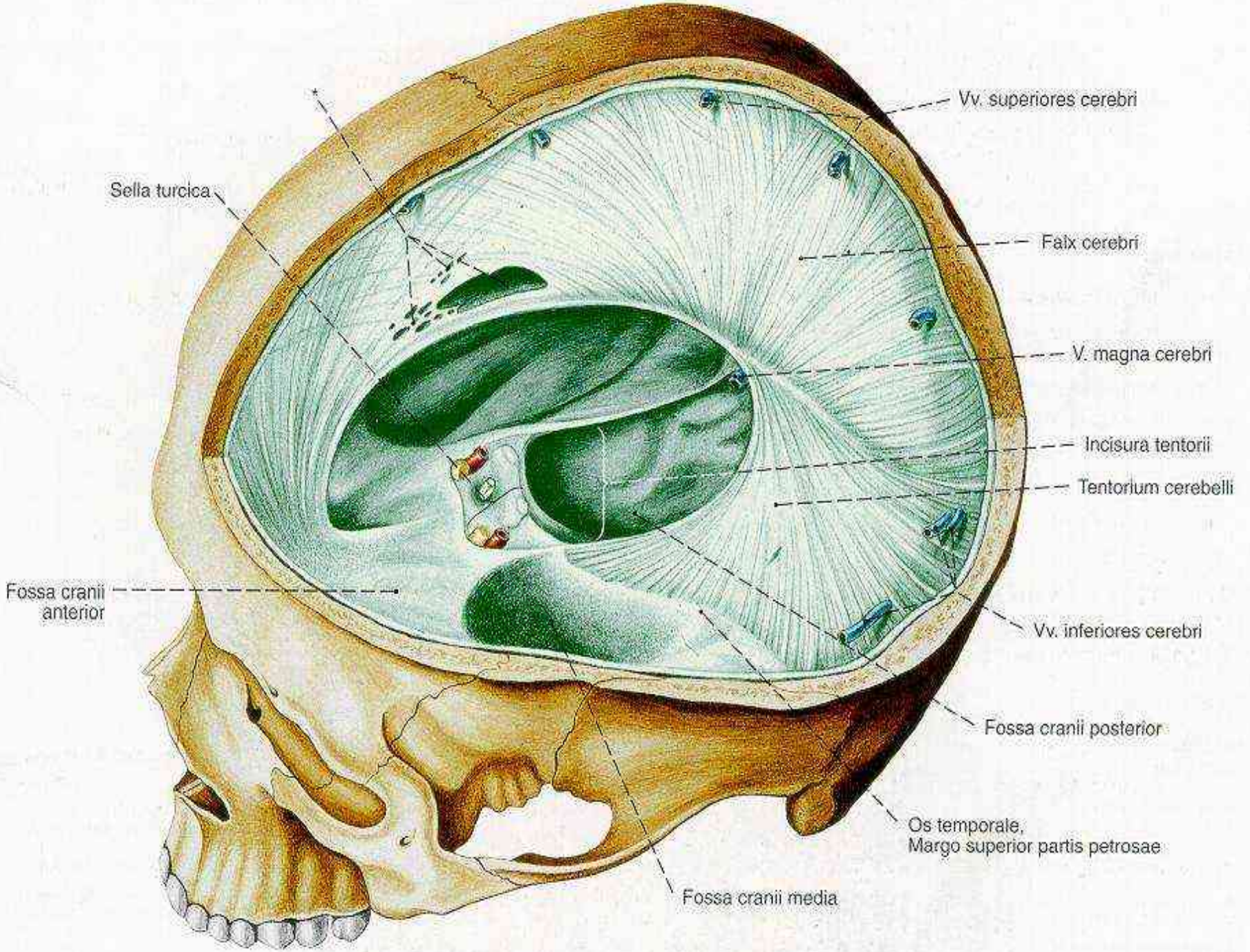
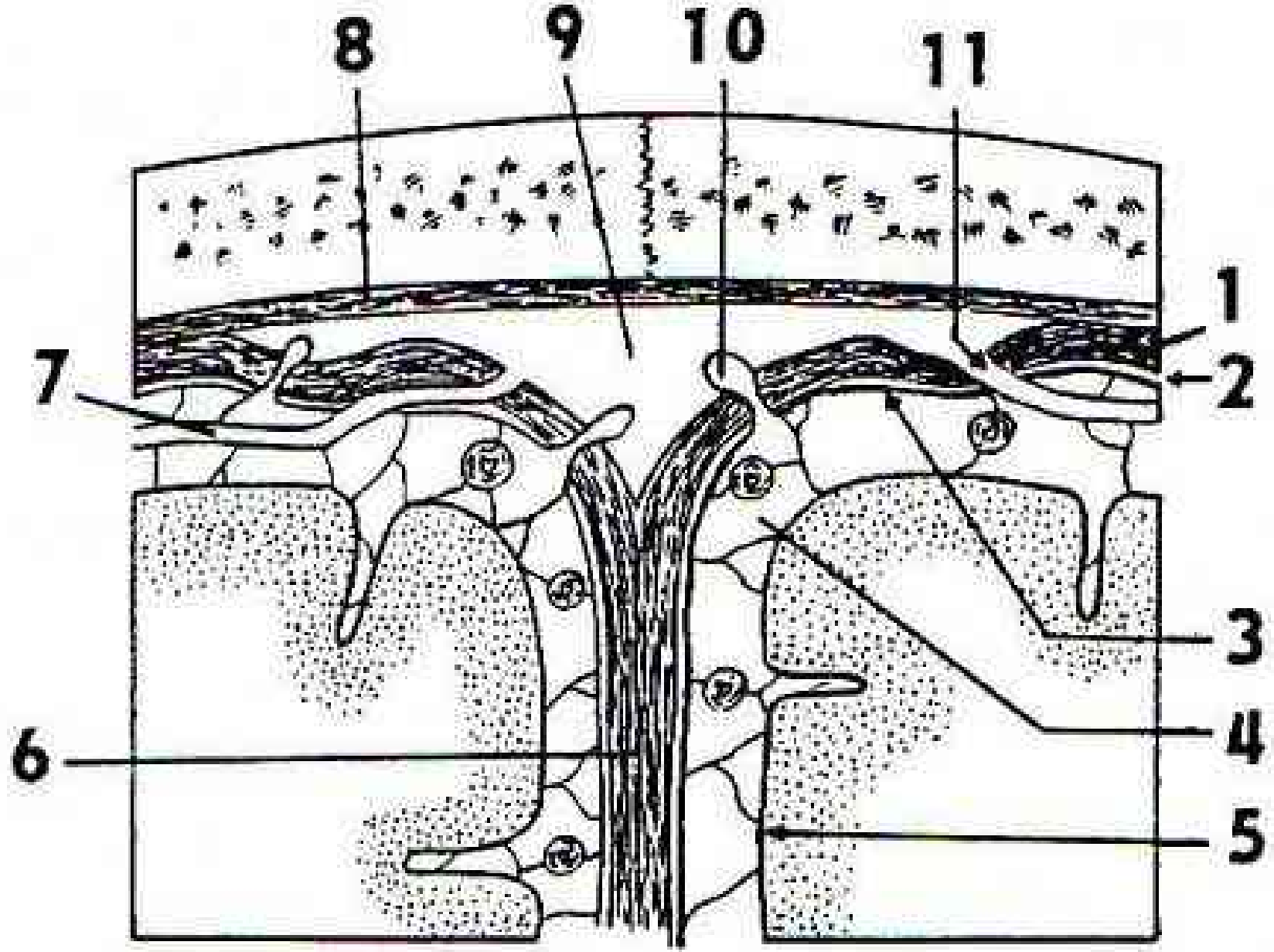
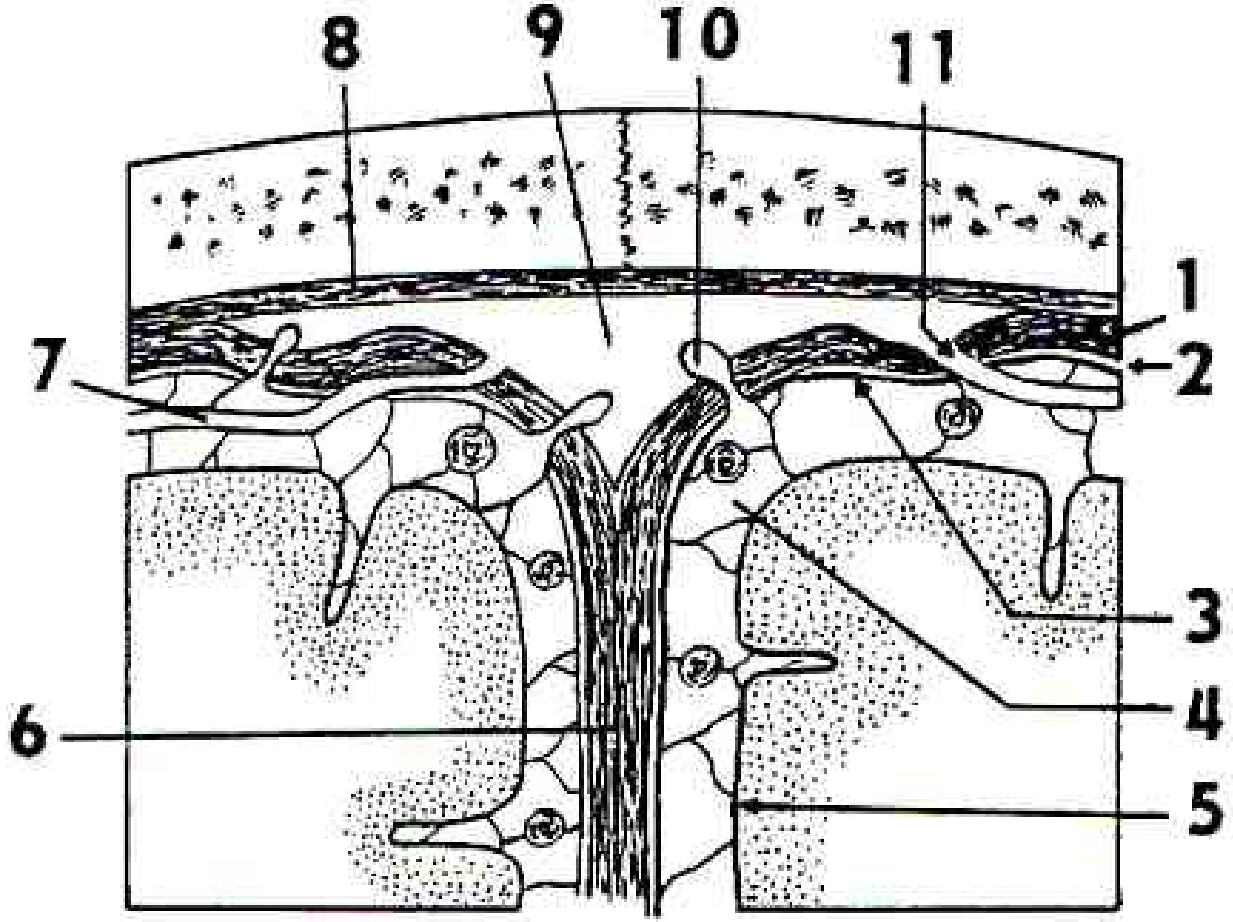
Cévy mozku a míchy

Veronika Němcová
Rastislav Druga


Vv. superiores cerebri
Sella turcica
Falx cerebri
V. magna cerebri
Incisura tentorii
Tentorium cerebelli
Fossa cranii anterior
Vv. inferiores cerebri
Fossa cranii posterior
Os temporale,
Margo superior partis petrosae
Fossa cranii media


8
9
10
11
1
2
7
3
4
6
5



Obr. 60.: Frontální řez ve vrcholu lebky, zasahující žilní sinus sagittalis superior a odstup falx cerebri.

1 – dura mater, 2 – "spatium" subdurale, 3 – arachnoidea s odstupujícími trámčitými výběžky směrem k pia mater, 4 – cavitas subarachnoidalis, 5 – pia mater, 6 – falx cerebri, 7 – mozková žíla, 8 – periost, 9 – sinus sagittalis superior, 10 – granulationes arachnoidales, 11 – vůstění mozkové žíly do sinu.

ter

Obaly míchy
Spinal cord - meninges

Endorhachis

Cavitas epiduralis – žilní pleteně

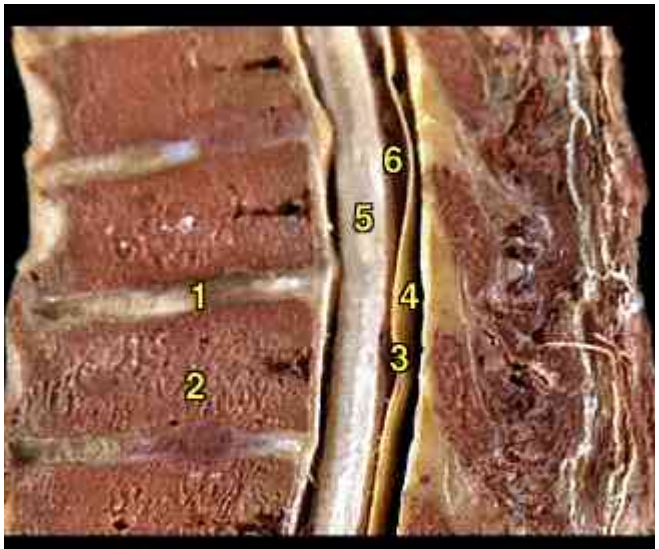
Dura mater spinalis

Cavum subdurale

Arachnoidea – lig. denticulatum

Cavitas subarachnoidalis

Pia mater spinals



Systém a. carotis interna

+

Vertebrobasilární systém

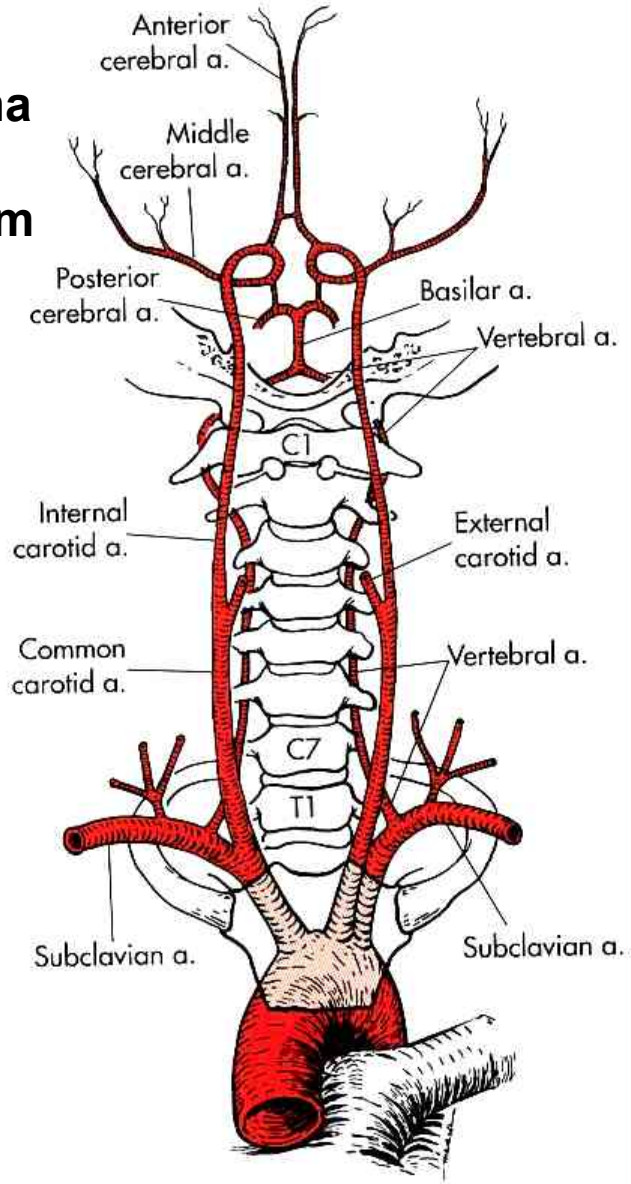
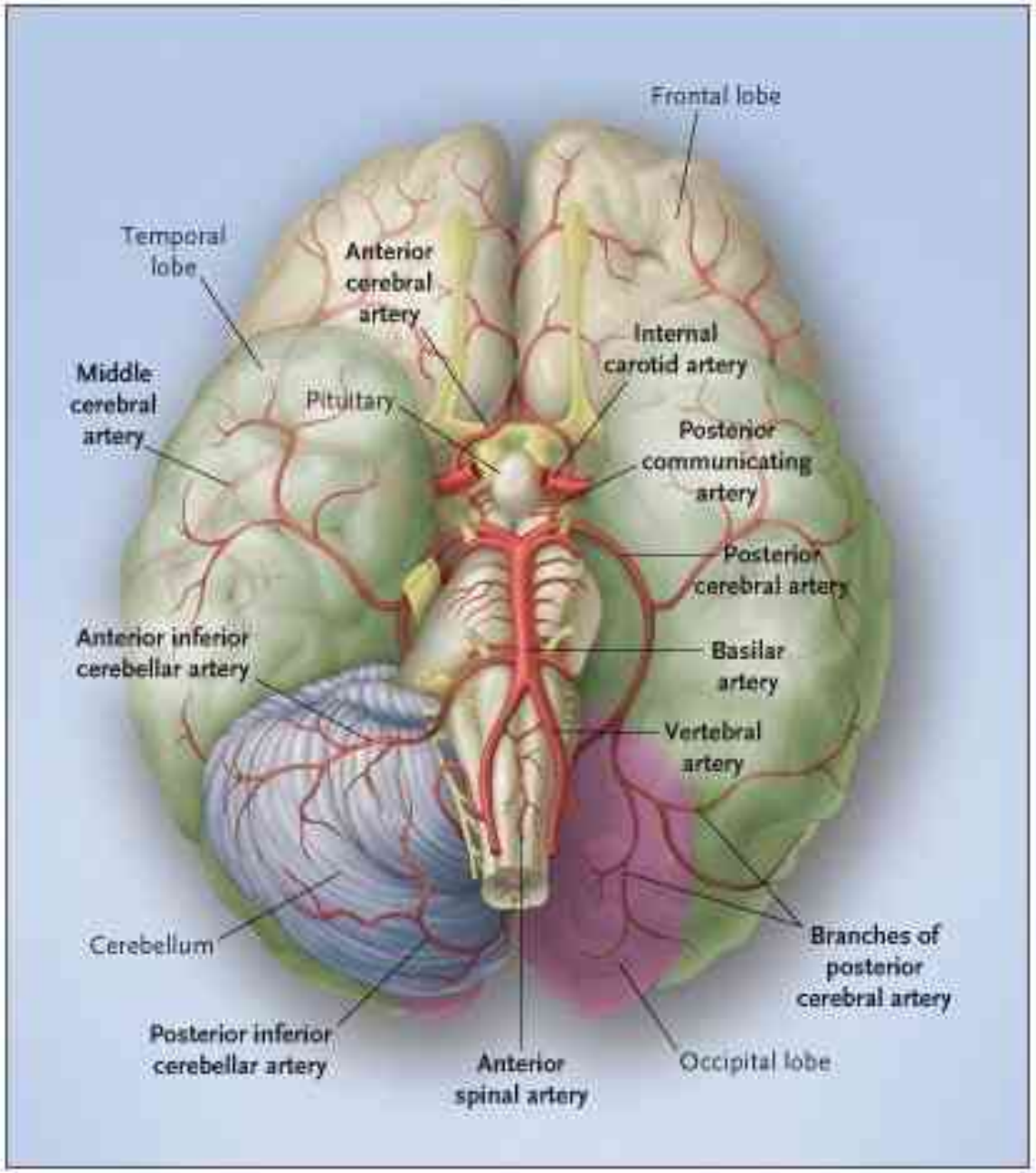
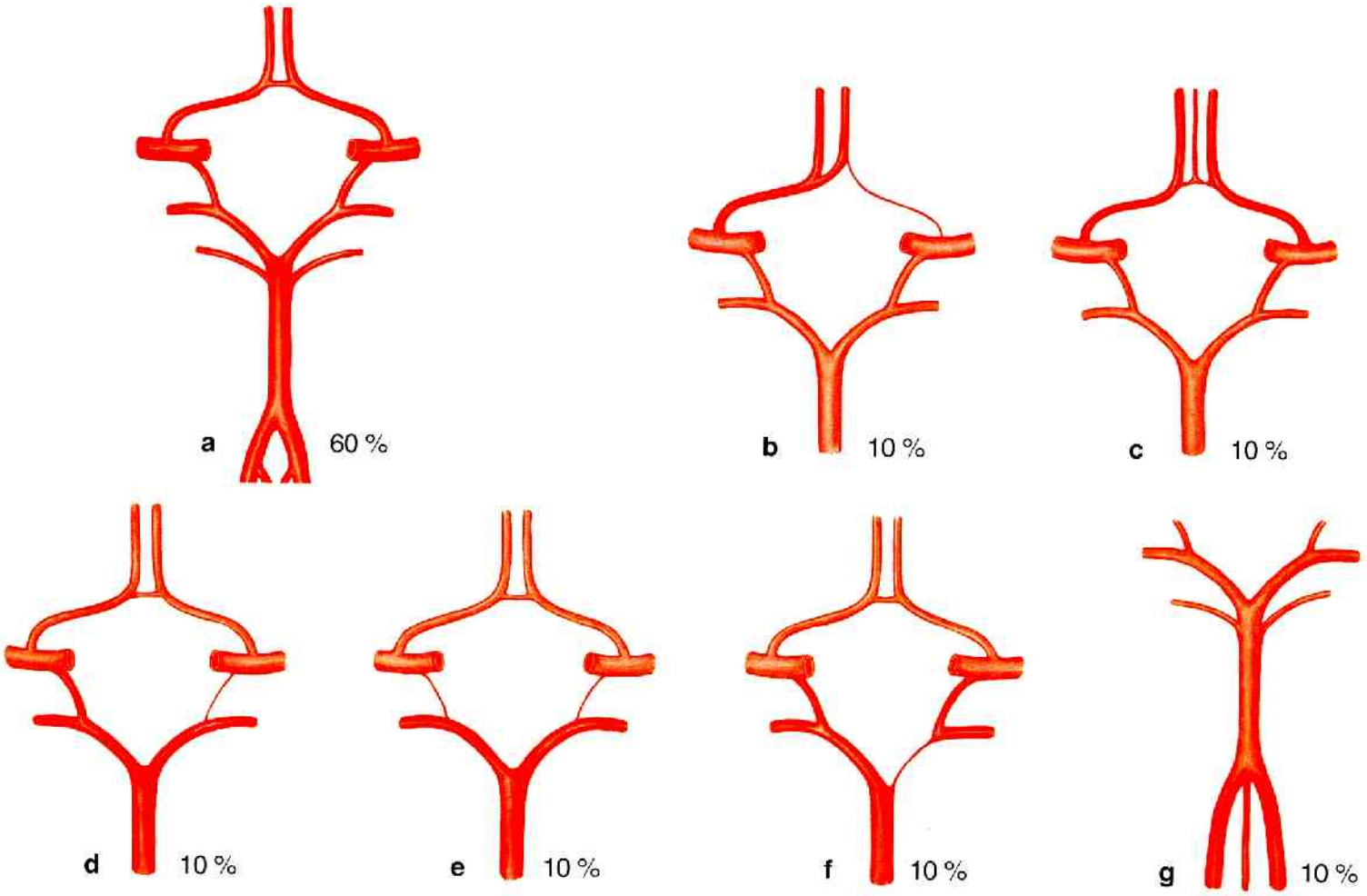


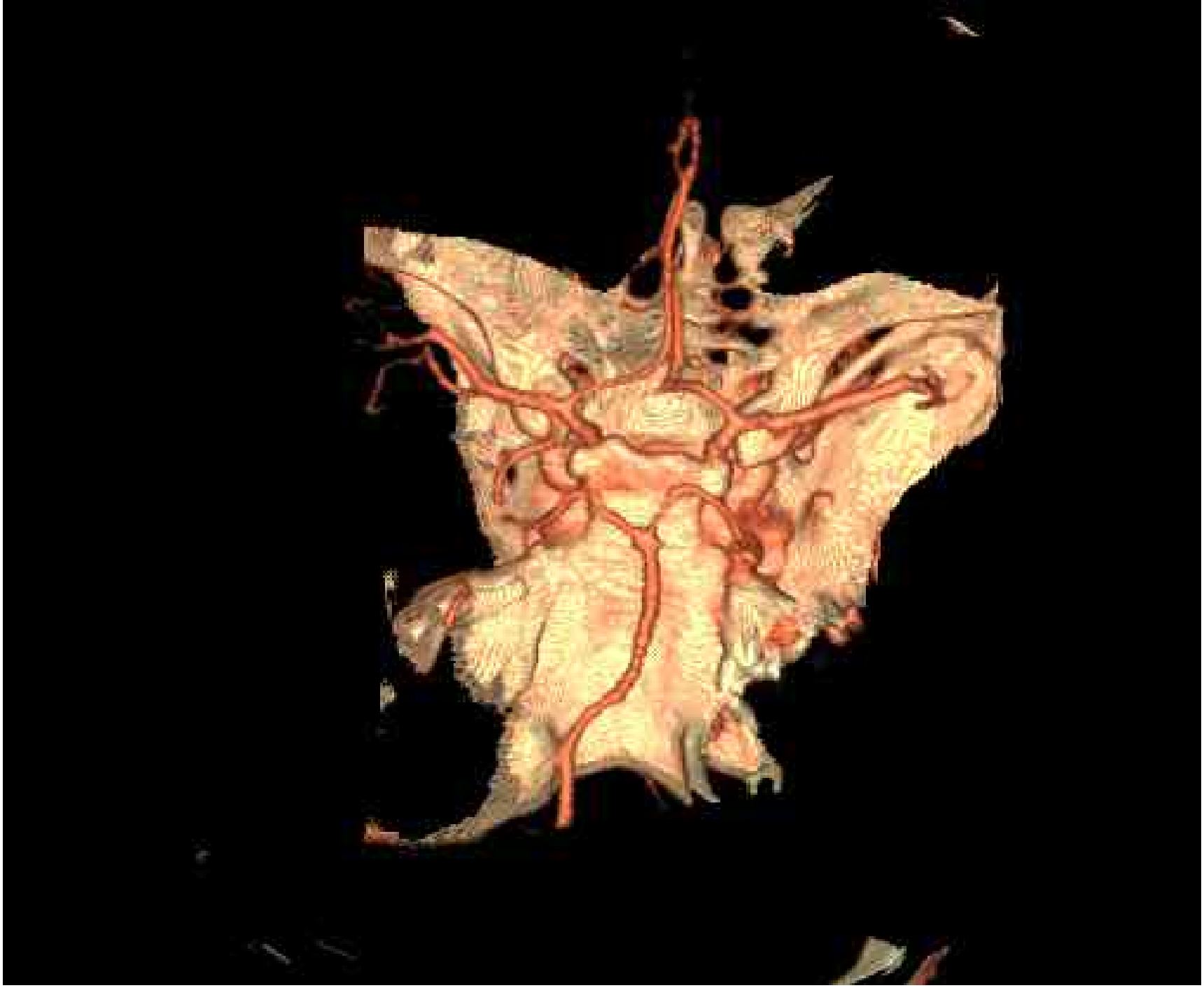
FIGURE 6-2
Origins of the arterial supply of the brain. a, Artery. (From Osborn AG: *Introduction to cerebral angiography*, Hagerstown, 1980, Harper & Row.)

