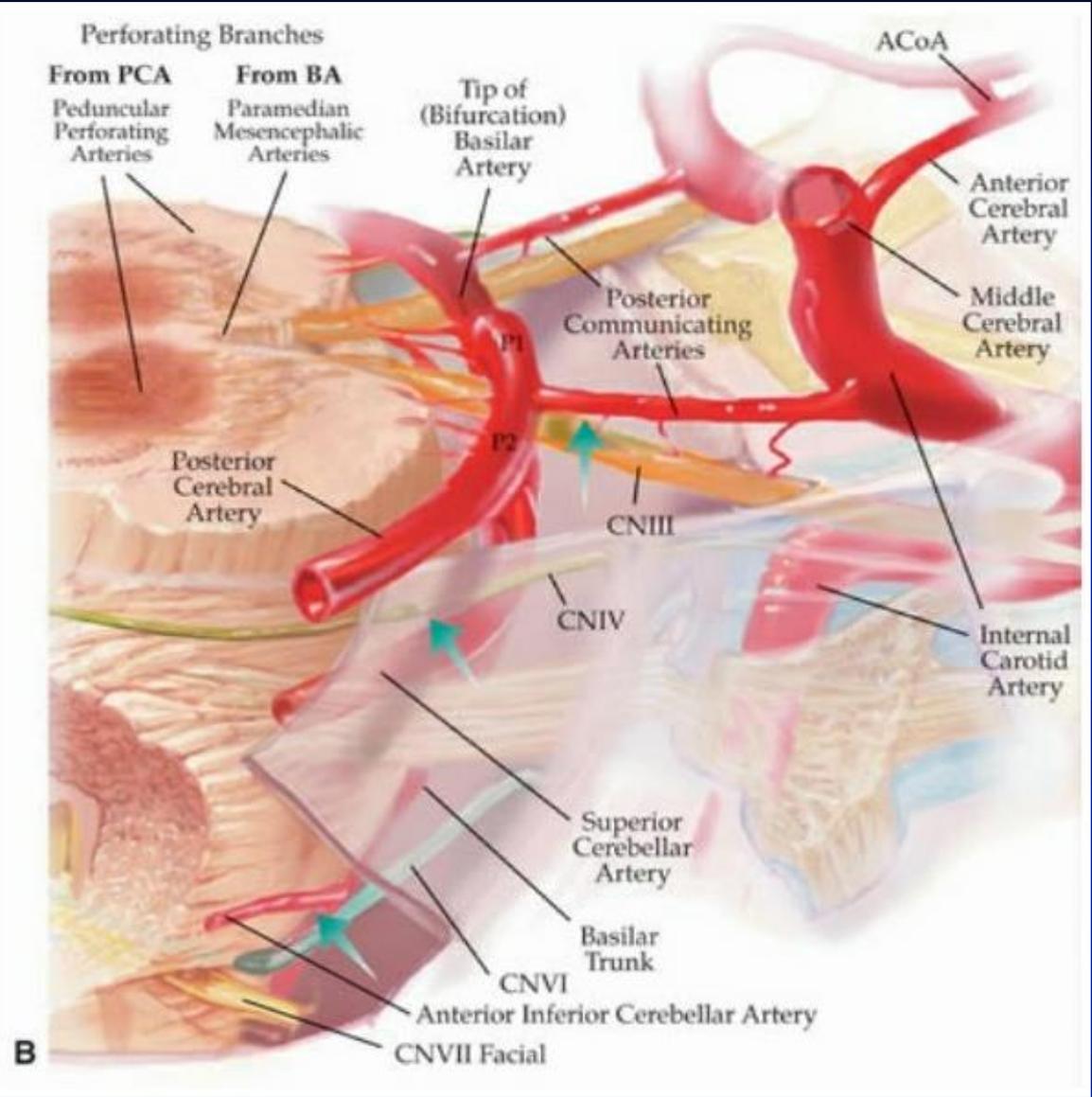
Somboon Panyakorn, MD

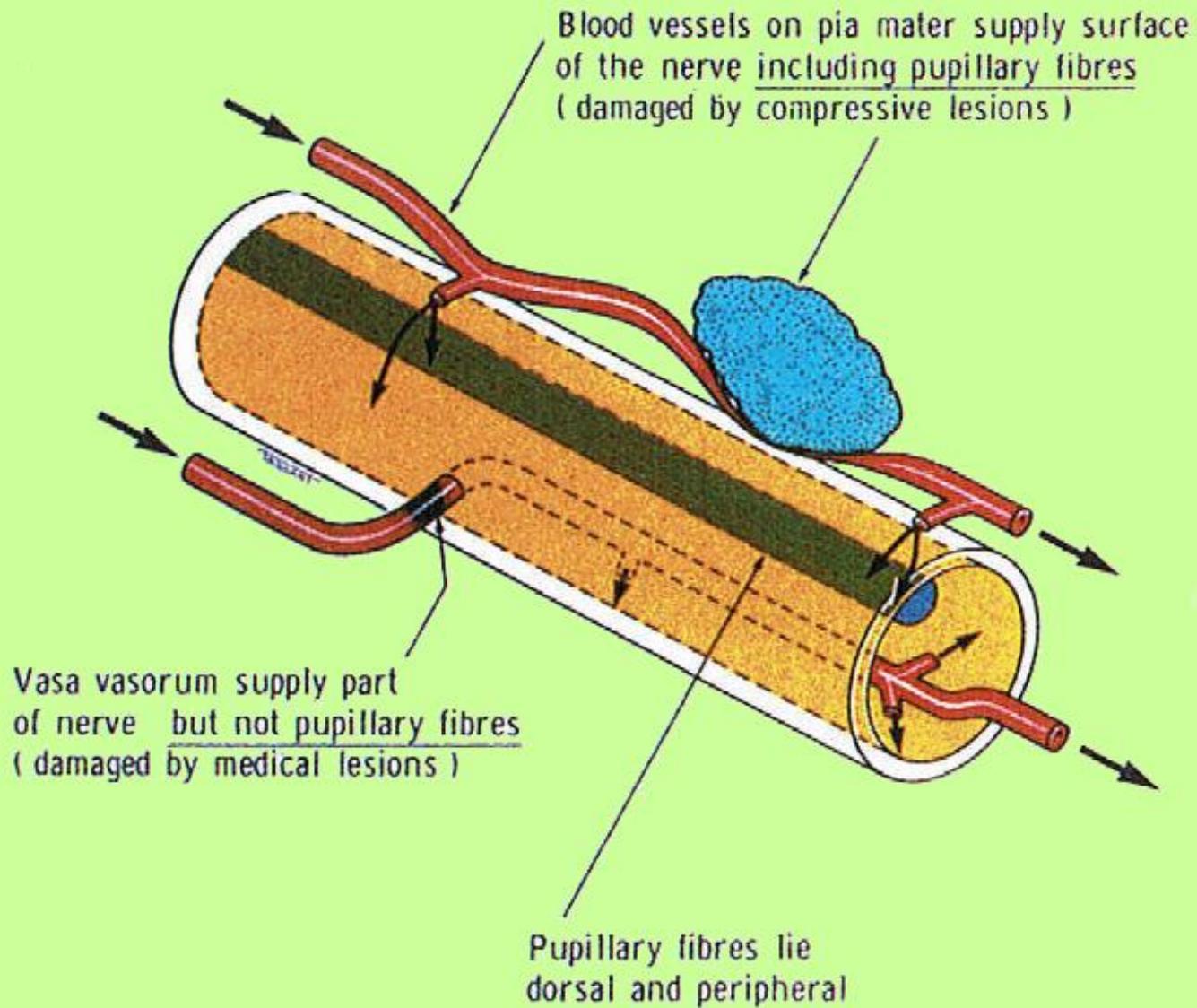
Neuro-Ophthalmology service  
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# Isolated third nerve palsy with pupillary involvement

# Nuclear and fascicular structures







- Further study disclosed “pupil sparing” is not an entirely safe
- Patient age is not a guide; berry aneurysms become clinically manifest between ages 20-60 an enormous age span
- The presence of arteriosclerotic risk factors favors a microvascular ischemic cause

