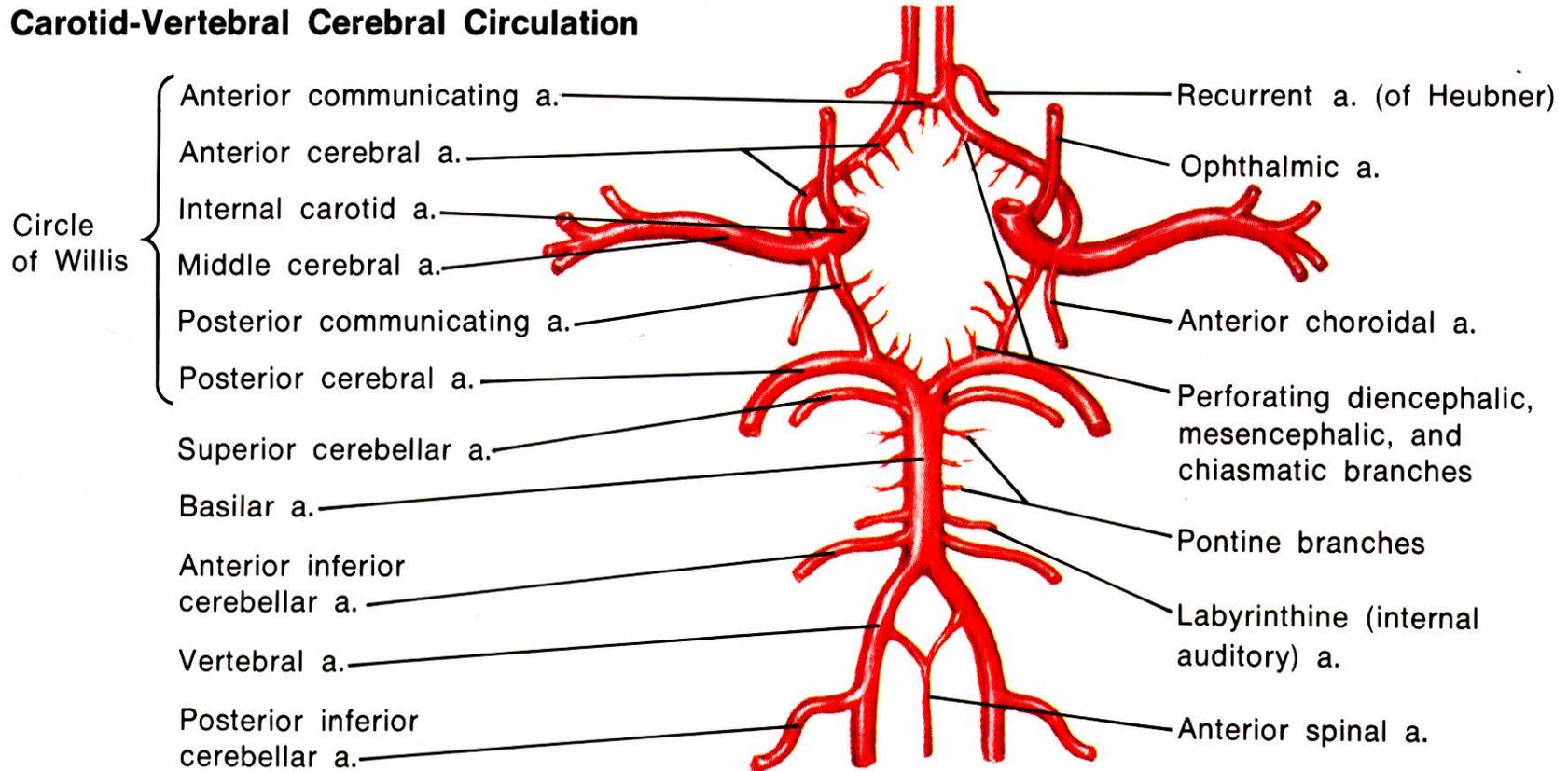


Нейровизуализация аневризм головного мозга

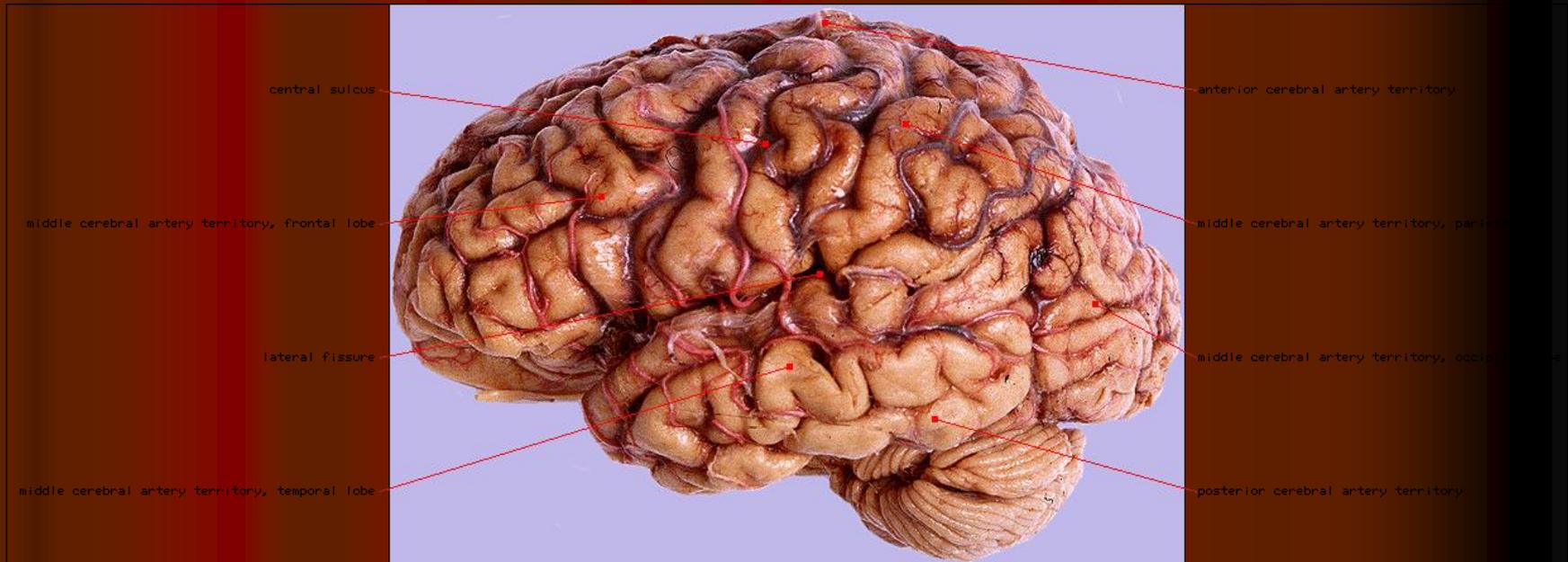
Кафедра неврологии и
нейрохирургии ФПДО КГМУ

Circle of Willis

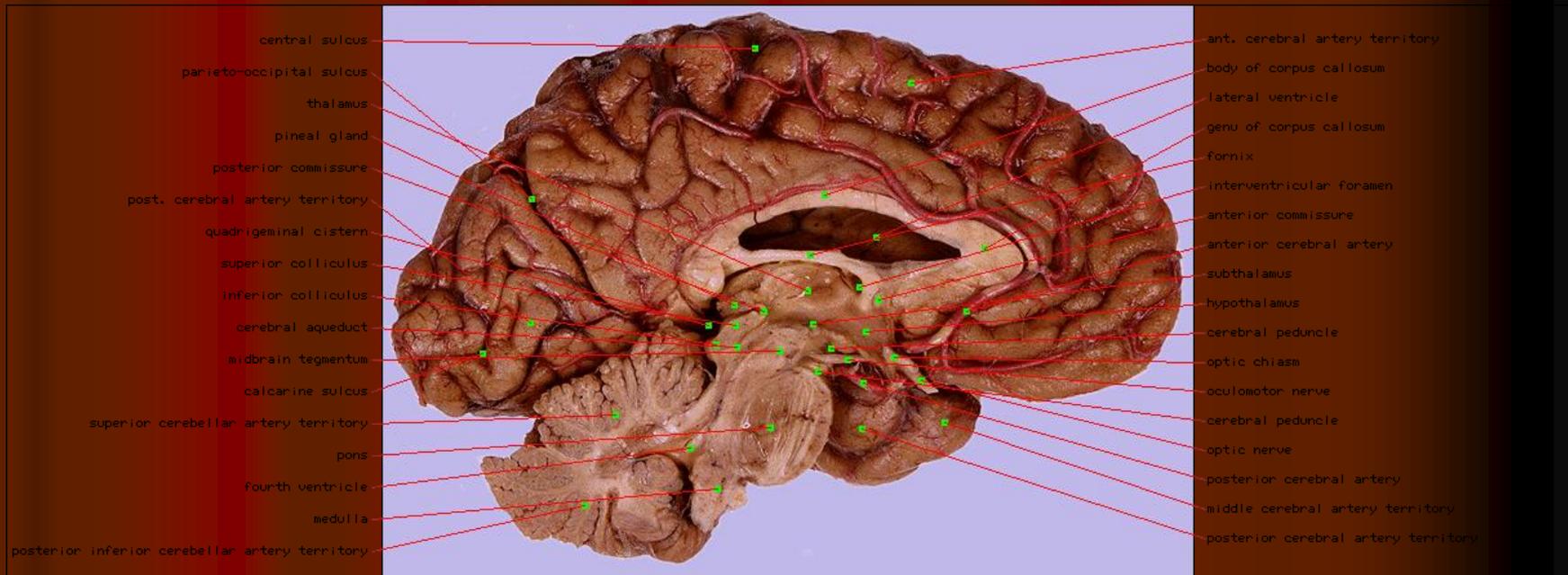
Carotid-Vertebral Cerebral Circulation



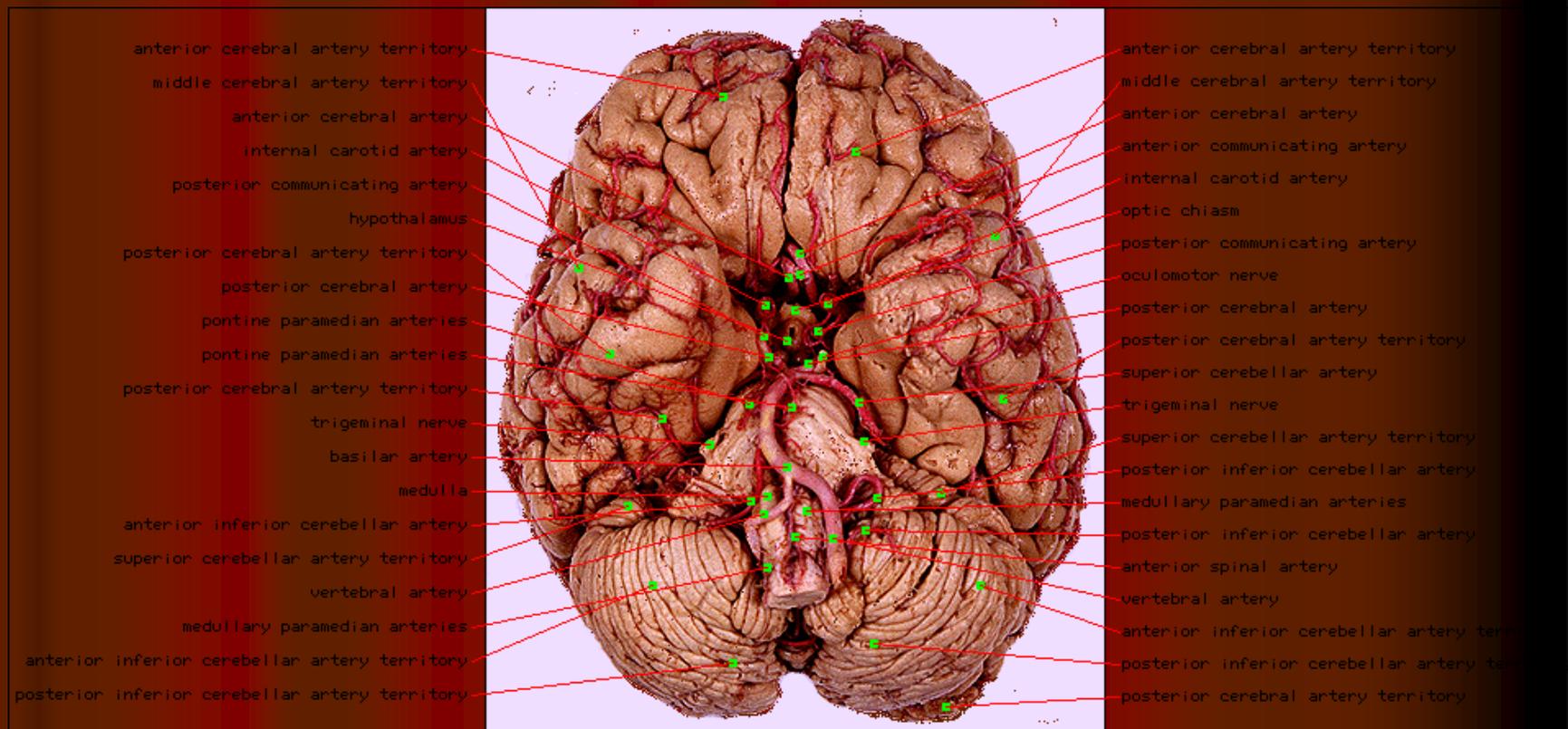
Сосуды мозга. Конвекситальная поверхность.



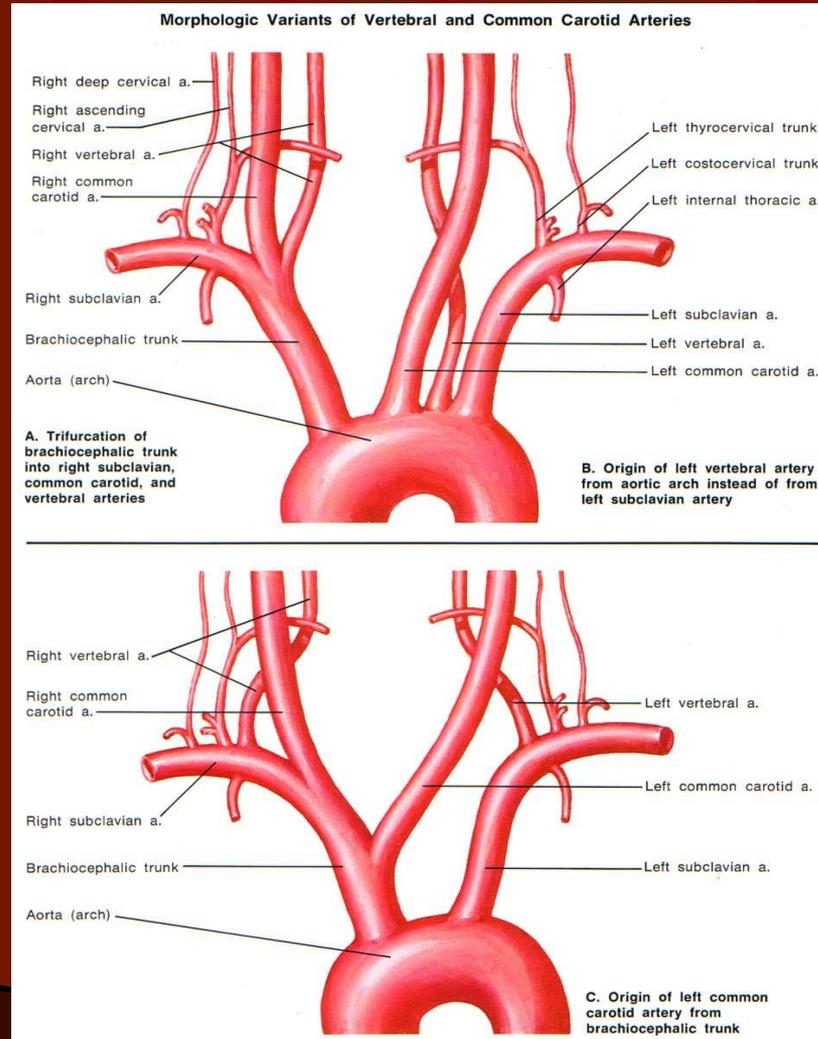
Сосуды мозга. Медиальная поверхность.



Сосуды мозга. Базальная поверхность.