Cévy mozku


Frontal lobe
Temporal lobe
Anterior cerebral artery
Internal carotid artery
Middle cerebral artery
Pituitary
Posterior communicating artery
Posterior cerebral artery
Anterior inferior cerebellar artery
Basilar artery
Vertebral artery
Cerebellum
Branches of posterior cerebral artery
Posterior inferior cerebellar artery
Anterior spinal artery
Occipital lobe



Obr. 564 a-g Willisův arterielní okruh, circulus arteriosus cerebri.
a-c variety předního oddílu
d-f variety zadního oddílu
g kaudální spojení vertebrálních arterií



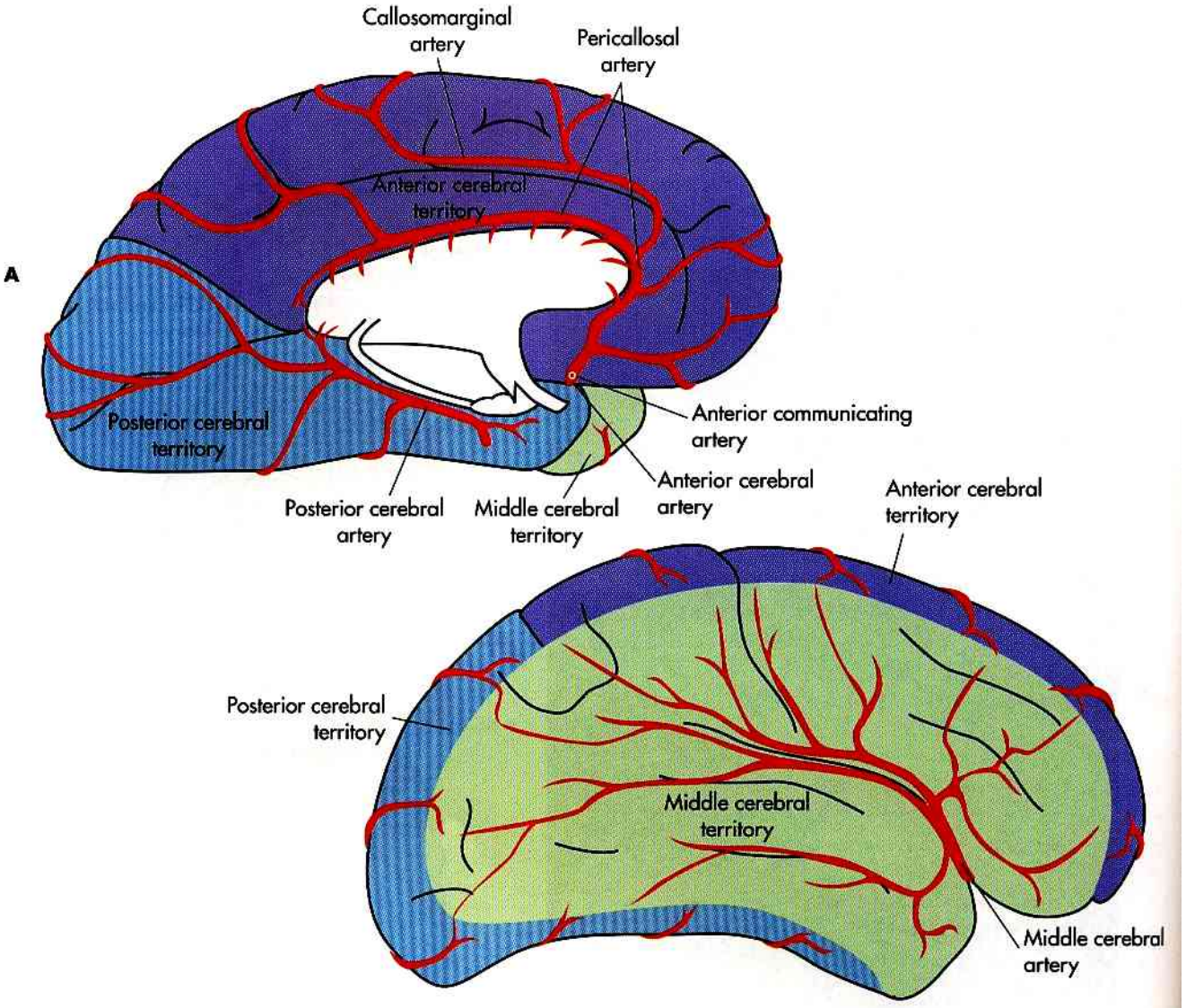
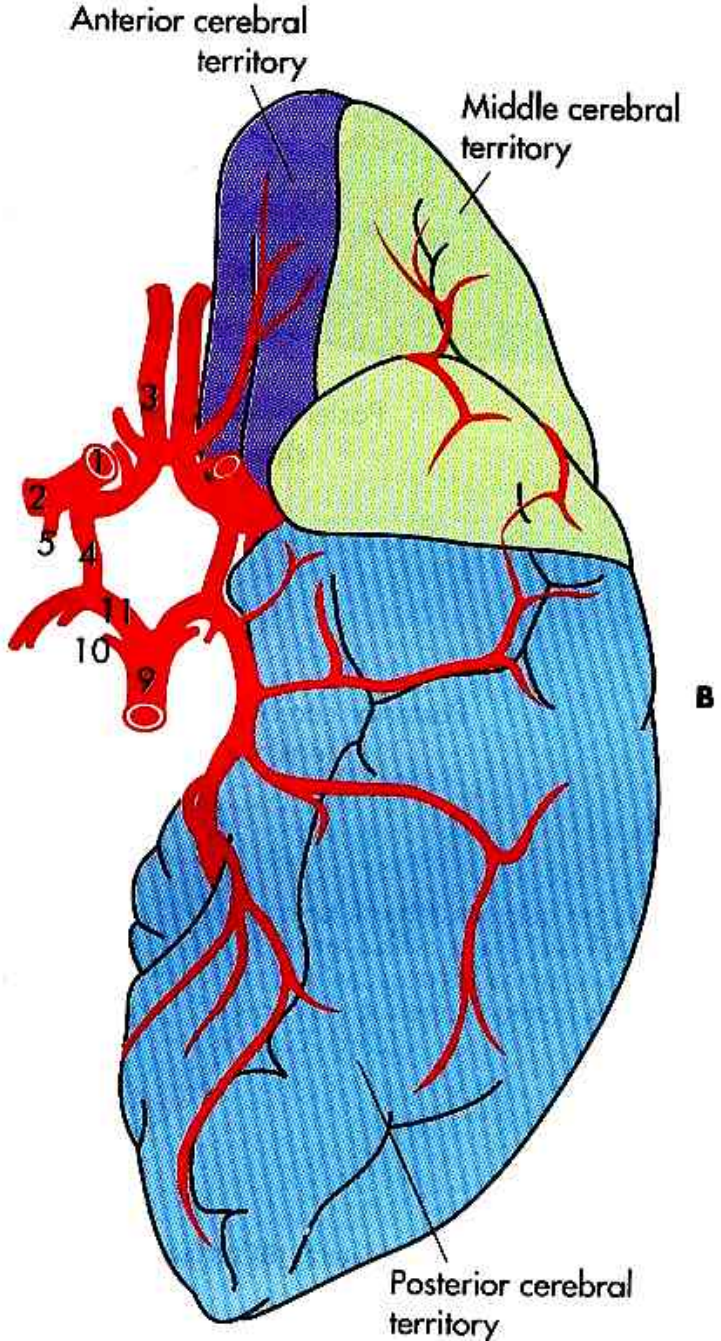
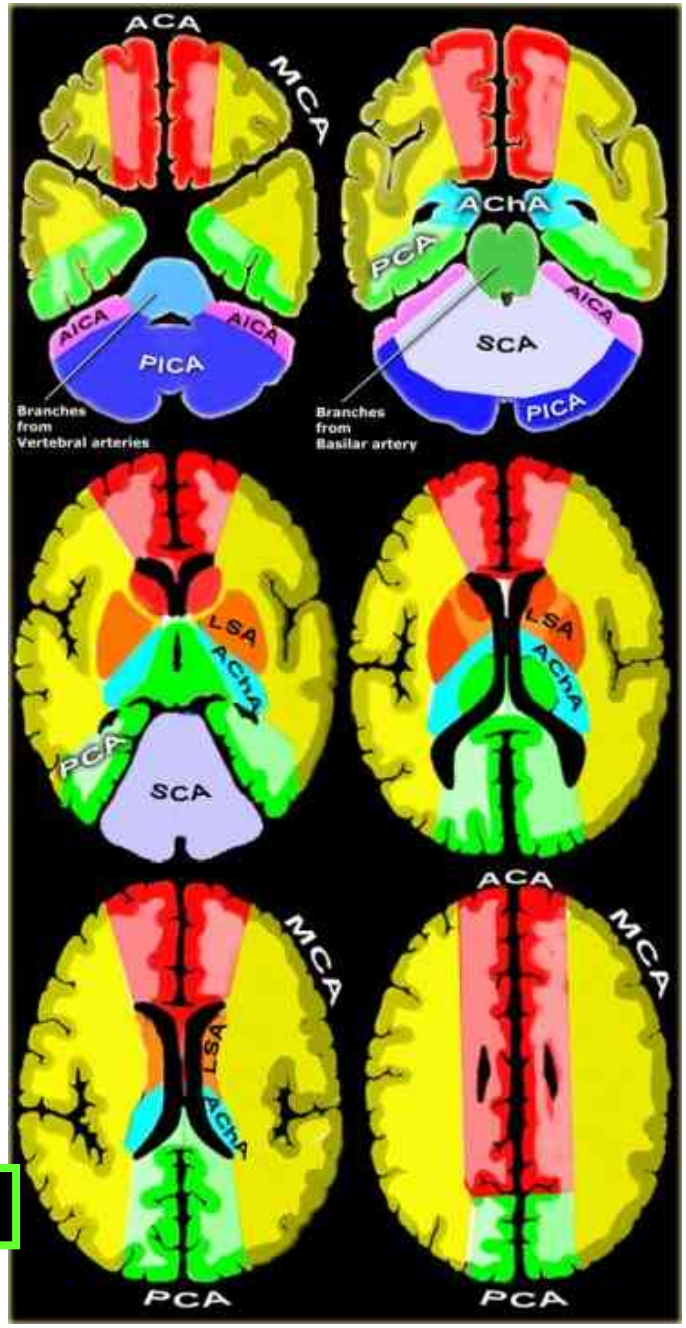


FIGURE 6-4
Arteries on the medial **(A)** and lateral **(B)** surfaces of the brain, with their areas of supply indicated. (Modified from Mettler FA: *Neuroanatomy*, ed 2, St. Louis, 1948, Mosby.)


Anterior cerebral territory
Middle cerebral territory
1
2
3
4
5
10
11
Posterior cerebral territory
B

Teritoria mozkových tepen



a.cerebellaris inferior anterior

a.cerebellaris inferior posterior

a.cerebellaris superior

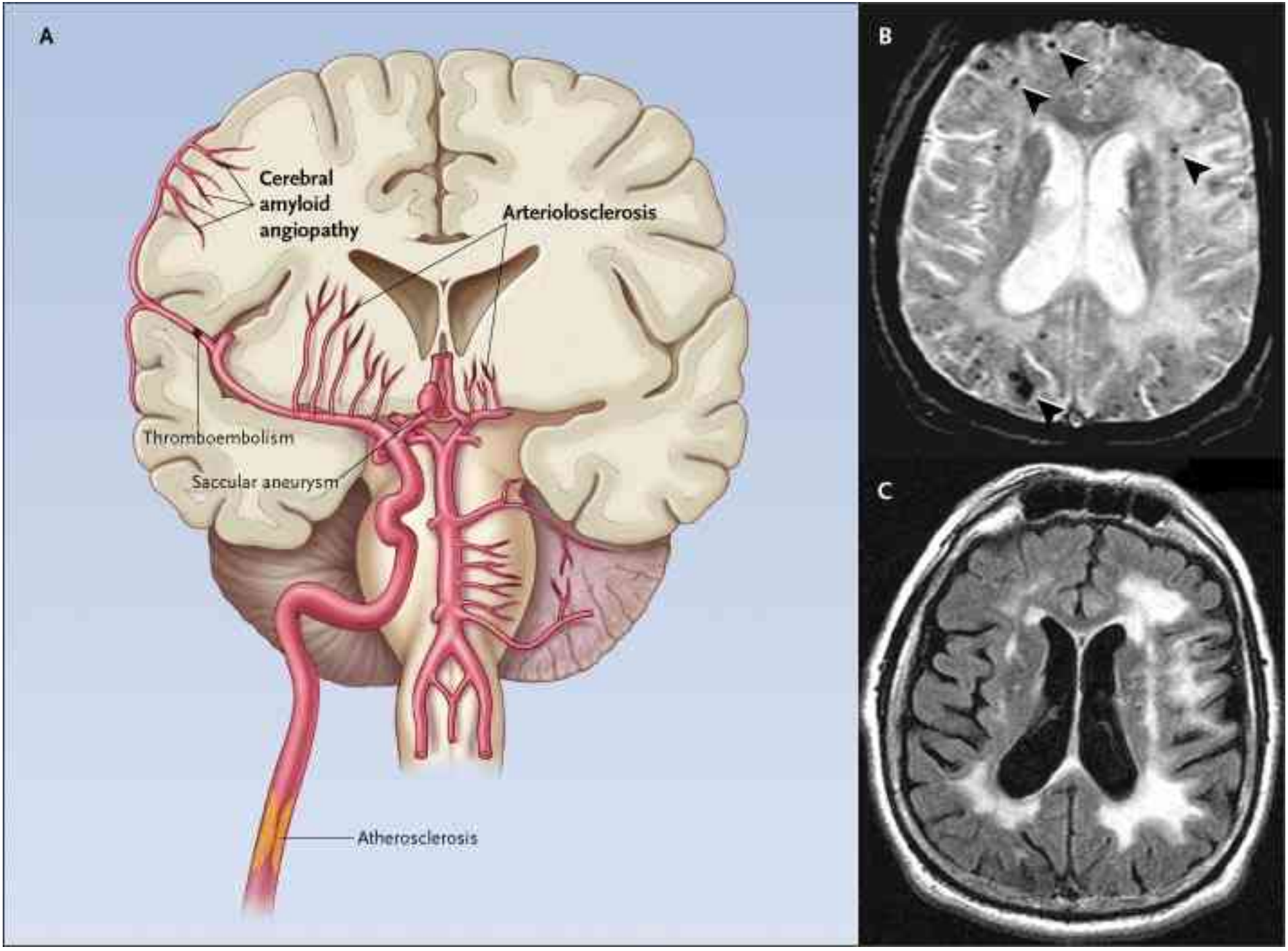
a.cerebri anterior

aa. lenticulostriaticae

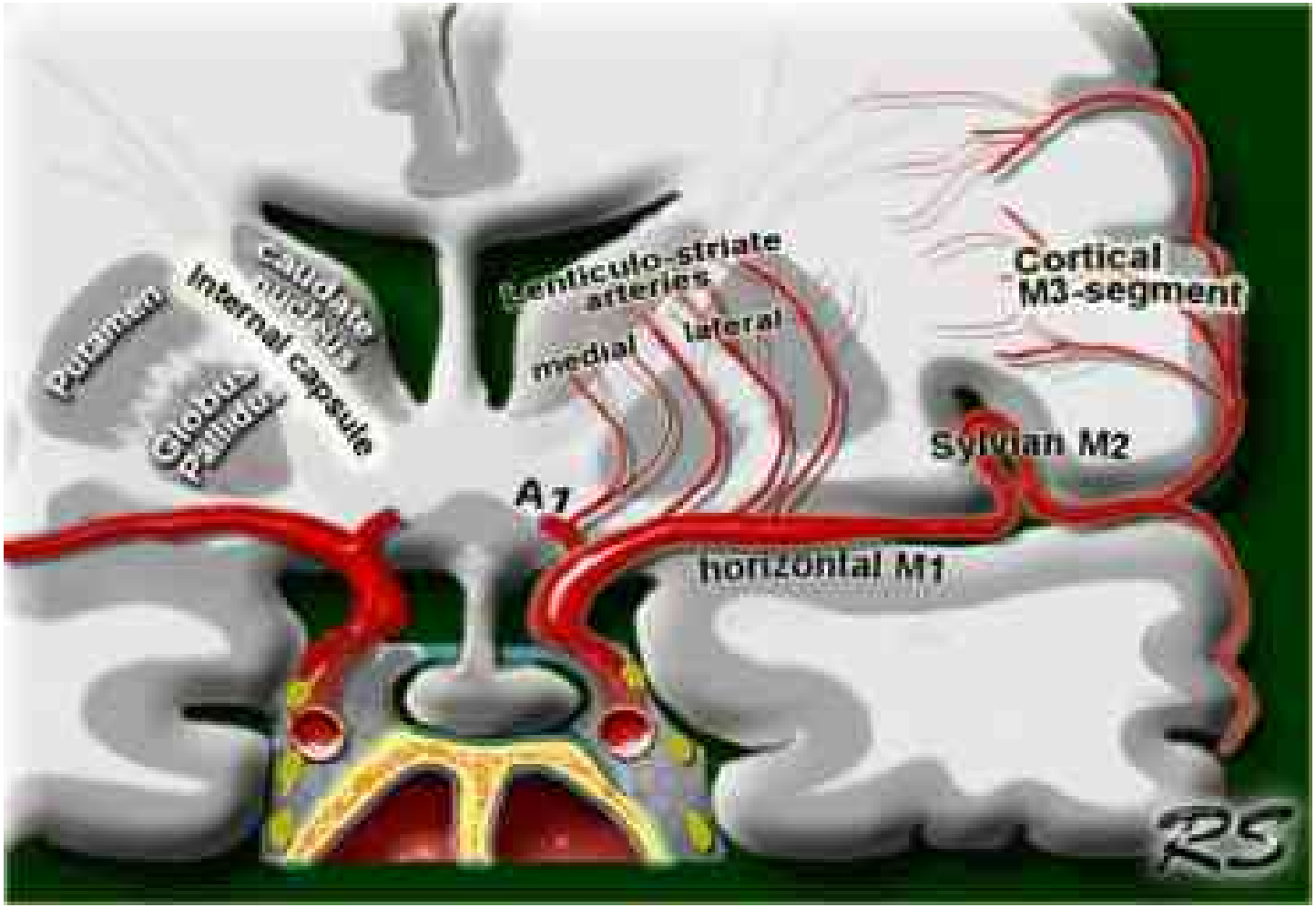
a. choroidea anterior

a.cerebri media

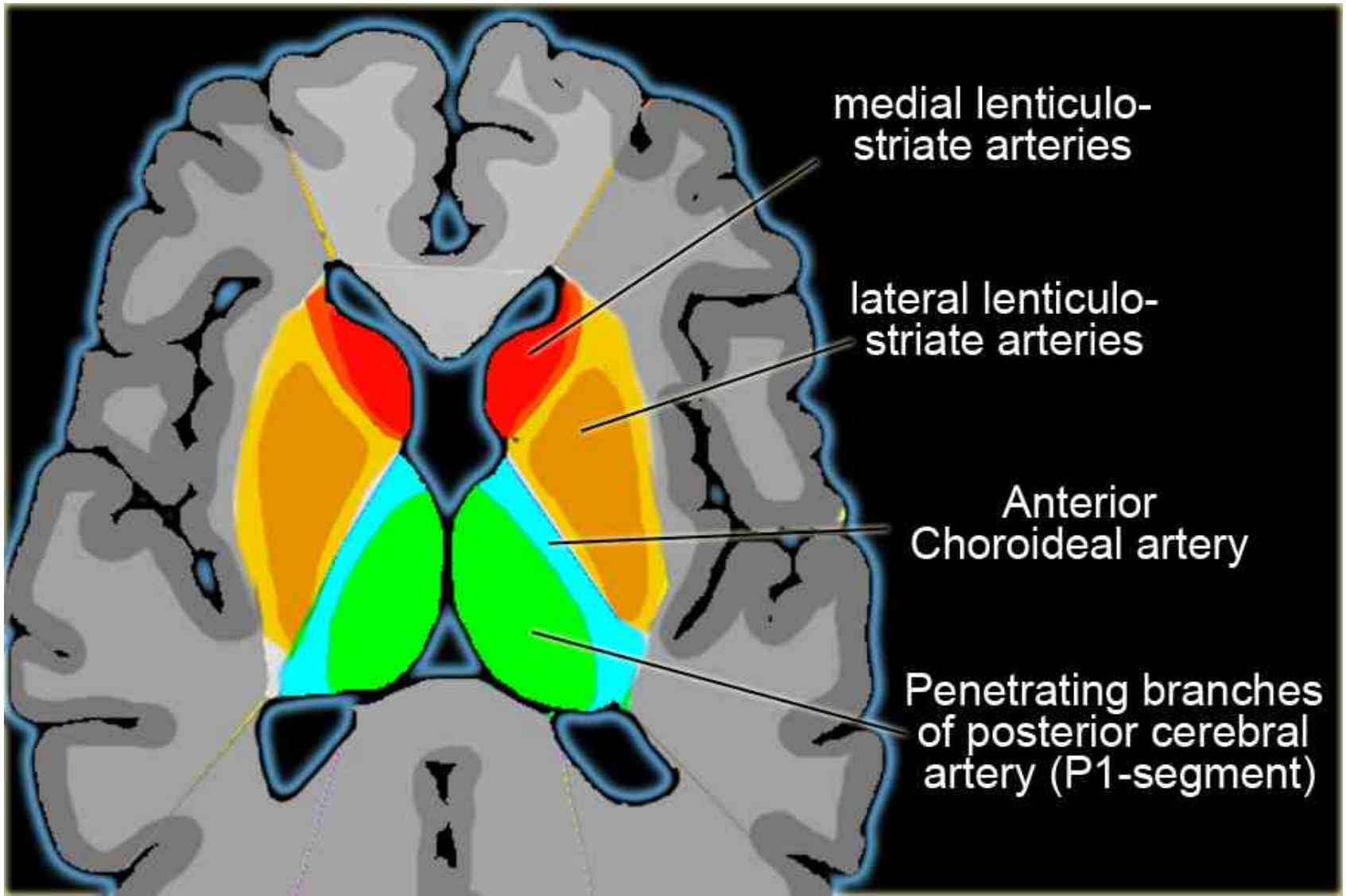
a. cerebri posterior


A
Cerebral amyloid angiopathy
Arteriolosclerosis
Thromboembolism
Saccular aneurysm
Atherosclerosis
B
C