However, patients with arteriosclerosis can also have aneurysms

- New headache, especially if severe, tends to suggest aneurysm, but its absence does not exclude
- Headache and periocular pain are reported in 30% of patients with aneurysmal third cranial nerve palsy\*

\* *Third nerve palsy and the pupil. Footnotes to the rule.*

*Arch Ophthalmol 1998 ;106:601-2*

\* *The rule of the pupil revisited :Jonatan D .Trobe North American Neuro-Ophthalmology Society annual Meeting 2009*

- Rupture aneurysm carries 66% of mortality rate\*

\* *Molyneux A, Kerr R, Stratton I et al. International Subarachnoid Aneurysm Trial (ISAT) Collaborative Group. International Subarachnoid Aneurysm Trial (ISAT) of neurosurgical clipping versus endovascular coiling in 2143 patients with ruptured intracranial aneurysms: a randomised trial. Lancet 2002;360:1267-1274*

# Modalities used in neurovascular imaging

- Computerized topographic angiography (CTA)
- Magnetic resonance angiography (MRA)
- Catheter cerebral angiography (CCA)
  - 3-dimensional rendering of the rotational digital subtraction angiogram (3DRA DSA)

# CTA

- x-ray source to display digital images on a screen
- The 128 ,256-slice and the 320-slice Aquilion multidetector scanners
- intravascular injection of contrast material

- Several well-documented reports establishing that when third cranial nerve palsy is caused by aneurysms they will appear to be at least 4 mm in diameter on noninvasive studies\*\*\*

- *Mathew MR, Teasdale E, McFadzean RM. Multidetector computed tomographic angiography in isolated third nerve palsy. Ophthalmology 2008*