Морфологические варианты строения артерий шеи



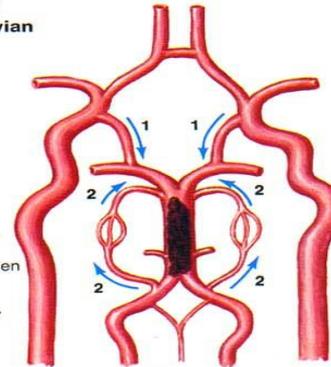
Магистральные артерии головы и шеи

Potential Collateral Circulation Following Occlusion of Basilar, Vertebral, or Subclavian Arteries

A. Occlusion of basilar artery

Circulation maintained by flow from internal carotid arteries via:

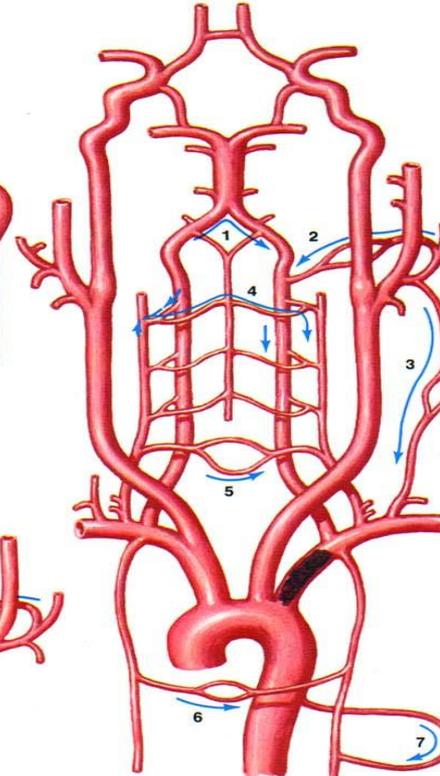
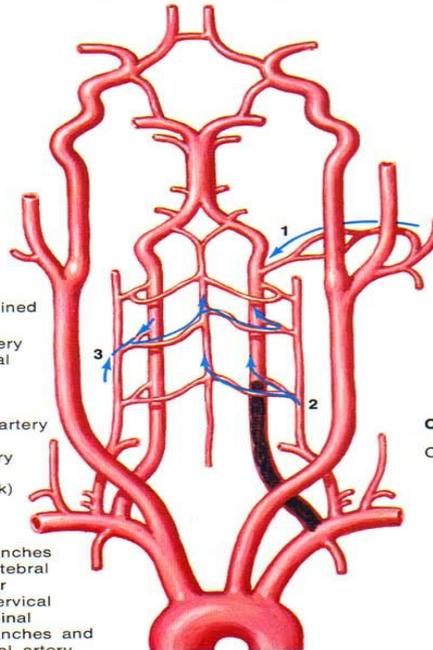
1. Posterior communicating arteries
2. Anastomosis between posterior inferior cerebellar and superior cerebellar arteries



B. Occlusion of proximal vertebral artery

Circulation maintained by flow from:

1. Occipital artery (from external carotid) to muscular branches of vertebral artery
2. Ascending cervical artery (from thyrocervical trunk) by direct connection or via spinal radicular branches
3. Opposite vertebral artery and/or ascending cervical artery via spinal radicular branches and anterior spinal artery

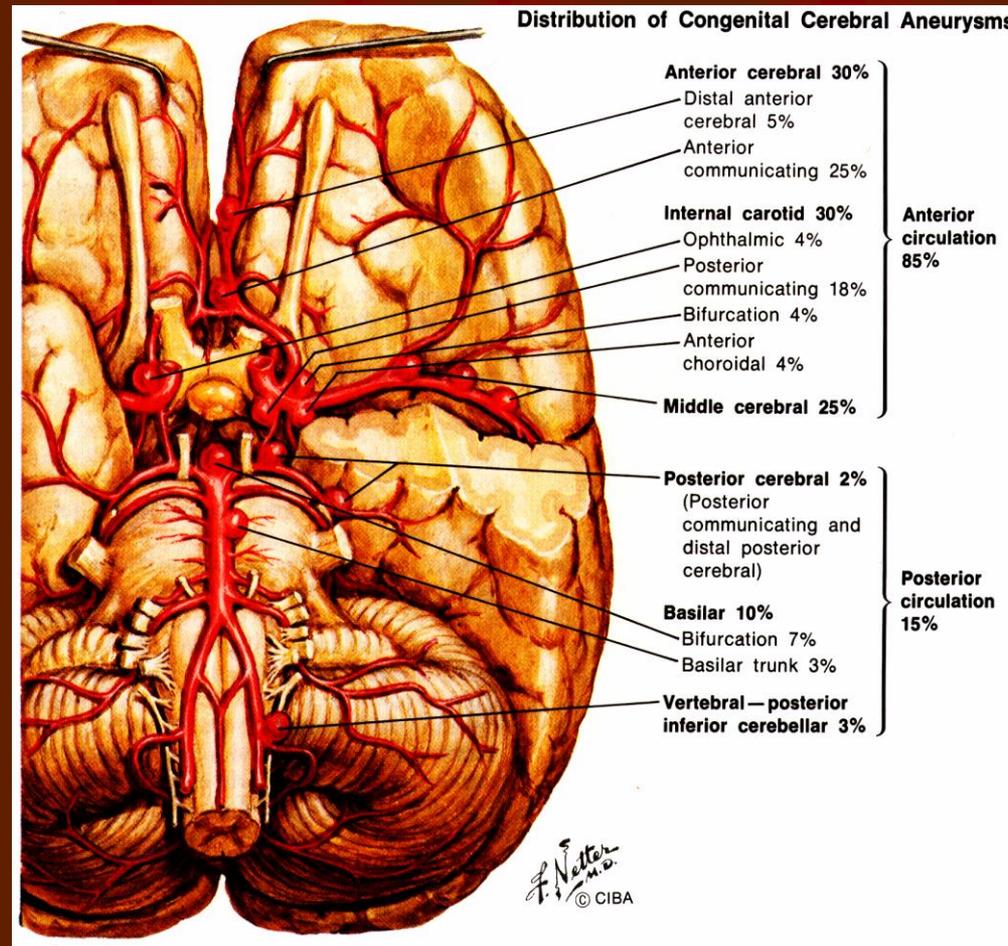


C. Occlusion of proximal subclavian artery

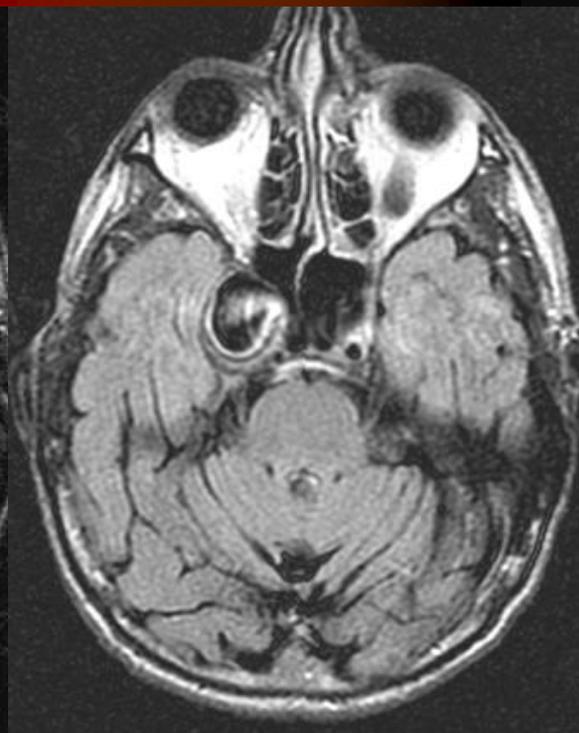
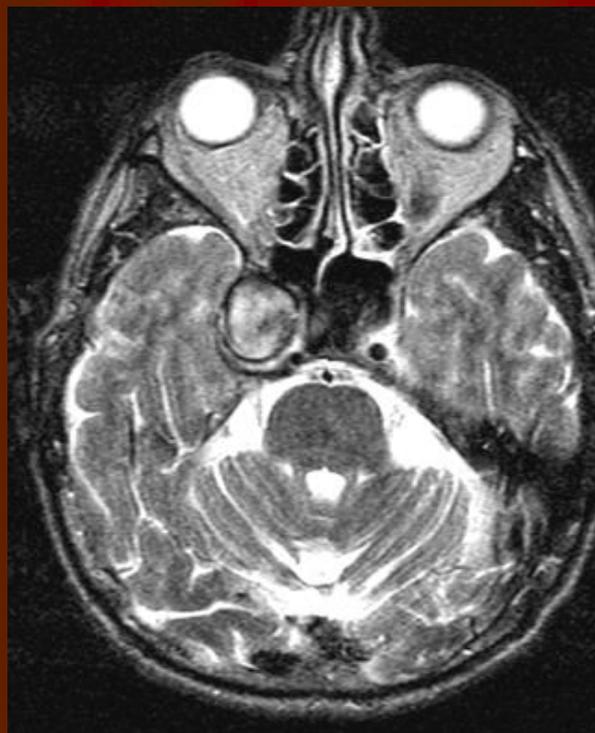
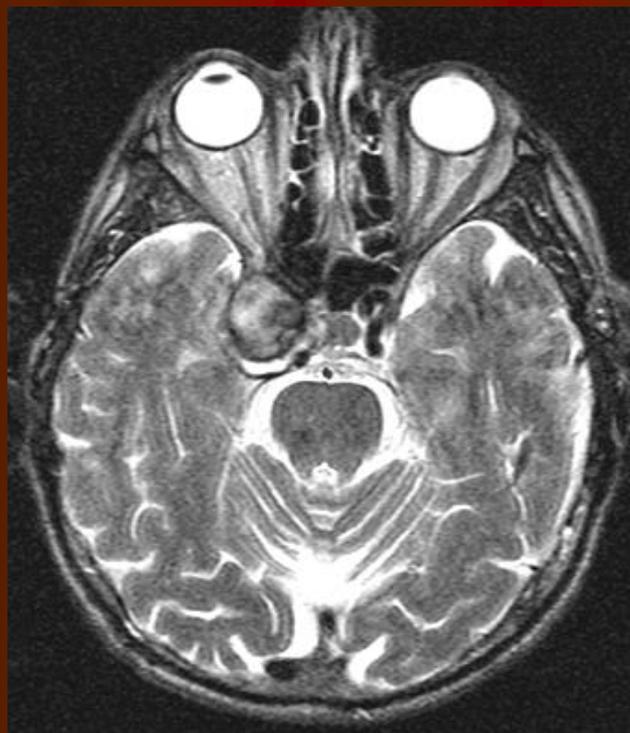
Circulation maintained by flow from:

1. Vertebral-vertebral anastomosis
2. Occipital artery (external carotid) to muscular branches of vertebral artery
3. Occipital artery to deep cervical artery
4. Via spinal radicular branches of vertebral and ascending cervical arteries
5. Inferior thyroid anastomosis between both inferior thyroid arteries
6. Anastomosis between internal thoracic (internal mammary) arteries
7. Aortic intercostal arteries to internal thoracic arteries