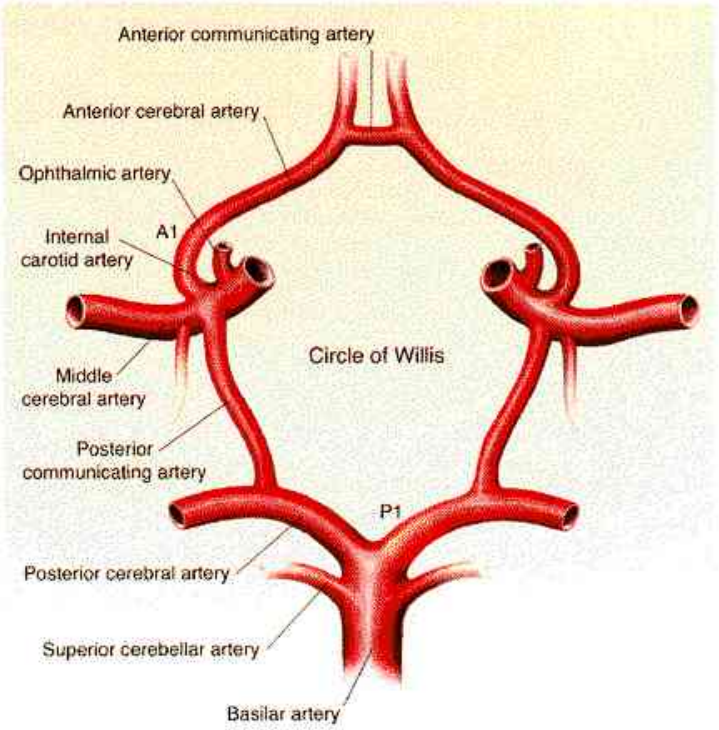
Cévní zásobení basálních ganglií

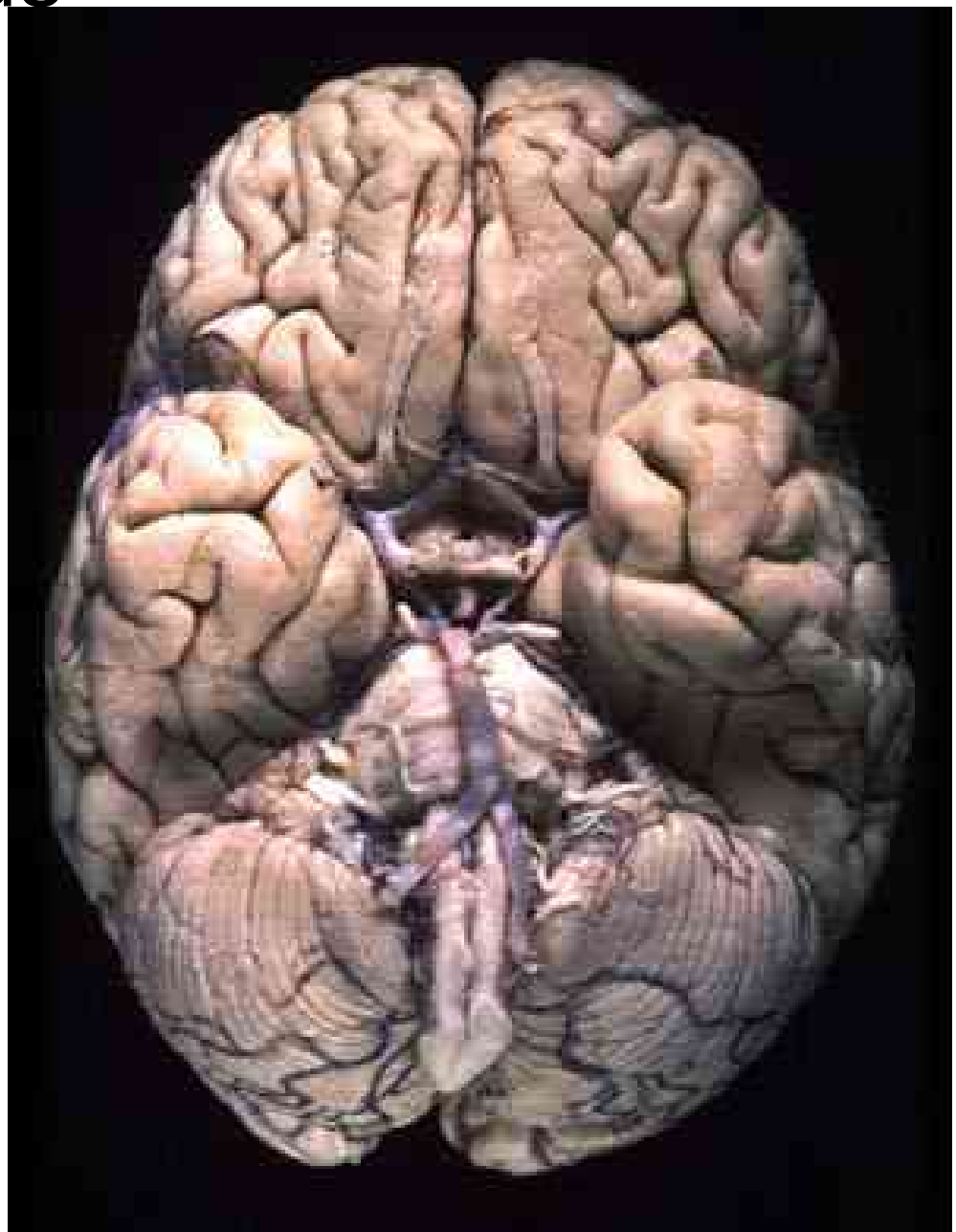


Cévní zásobení basálních ganglií, thalamu a capsula interna

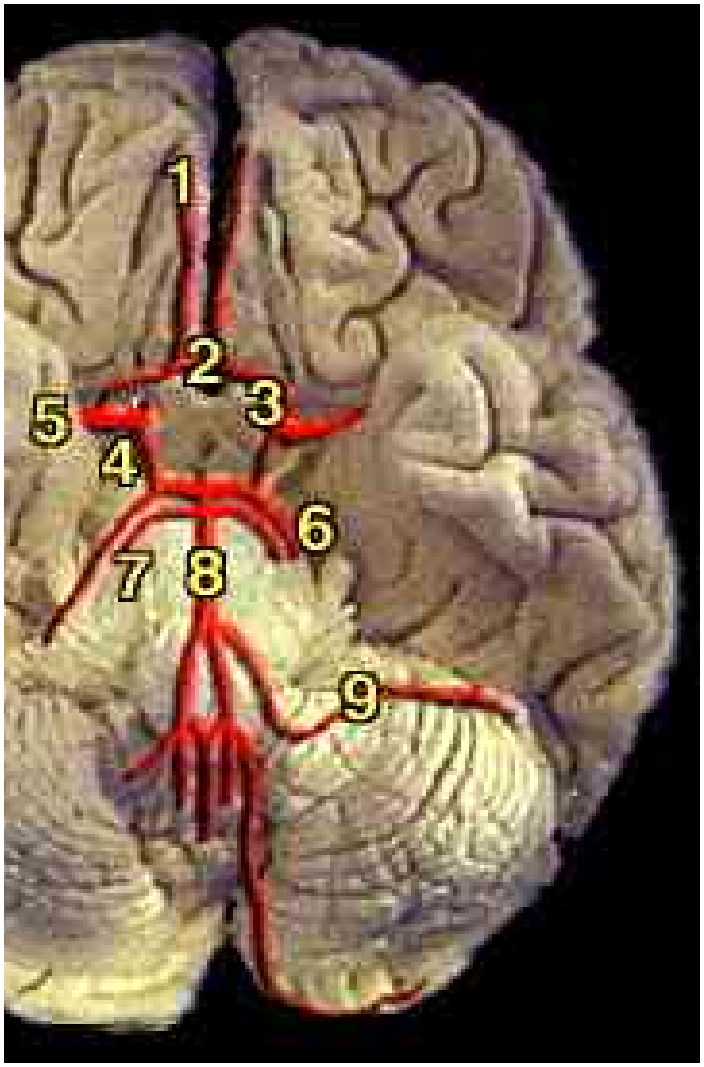


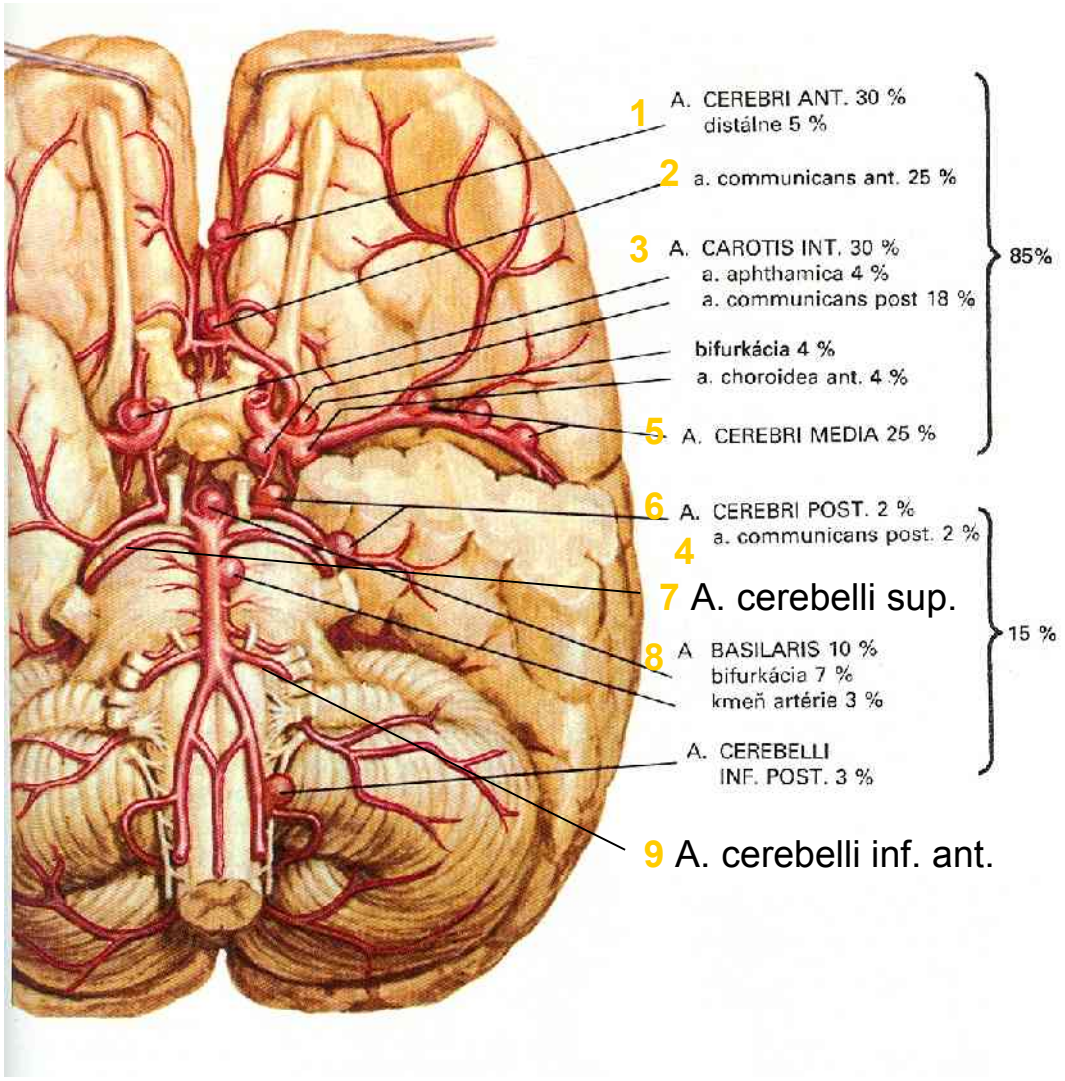
Circulus arteriosus



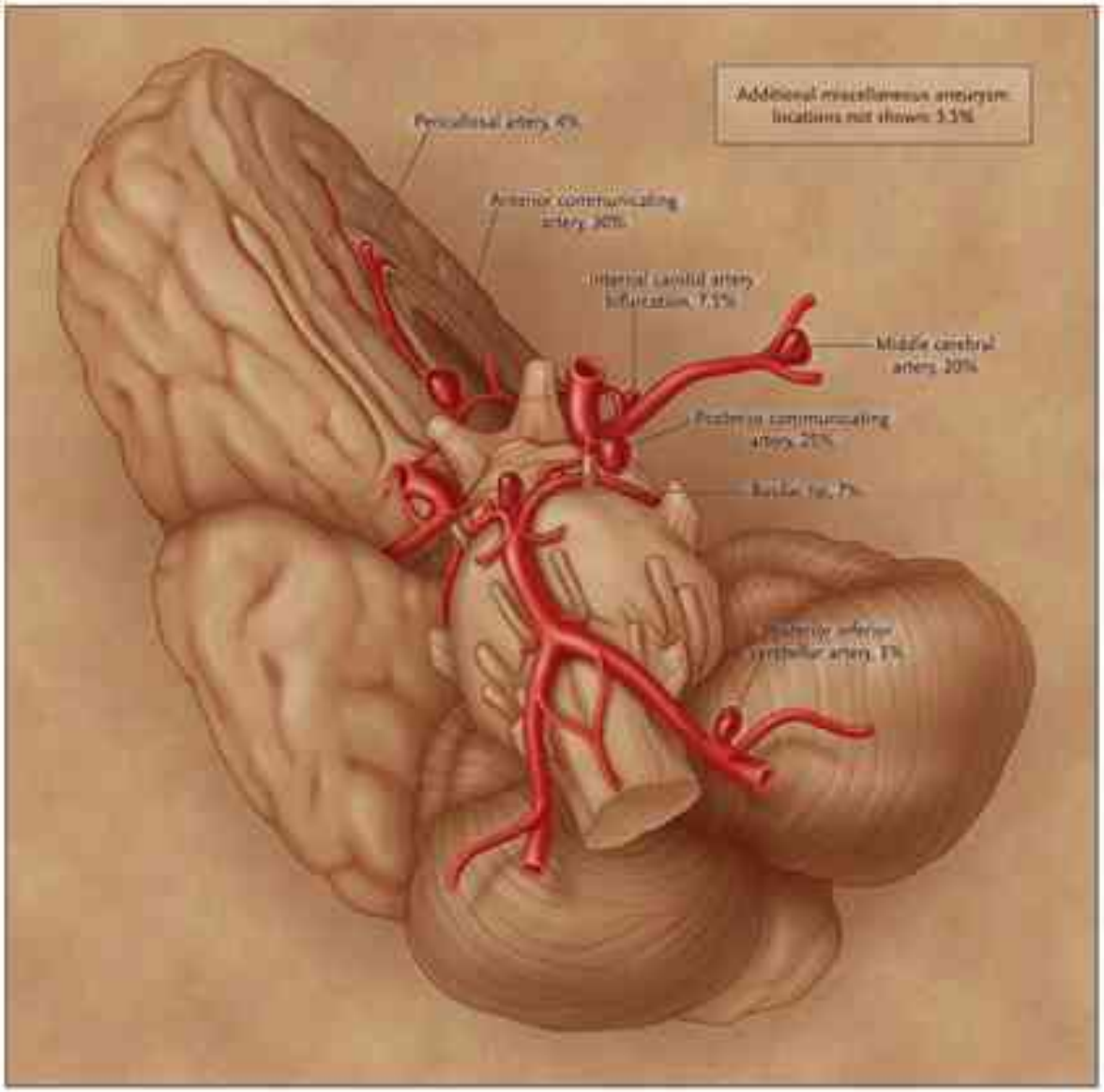


Circulus arteriosus Willisi – četnost aneurysmat



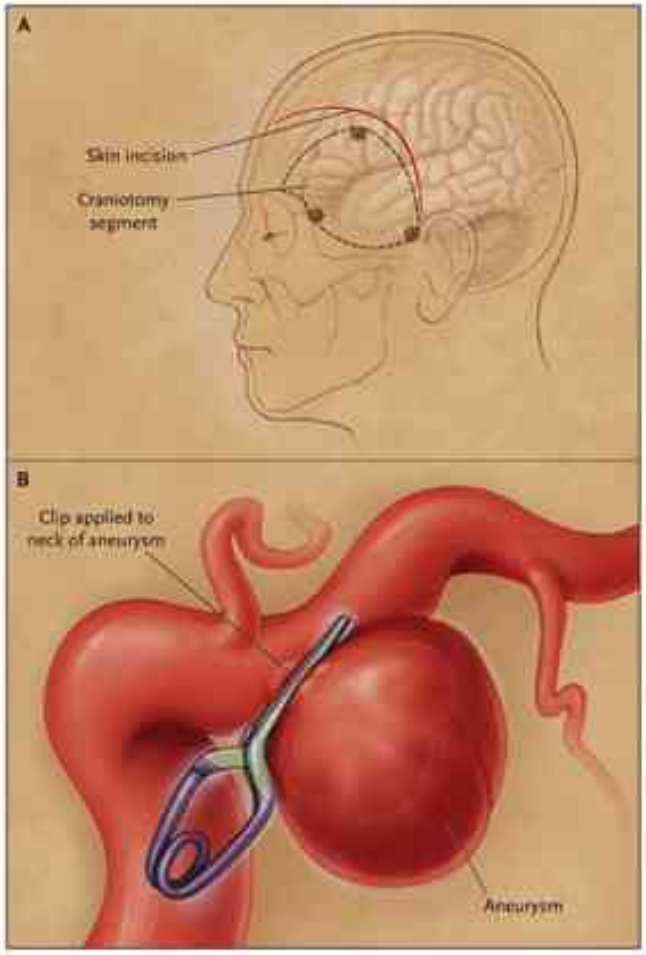


Aneurvsmata lokalizace

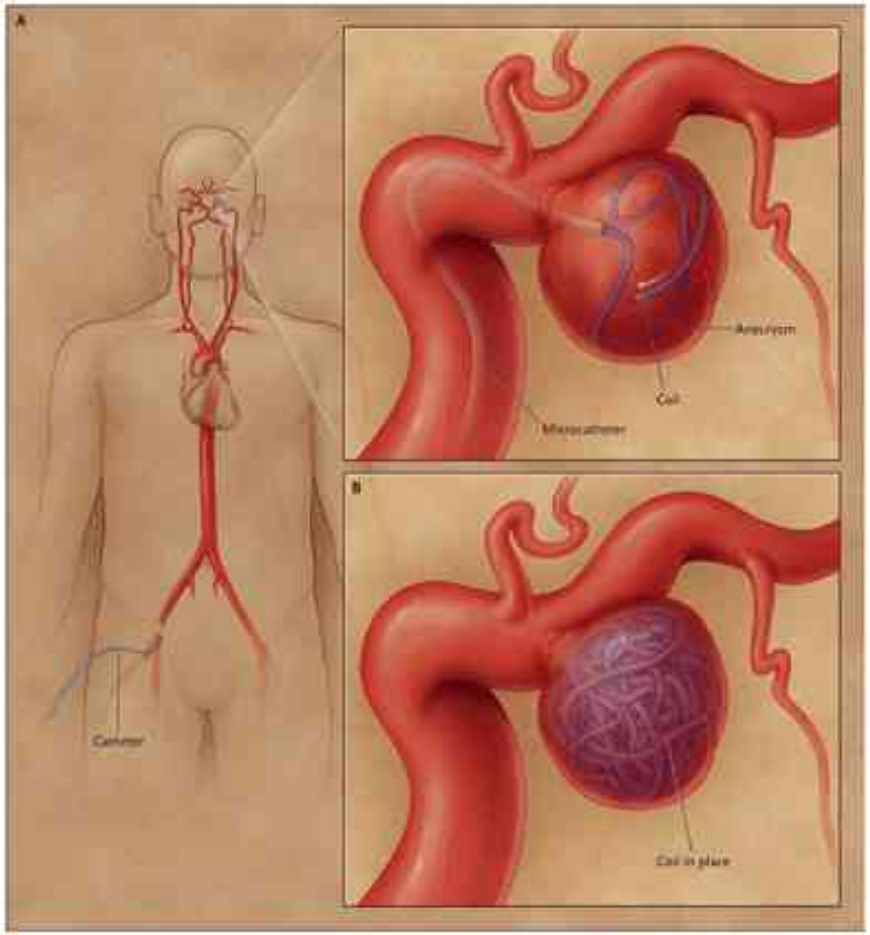


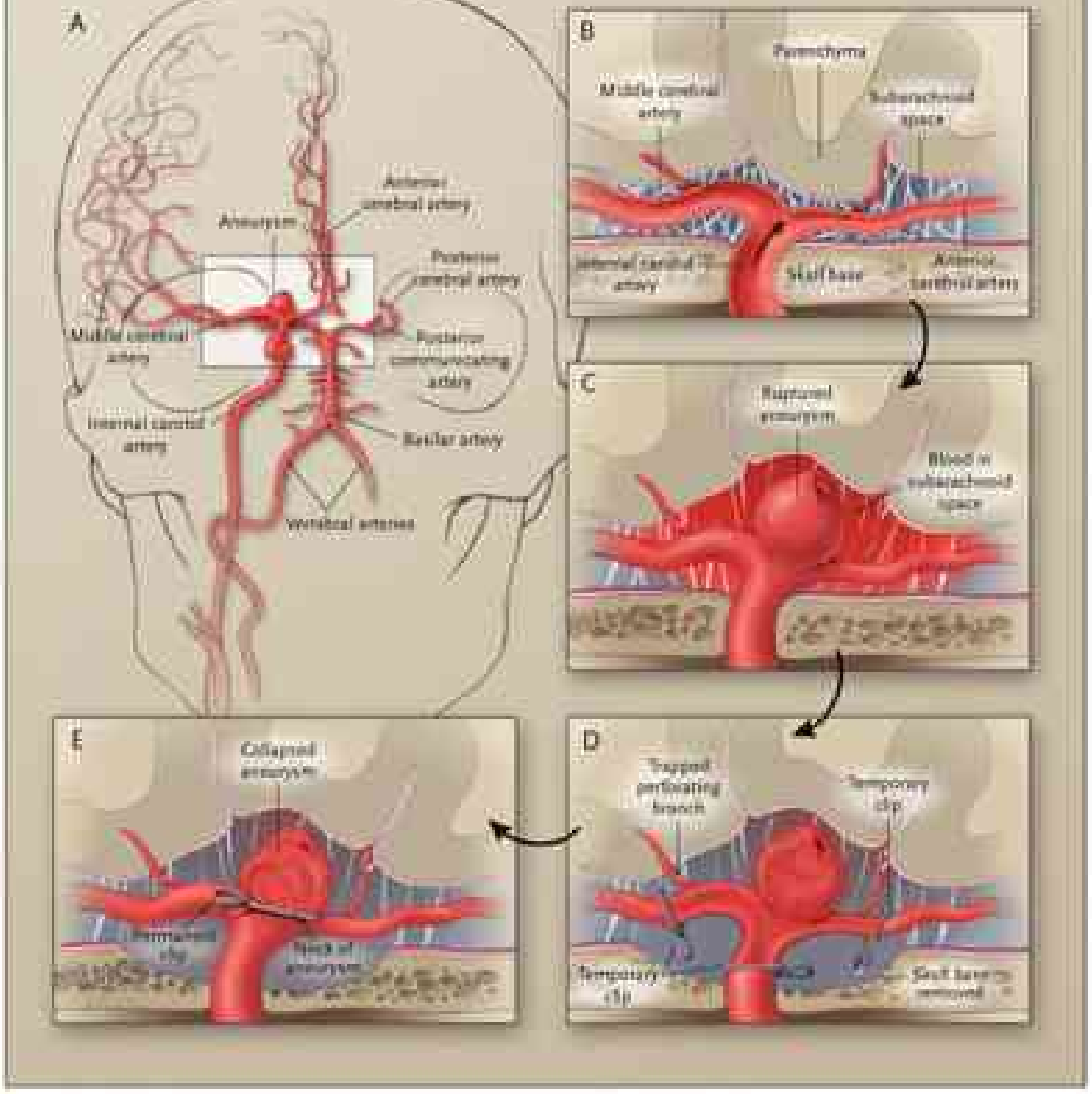
Aneurysma - léčba

Clip

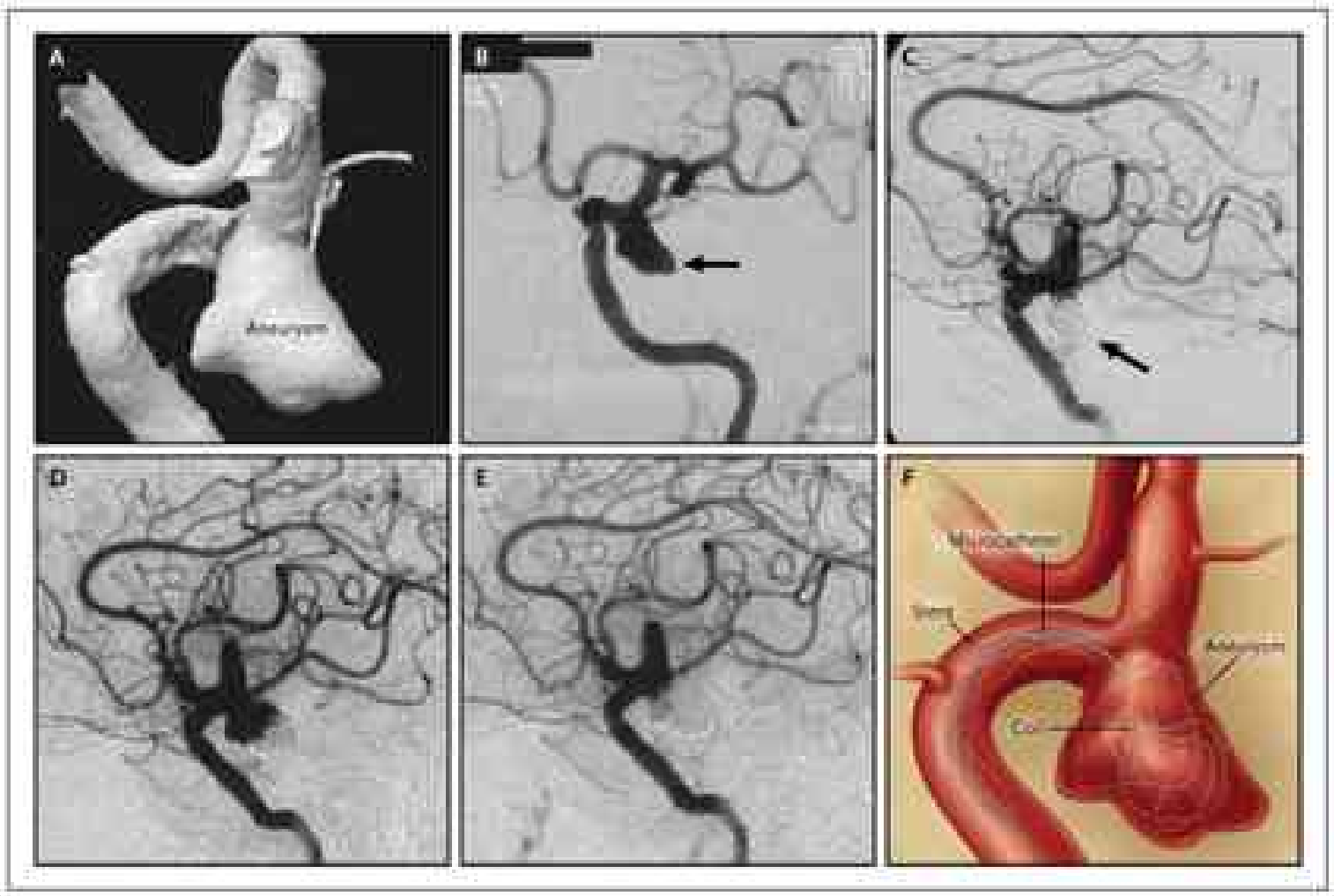


Endovascular occlussion

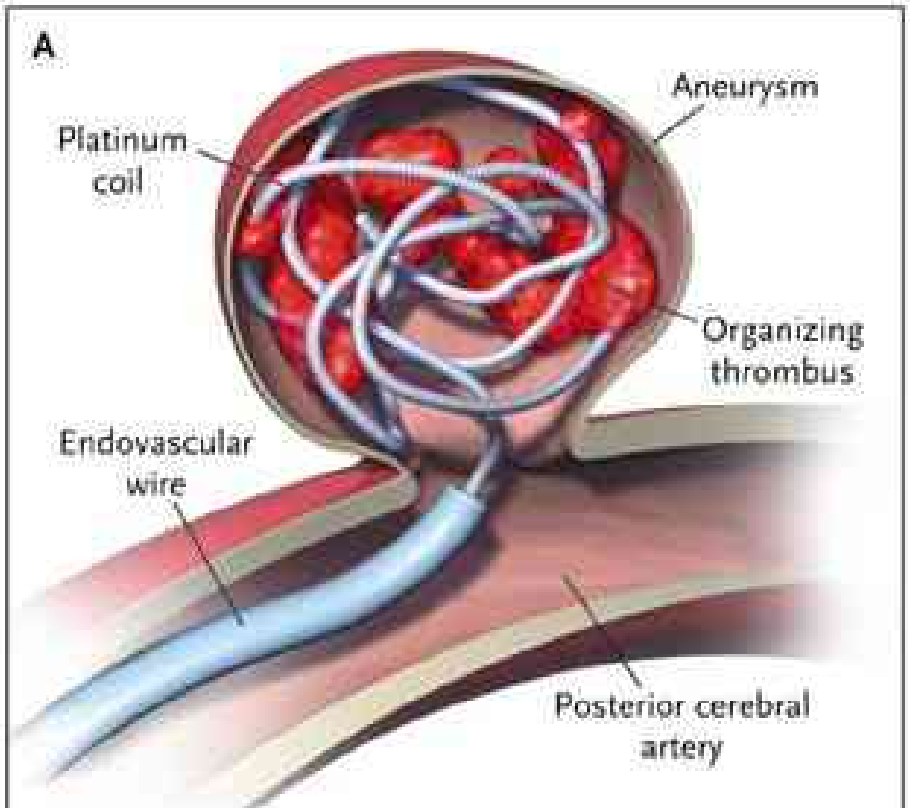


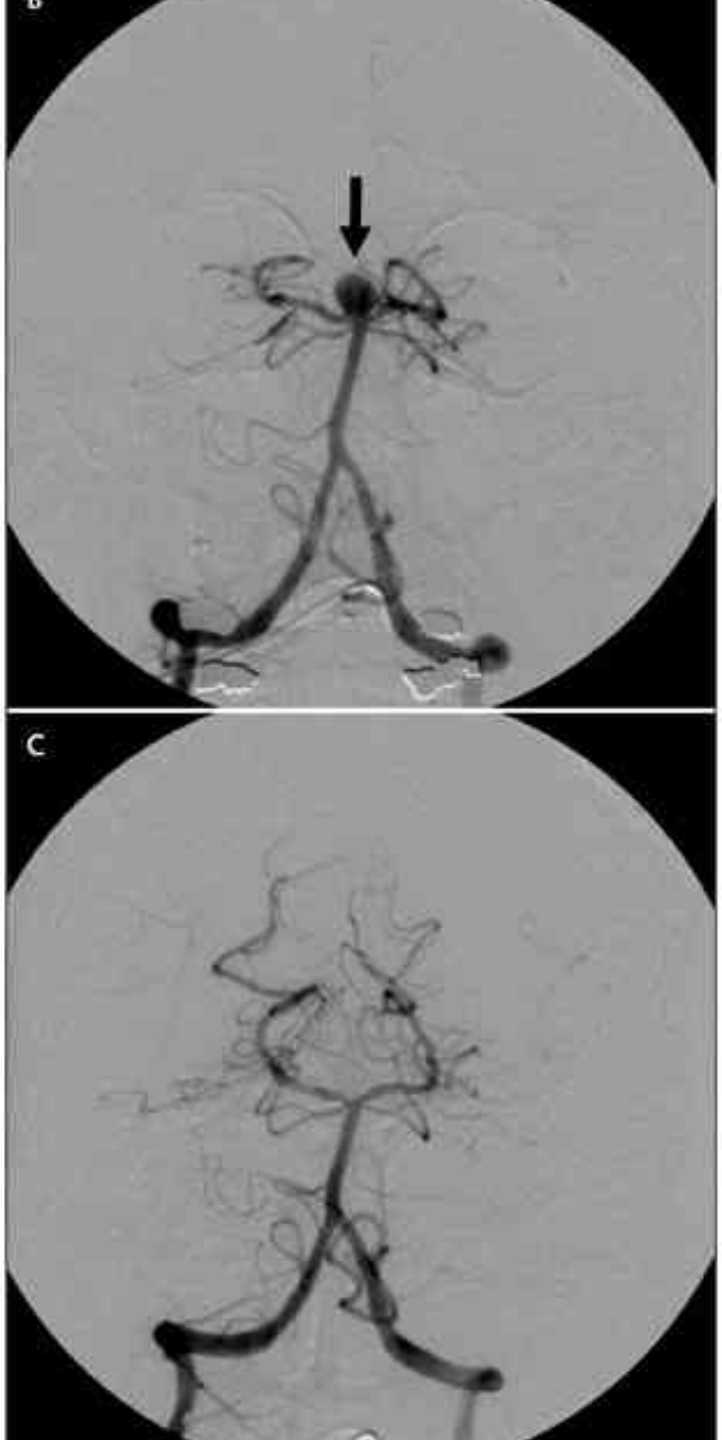

A
Aneurysm
Anterior cerebral artery
Posterior cerebral artery
Middle cerebral artery
Posterior communicating artery
Internal carotid artery
Basilar artery
Vertebral arteries
B
Parenchyma
Middle cerebral artery
Subarachnoid space
Internal carotid artery
Skull base
Anterior cerebral artery
C
Ruptured aneurysm
Blood in subarachnoid space
D
Temporary clip
Skull base removed
E
Clipped aneurysm
Neck of aneurysm