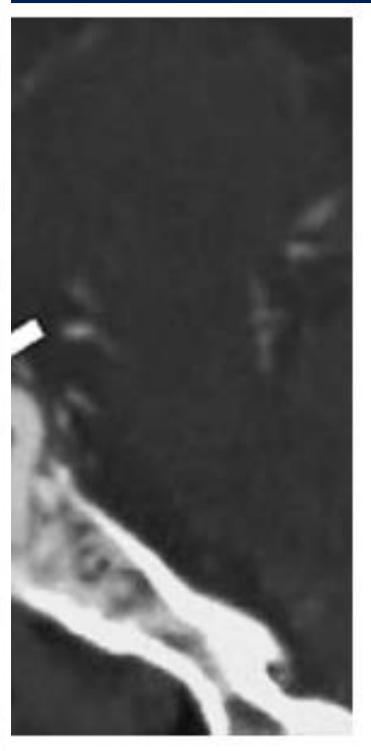
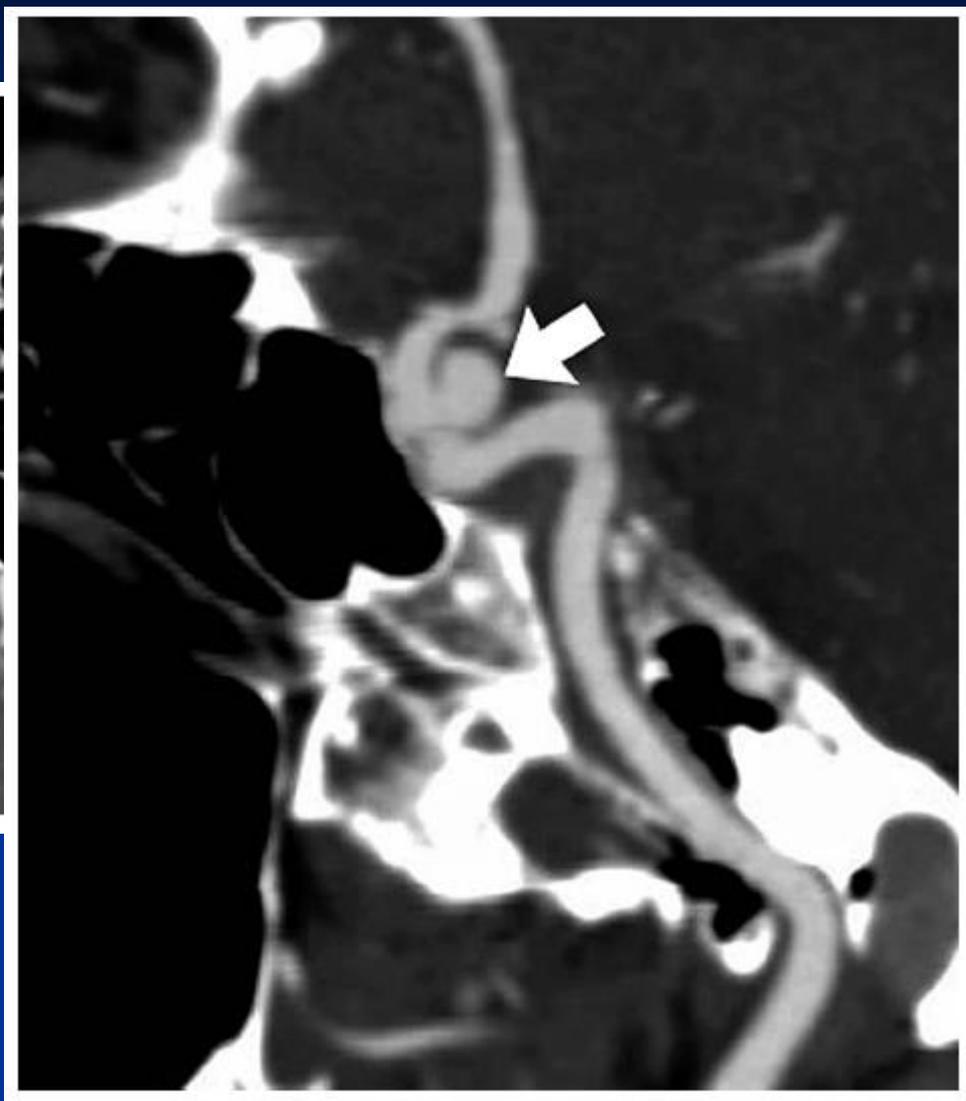
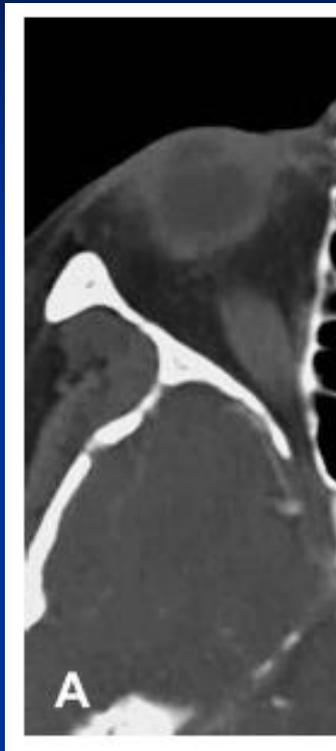
# To detect aneurysms

- CTA and MRA

in aneurysms  $\geq 3$  mm

Sensitivity  $> 95\%^*$

*\*The rule of the pupil revisited :Jonatan D.Trobe North American  
Neuro-Ophthalmology Society annual Meeting 2009*