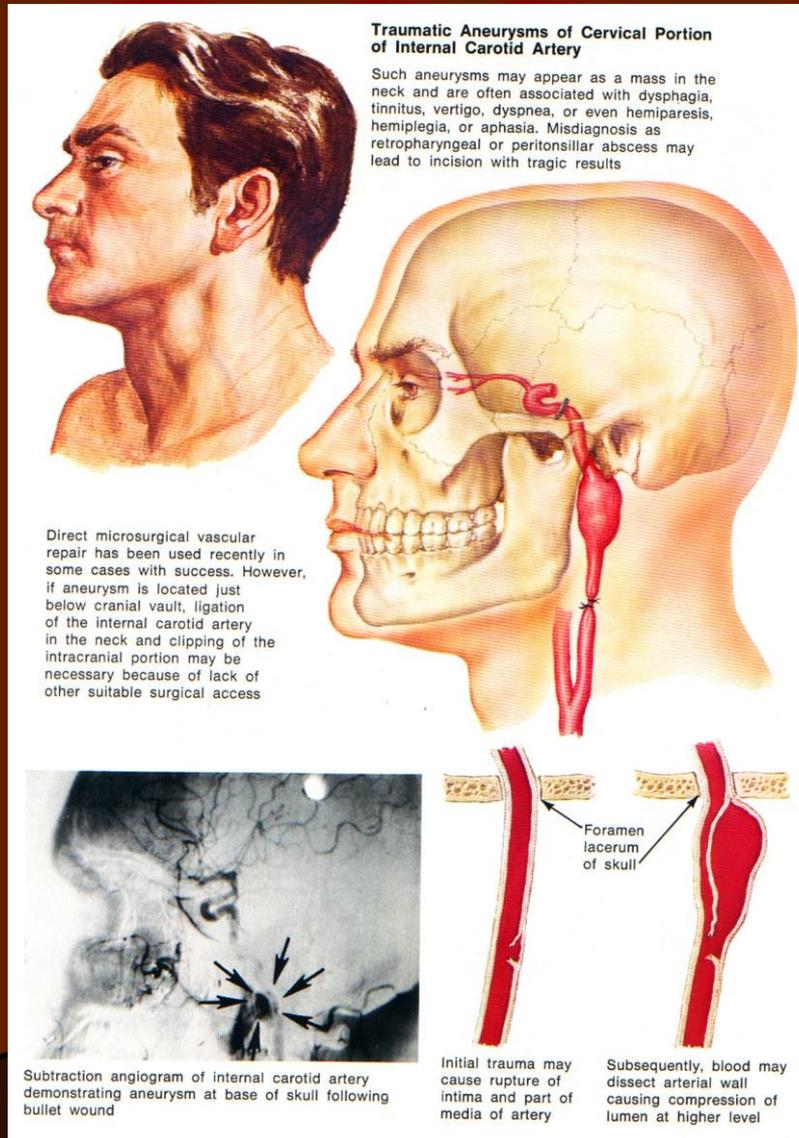
Артерии мозга



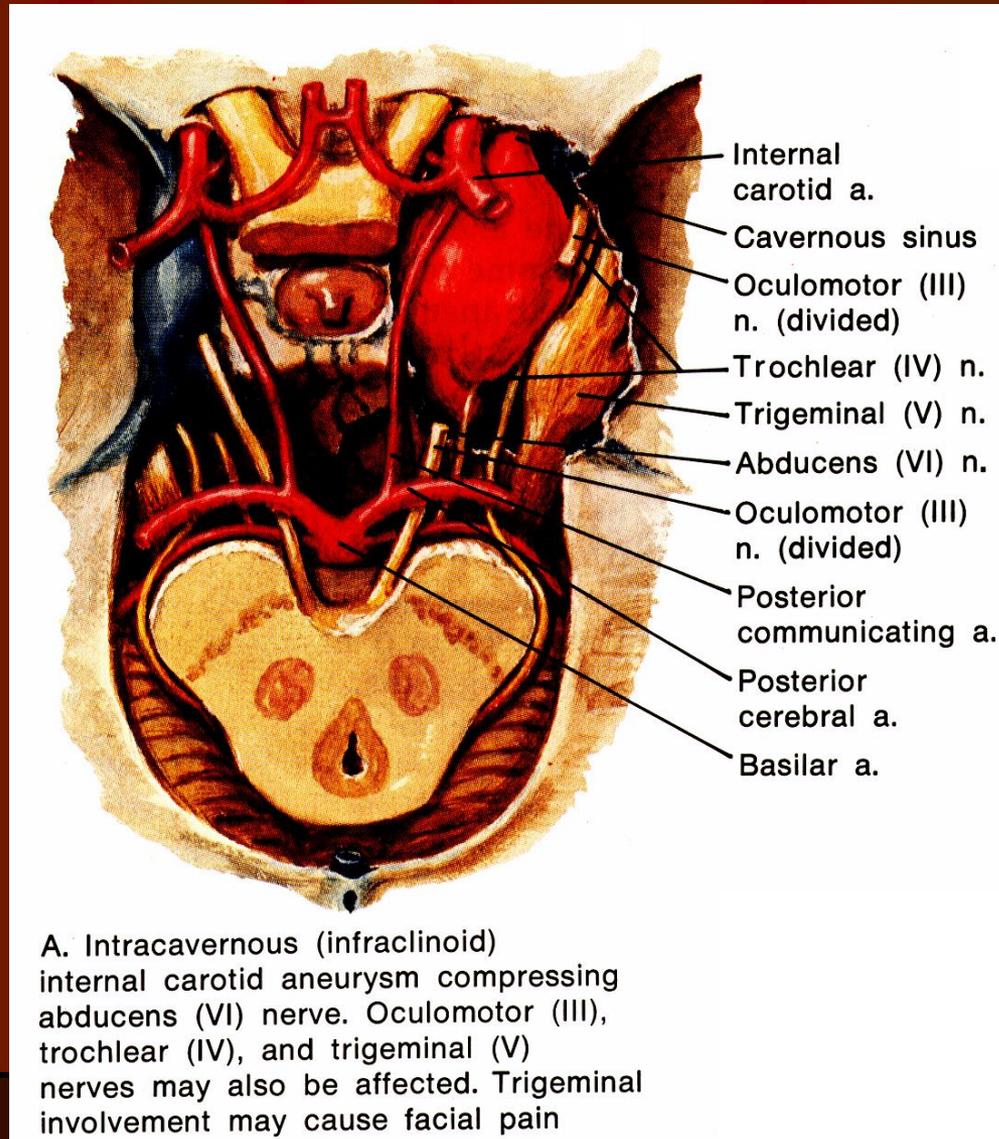
Гигантская аневризма ВСА



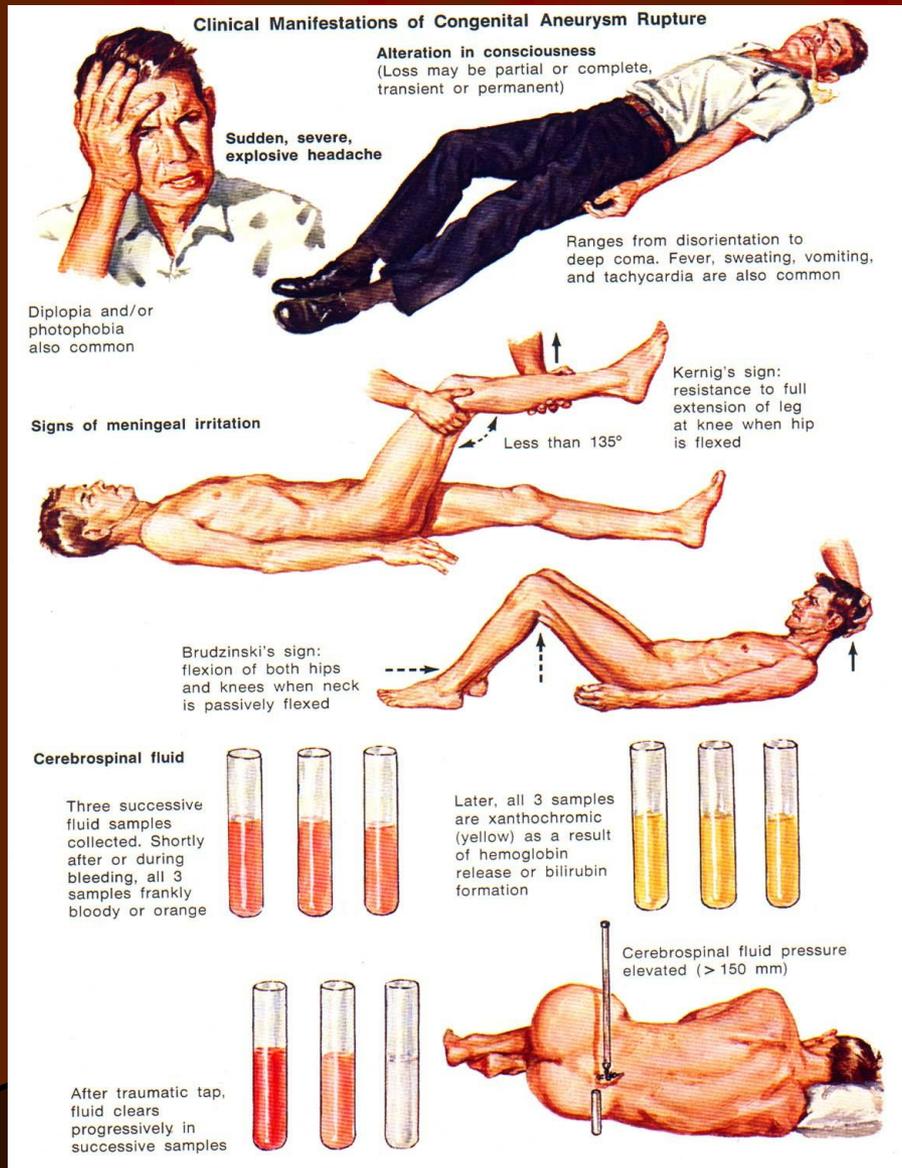
Травматические разрывы СА



Аневризма в кавернозном синусе



Клиника артериальных аневризм

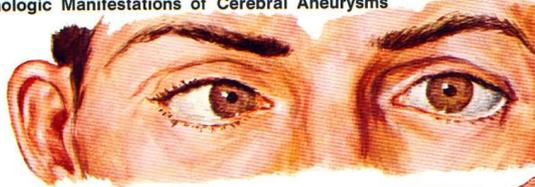


Офтальмические симптомы аневризм

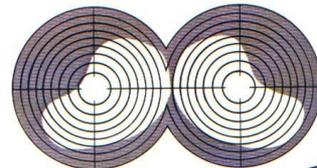
Ophthalmologic Manifestations of Cerebral Aneurysms

A. Neuromuscular disorders

Abducens palsy: Affected eye turns medially. May be first manifestation of intracavernous carotid aneurysm. Pain above eye or on side of face may be secondary to trigeminal (V) nerve involvement

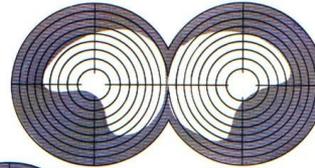


Oculomotor palsy: ptosis, eye turns laterally and inferiorly, pupil dilated. Common finding with cerebral aneurysms, especially carotid – posterior communicating aneurysms

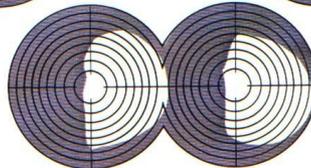


Superior bitemporal quadrantanopia caused by supraclinoid carotid aneurysm compressing optic chiasm from below

B. Visual field disturbances

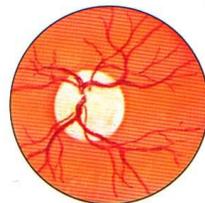


Inferior bitemporal quadrantanopia caused by compression of optic chiasm from above



Right (or left) homonymous hemianopia caused by compression of optic tract. Unilateral amaurosis may occur if optic (II) nerve is compressed

C. Retinal changes



Optic atrophy may develop as a result of pressure on the optic (II) nerve from a supraclinoid carotid, ophthalmic, or anterior cerebral aneurysm

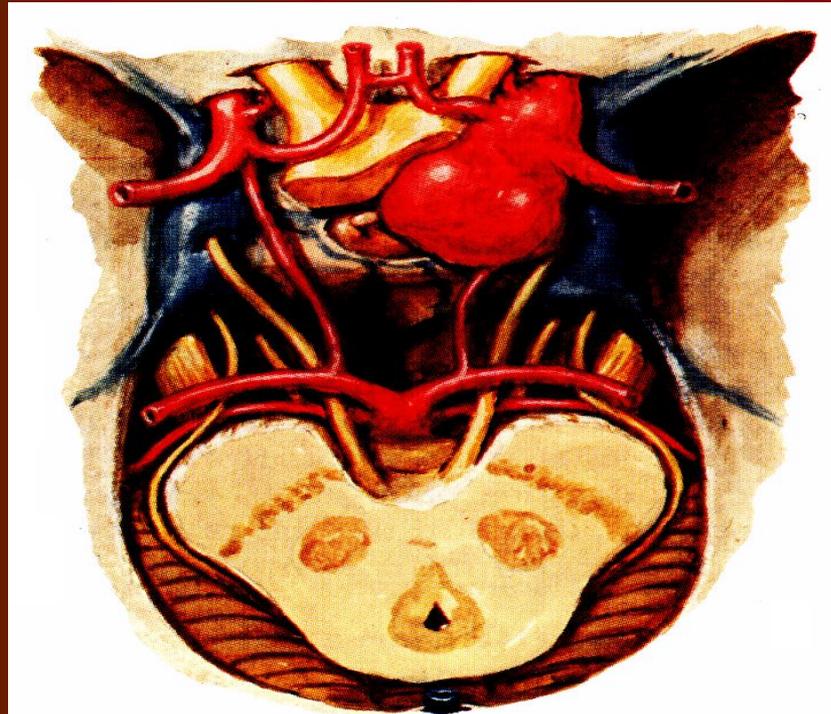


Papilledema may be caused by increased intracranial pressure secondary to rupture of a cerebral aneurysm



Hemorrhage into optic (II) nerve sheath after rupture of aneurysm may result in subhyaloid hemorrhage with blood around disc

Аневризма супраклиноидной части ВСА



B. Aneurysm of supraclinoid portion of internal carotid artery elevating optic chiasm, distorting infundibulum, and compressing oculomotor (III) nerve

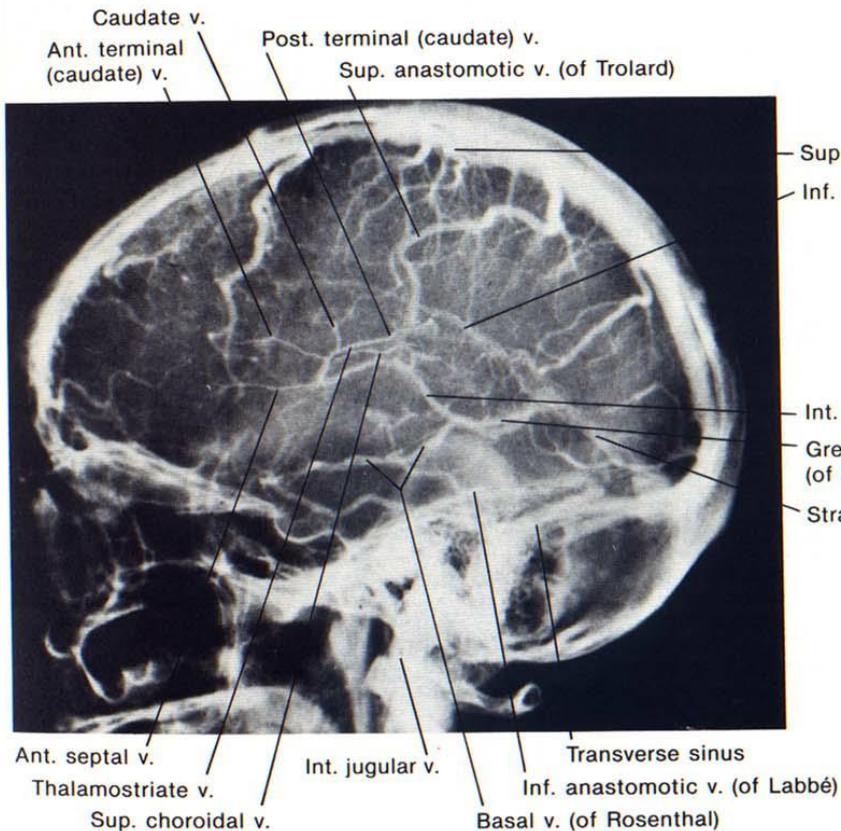
Методы визуализации сосудов мозга

- ◆ ЦАГ (золотой стандарт)
- ◆ СКТА
- ◆ ЭЛТ
- ◆ МРА
- ◆ ПЭТ
- ◆ УЗДС (ТКДС, ЭКДС)

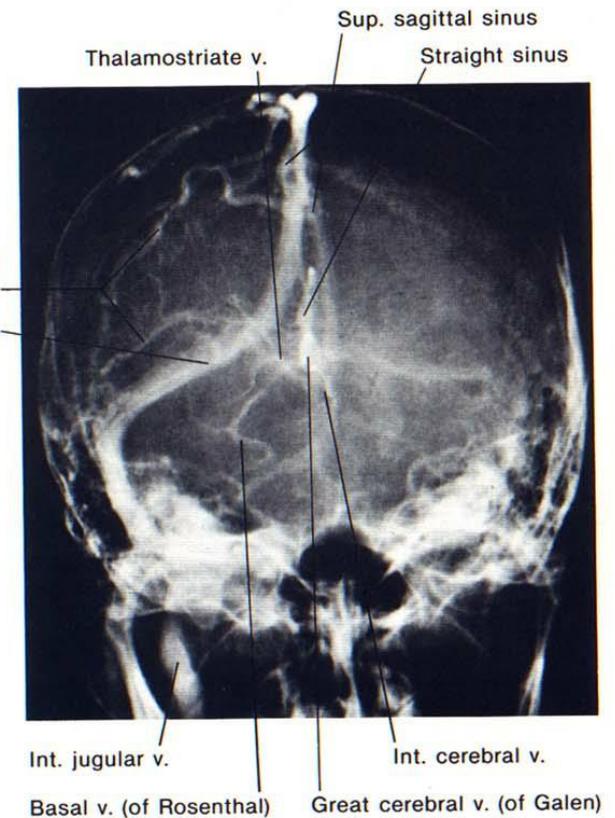
Каротидные ангиограммы

Carotid angiograms: venous phase

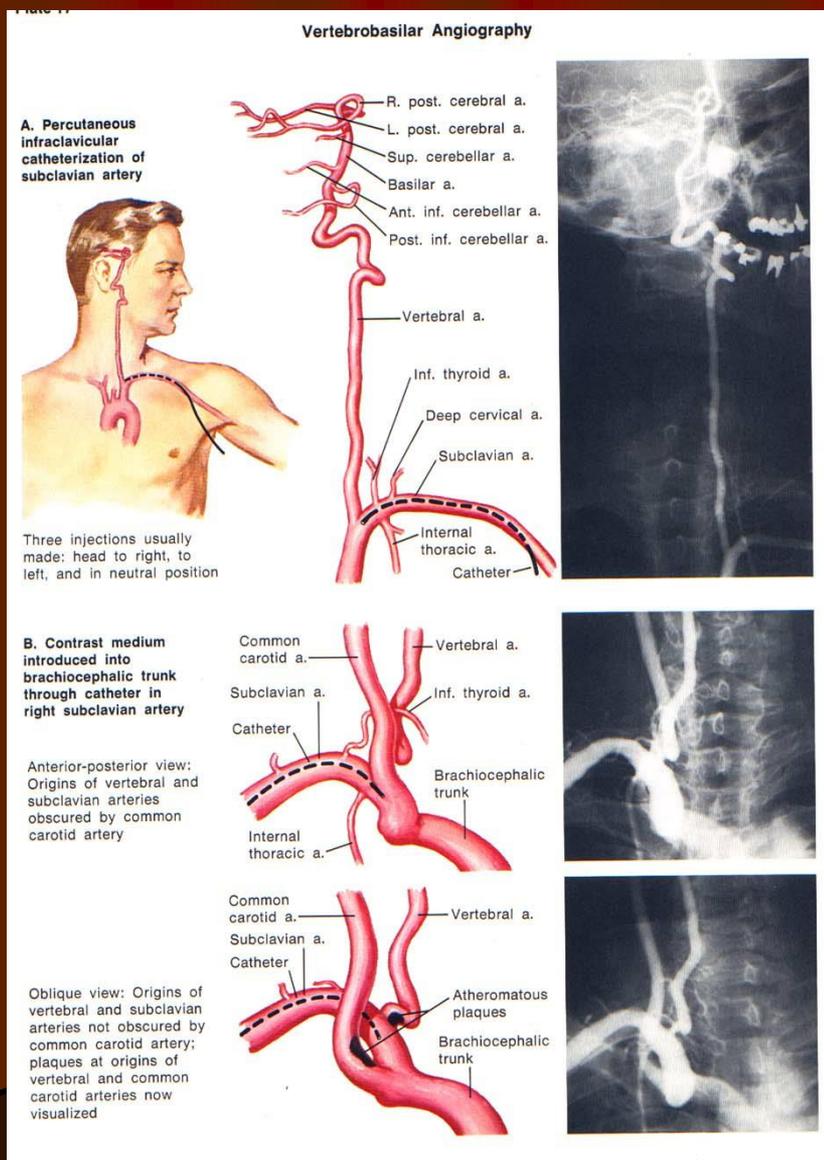
Lateral projection



Frontal projection

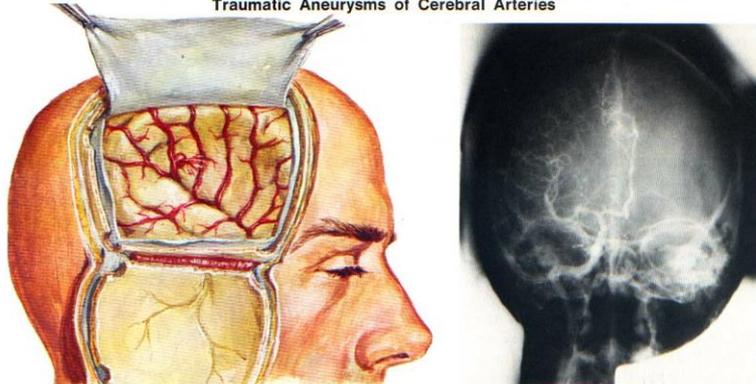


Вертебробазилярная ангиография



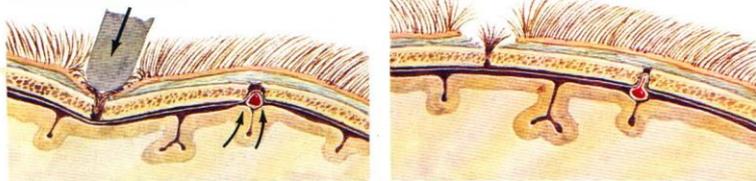
Аневризмы травматического происхождения

Traumatic Aneurysms of Cerebral Arteries



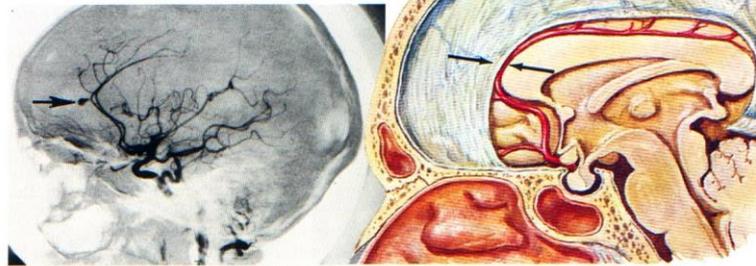
Aneurysm of posterior parietal branch of right middle cerebral artery exposed after evacuation of a subdural hematoma