Aneurysma – stent, recoiling

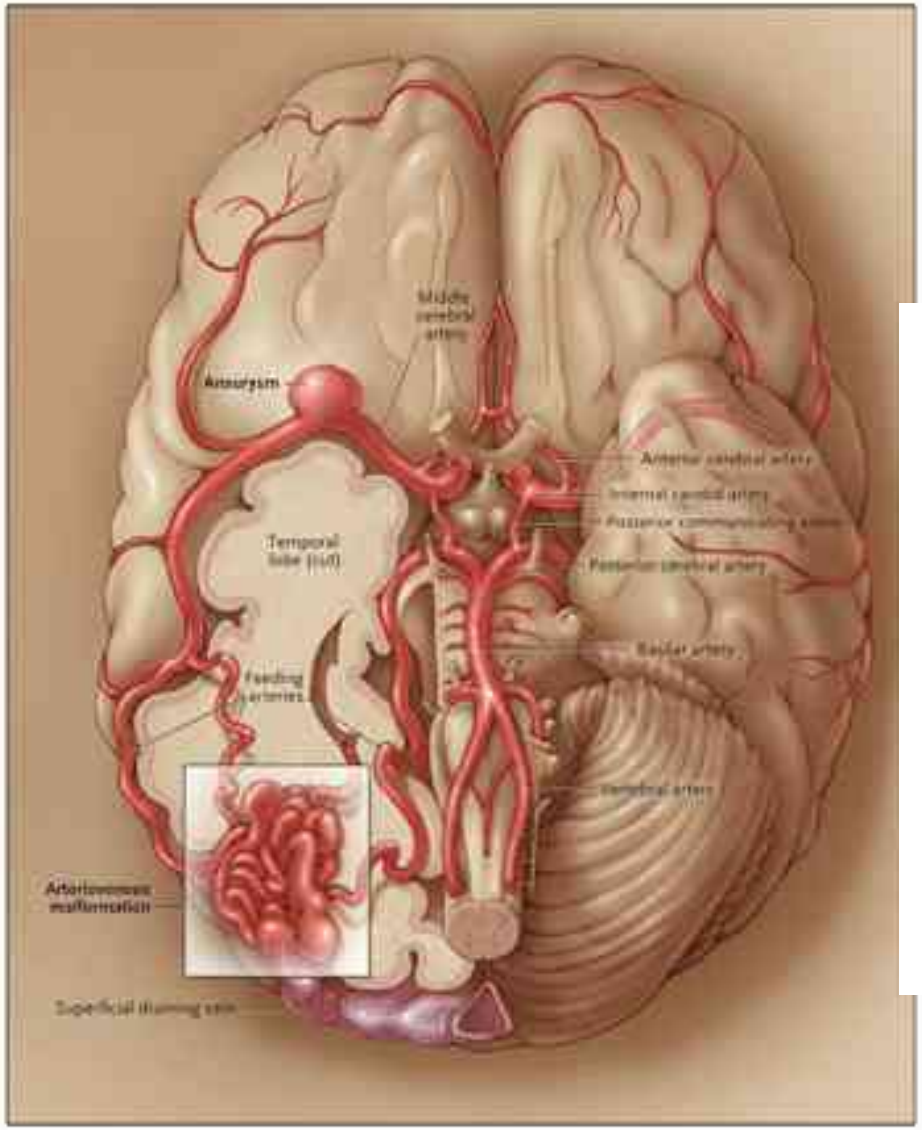


Intravascular coiling



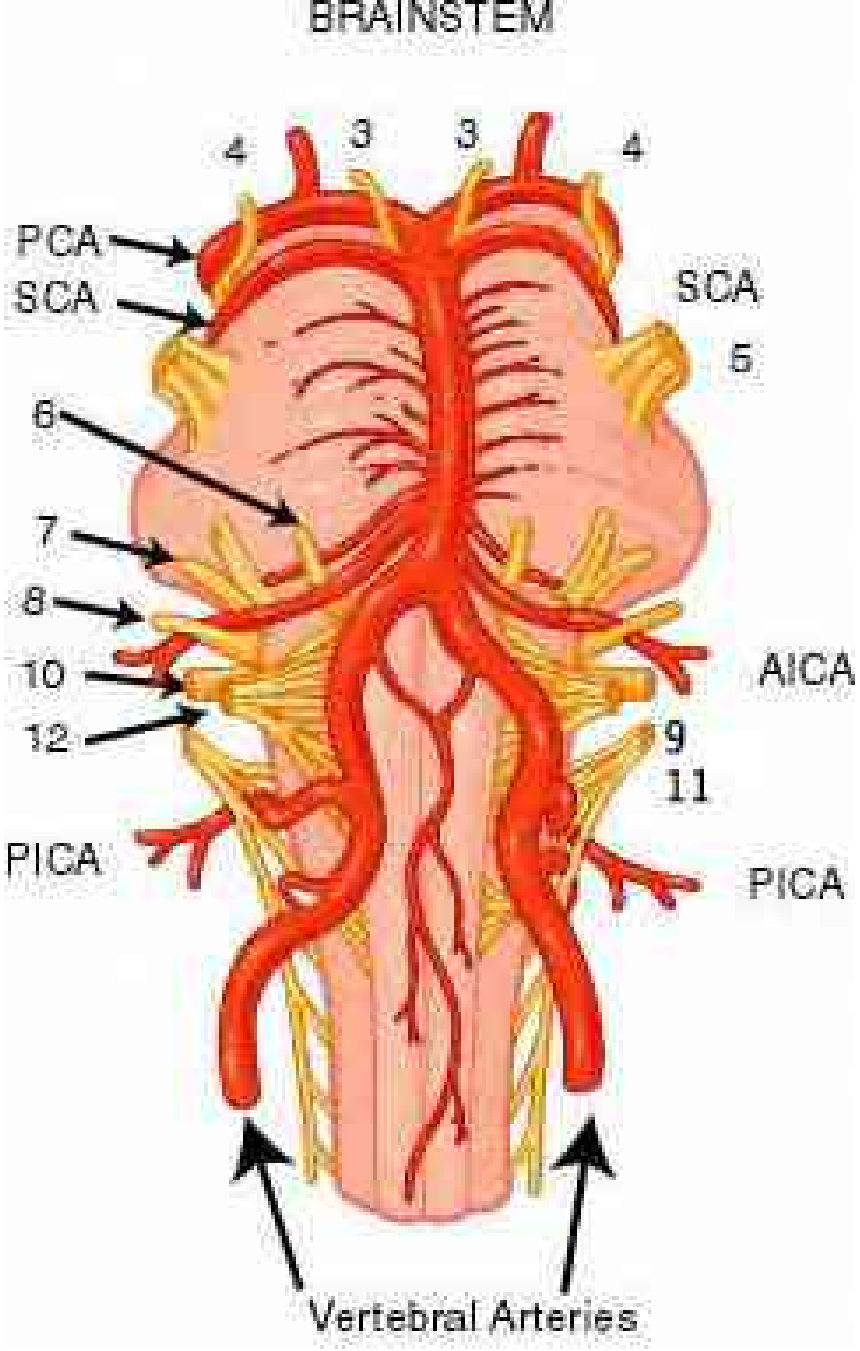


A-V malformace

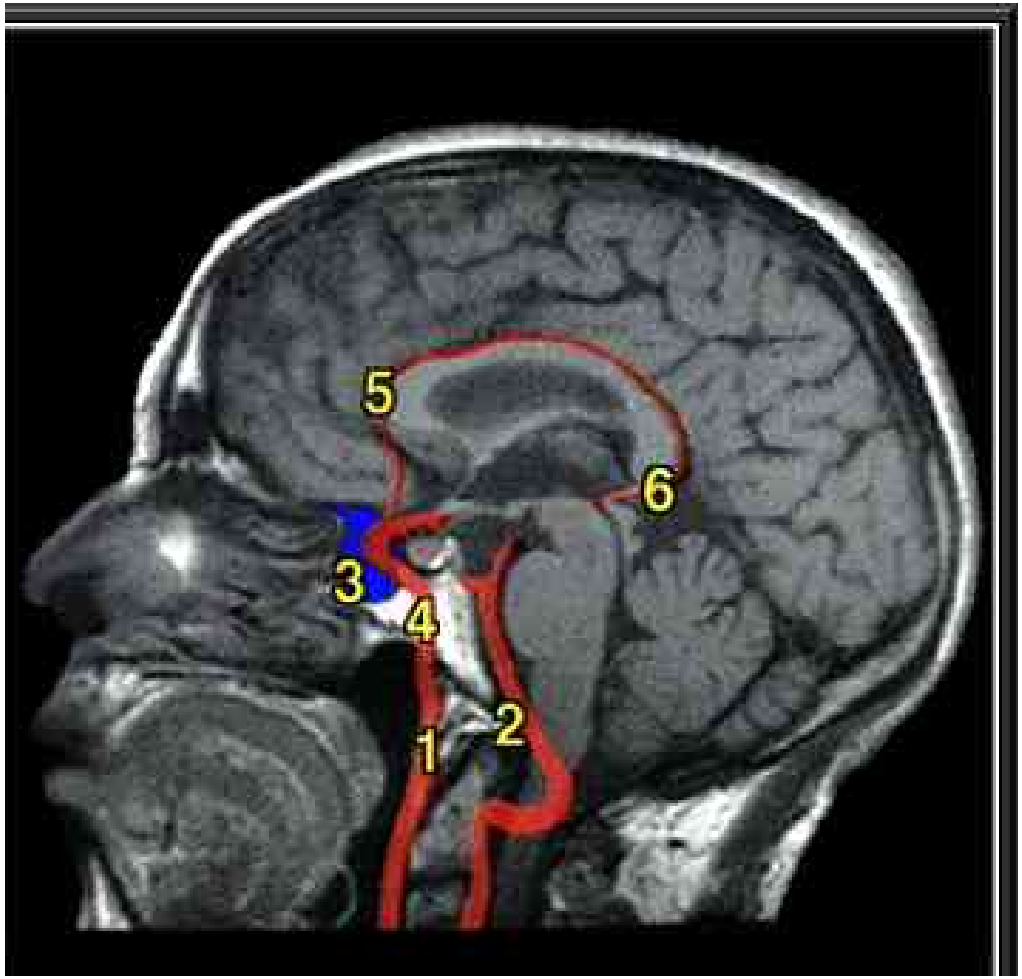


peroperačně

Výstupy hlavových nervů a cévy na ventrální straně mozkového kmene



NMR – angoigrafie na sagitálním řezu



1 - a.carotis interna

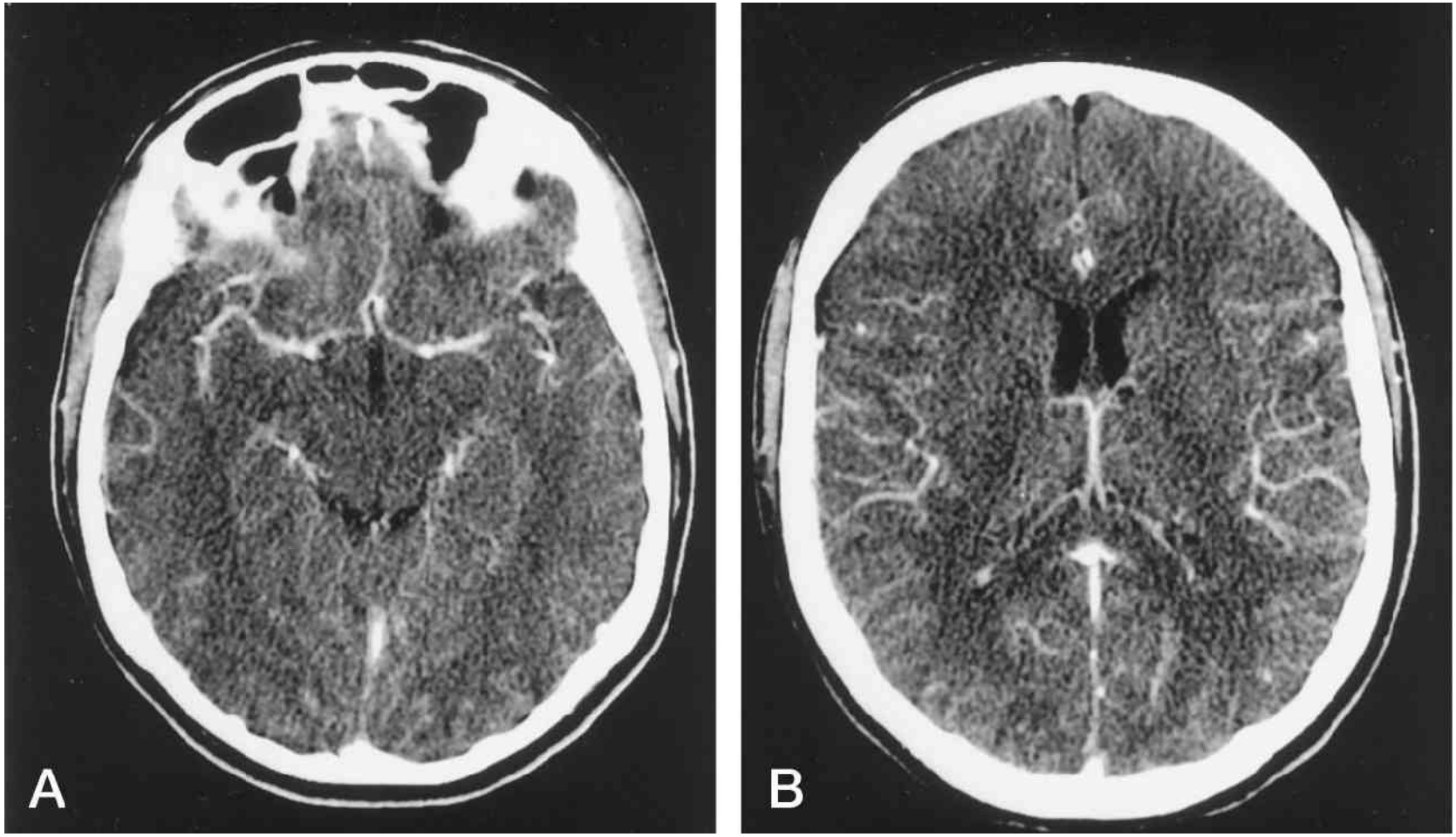
2 - a.vertebralis

3 - sinus cavernosus

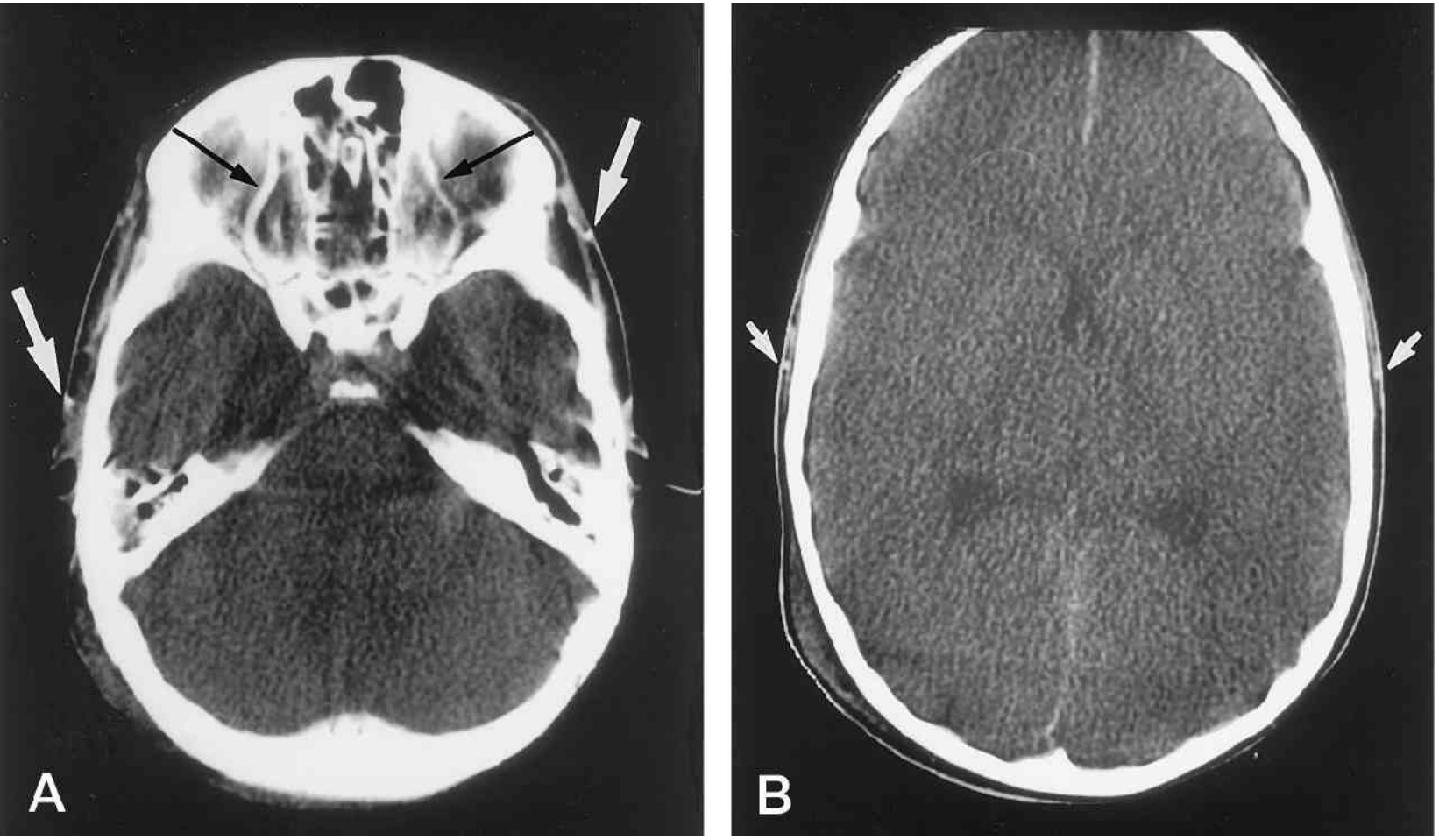
4 - canalis caroticus

5 - a.cerebri anterior

6 - a.cerebri posterior

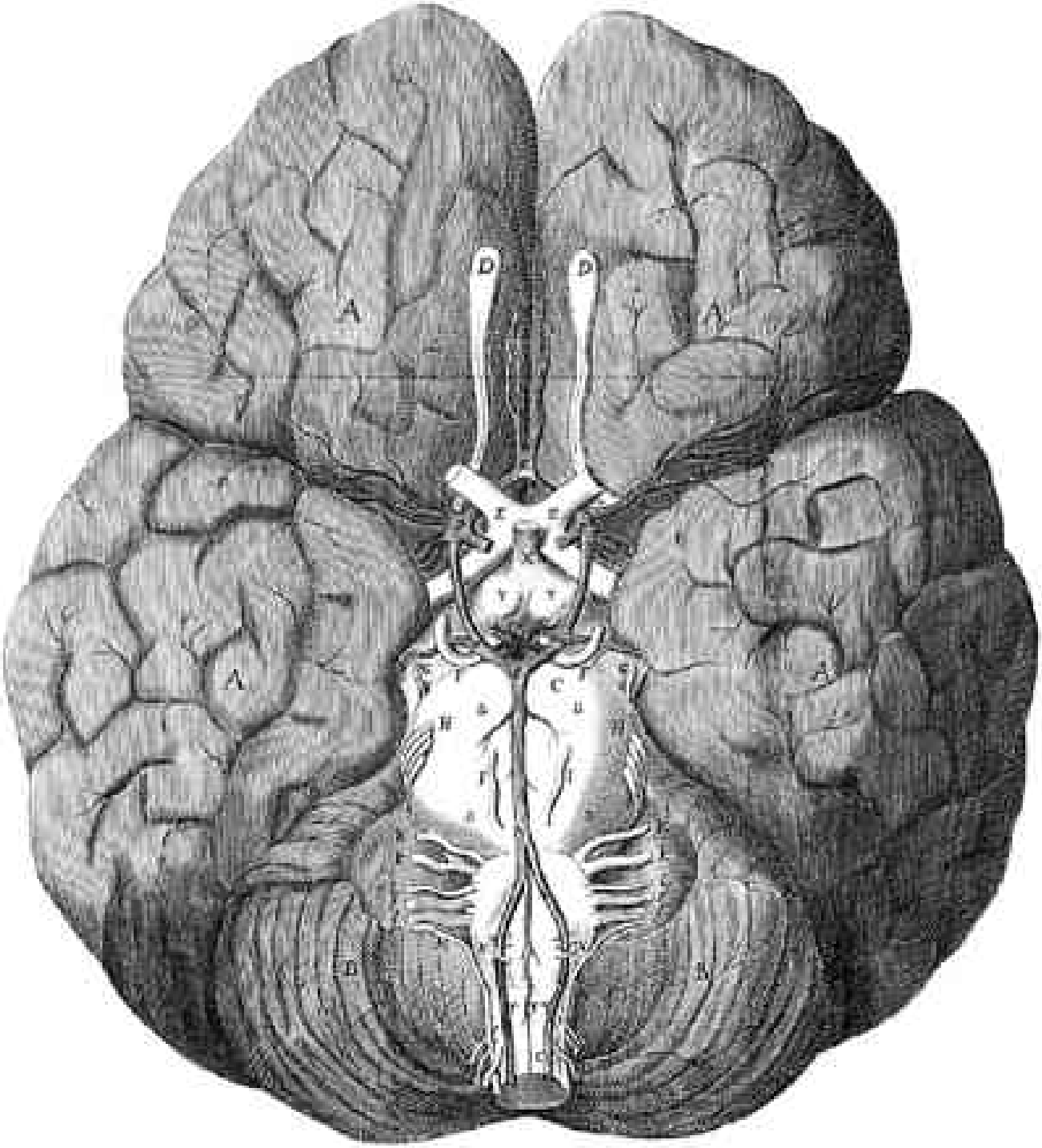


Spiral CT: first phase in a healthy adult.
A, Twenty-six seconds after intravenous injection of nonionic contrast medium, all arteries are opacified: **anterior cerebral arteries, middle cerebral arteries, posterior cerebral arteries, and superficial temporal arteries**.
B, Two seconds later and a section above *A*: on the midline of the brain, the **pericallosal arteries, internal cerebral veins, great cerebral vein, straight sinus,and superior sagittal sinus. Terminal arteries for the cortex** are also well opacified.



Brain death.
A, The first phase of spiral CT 25 seconds after intravenous injection of contrast medium: the cerebral arteries and the basilar artery are not visible, whereas the **superficial temporal arteries** (*white arrows*) and **superior ophthalmic veins** (*black arrows*) are opacified.
B, Three seconds later, neither midline vessels (arteries and veins) nor terminal arteries for the cortex are seen, whereas **superficial artery branches** (*arrows*) are opacified. Note **brain swelling.**

Thomas Willis
(1621–1675)

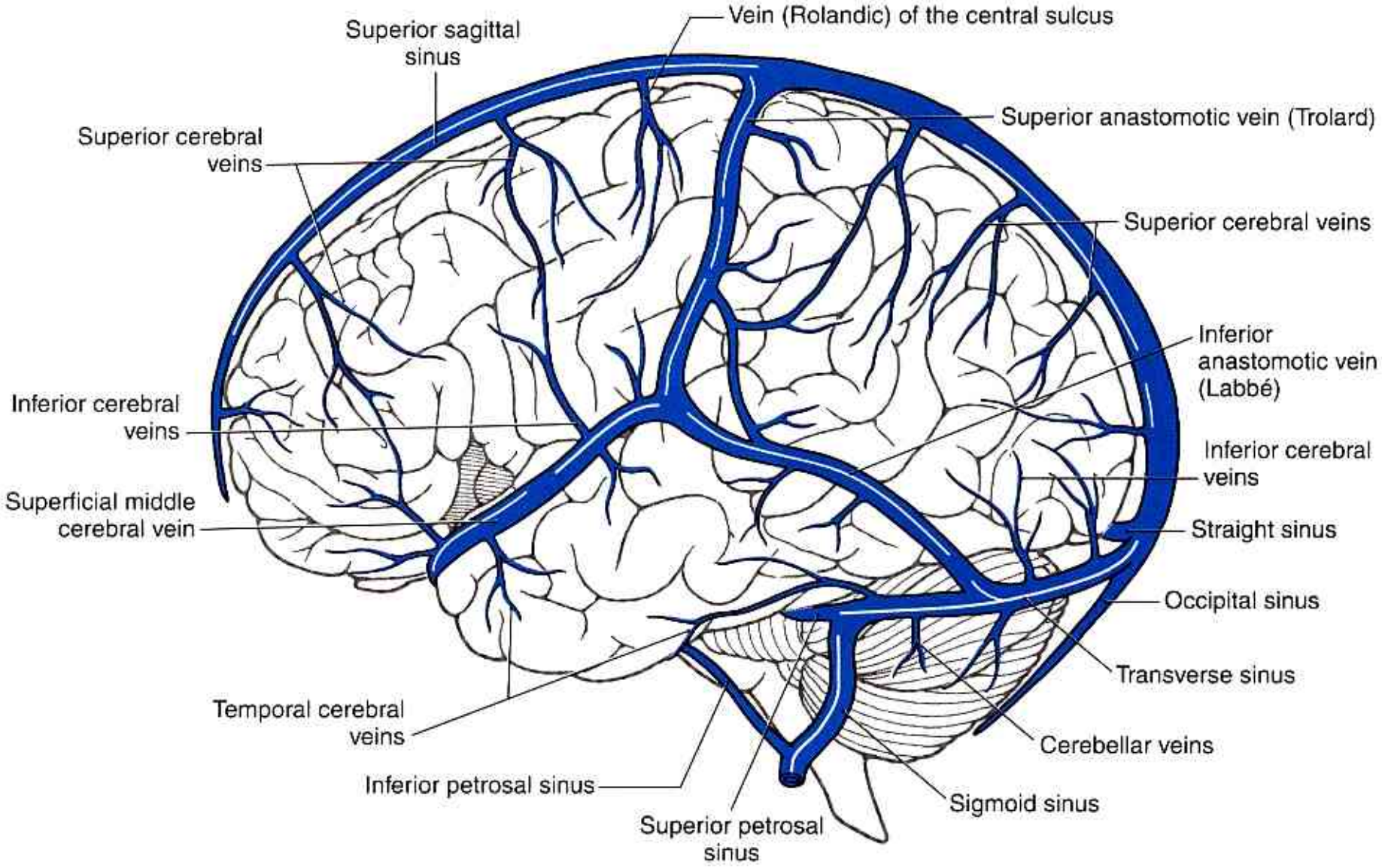


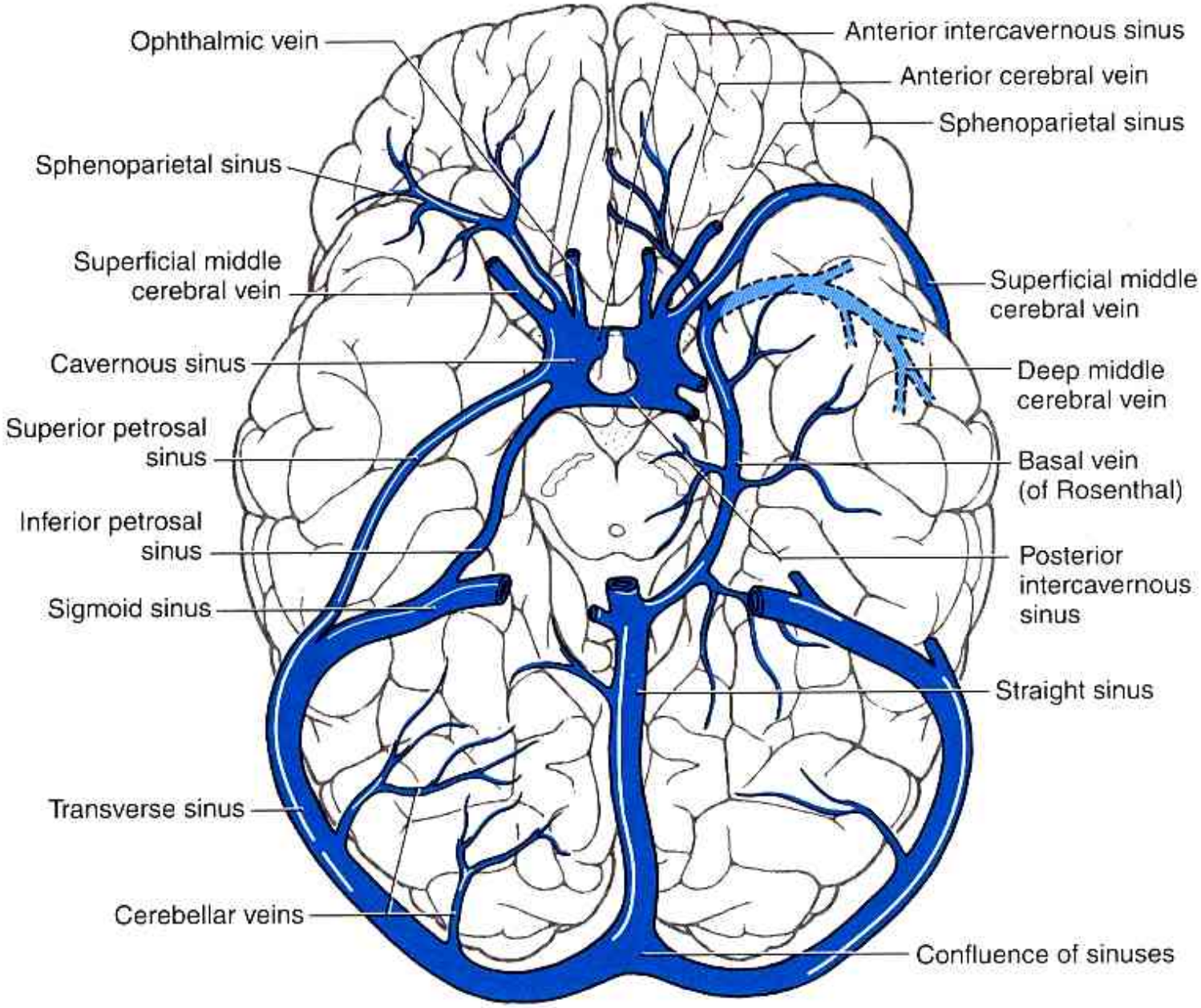
The home of Thomas Willis from 1657 to 1667