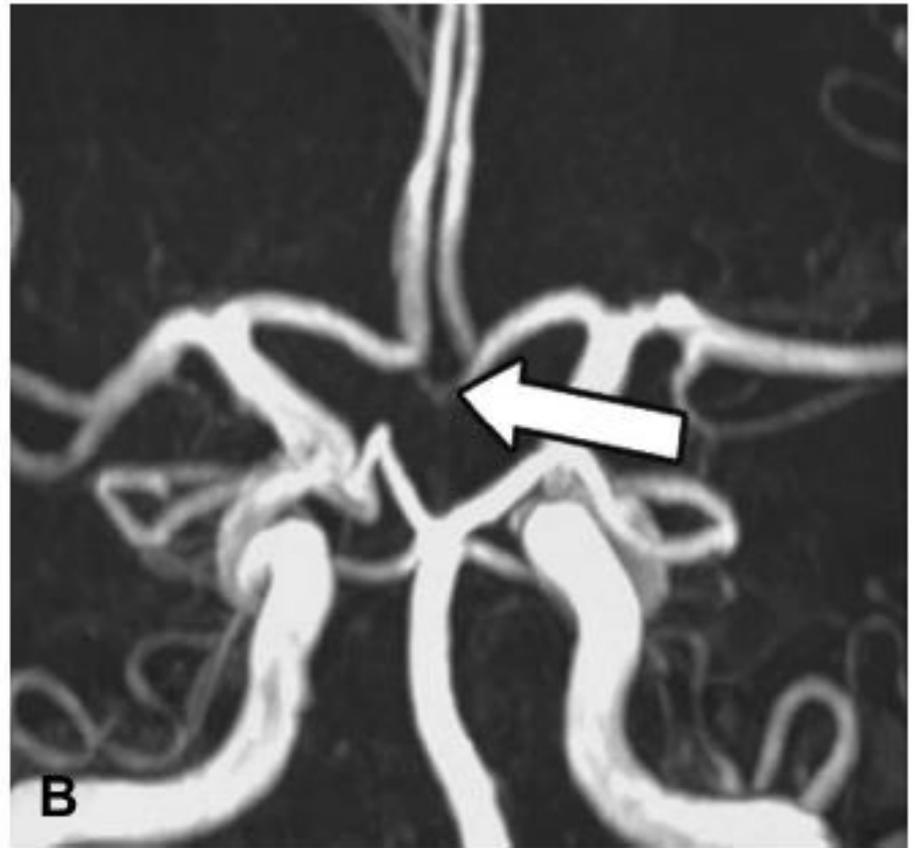
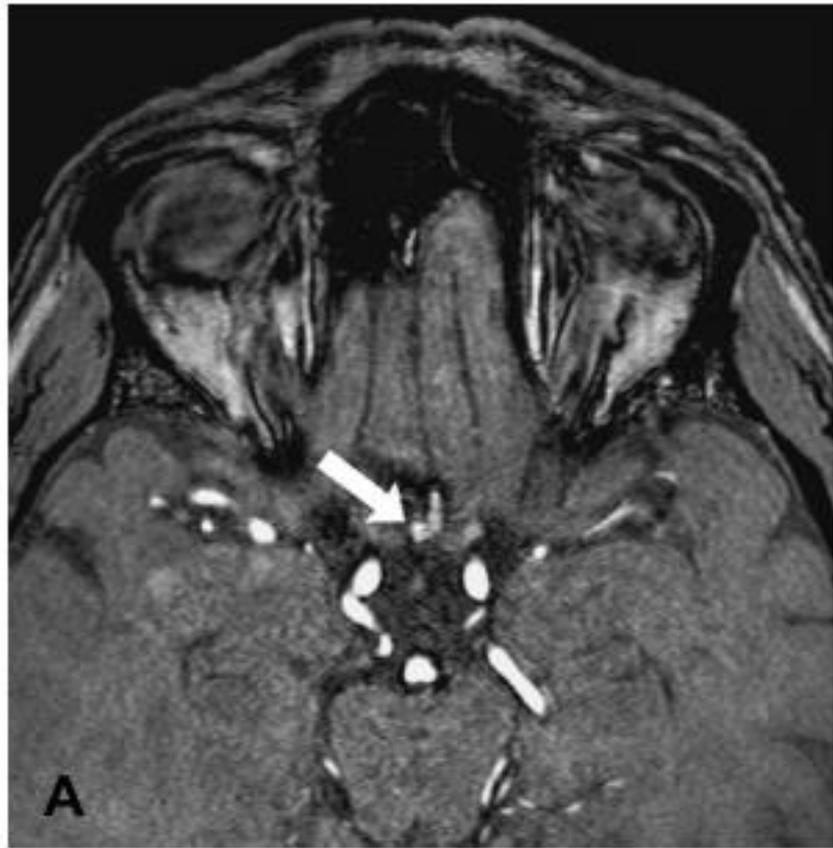
post-processing

# MRA

- MRA is based on the flow effects damping down signal from adjacent tissue while simultaneously enhancing signal from flowing blood within vessel

# Advantage over CT

- x-ray and dye exposure
- pregnant women
- children
- renal or cardiac dysfunction