Right A-P angiogram revealing subdural hematoma with underlying aneurysm



Compression fracture of skull at site of impact may cause "outbursting" at another location with momentary herniation of a cortical vessel into the secondary fracture line

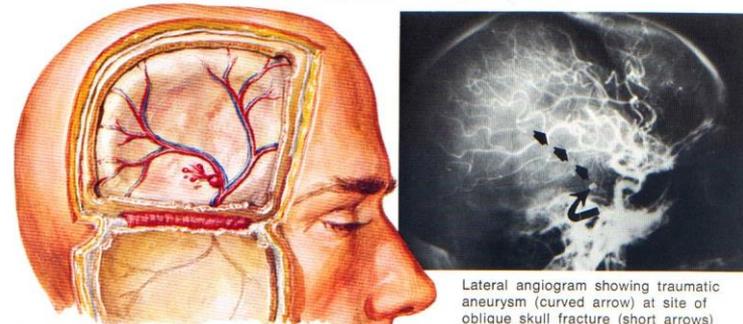
Cortical artery trapped and injured as bone returns to normal position. Hair trapped in primary fracture



Lateral internal carotid angiogram showing aneurysm of pericallosal portion of anterior cerebral artery

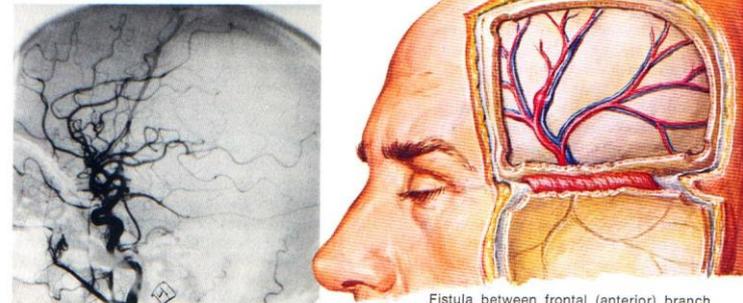
Right pericallosal portion of anterior cerebral artery traumatized by sharp edge of falx cerebri during closed head injury

Traumatic Aneurysms of Meningeal Arteries



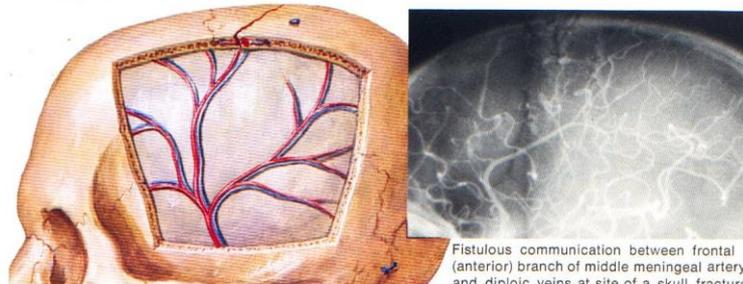
Bleeding aneurysm of parietal (posterior) branch of middle meningeal artery exposed after evacuation of overlying epidural hematoma

Lateral angiogram showing traumatic aneurysm (curved arrow) at site of oblique skull fracture (short arrows)



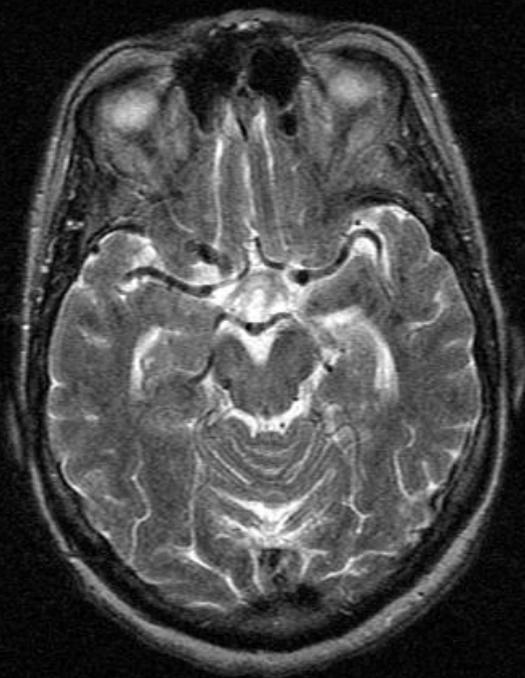
Common carotid subtraction angiogram showing "railroad track" sign indicating a meningeal arteriovenous fistula

Fistula between frontal (anterior) branch of middle meningeal artery and vein. The feeding artery is greatly dilated and has aneurysmal dilatation at fistula site



Fistulous communication between frontal (anterior) branch of middle meningeal artery and diploic veins at site of a skull fracture

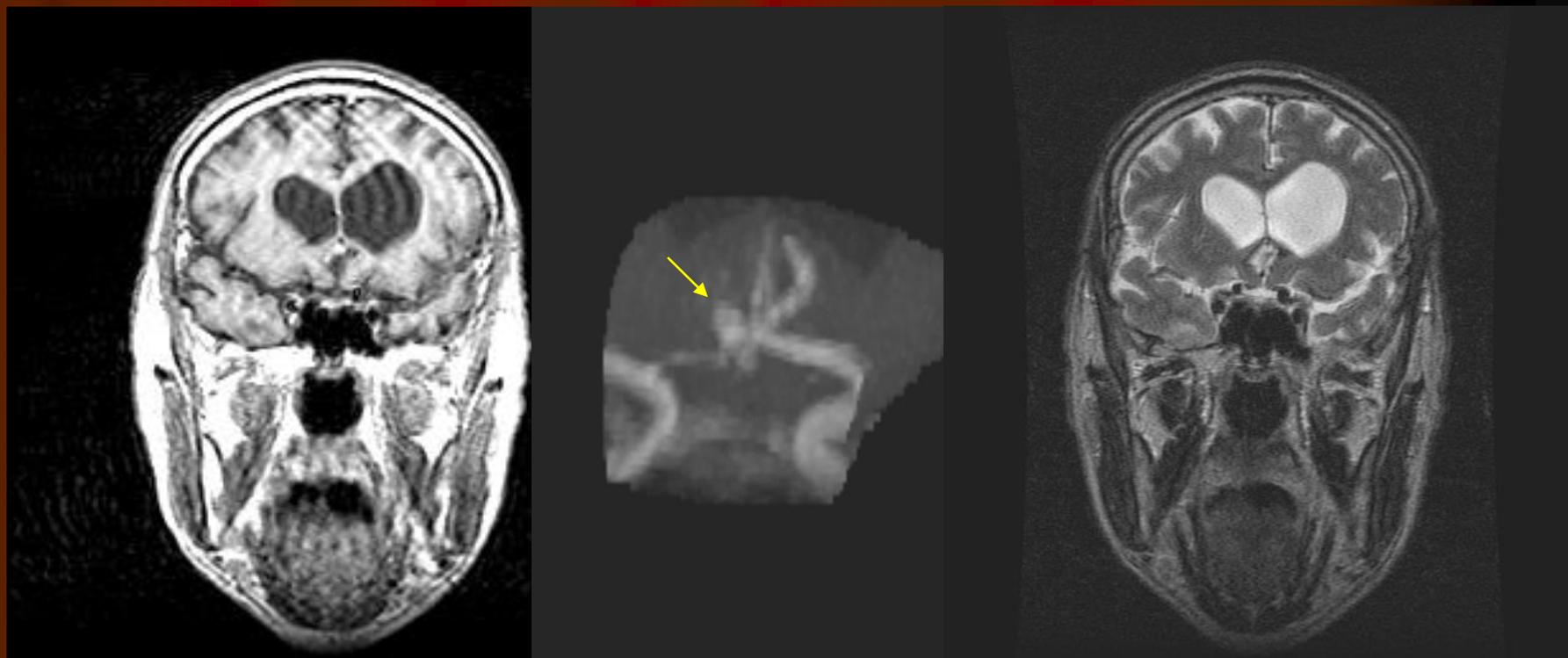
Аневризма ПМА



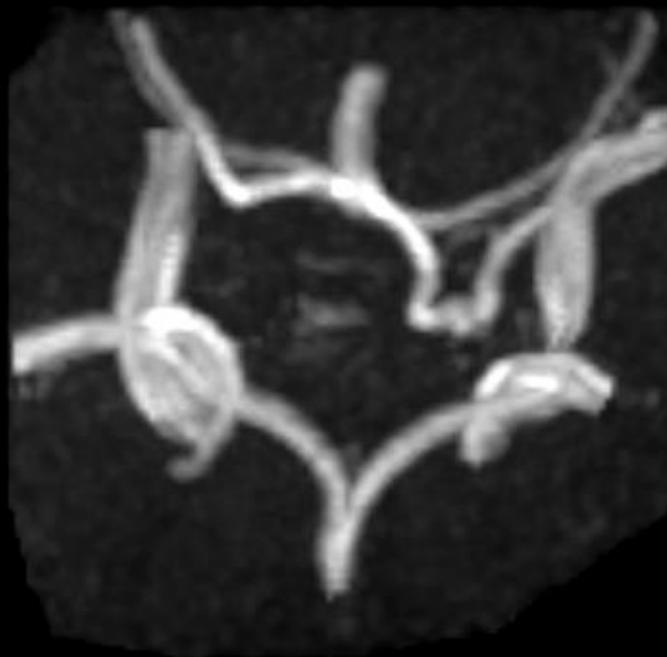
Аневризма офтальмического сегмента правой ВСА



Аневризма ПМА



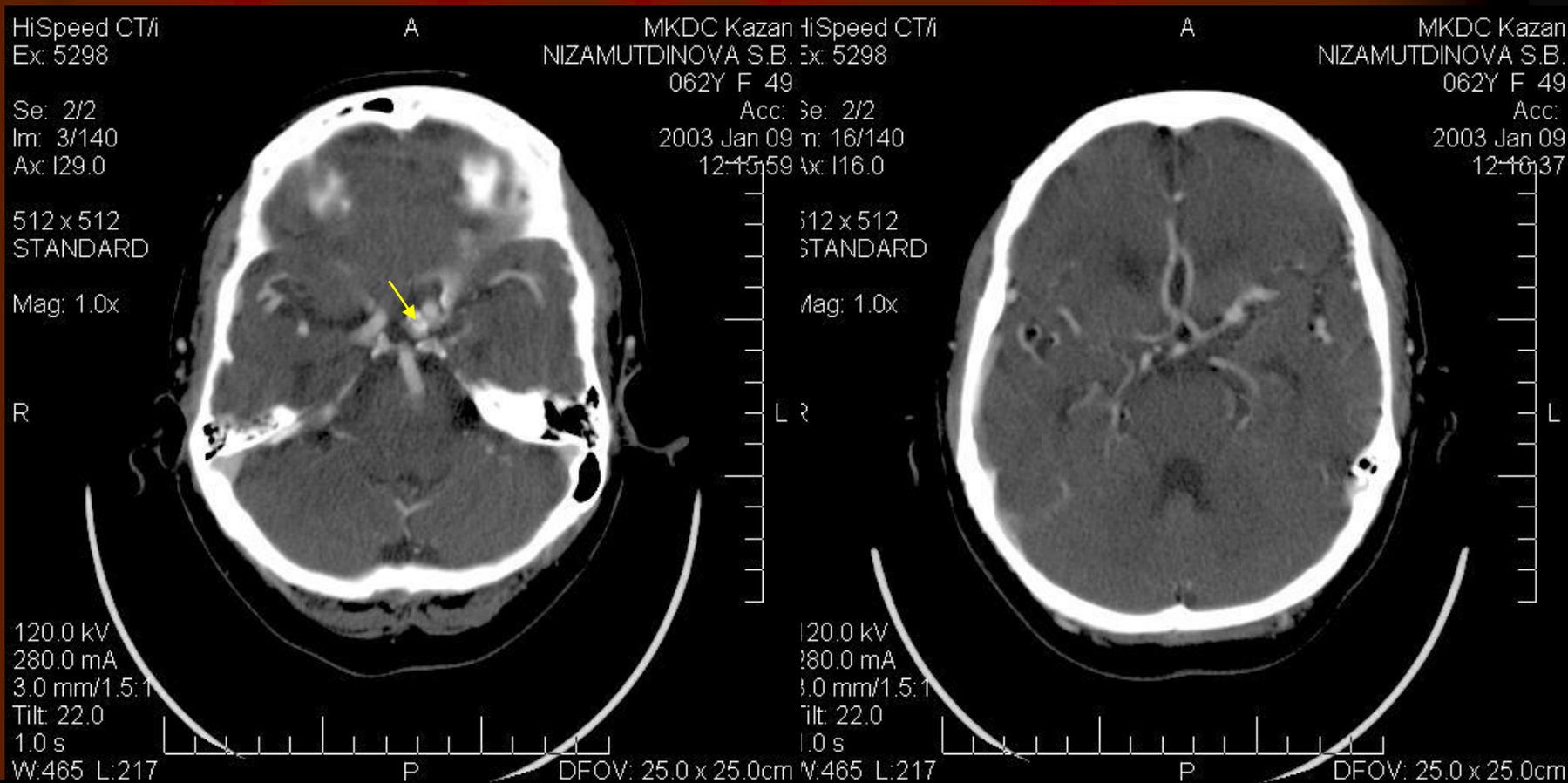
Аневризма ЗМА



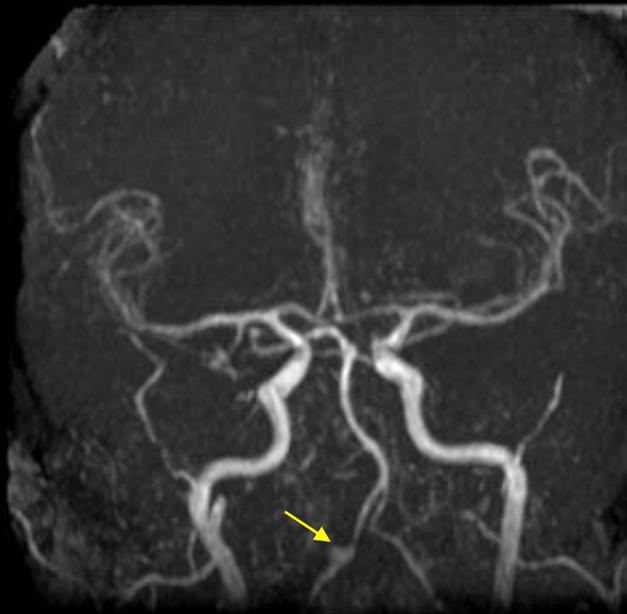
Множественные аневризмы (аневризма левой задней соединительной артерии и аневризма развилки сегмента М1 левой СМА).