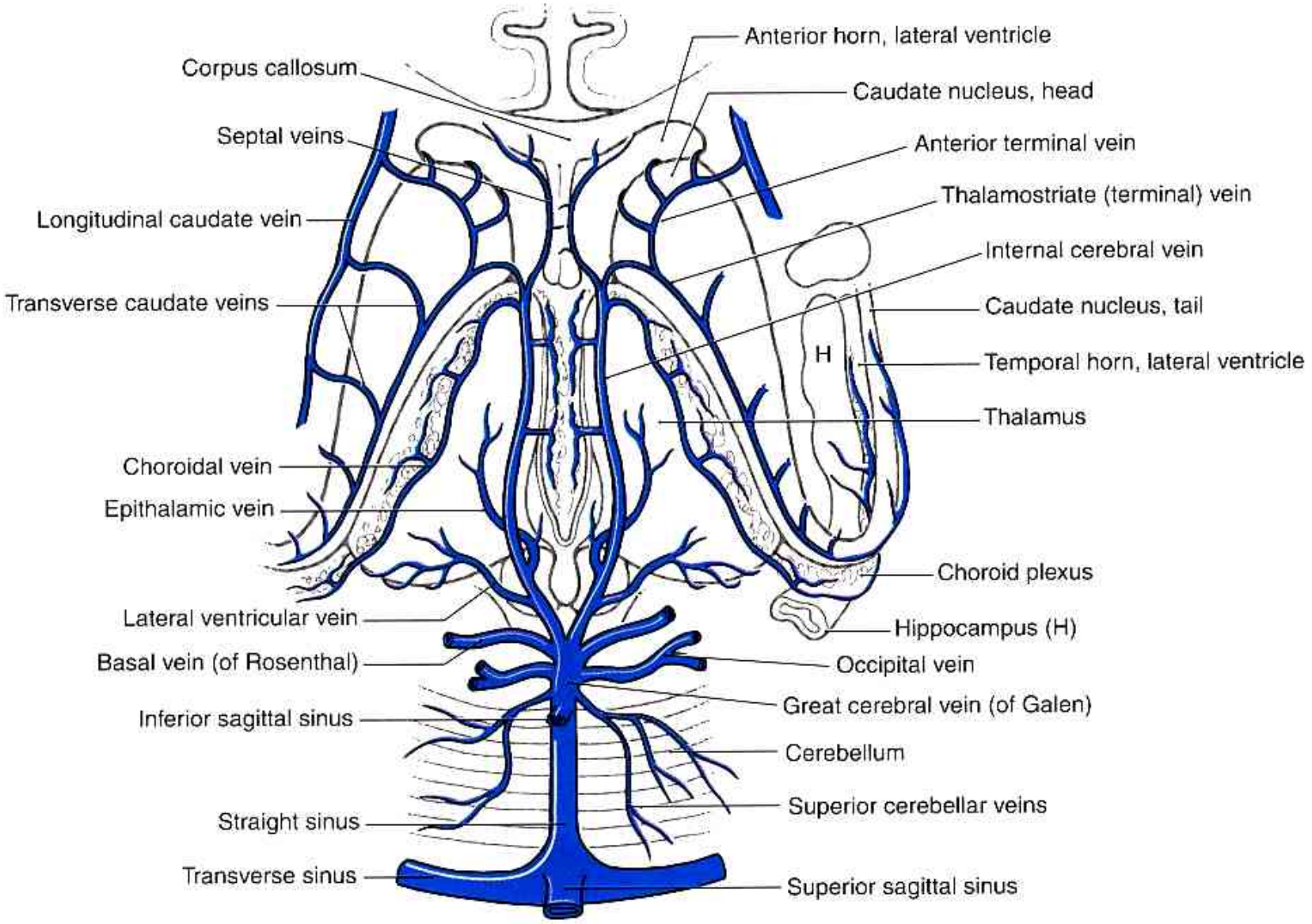
Oxford, Beam Hall

Thomas Willis

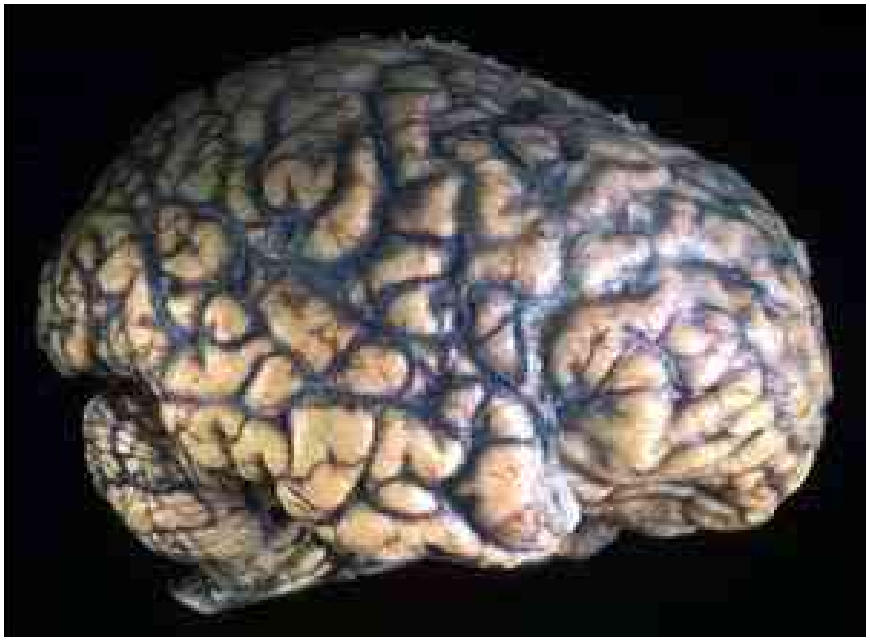
- **Neuroanatomical terms coined by Willis**
- Anterior commissure | Cerebellar peduncles | Claustrum | Corpus striatum | Inferior olives (corpora teretia) | Internal capsule | Medullary pyramids | Nervus ophthalmicus | The word 'neurology' | Optic thalamus | Spinal accessory nerve | Stria terminalis (taenia cornua) | Striatum | Vagus nerve
- **Pathologies recognized by Willis**
- Achalasia of the cardia (achalasia of the oesophagus) | Akathisia (restless legs syndrome, Ekbom's syndrome) | Symptoms of myasthenia gravis | Paracusis Willisii. Occurs in deaf patients whose hearing improves in the presence of noise, indicating osteosclerosis | Diabetes mellitus | Abnormalities of the brains of patients with congenital mental retardation | Unilateral degeneration of the cerebral peduncle in a case of long-standing unilateral paralysis | Symptoms of malaria | Distinctions between typhoid and puerperal fevers

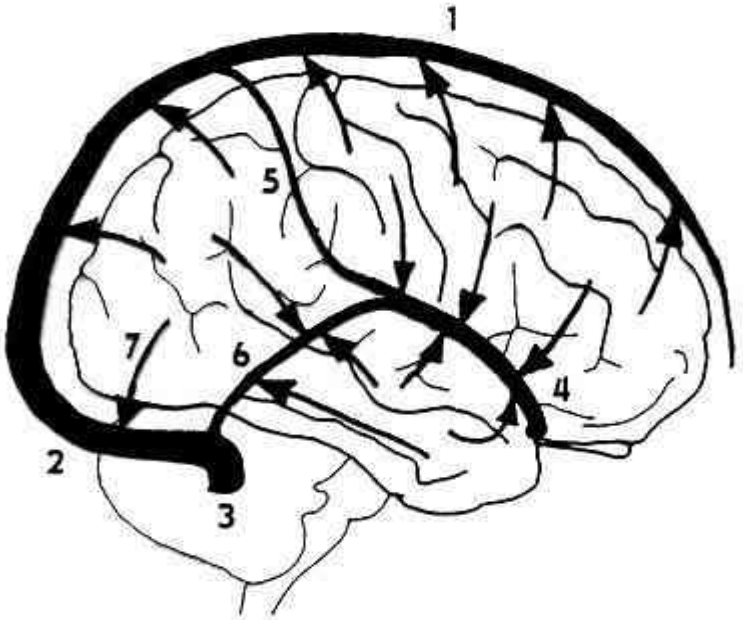

Superior sagittal sinus
Vein (Rolandic) of the central sulcus
Superior anastomotic vein (Trolard)
Superior cerebral veins
Superior cerebral veins
Inferior anastomotic vein (Labbé)
Inferior cerebral veins
Inferior cerebral veins
Superficial middle cerebral vein
Straight sinus
Occipital sinus
Transverse sinus
Temporal cerebral veins
Cerebellar veins
Inferior petrosal sinus
Sigmoid sinus
Superior petrosal sinus

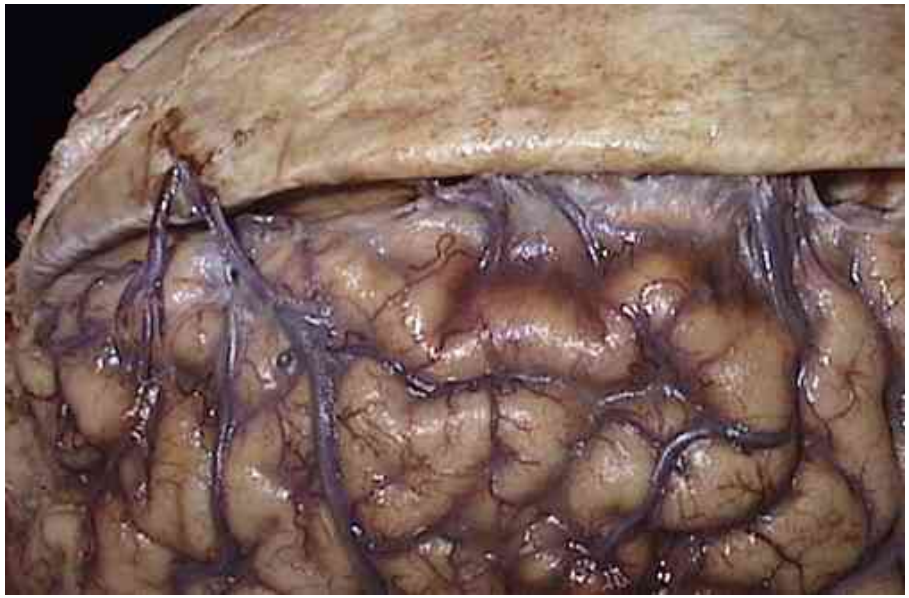

Ophthalmic vein
Sphenoparietal sinus
Superficial middle cerebral vein
Cavernous sinus
Superior petrosal sinus
Inferior petrosal sinus
Sigmoid sinus
Transverse sinus
Cerebellar veins
Anterior intercavernous sinus
Anterior cerebral vein
Sphenoparietal sinus
Superficial middle cerebral vein
Deep middle cerebral vein
Basal vein (of Rosenthal)
Posterior intercavernous sinus
Straight sinus
Confluence of sinuses



igure 8–17. Veins draining internal areas of the hemisphere and the tributaries of the great cerebral vein and straight sinu
I, hippocampus.



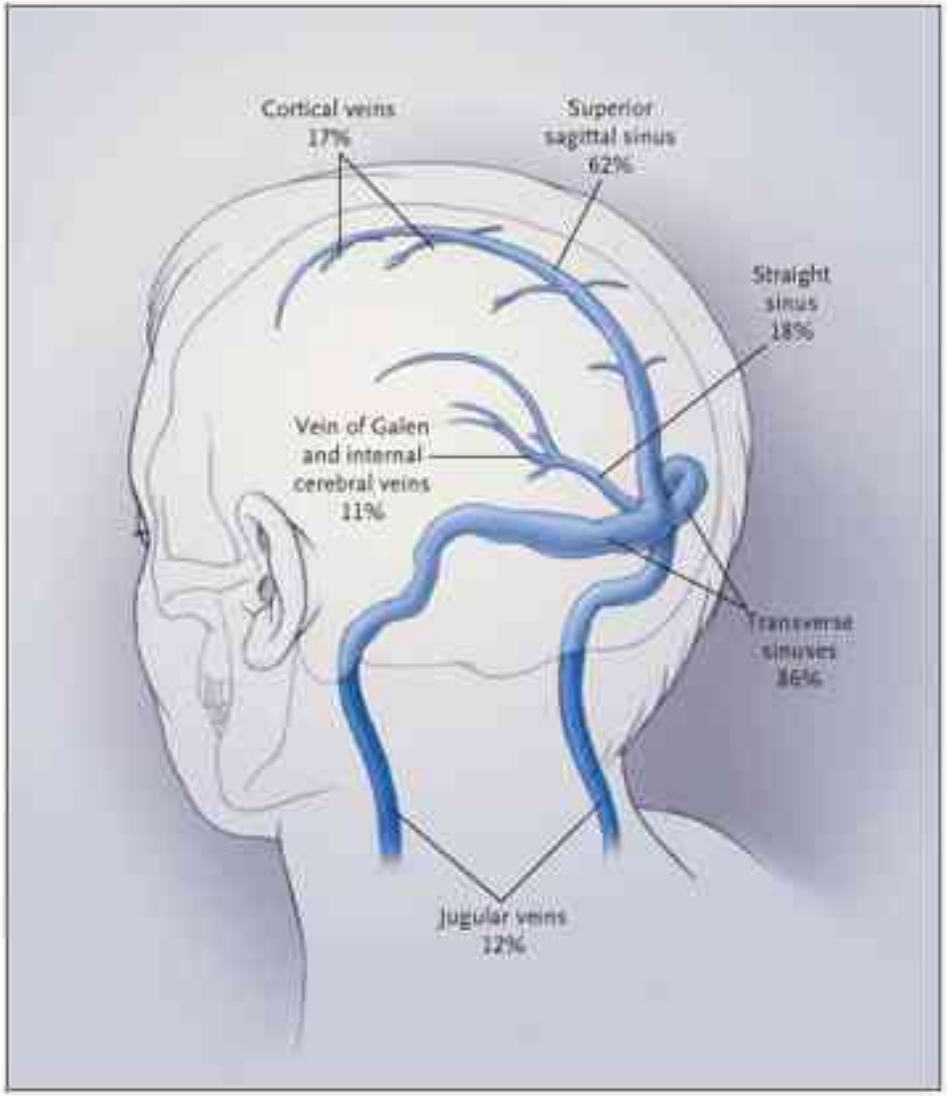




5 Vena anastomotica sup. (Trolardova)

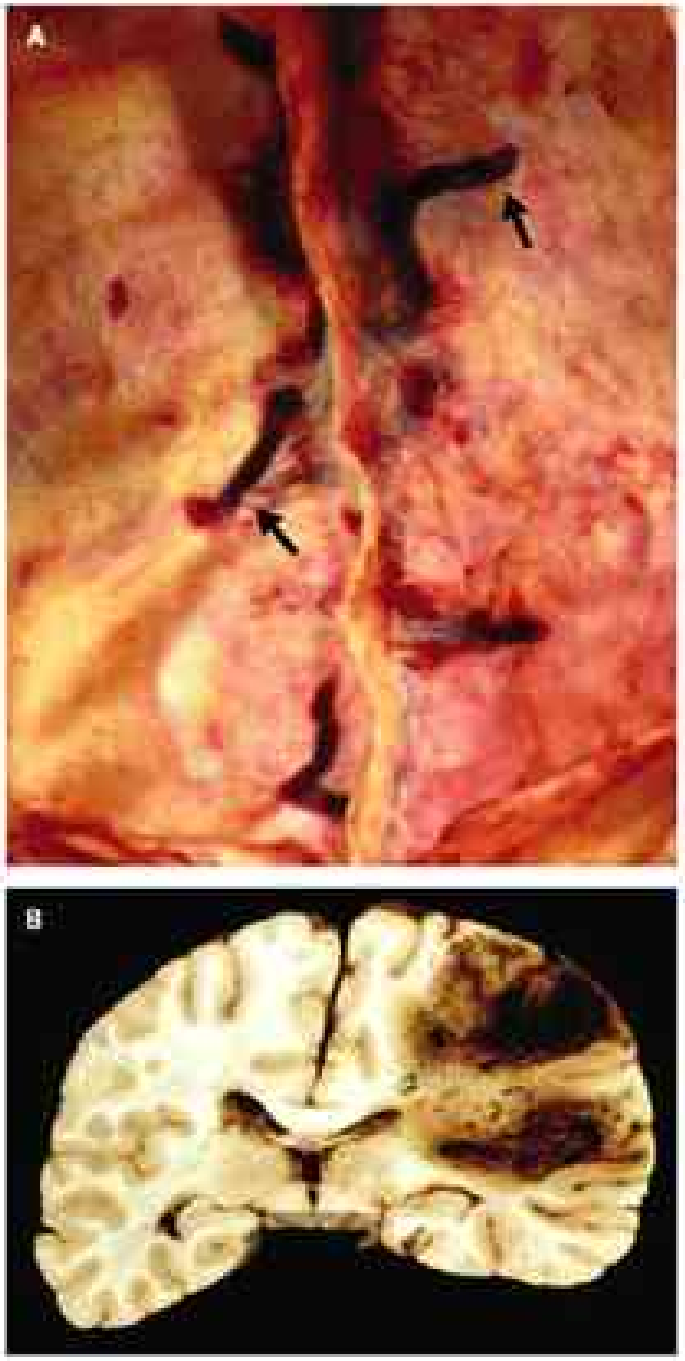
6 Vena anastomotica post. (Labbéova)

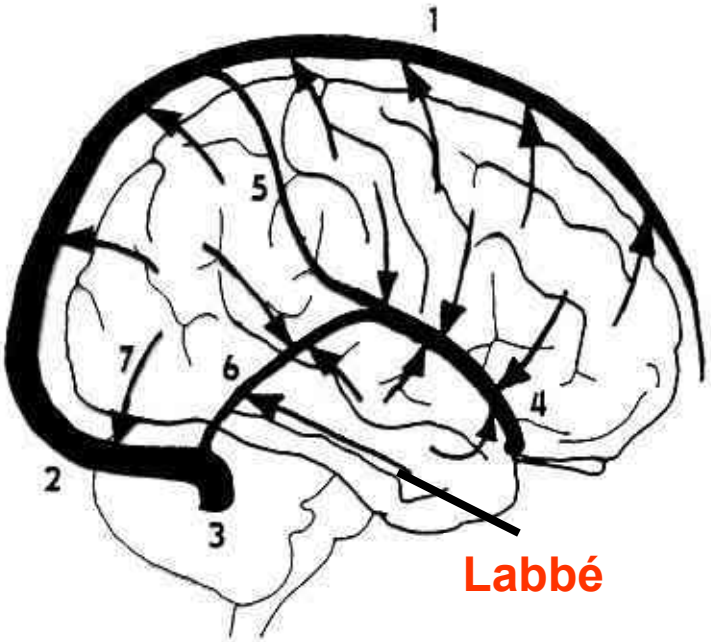
Žíly mozku, četnost trombos



Trombosa sinus sagittalis superior

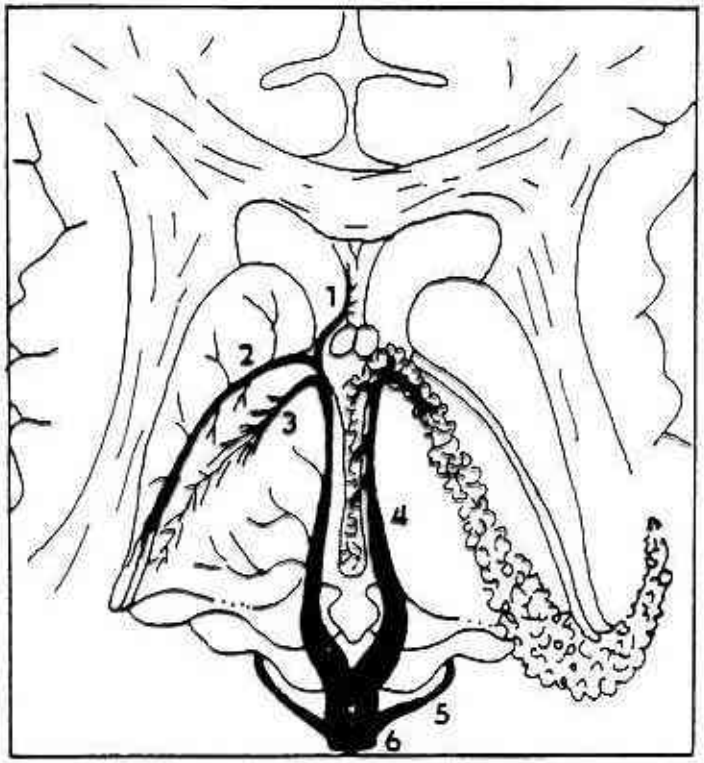
Trombosy vv. cerebri superiores





Obr. 65.: Korové žíly na laterální straně hemisféry.

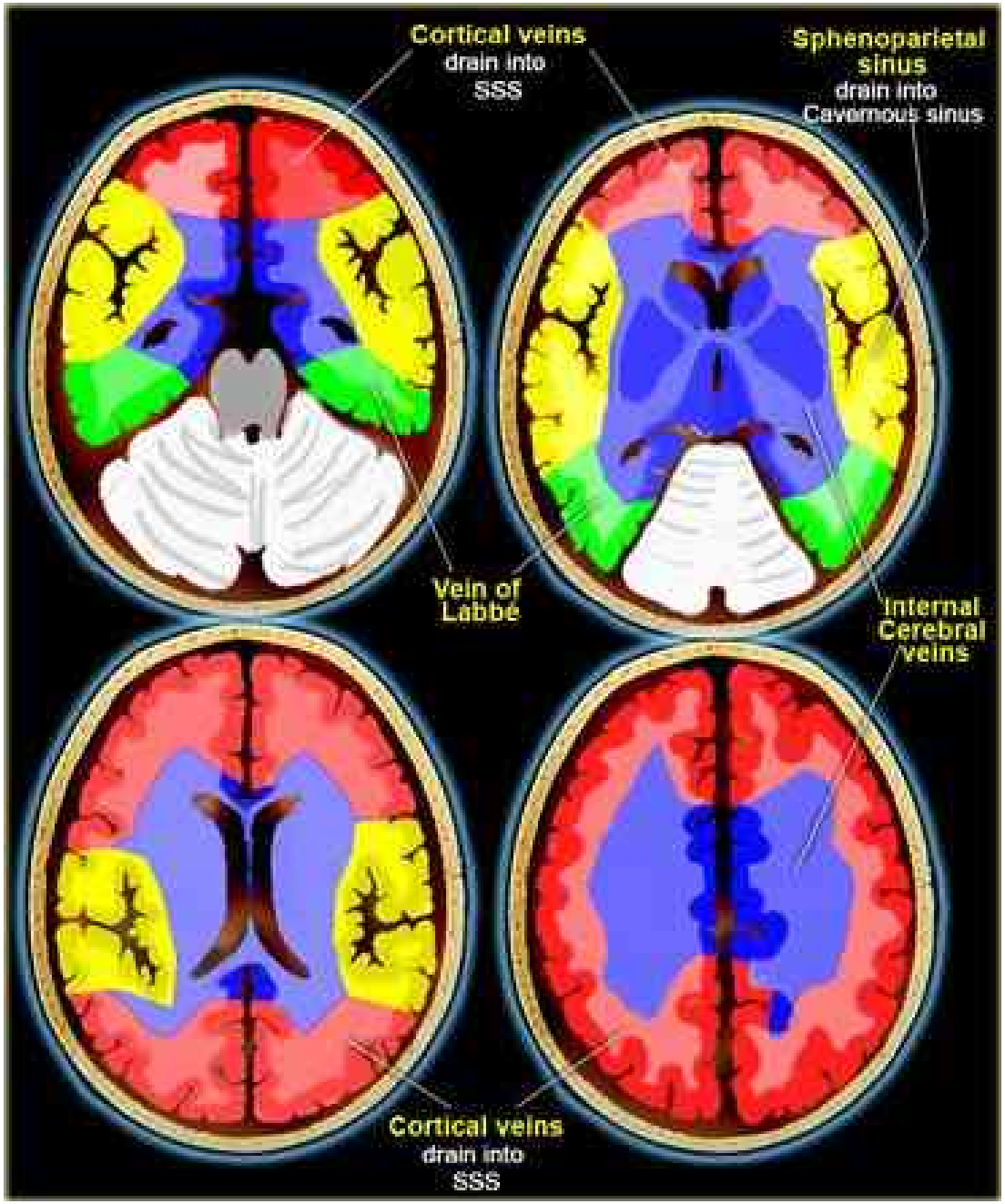
1 – sinus sagittalis superior s vtékajícími vv. cerebri superiores (šipky), 2 - transversus, 3 – sinus sigmoideus 4 – v. cerebri media superficialis, 5 – v. superior (Trolardova), 6 – v. anastomotica posterior (Labbéova) 7 – vv. ce inferiores.



Obr. 66.: Hluboké mozkové žíly.

Jsou zakresleny do obrázku shodného s obr. 23, kde jsou také popsány jednotlivé struktury.

1 – v. septi pellucidi, 2 – v. thalamostriata, 3 – v. choroidea superior, 4 – v. cerebri interna, 5 – v. basalis (Rosenthali) 6 – v. magna cerebri (Galeni).