# Digital subtraction angiography (DSA)

- gold standard for imaging intracranial aneurysms
- risk of stroke 2%

may be higher older patients with arteriosclerosis

# 3D rotational angiography (3DRA)

Rotation of the image intensifier through 180

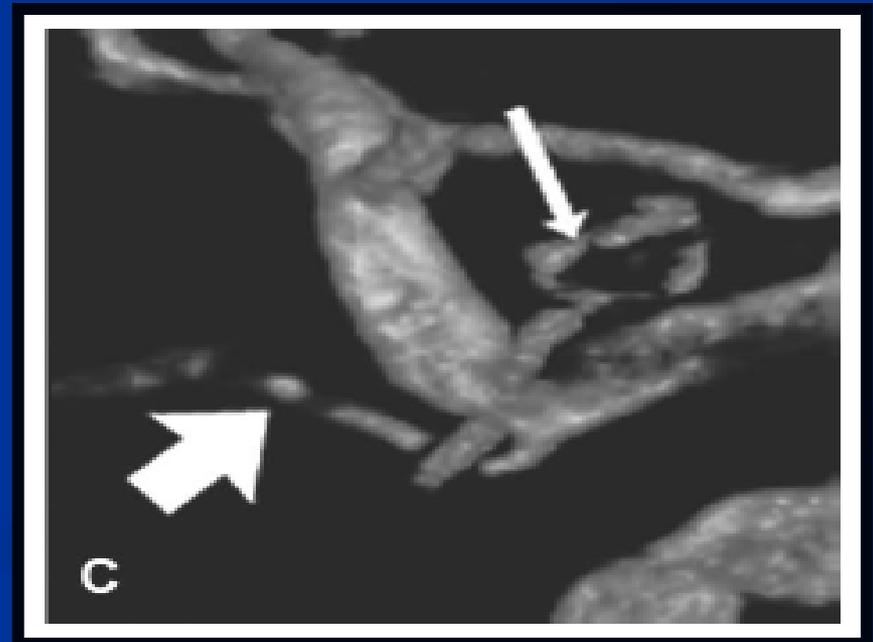
during intraarterial injection of contrast material