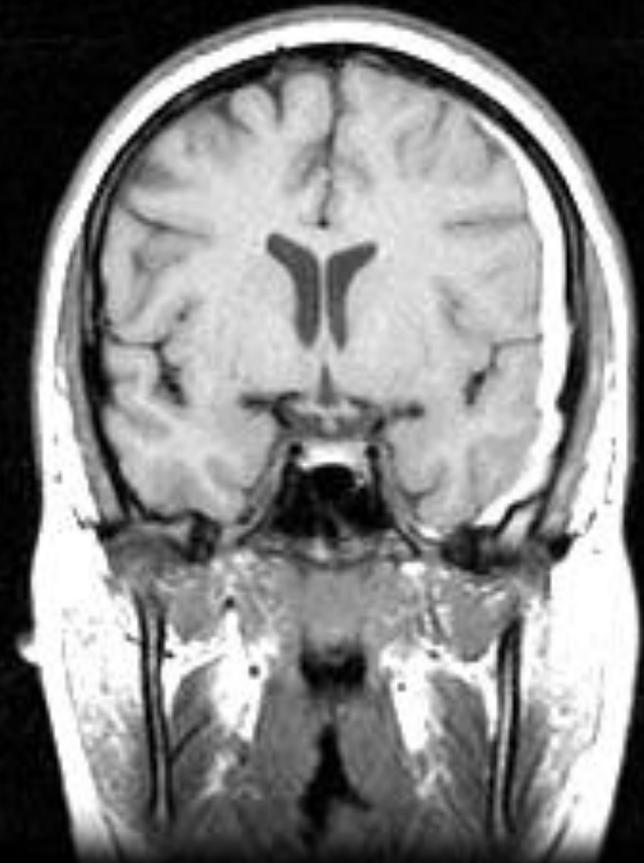
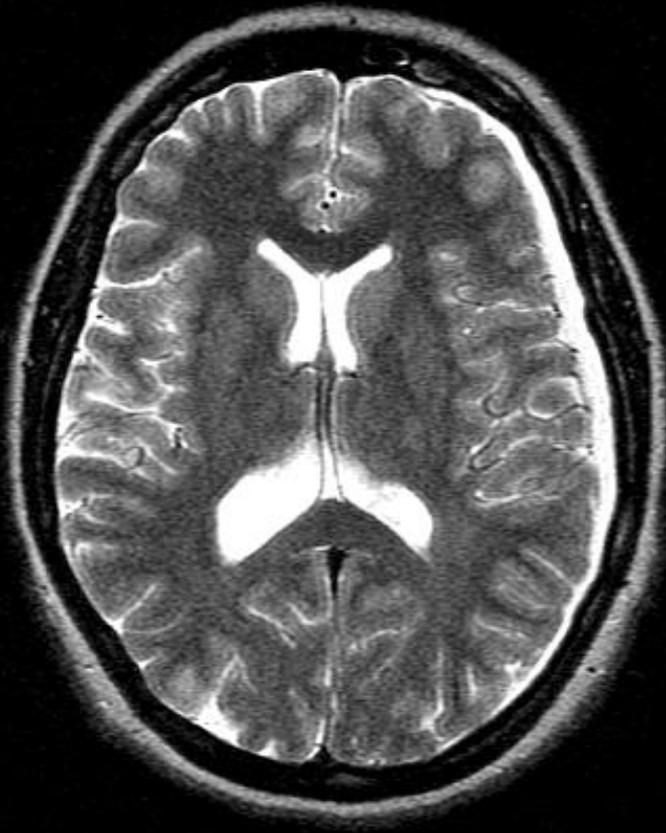
Множественные аневризмы (СКТА)



Аневризма позвоночной артерии



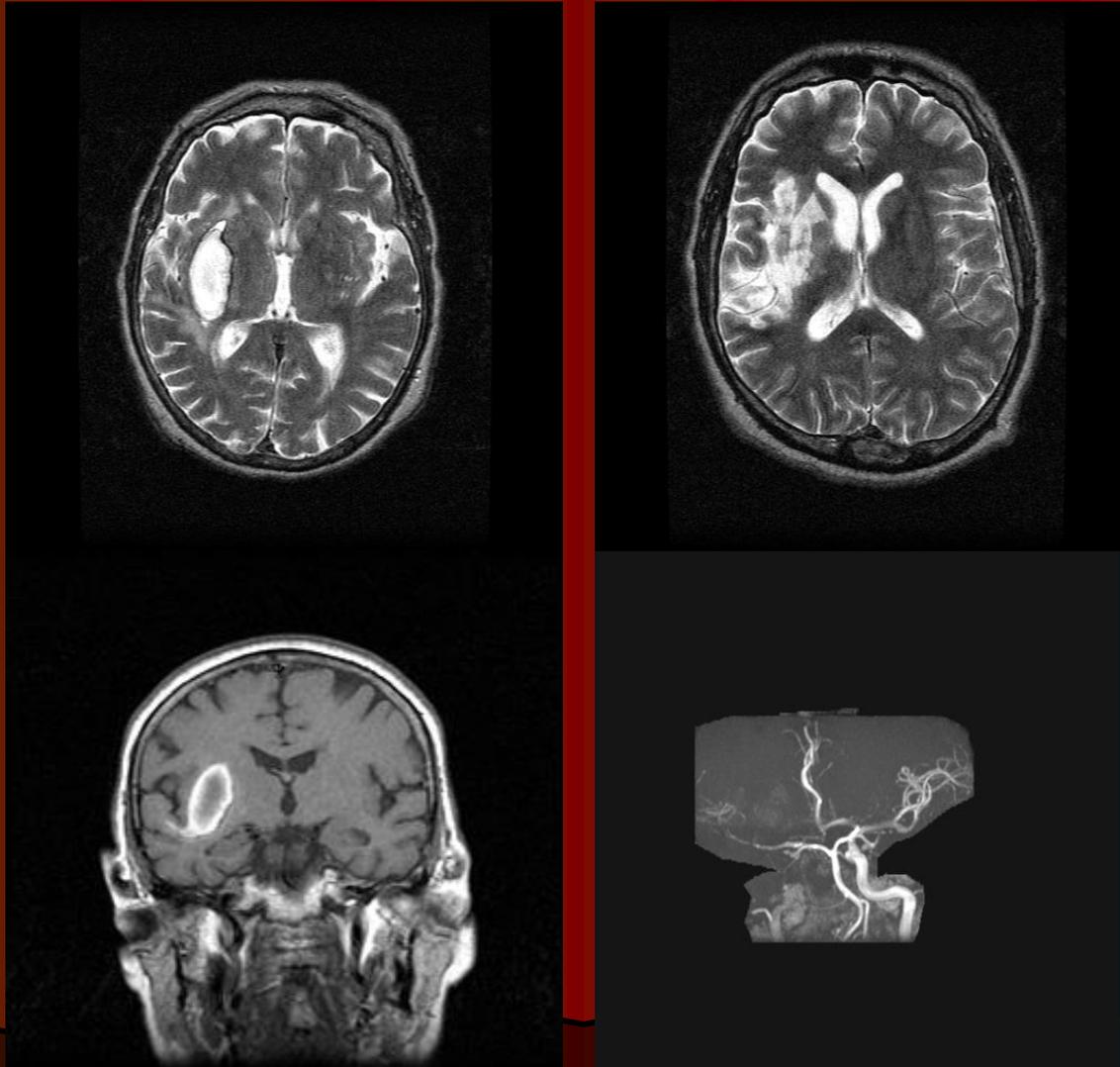
Субдуральная гематома



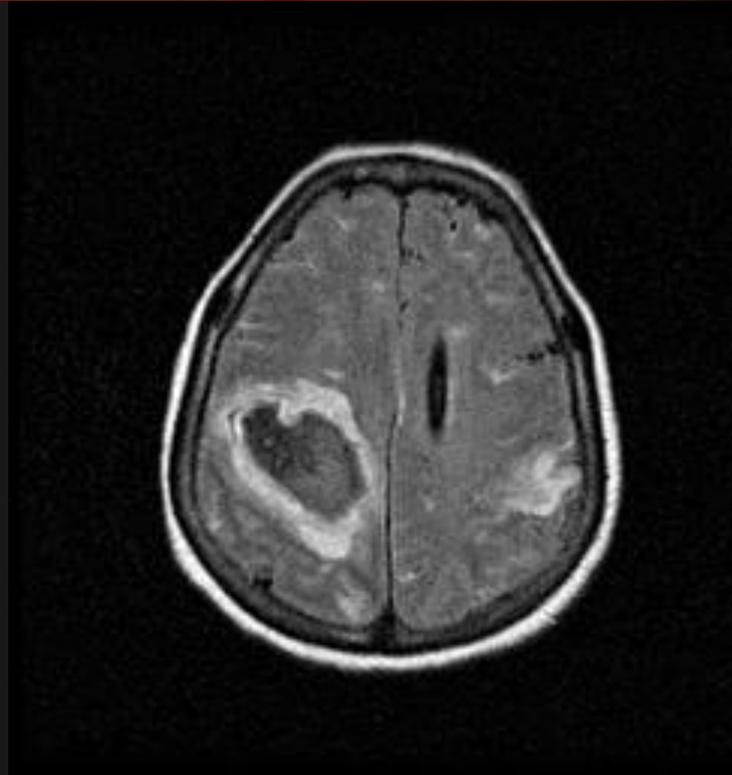
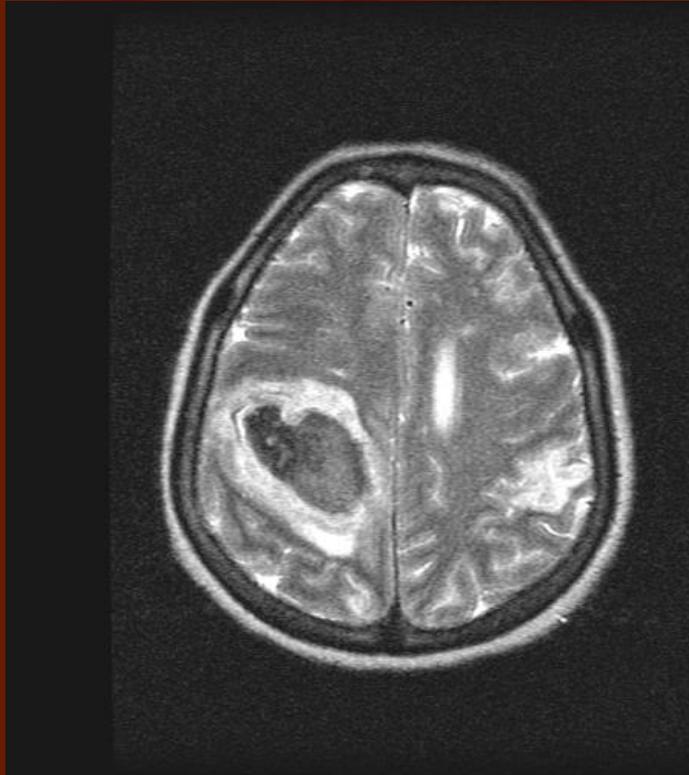
Субдуральная гематома БП



Внутричерепная гематома



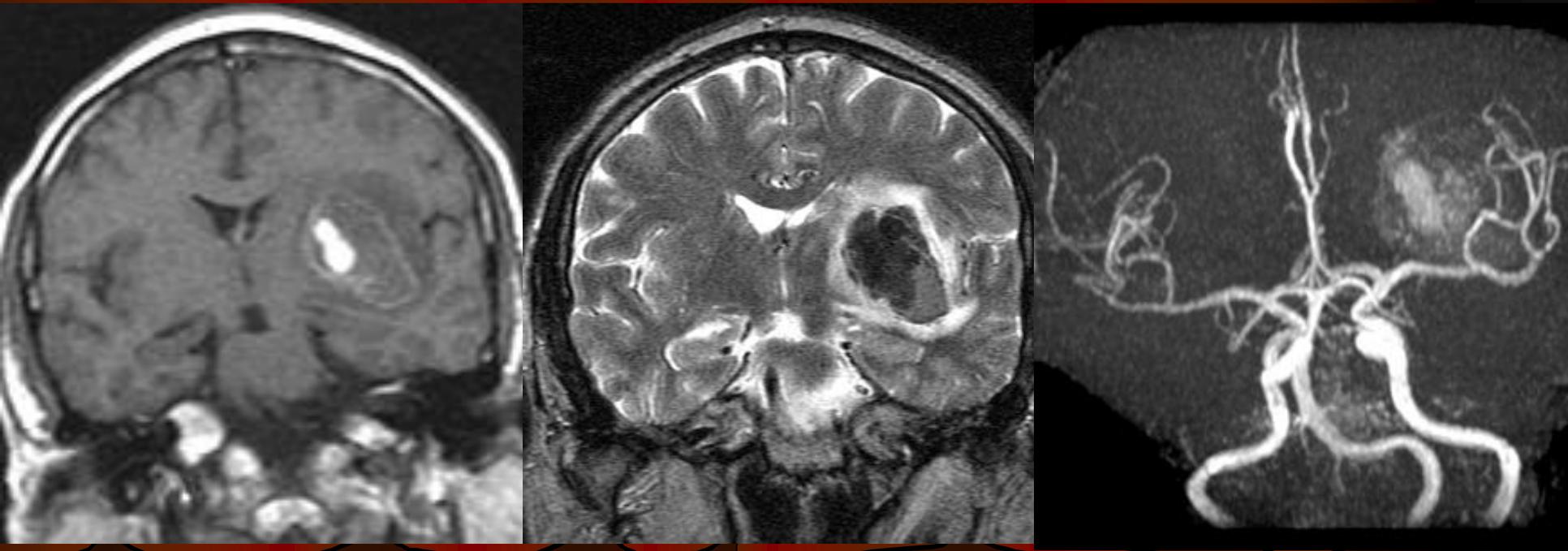
Геморрагический инсульт с подострой внутримозговой гематомой



Подострая внутримозговая гематома

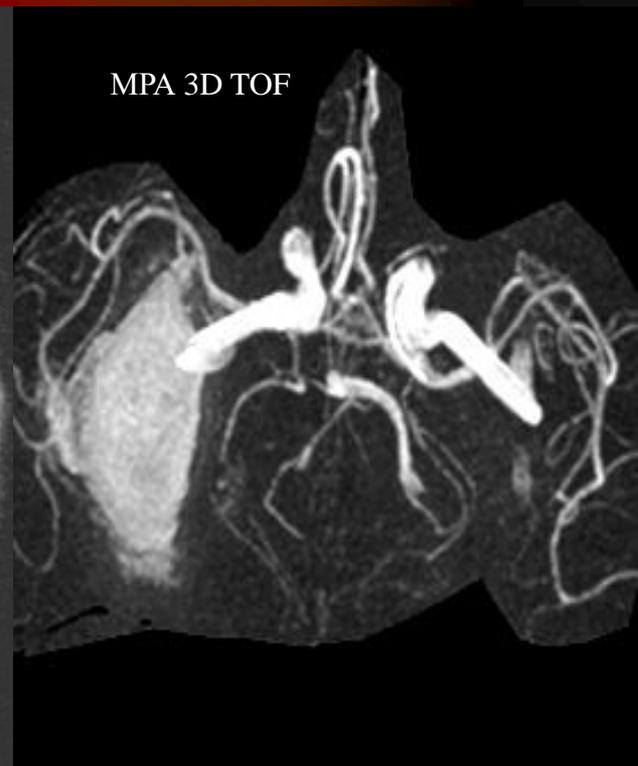
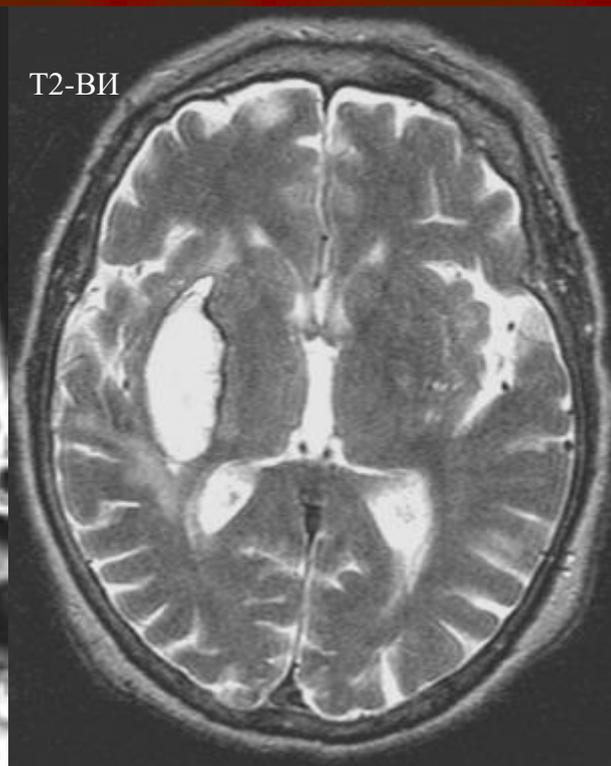
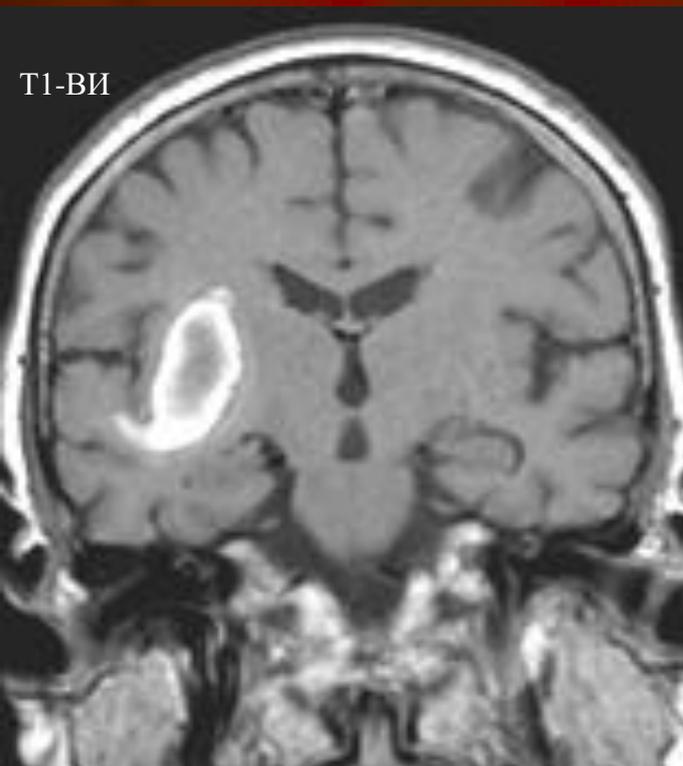
- 4-ые сутки инсульта.