Cerebral Venous territories

„rough guide“

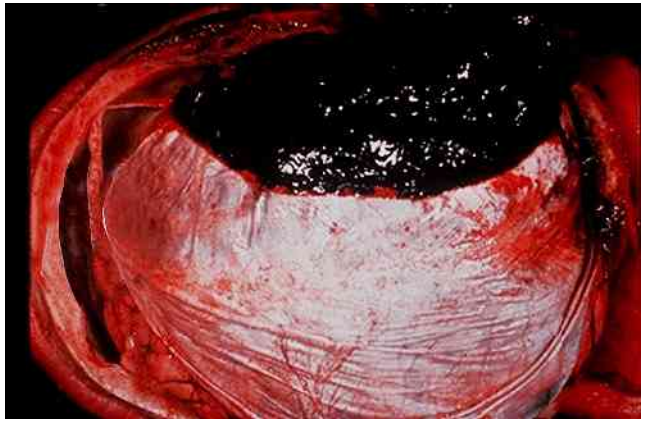
superior sagittal sinus

internal cerebral veins

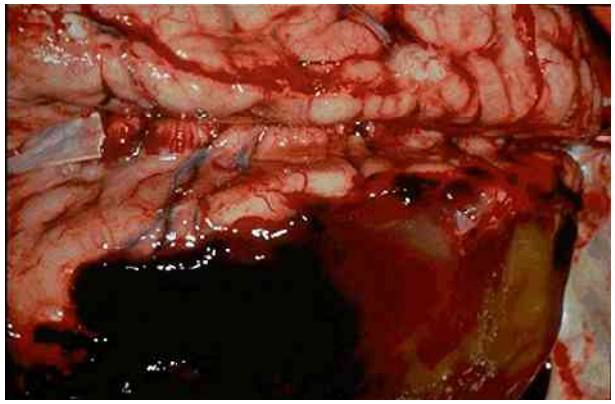
sphenoparietal sinus

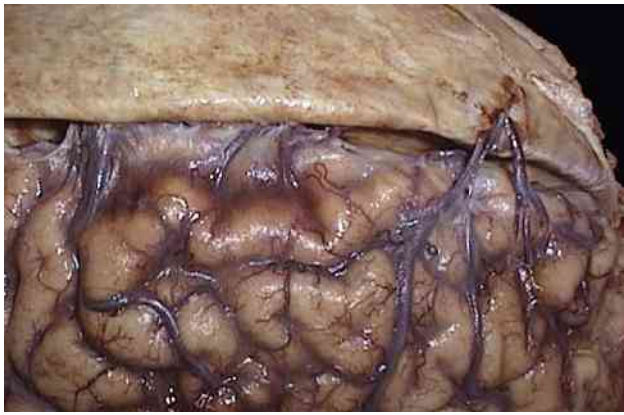
vein of Labbé

1. Epidurální hematom

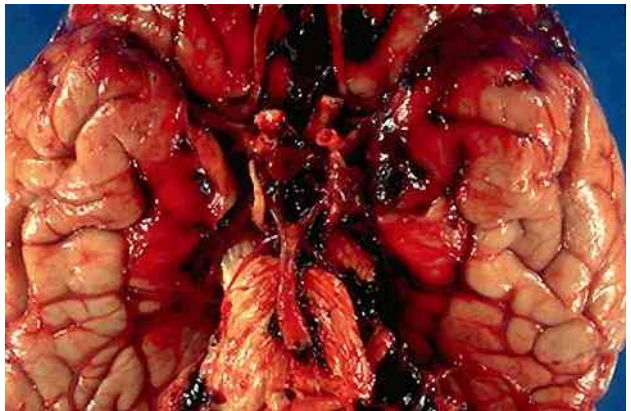


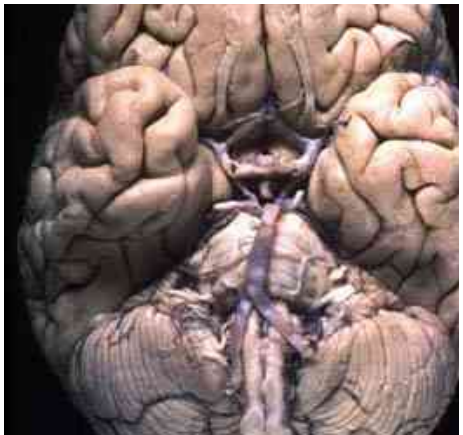
2. Subdurální hematom





3. Subarachnoidální hematom



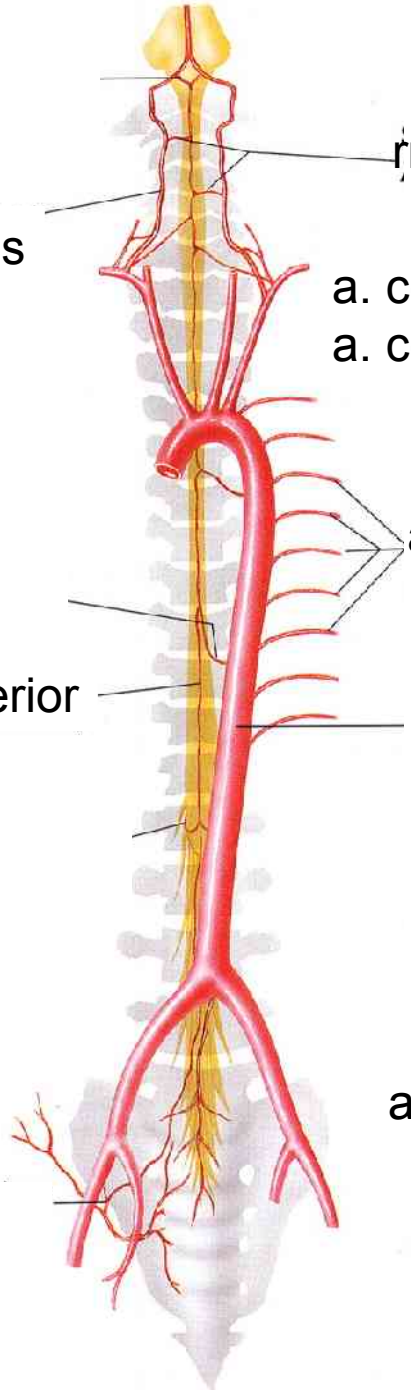



Epi


Subar


Subd

Tepny zásobující míchu a páteřní kanál



rr. spinales (radikulární tepny)

a. vertebralis

a. cervicalis ascendens
a. cervicalis profunda

Adamkiewiczova tepna
(a.spinalis magna) odstup z a. intercostalis post. ve výši Th9–L1 (Th7-L2)

aa. intercostales

a.spinalis anterior

aa. lumbales

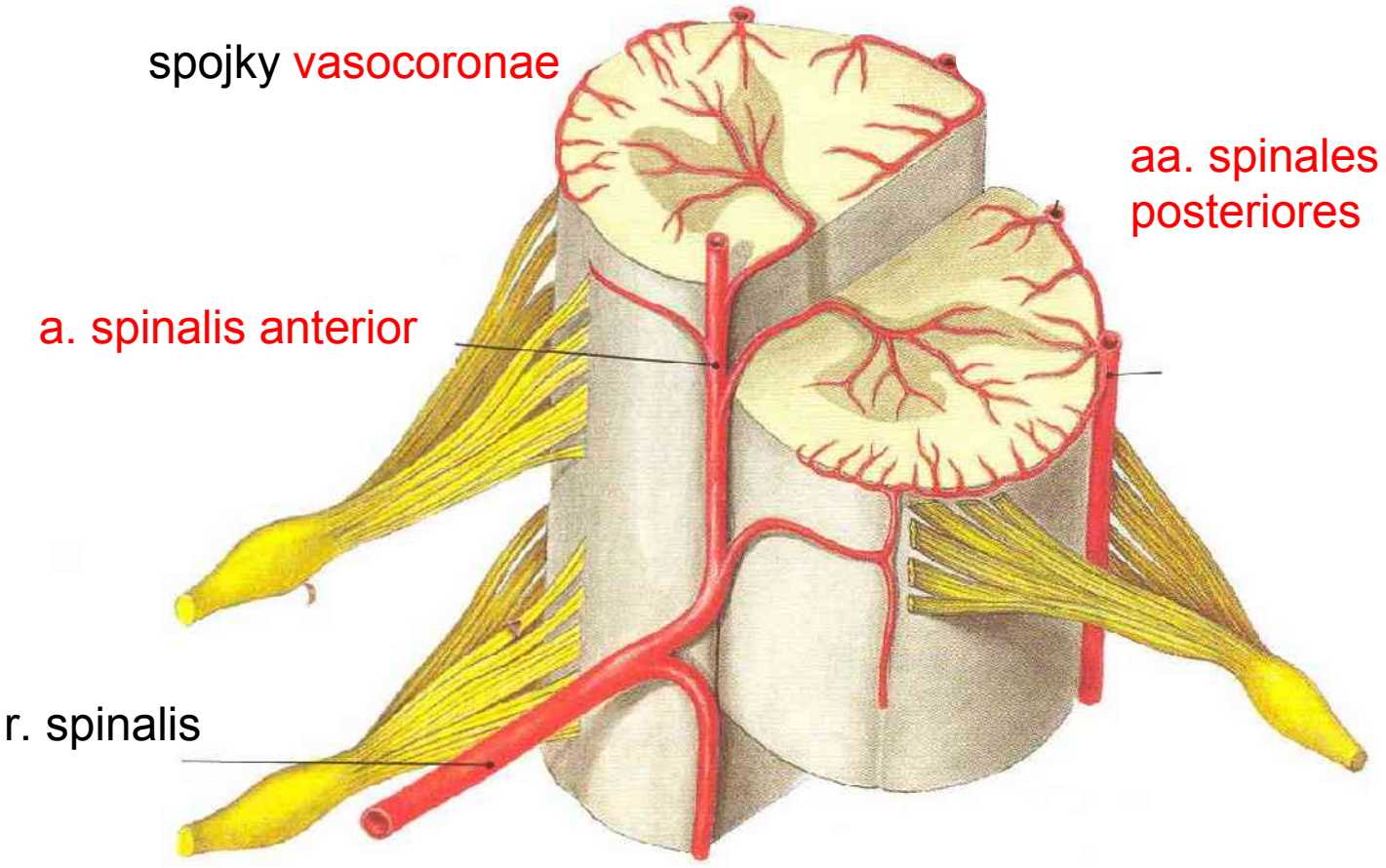
aa. sacrales laterales

a. iliolumbalis

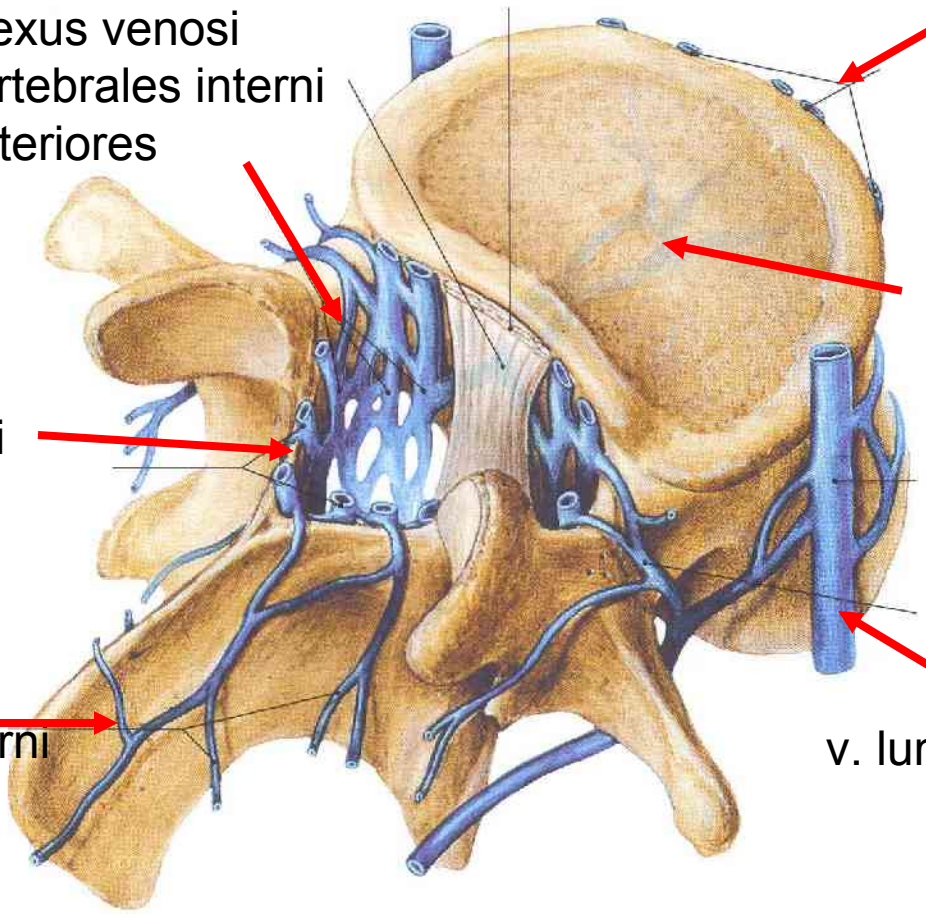
Yoshioka K et al. Radiographics 2003;23:1215-1225

Tepny míchy

5 podélně probíhajících kmenů



Páteřní kanál žíly



Plexus venosi vertebrales externi anteriores

Plexus venosi vertebrales interni anteriores

vv. basivertebrales

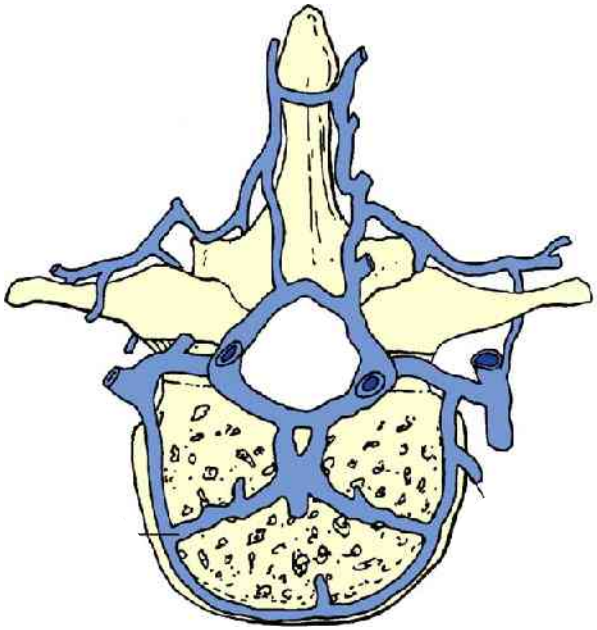
Plexus venosi vertebrales interni posteriores

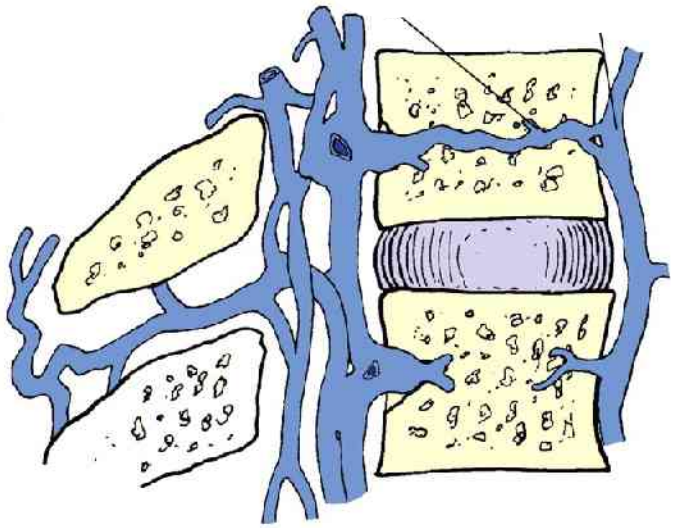
Plexus venosi vertebrales externi posteriores

v. lumbalis ascendens

Plexus venosi vertebrales

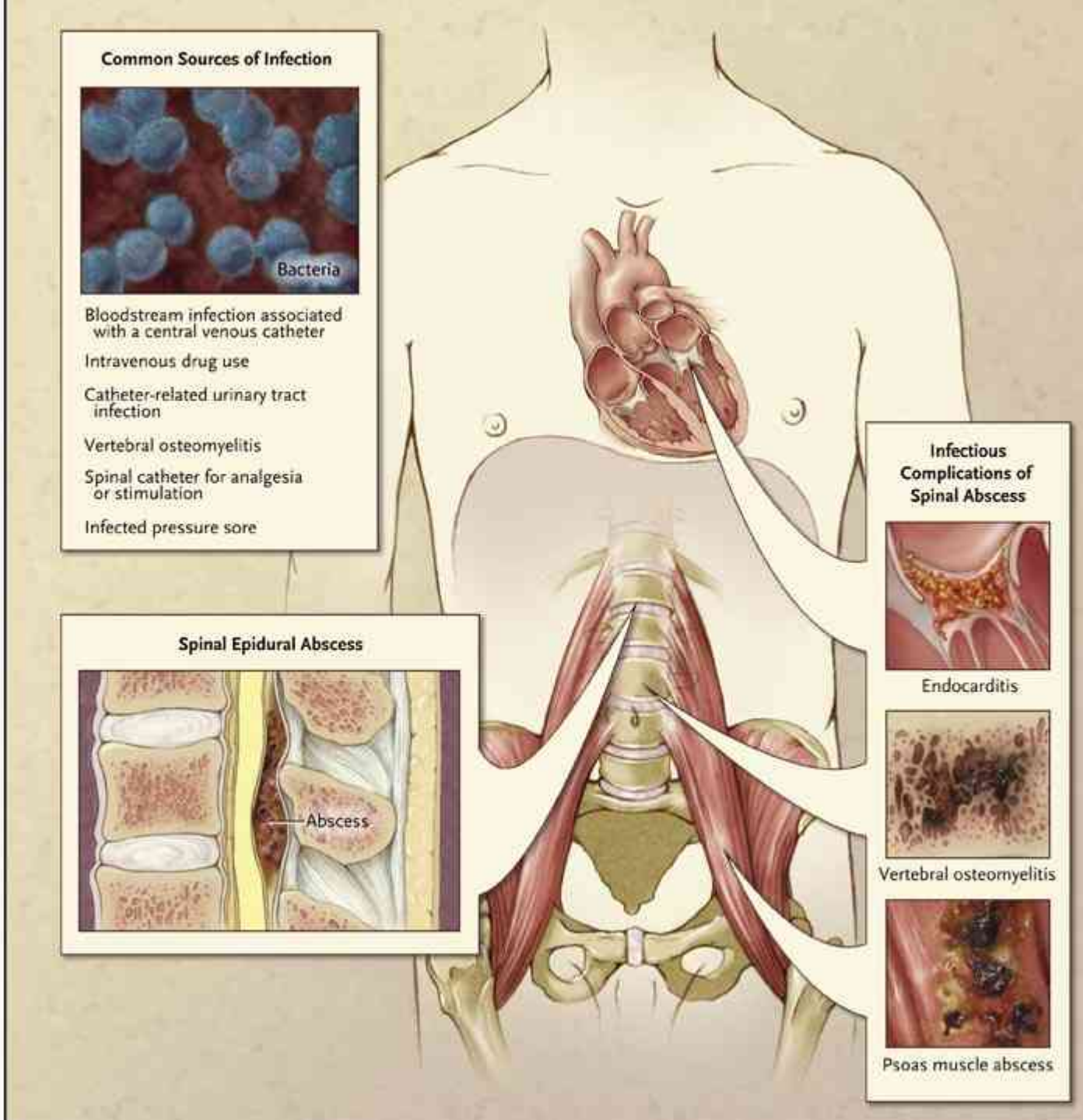
- plexus venosi vertebrales nemají chlopně a anastomosují mezi sebou
- anastamosují s žilními plexy kolem os sacrum a pánve
- jsou: 1) uvnitř kanálu v epidurálním prostoru (plexus venosi vertebrales interni)
- 2) kolem páteře zvenčí (plexus venosi vertebrales externi)
- 3) uvnitř obratlových těl (venae basivertebrales)





Batsonovy žíly
Plexus venosi vertebrales

- nemají chlopně a spojují pánevní a hrudní žíly (z moč. měchýře, prsu, prostaty) s plexus venosi vertebrales interni. Považují se za žíly, jimiž dochází k metastazování nádorů, např. z rekta či prostaty do mozku. Žilní cesta metastazování ca plic není prokázána. Oscar Vivian Batson, je poprvé popsal v roce 1940.
- Infekce se mohou šířit stejně. Např. pyelonefritis může způsobit osteomyelitidu obratlů.


Common Sources of Infection
Bacteria
Bloodstream infection associated with a central venous catheter
Intravenous drug use
Catheter-related urinary tract infection
Vertebral osteomyelitis
Spinal catheter for analgesia or stimulation
Infected pressure sore
Spinal Epidural Abscess
Abscess
Infectious Complications of Spinal Abscess
Endocarditis
Vertebral osteomyelitis
Psoas muscle abscess

Mozkomíšní mok

Tvorba v plexus choroideus

Komory a spatium subarachnoidale 140 ml

Mechanická opora mozku („plave“)

Chemická komunikace v CNS (neurony- mok-stěna komor– neurony)

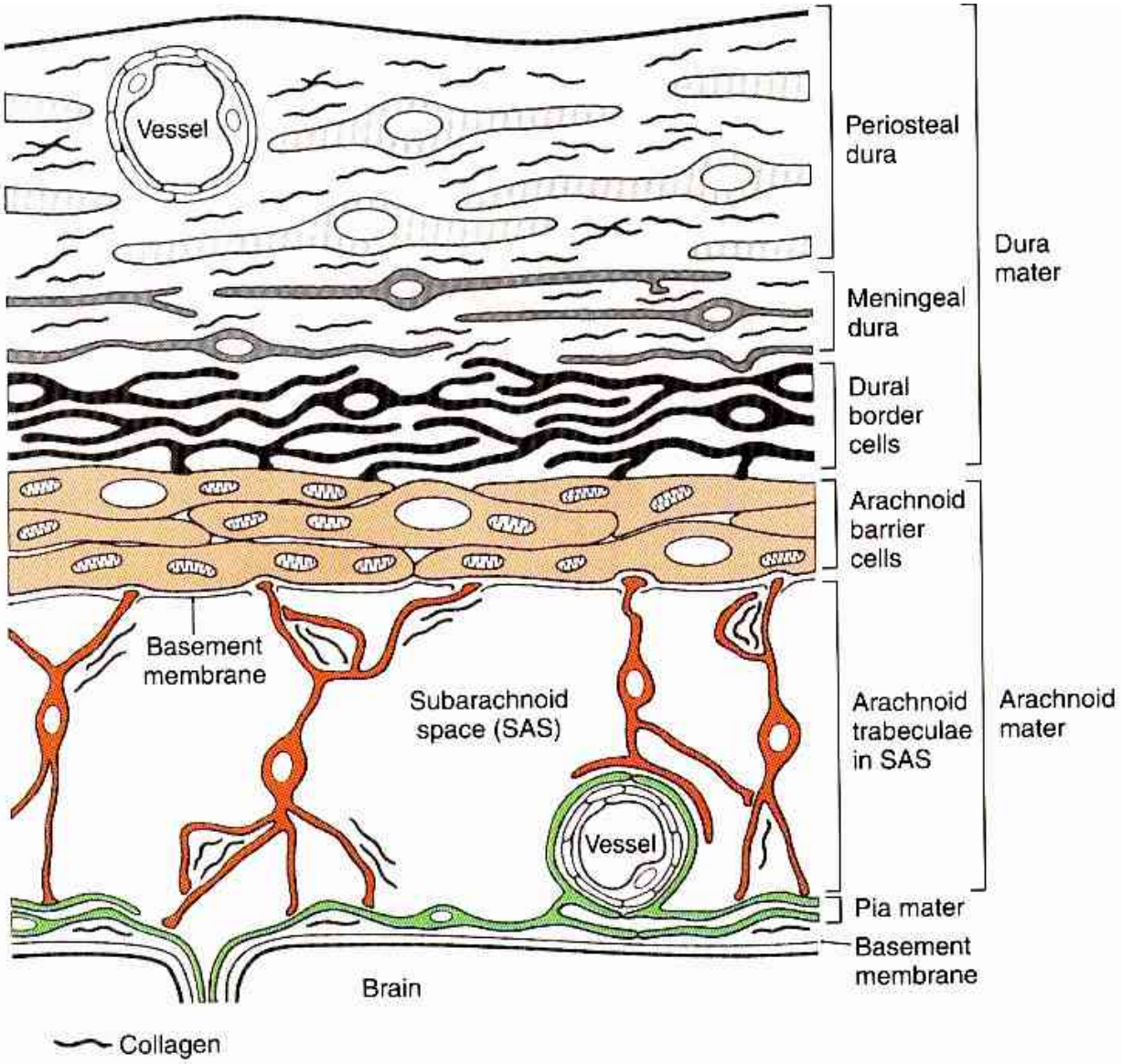
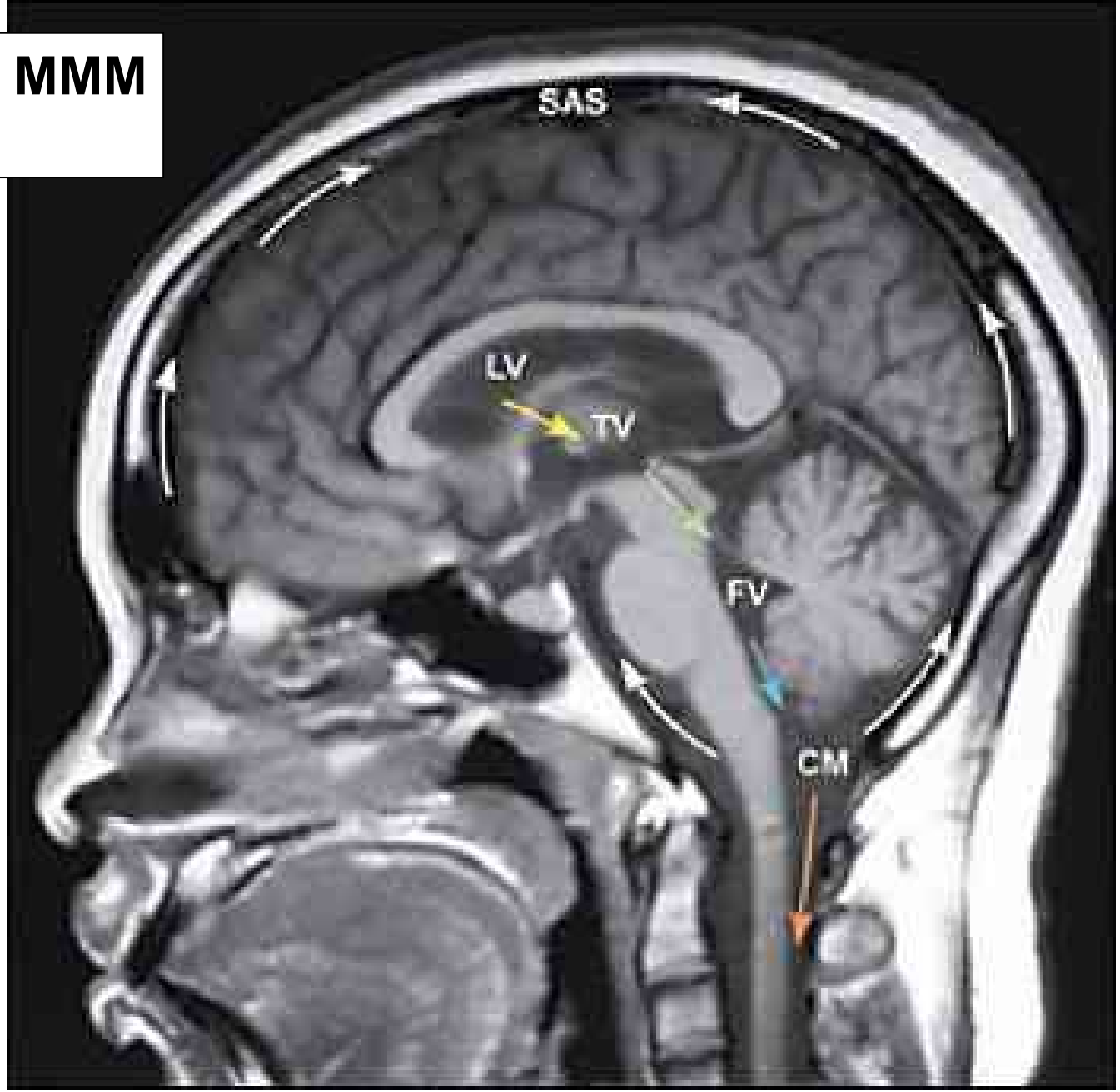
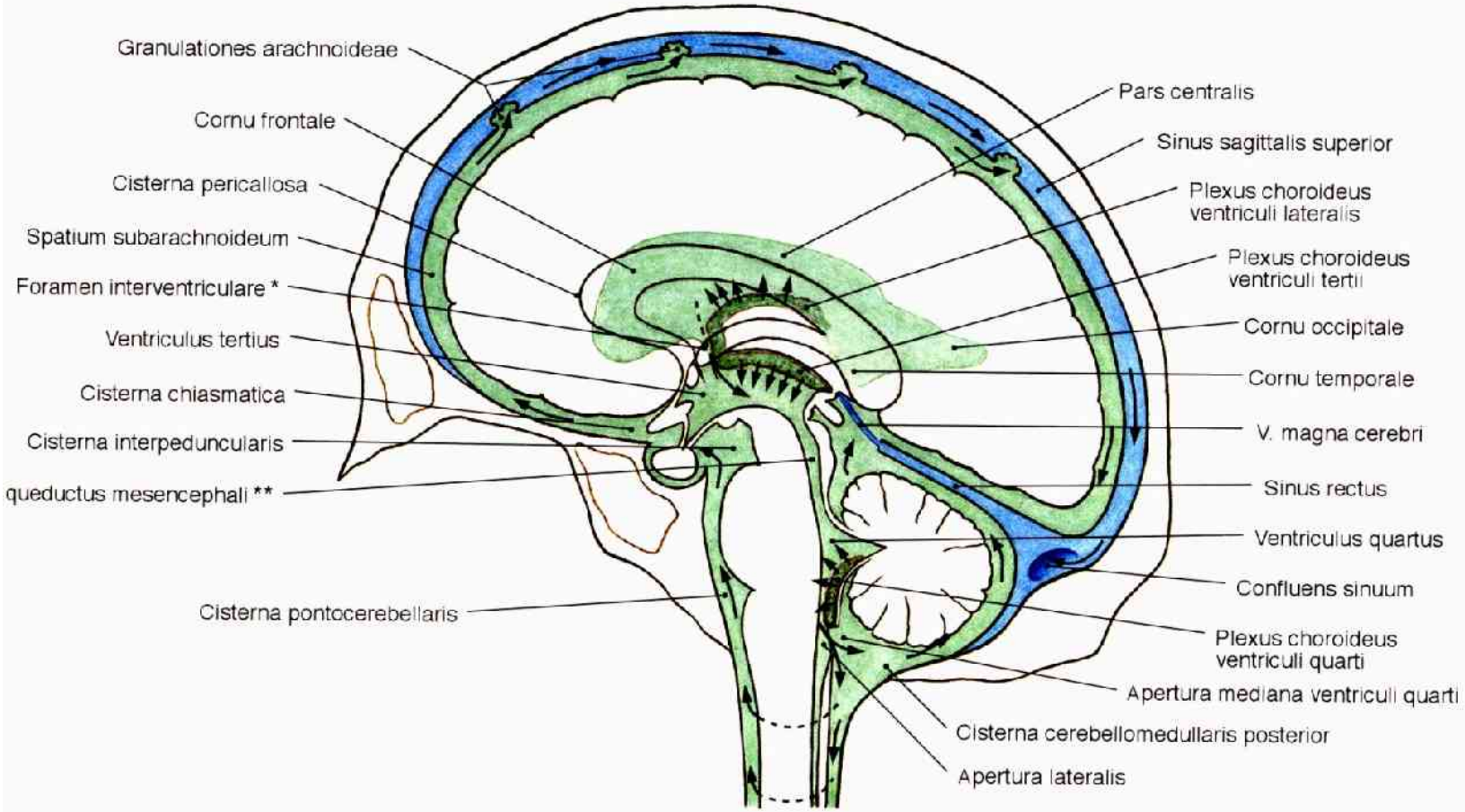


Figure 7–3. The structure of the meninges. Layers of the dura are shown in shades of black, the arachnoid in shades of red, and the pia in green.