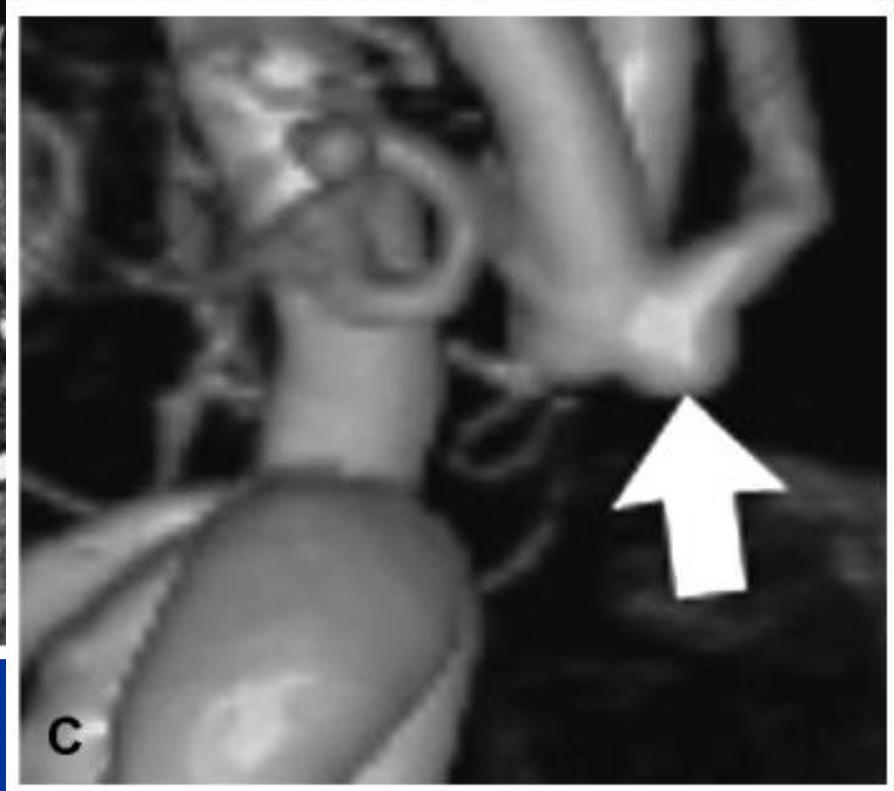
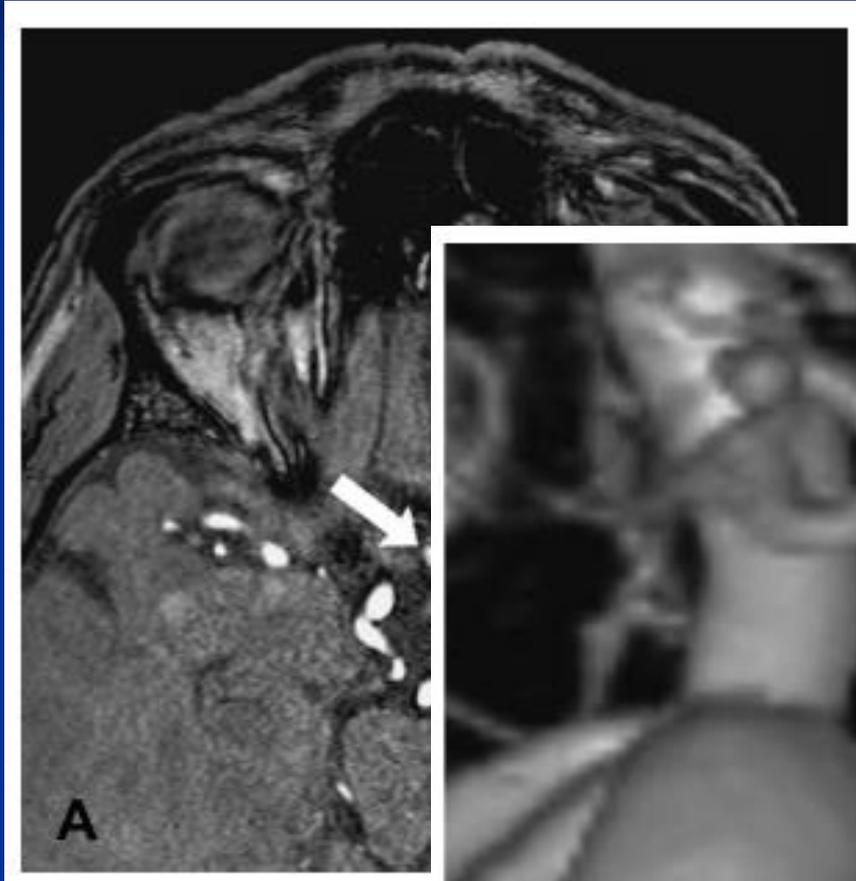


3DRA DSA

3-mm diameter aneurysm

after the aneurysm clipping





## How Should We Evaluate New-Onset Isolated Nontraumatic Third Cranial Palsy?

- 1. Nonpregnant, adult patient without renal or cardiac failure should undergo emergency CTA if CTA results are negative and the clinical suspicion of aneurysm is high, MRI and MRA should be done

# How Should We Evaluate New-Onset Isolated Nontraumatic Third Cranial Palsy?

- 2. Children, pregnant women, and patient with renal or cardiac failure should undergo emergency MRA
  - \* MRI should be included because it allows excellent detection of nonaneurysmal causes

# How Should We Evaluate New-Onset Isolated Nontraumatic Third Cranial Palsy?

- 3. If the noninvasive imaging study is interpreted as negative, it should be reviewed by an experienced neuroradiologist before the diagnosis of aneurysm is dismissed.
- Digital subtract angiogram should be performed in high suspicious aneurysm if noninvasive studies are all negative.

# Pitfall

1. Pupil Sparing/ Involve
2. Careful follow up
3. Imaging modality
4. Interpretation

- Conventional CT scan or MRI are not the procedure of choice

High false negative rate 12 – 40 %

- Magnetic resonance angiography (MRA)  
Computed tomography angiography (CTA)

Overall sensitivity up to 95 %

# Summary

Clinical suspected aneurysm



CTA  
(first choice)



Reviewed by Neuroradiologist



MRA/MRI



3DRA CCA

THANK YOU