Содержимое гематомы преимущественно на стадии дезоксигемоглобина. Появление связанного метгемоглобина в медиальных отделах гематомы.



Хроническая внутримозговая гематома

Гематома области правой наружной капсулы на стадии свободного метгемоглобина с ободком гемосидероза по периферии (5 недель после ОНМК)

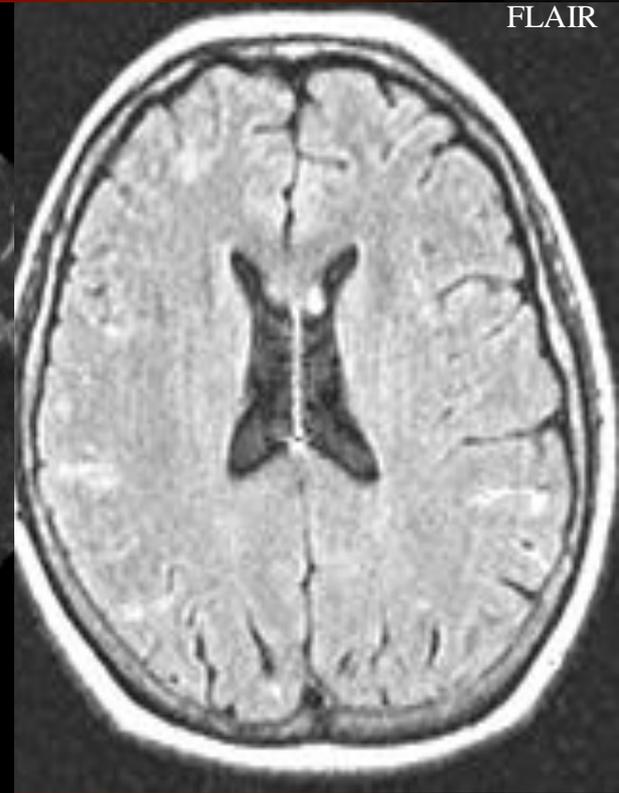
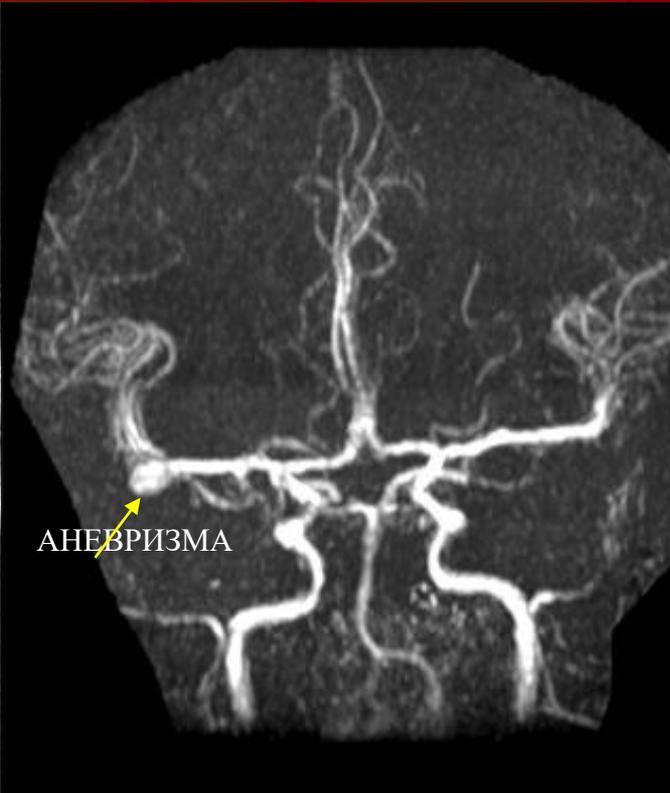


Артериальные аневризмы

- Аневризма левой СМА

САК

T2-ВИ



FLAIR

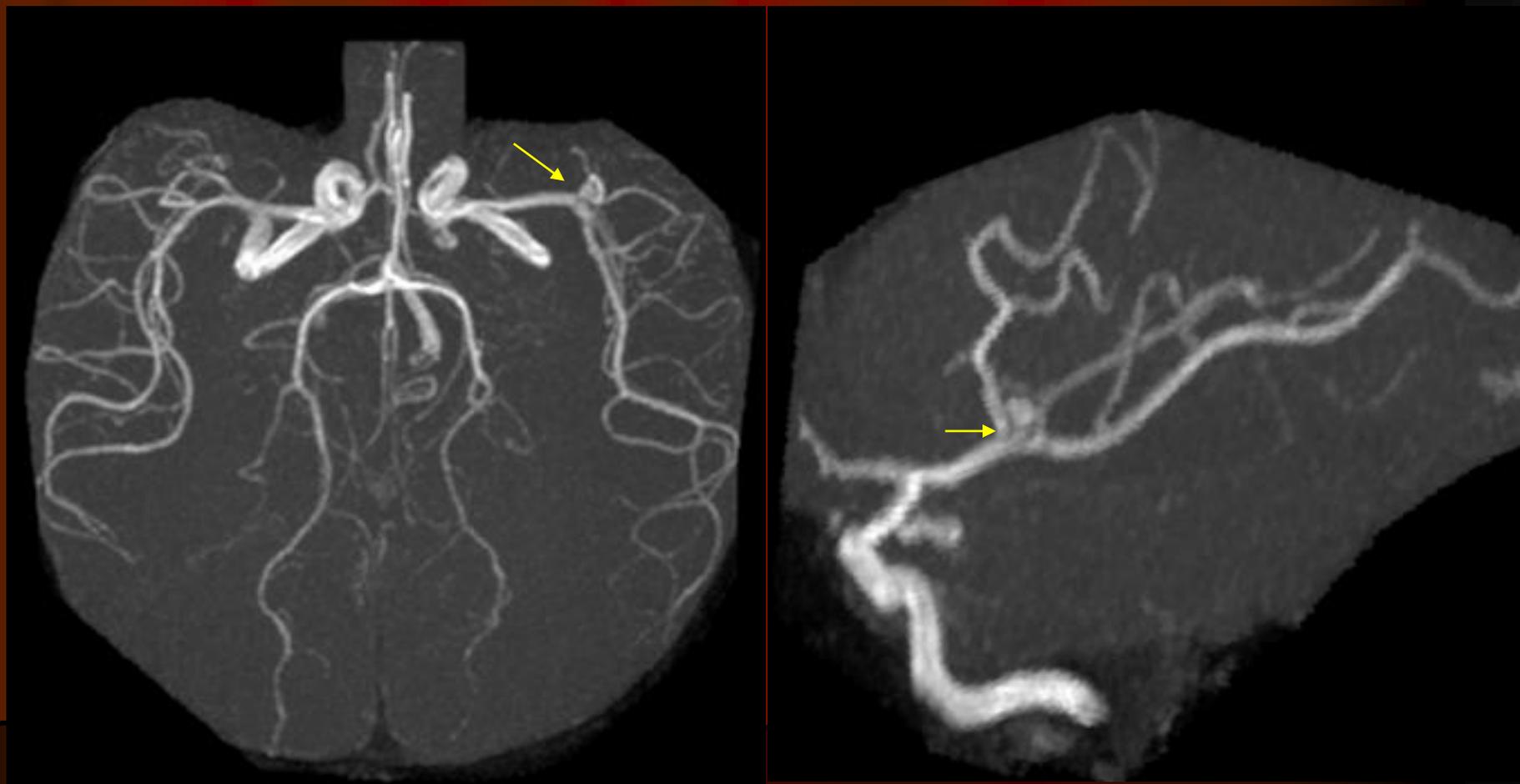
СУБАРАХНОИДАЛЬНАЯ ГЕМОРАГИЯ

- Аневризма офтальмического сегмента правой ВСА

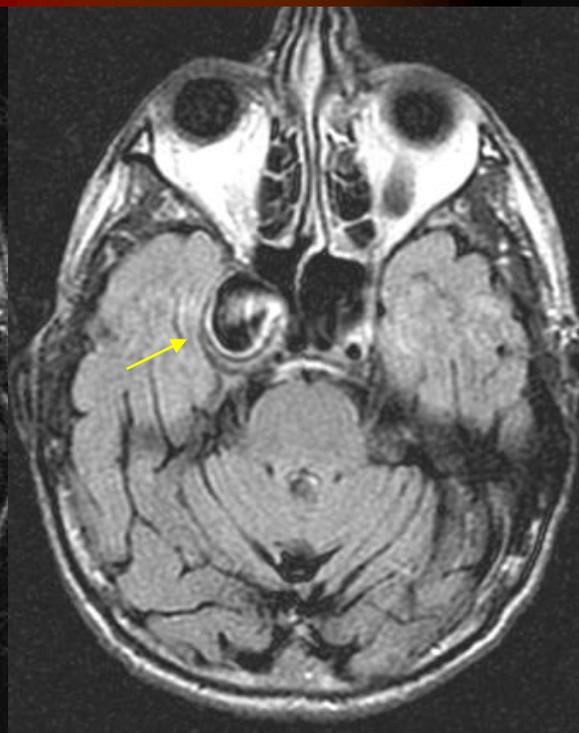


Множественные аневризмы

- Аневризма левой задней соединительной артерии и аневризма развилки сегмента М1 левой СМА



Гигантская аневризма ВСА



Гигантская аневризма ВСА

- Артериальная МРА 3D TOF
Слабая визуализация аневризмы вследствие медленного тока крови

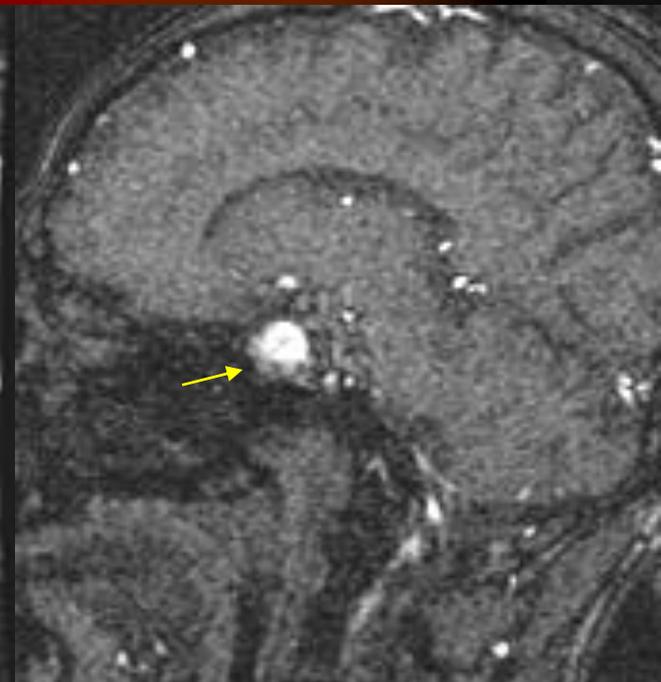
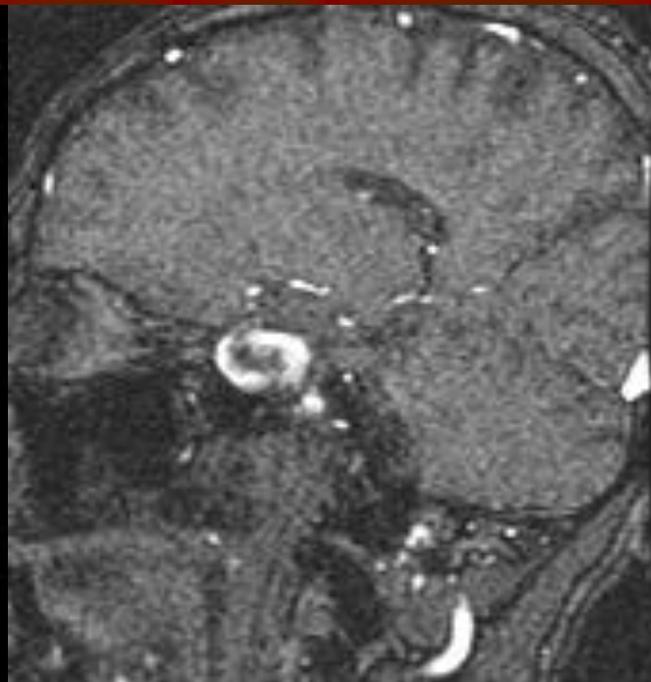
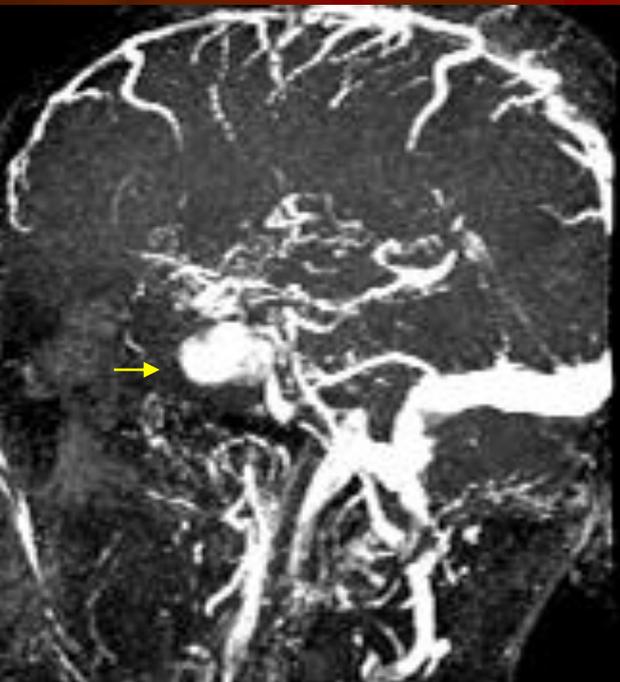


Гигантская аневризма ВСА

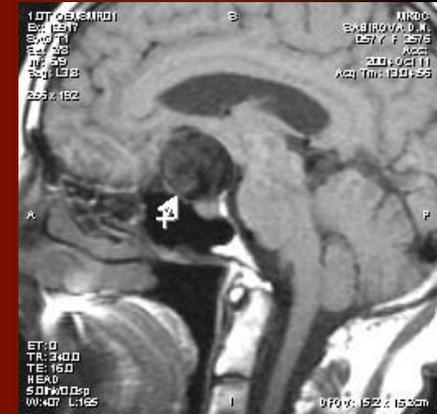
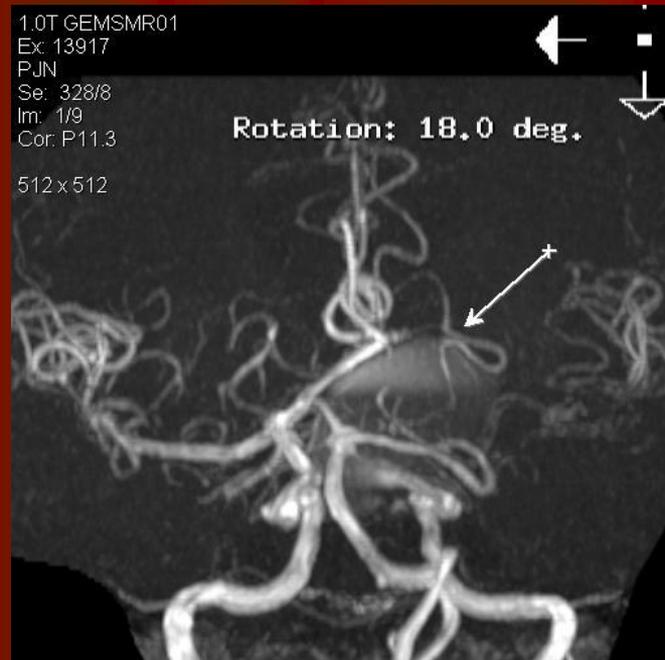
- Венозная сагиттальная МРА 2 D TOF