Cirkulace MMM MR



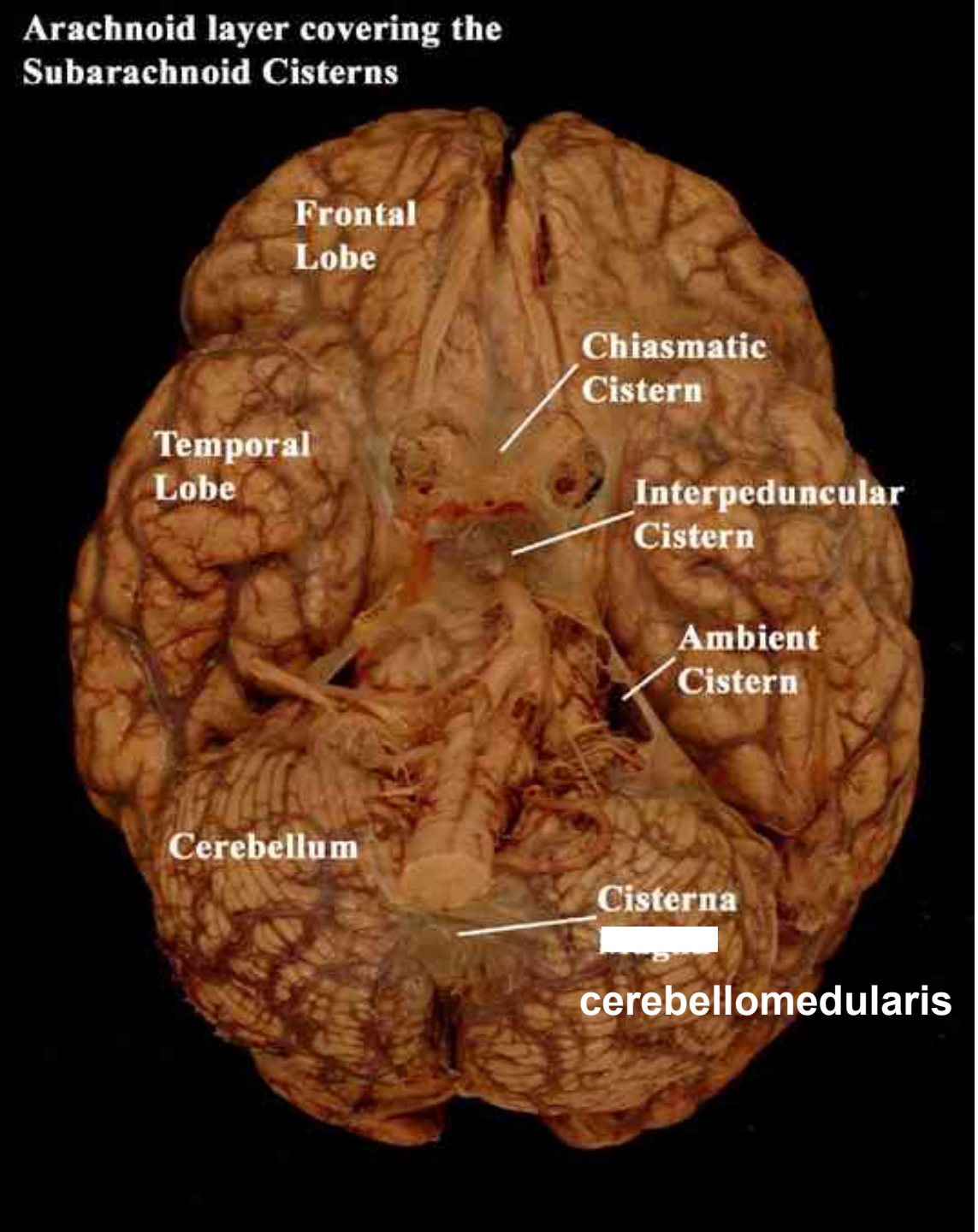
Choroidal plexus – lateral ventricles, 3rd ventricle, 4th ventricle



Obr. 551 Mozkové komory, ventriculi encephali a subarachnoideální prostor, spatium subarachnoideum;
schéma cirkulace (šipky) mozkomíšního moku, liquor cerebrospinalis z vnitřních do zevních likvorových prostorů.

* foramen MONROI
** canalis SYLVII

Granulationes arachnoidales

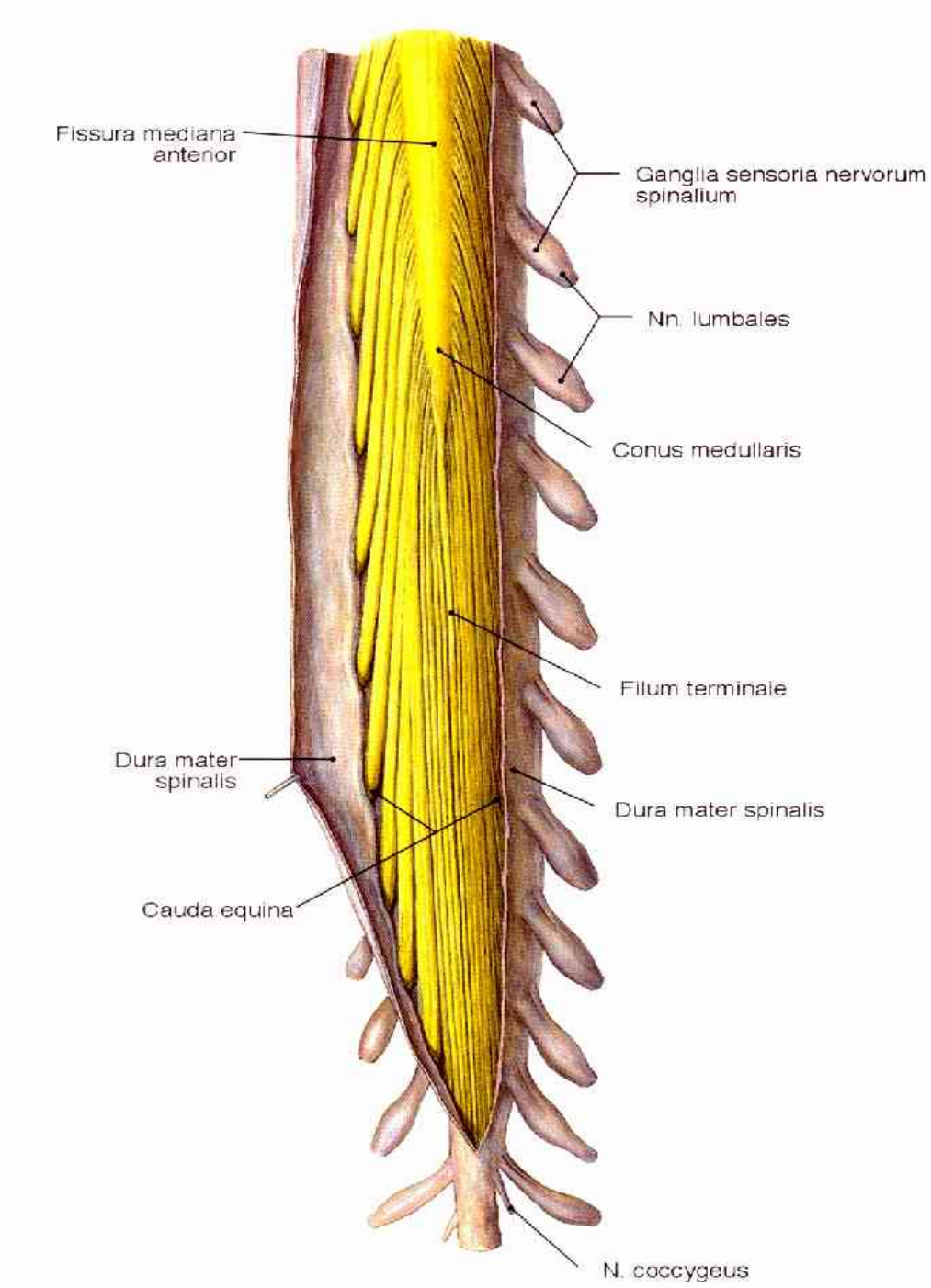


Cisternae subarachnoidales

Cisterna fossae lateralis cerebri
Cisterna pontis
Cisterna laminae quadrigeminae
Cisterna corporis callosi

Dural sheaths

Kořenové pochvy



Dural sheaths

CEREBRAL VENTRICLES

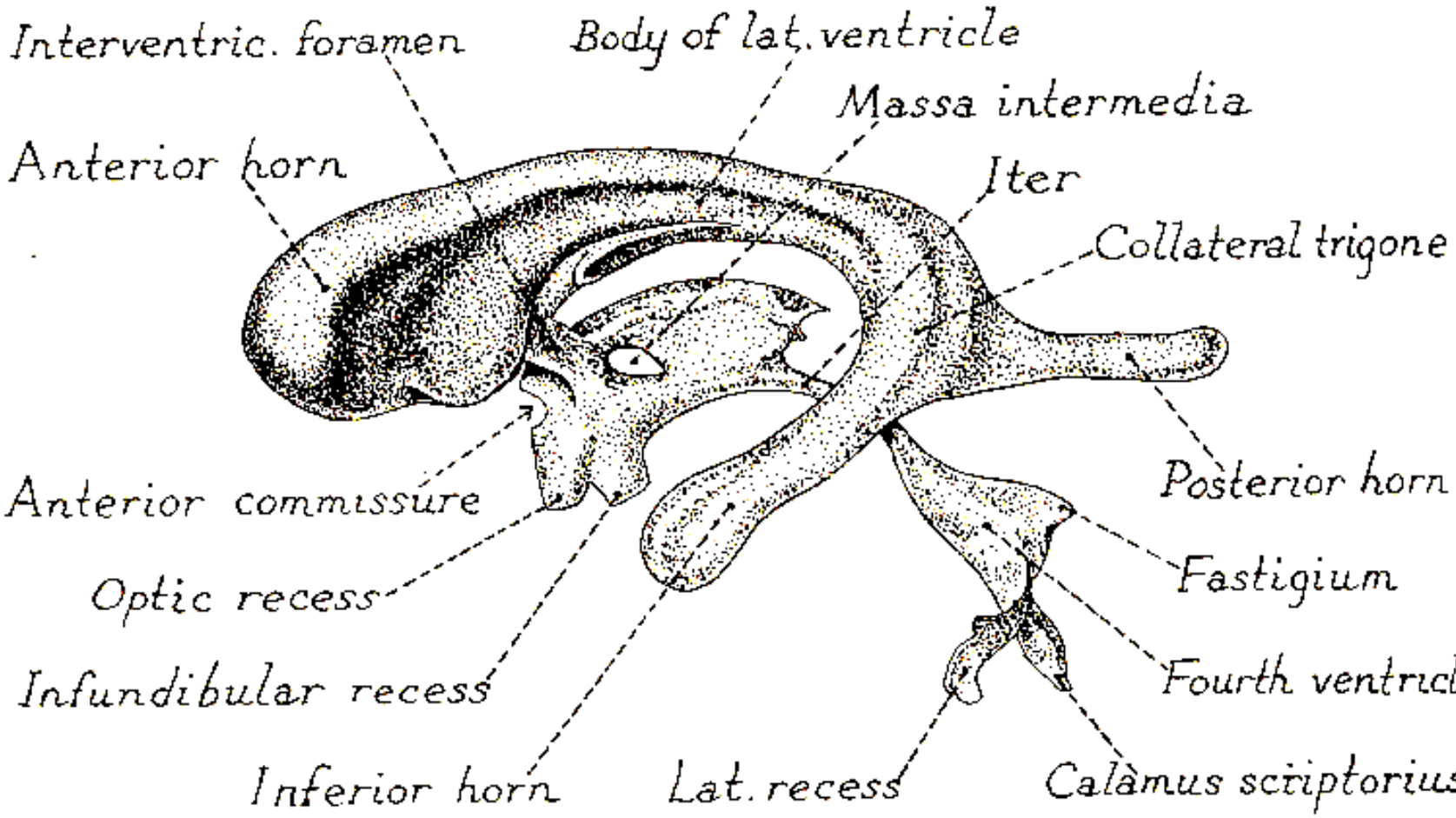
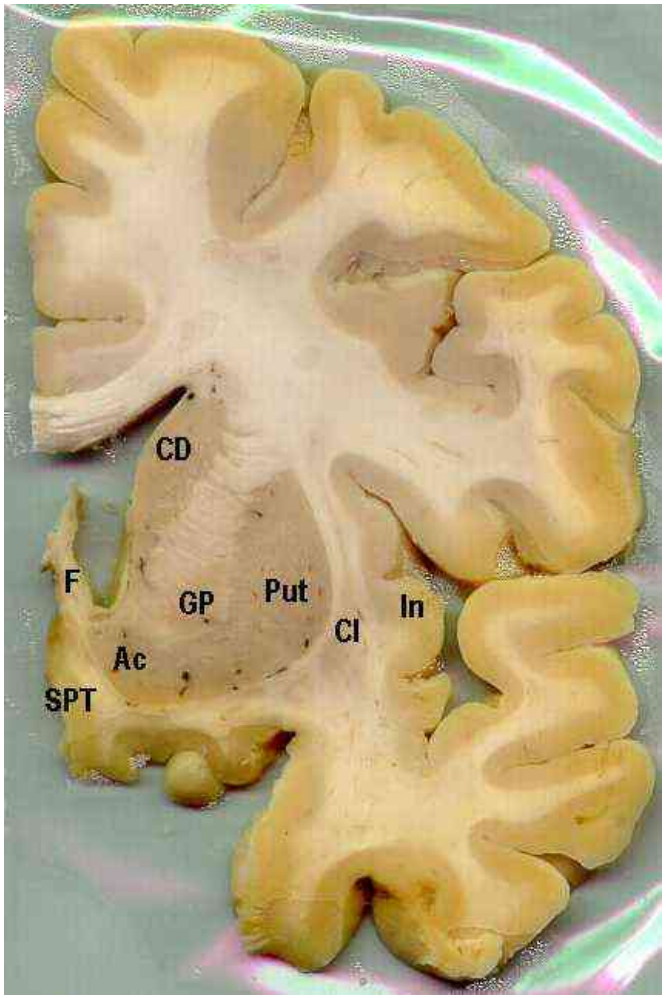
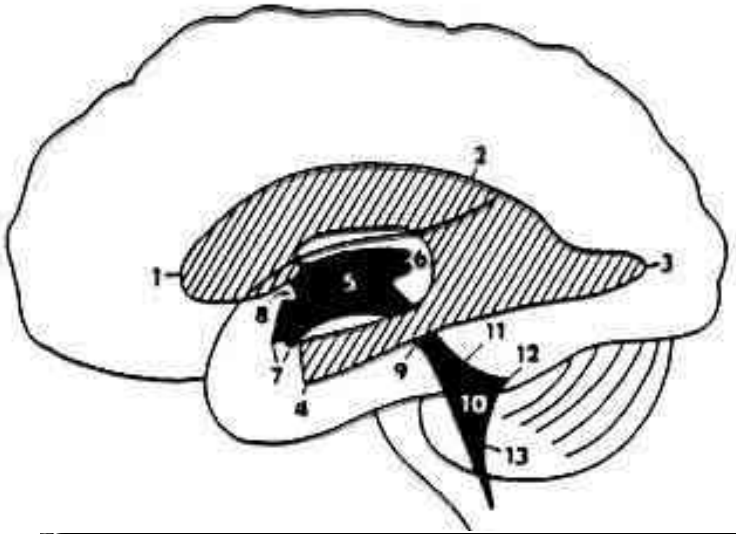
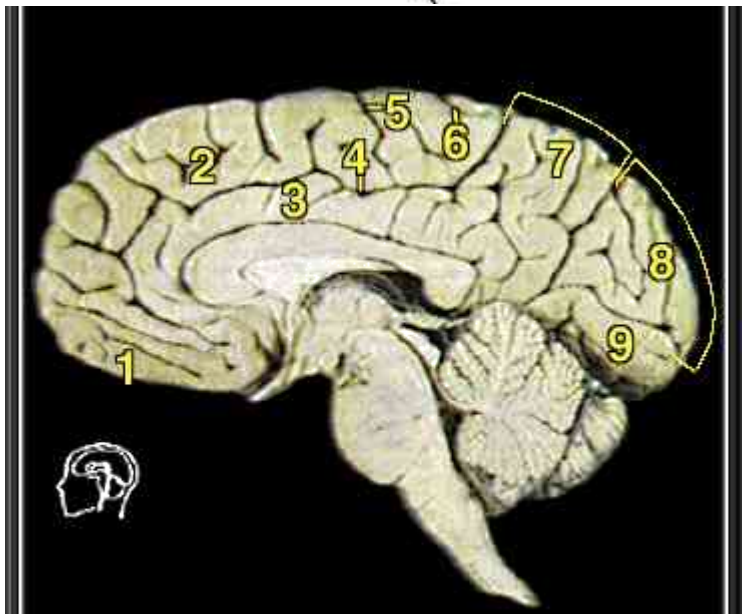


FIG. 305. Cast of the brain ventricles, viewed from the side. Only the left lateral ventricle is represented. (After Rauber-Kopsch.)

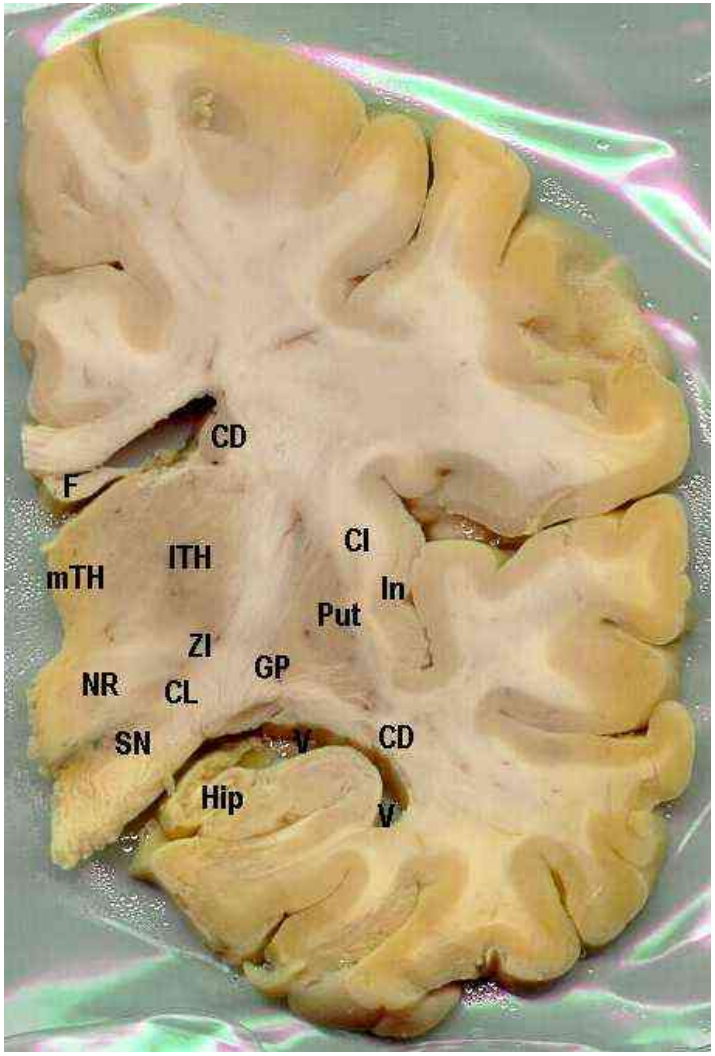
Cornu frontale ventriculi lateralis

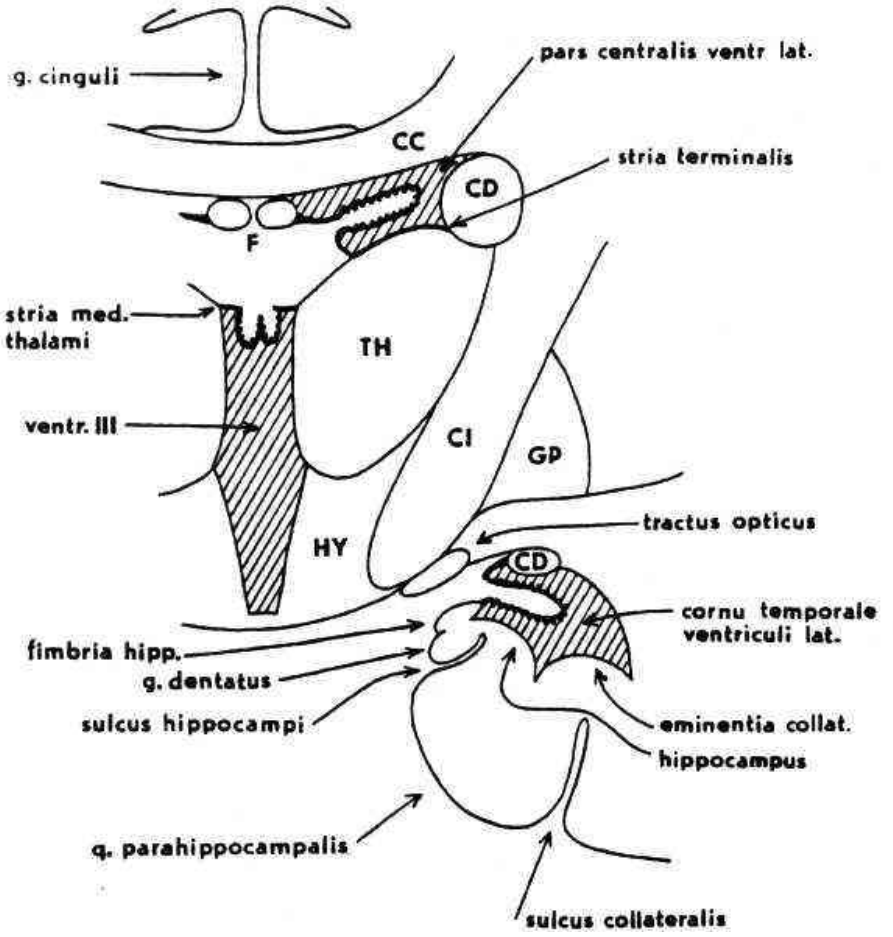


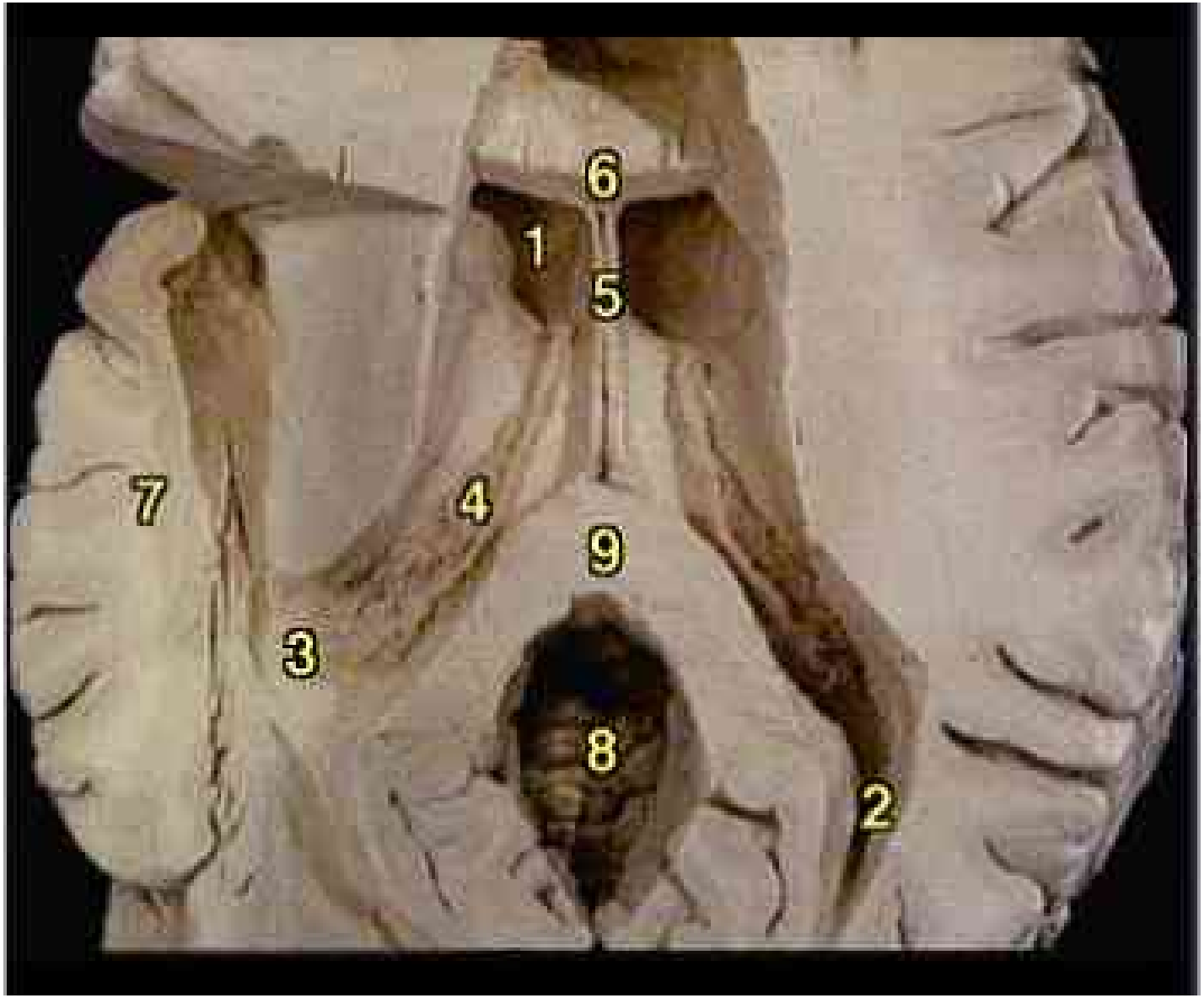




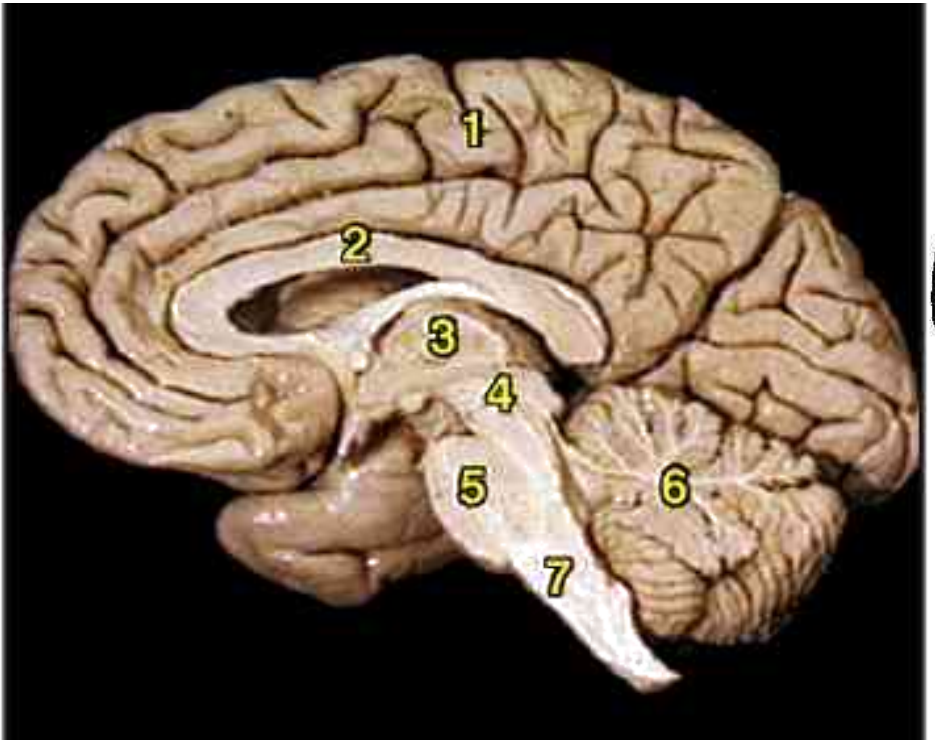
Pars centralis a cornu temporale

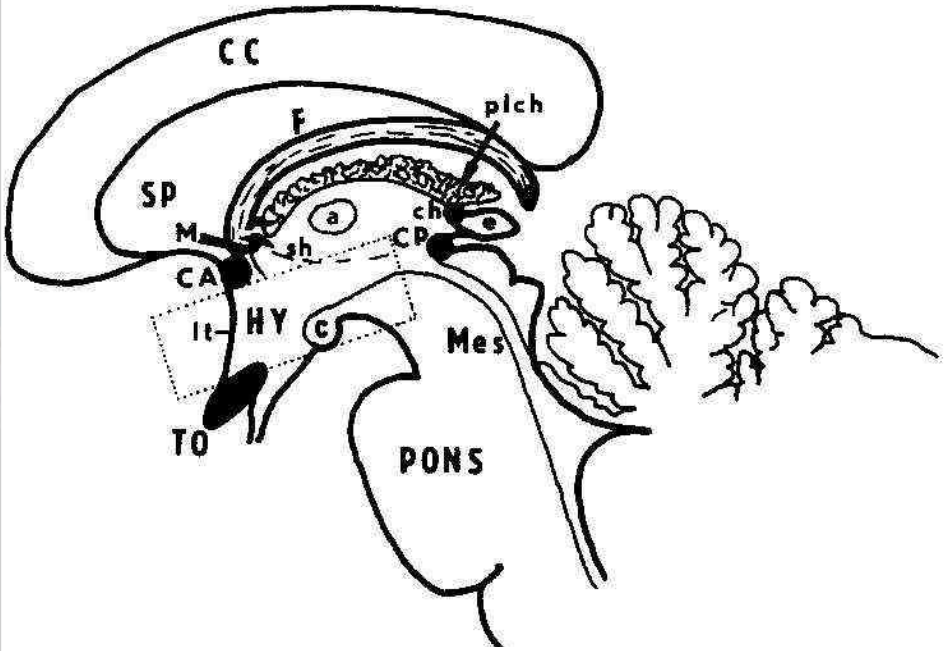


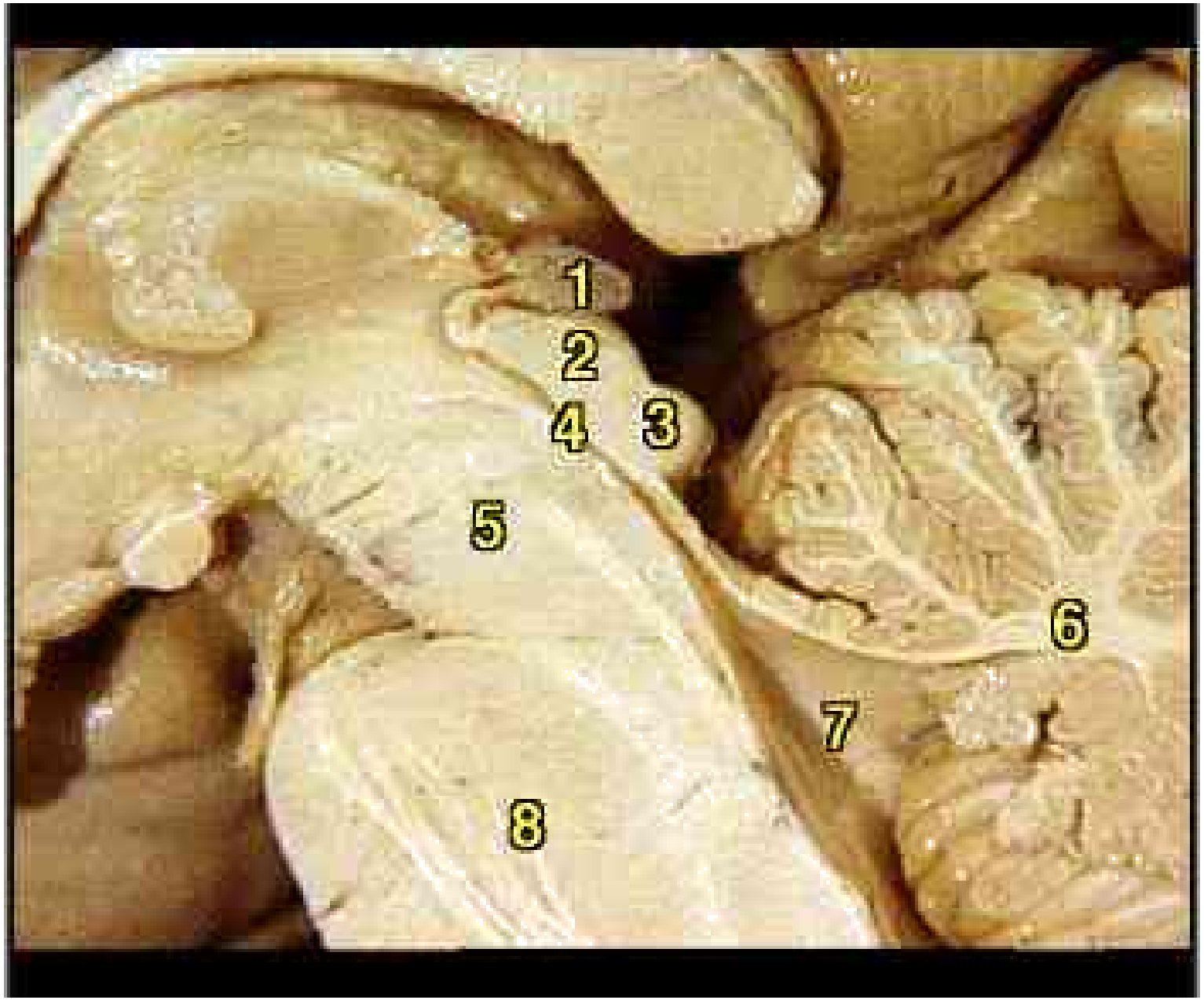



6
1
5
7
4
9
3
8
2

Ventriculus tertius






1
2
3
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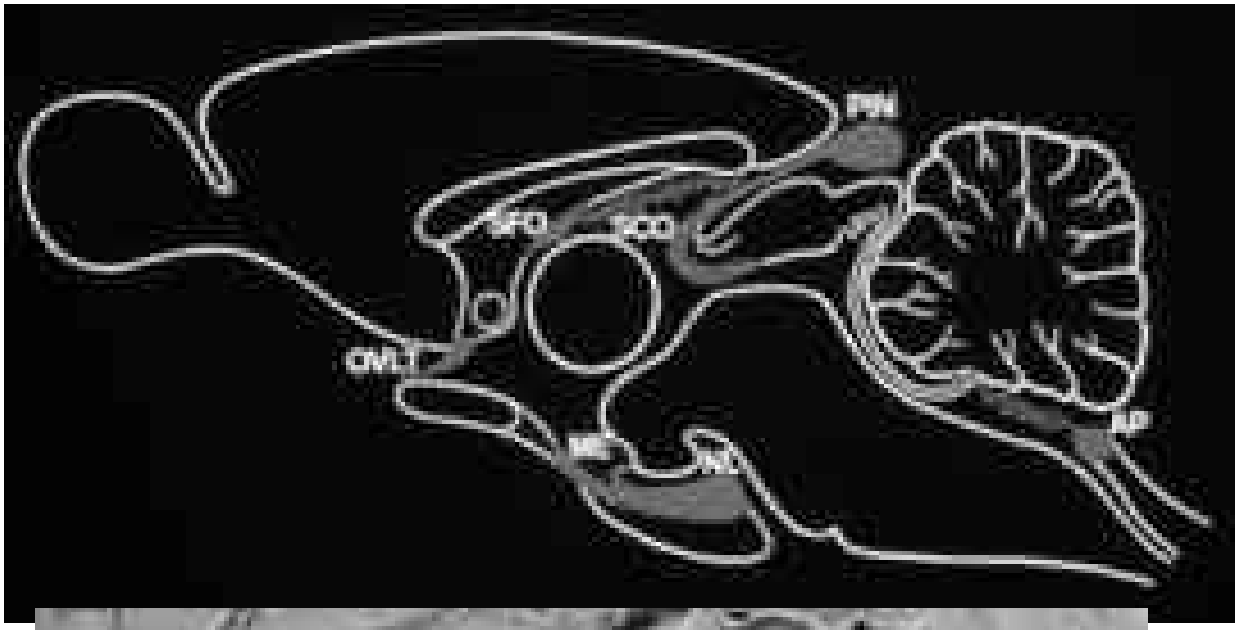
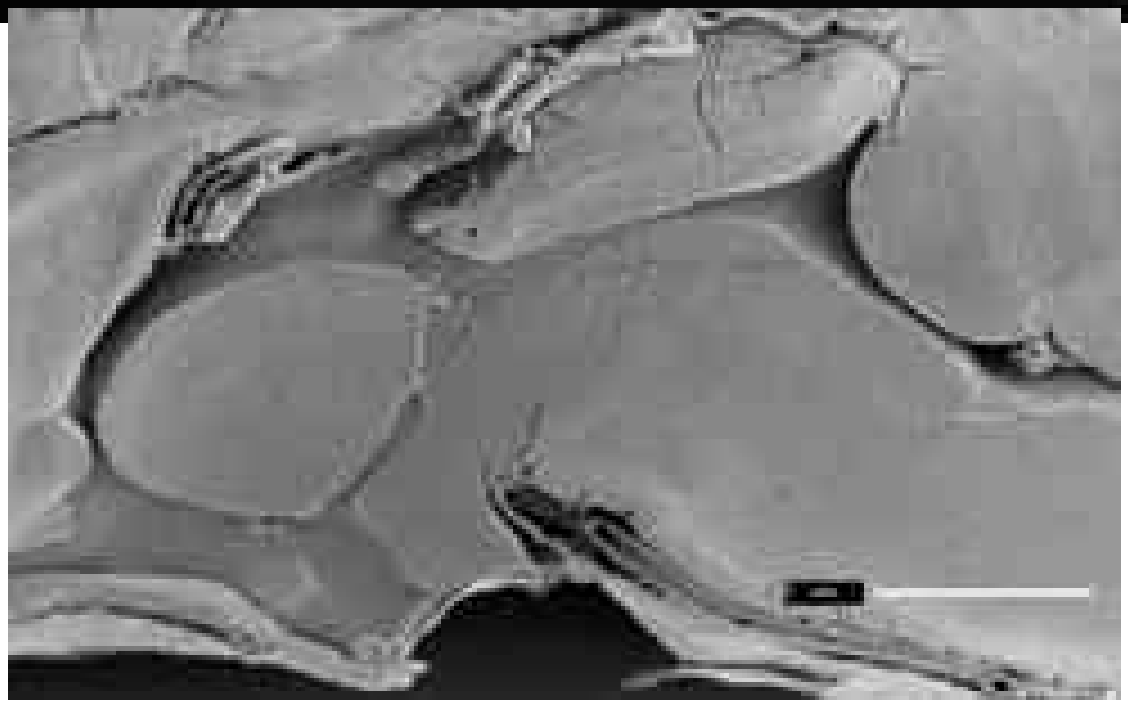
cirkumventrikulární orgány

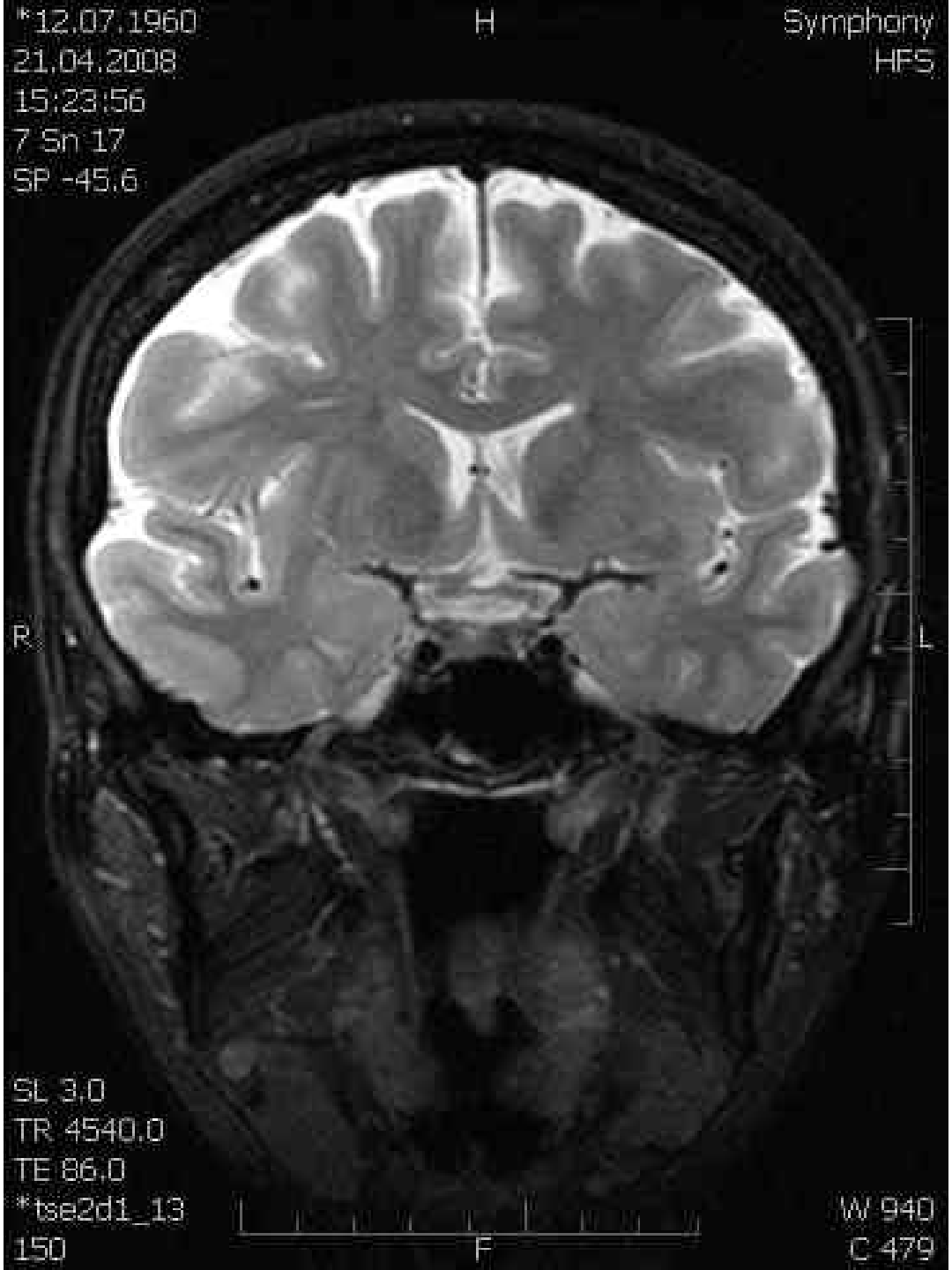
area postrema
organum subfornicale
eminentia mediana
neurohypophysis
corpus pineale



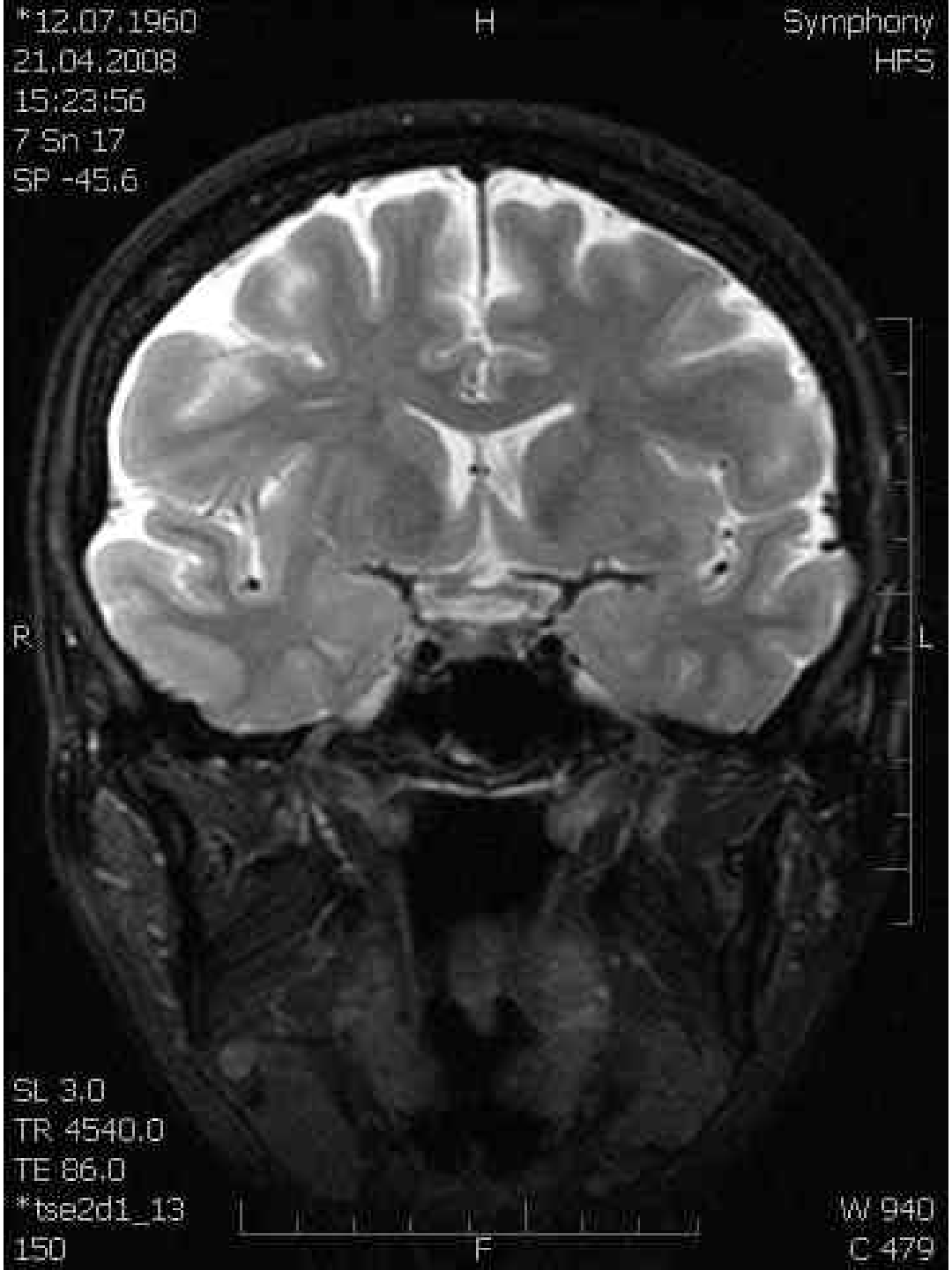
eminentia mediana



MRI – T2


*12.07.1960
21.04.2008
15:23:56
7 Sn 17
SP -45.6
H
Symphony
HFS
R
L
SL 3.0
TR 4540.0
TE 86.0
*tse2d1_13
150
F
W 940
C 479

MRI – T2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21.04.2008
15:23:56
7 Sn 17
SP -45.6
H
Symphony
HFS
R
L
SL 3.0
TR 4540.0
TE 86.0
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150
F
W 940
C 479


*12.07.1960
21.04.2008
15:19:17
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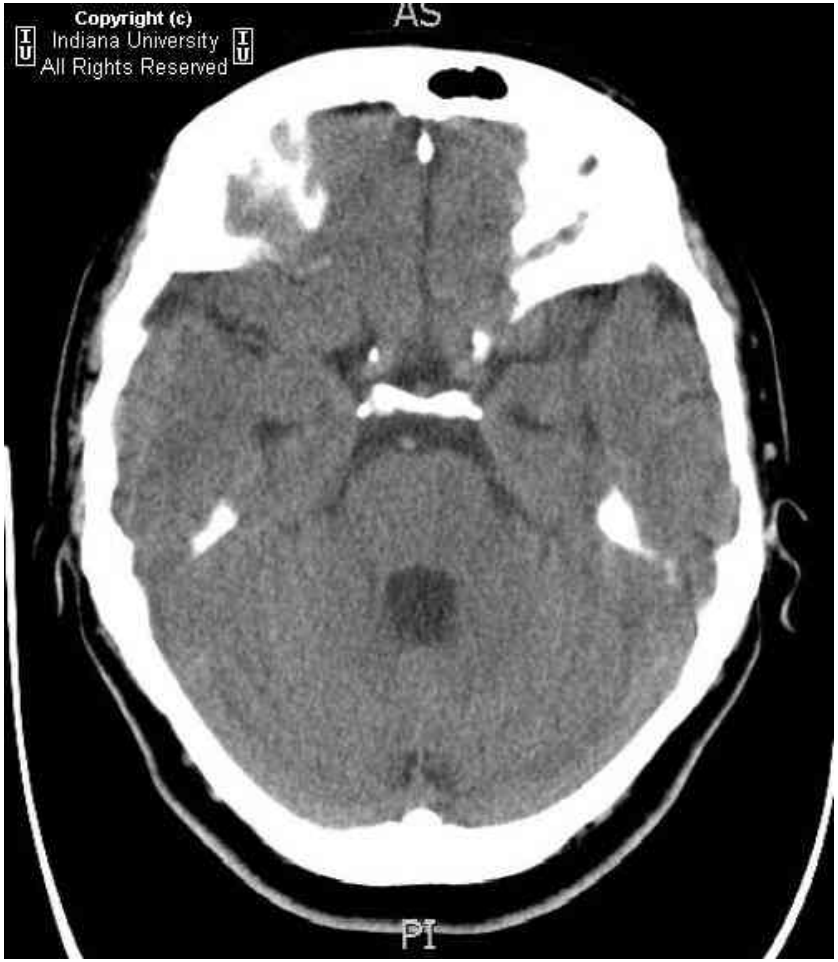
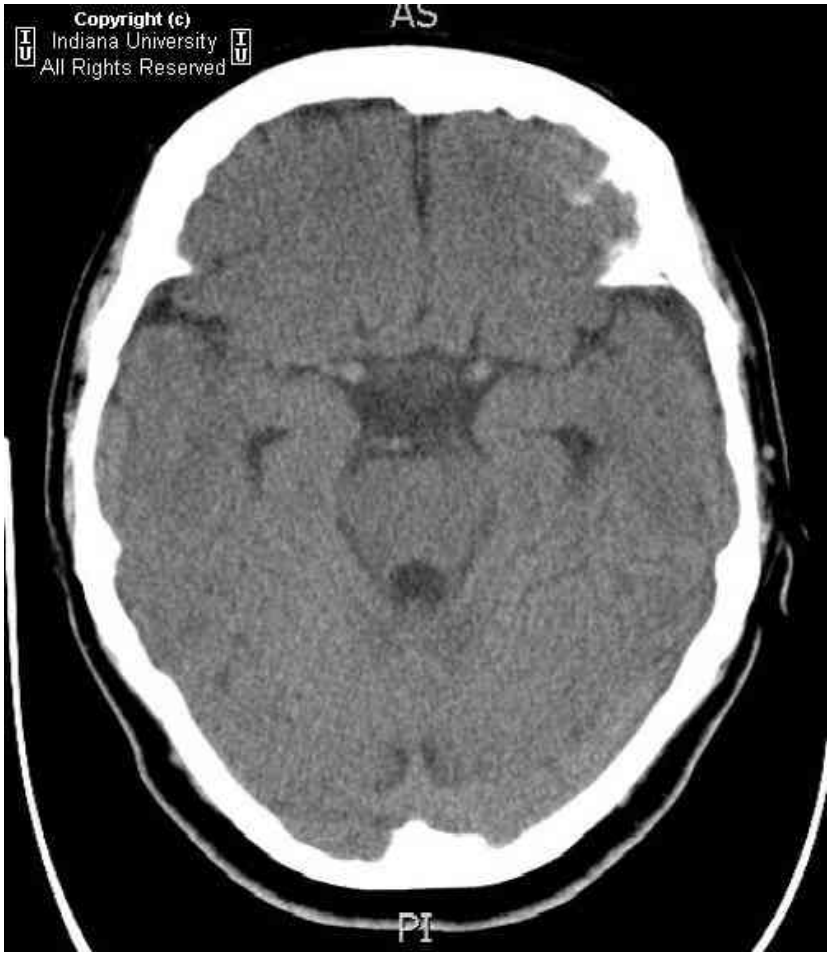
H
Symphony
HFS
A
P
SL 3.0
TR 3700.0
TE 102.0
*tse2d1_13
160
F
W 962
C 478

60-year woman with worsening cognitive impairment and gait disturbance



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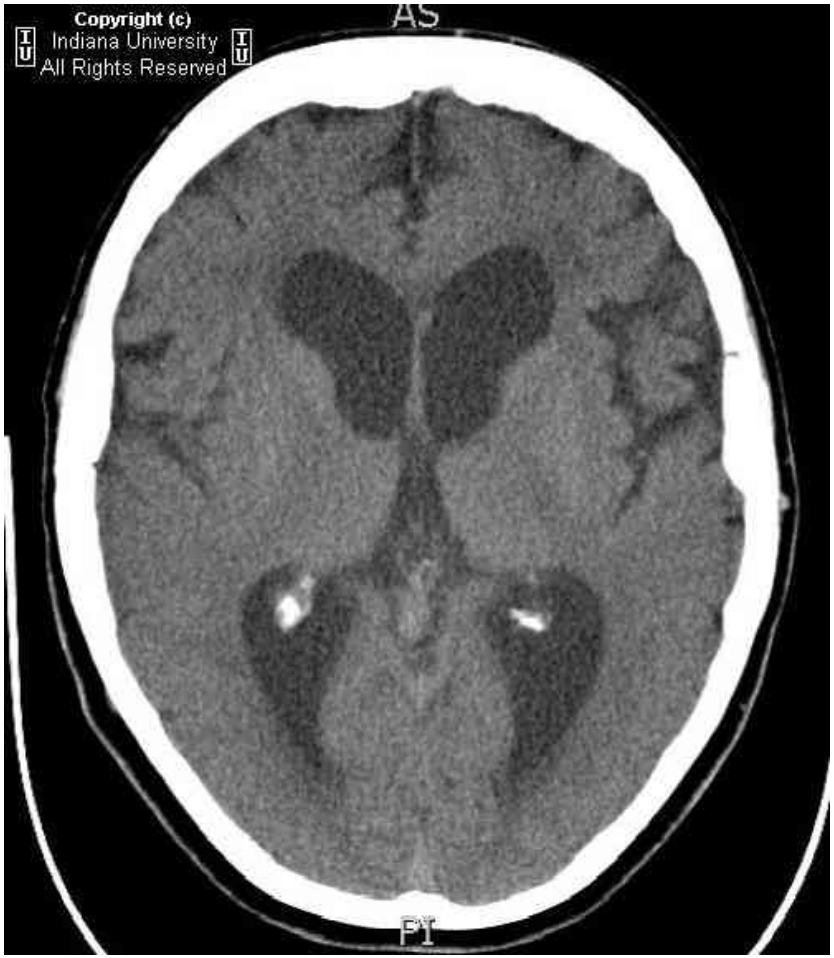
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Substantial enlargement of the 3rd, 4th, and lateral ventricles.
Relative normal appearance of sulci for age.
No evidence of substantial vascular pathology.

Normotensní hydrocephalus
Normal pressure hydrocephalus

- Classical clinical triad of **dementia, gait disturbance, and urinary incontinence** is seen with normal pressure hydrocephalus.
- Symptoms result from distortion of white matter by distended ventricles.
- Patients commonly have a history of prior SAH or meningeal infection.
- Gradient between ventricular system and subarachnoid space due to incomplete subarachnoid block.
- **Radiographic key: Diffuse ventriculomegaly out of proportion to sulcal prominence.**
- **Not a radiographic diagnosis. Diagnosis made by improvement of symptoms after shunting.**
- **Radioisotope cisternogram shows early entry into the lateral ventricles with persistence at 24-48 hours and delayed ascent to parasagittal regions.**
- **Flow void can be seen through the aqueduct of Sylvius on MR due to increased flow velocity**

Použité zdroje
sources

- Petrovický, Anatomie III
- http://www.radiologyassistant.nl/en/484b8328c
- http://www.nejm
- http://www.auntminnie.com/index.asp?Sec=edu
- jiné webové zdroje a soukromý archiv