МИП-реконструкция

Нативные изображения



Аневризмы ВСА

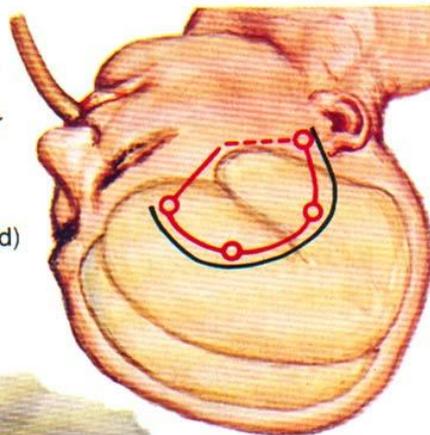


Хирургия аневризм

Frontotemporal Approach for Anteriorly Projecting Aneurysm of Basilar Artery Bifurcation

Head turned slightly more than for approach to anterior circulation

Skin incision (black)
Bur holes and bone cuts (red)



R. temporal lobe
(retracted)

R. oculomotor
(III) n.

R. internal
carotid a.

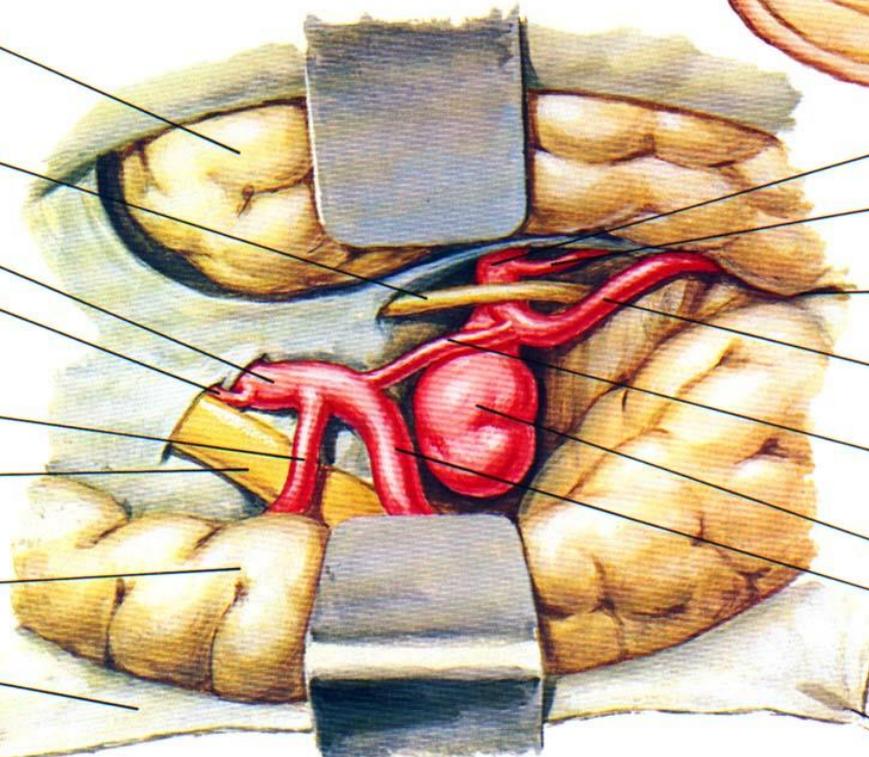
R. ophthalmic a.

R. anterior
cerebral a.

R. optic (II) n.

R. frontal lobe
(retracted)

Dura mater



Basilar a.

R. superior
cerebellar a.

Lateral
cerebral sulcus

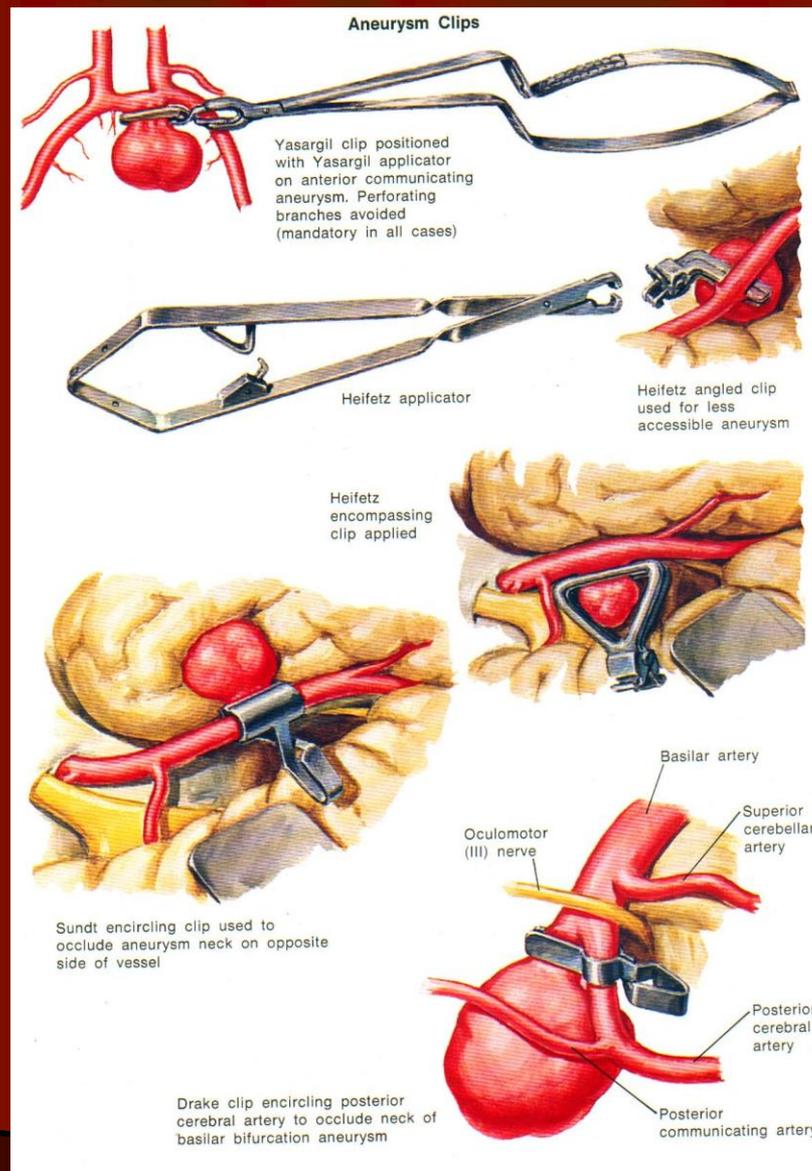
R. posterior
cerebral a.

R. posterior
communicating a.

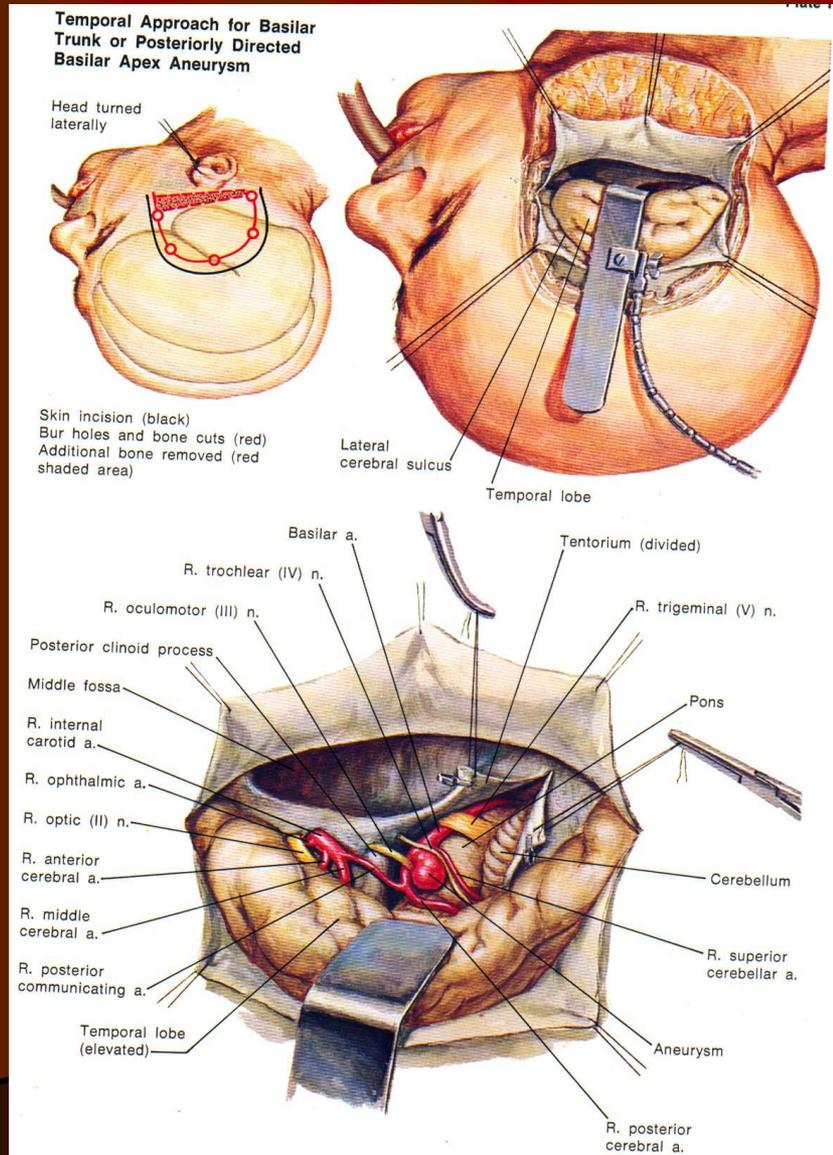
Aneurysm

R. middle
cerebral a.

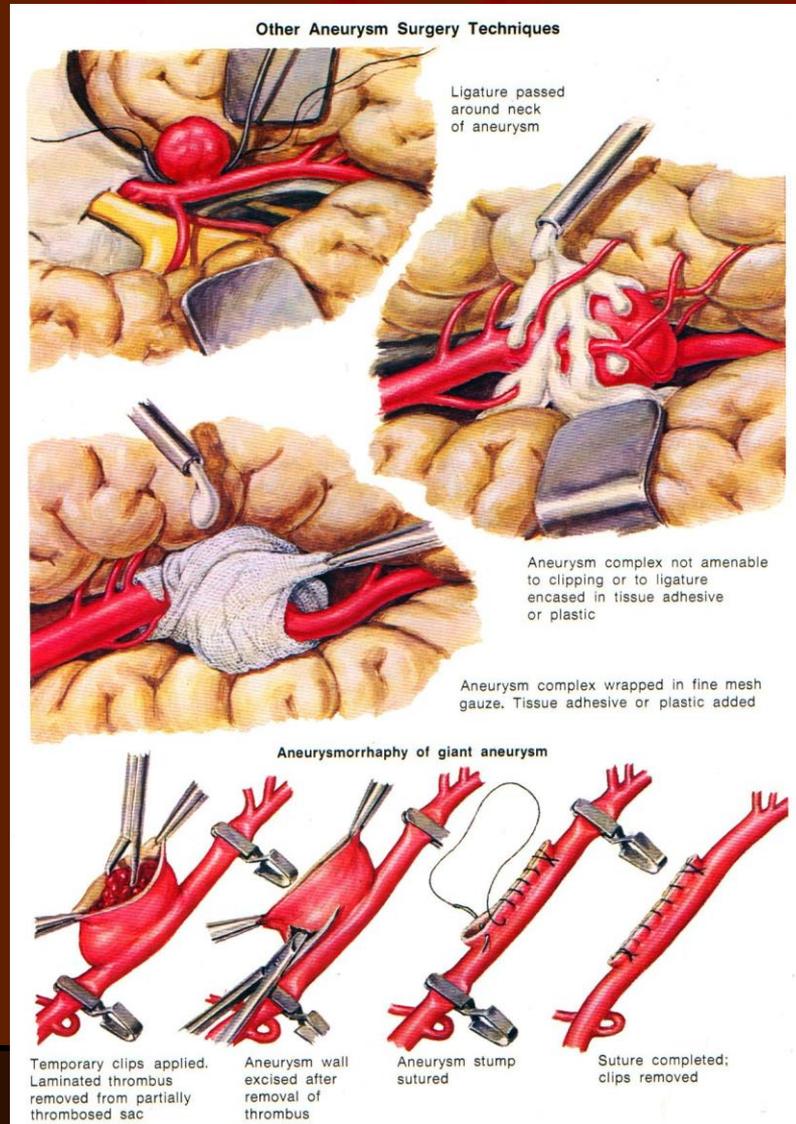
Хирургия аневризм



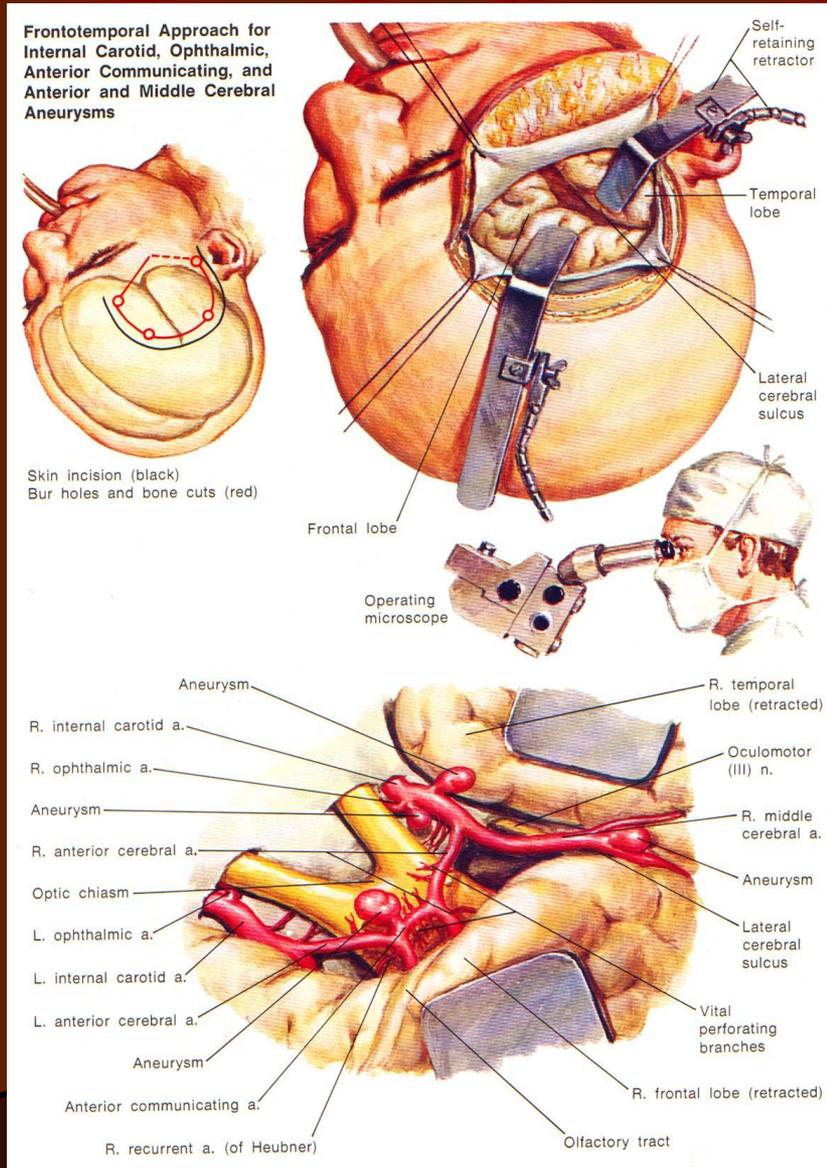
Хирургия аневризм базилярной артерии



Техника хирургии аневризм

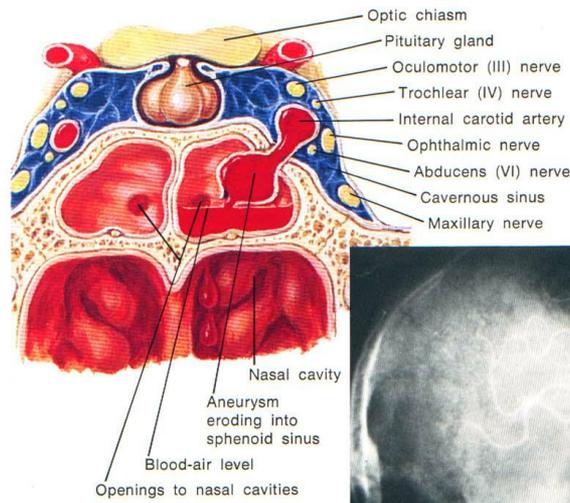
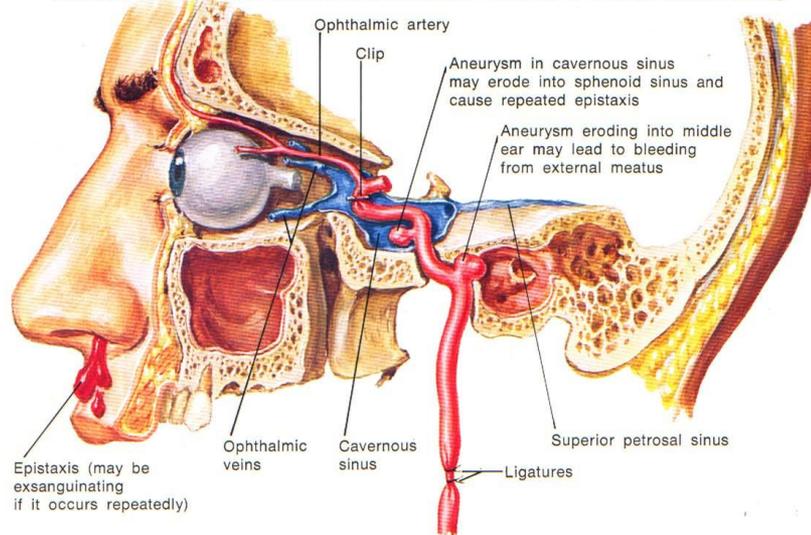


Фронтотемпоральный доступ в хирургии аневризм



Травмы кавернозной и пирамидной части ВСА

Traumatic Aneurysms of Petrous and Cavernous Portions of Internal Carotid Artery



Coronal section (posterior view) showing carotid aneurysm eroding into sphenoid sinus and air-fluid level seen often in brow-up lateral skull x-ray in fractures of sphenoid sinus

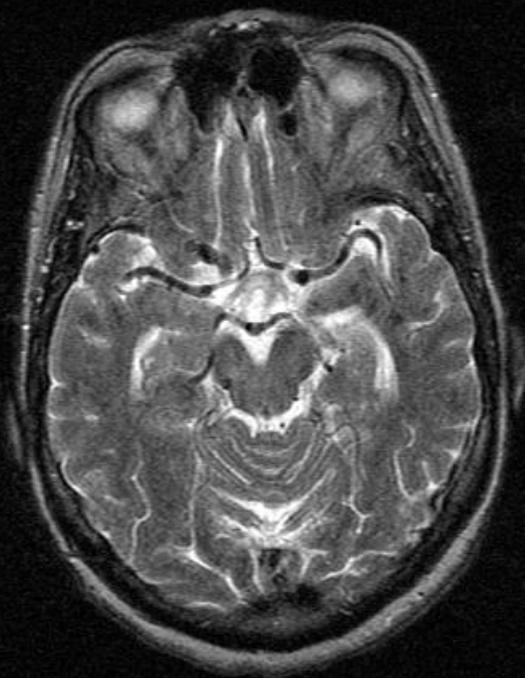


Internal carotid angiogram demonstrating aneurysm of petrous-cavernous segment of the artery

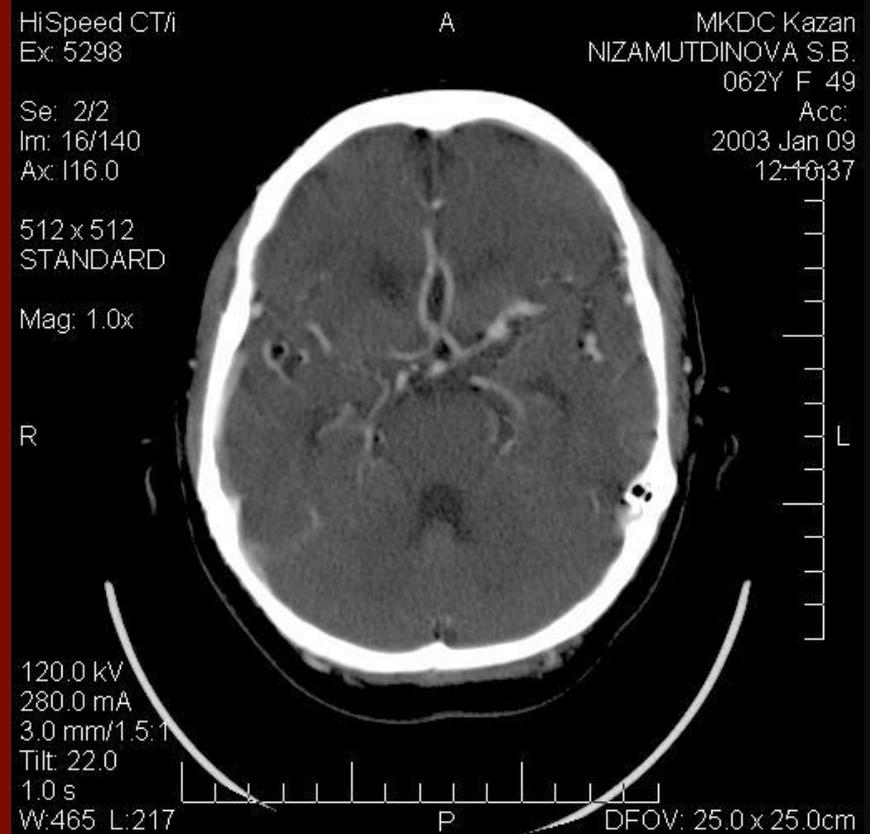
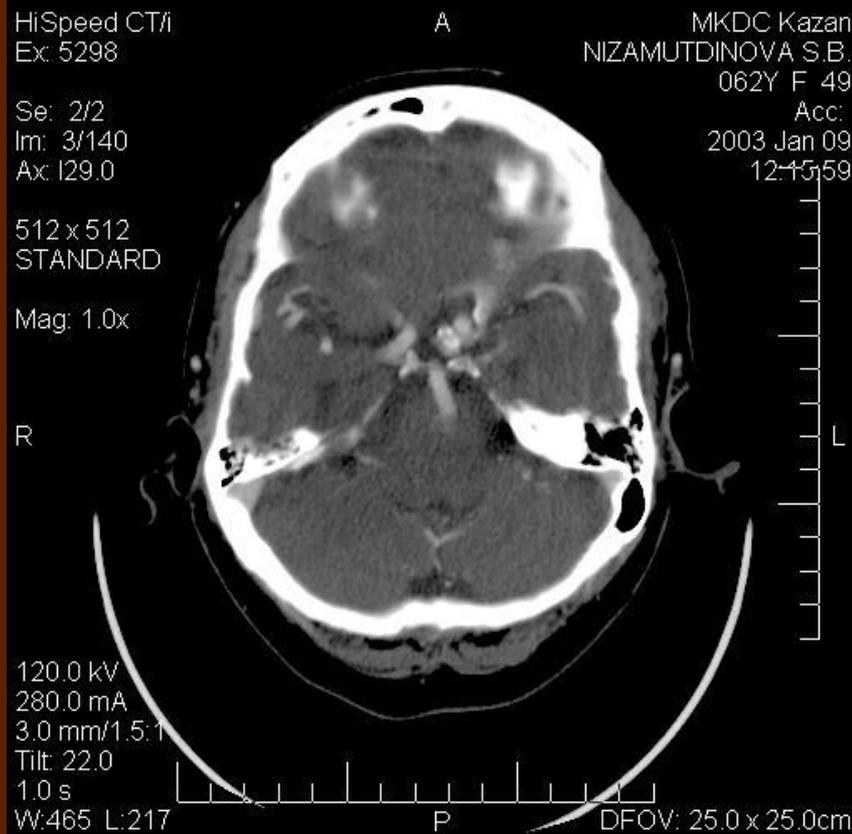
Ангиограмма аневризмы ПМА



Аневризма ПМА



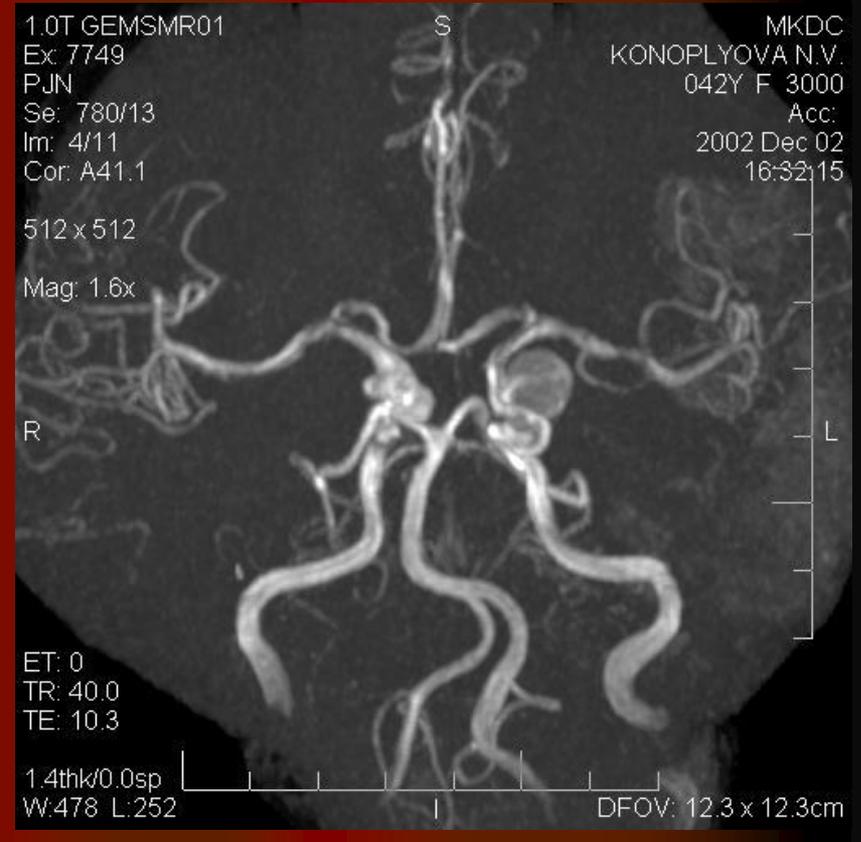
Аневризмы



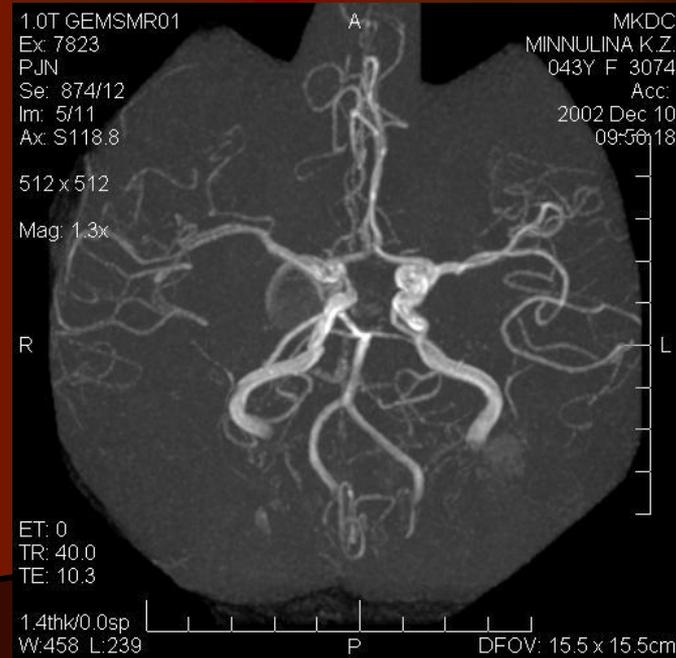
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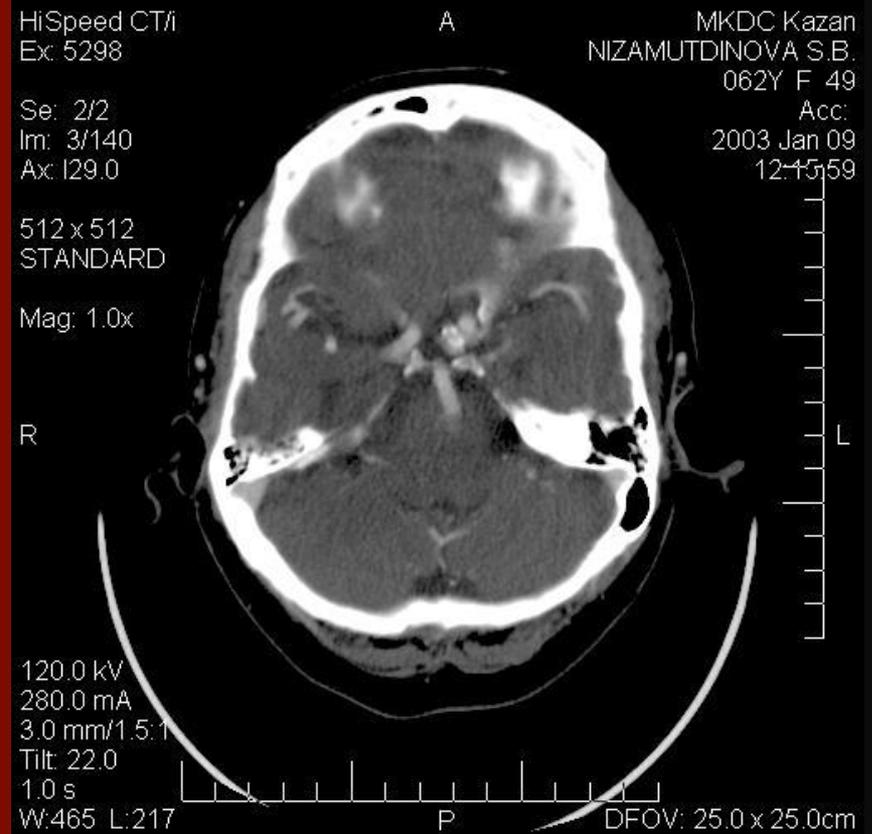
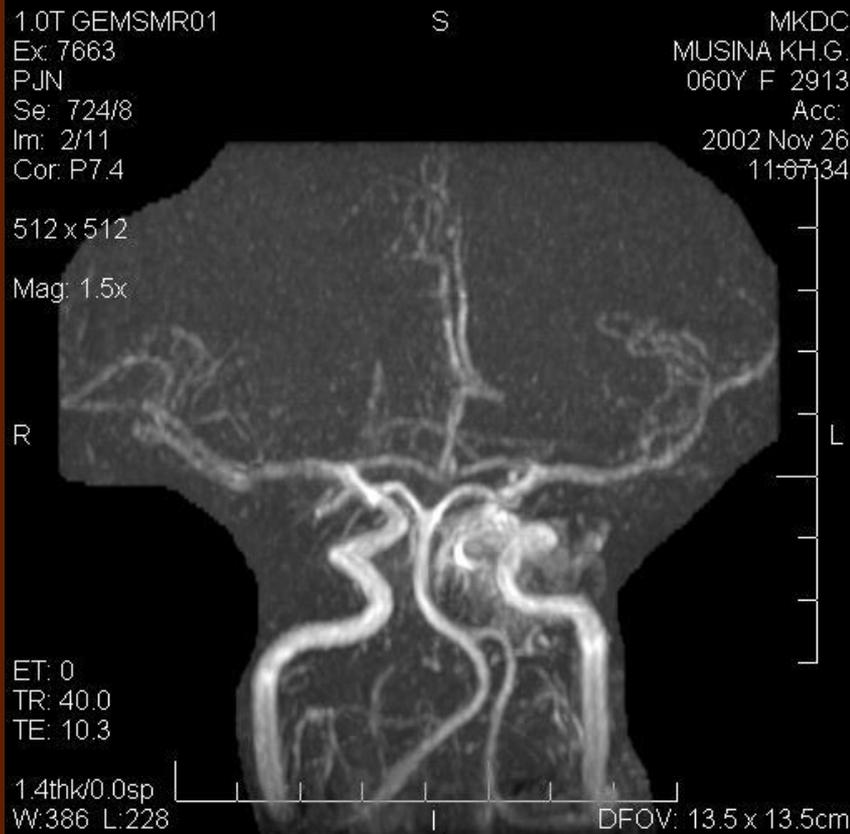
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