Stroke
ESO.org

Csiba László

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Globalis mortalitás

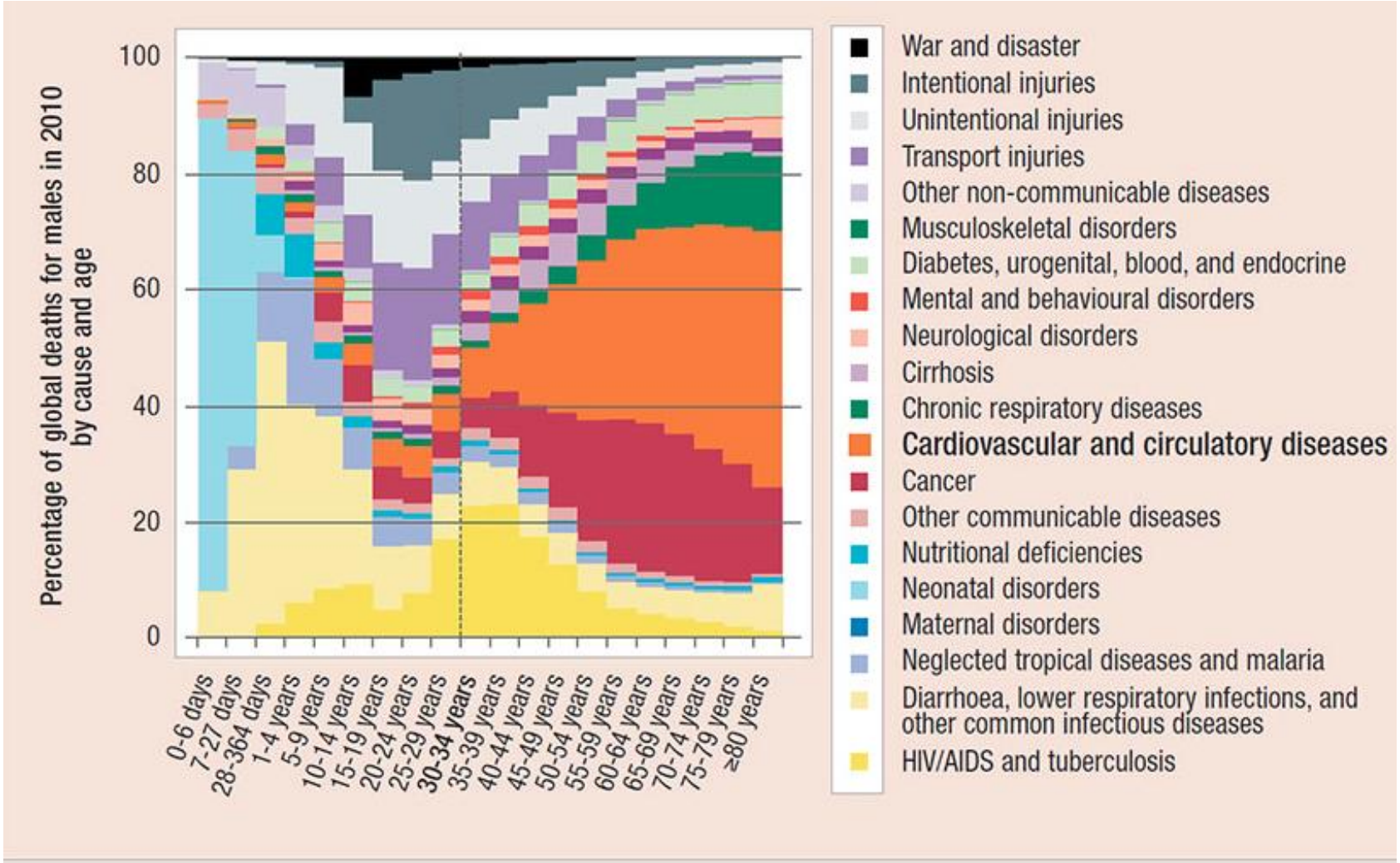


Figure 1. Percentage of global deaths for males in 2010 by cause and age according to the Global Burden of Diseases, Injuries, and Risk Factors Study 2010 (GBD 2010). (1)

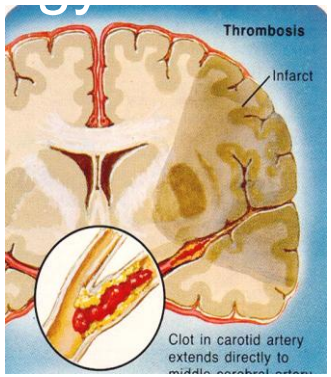
Normalis életvitel kezelés nélkül

MI után **70-80%**

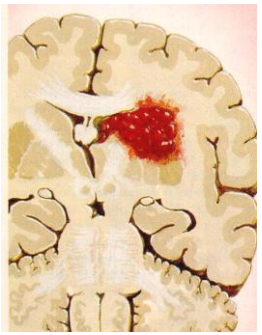
stroke után **10%**

Differencialis diagnosis---CT/MRI!!!

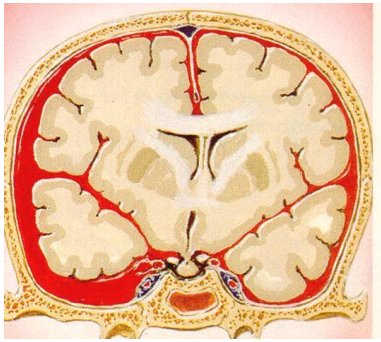
ischemia 80%



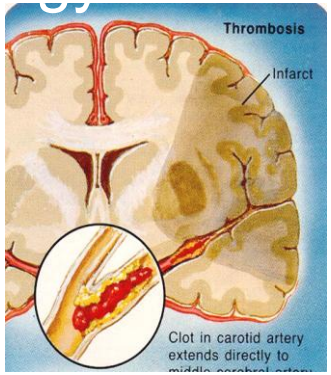
sp. Agyvérzés 10-15%



Subarachnoidalis vérzés SAV



ischemia 80%

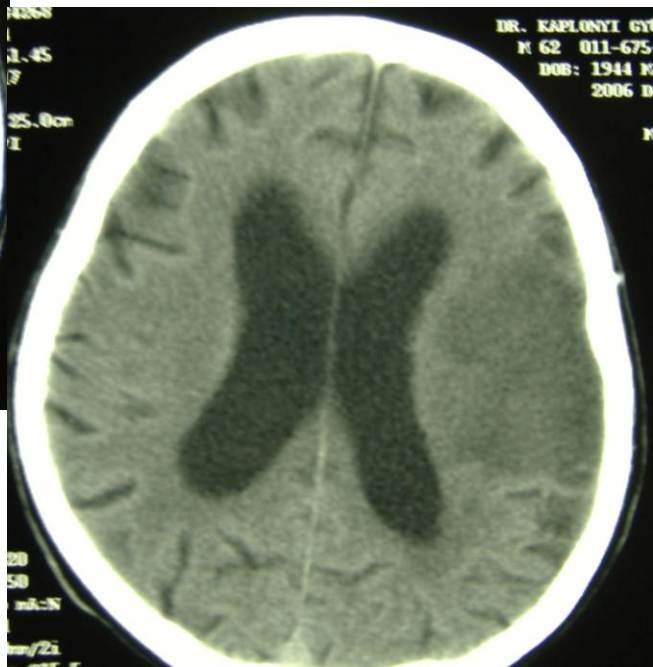

Thrombosis
Infarct
Clot in carotid artery
extends directly to

CT

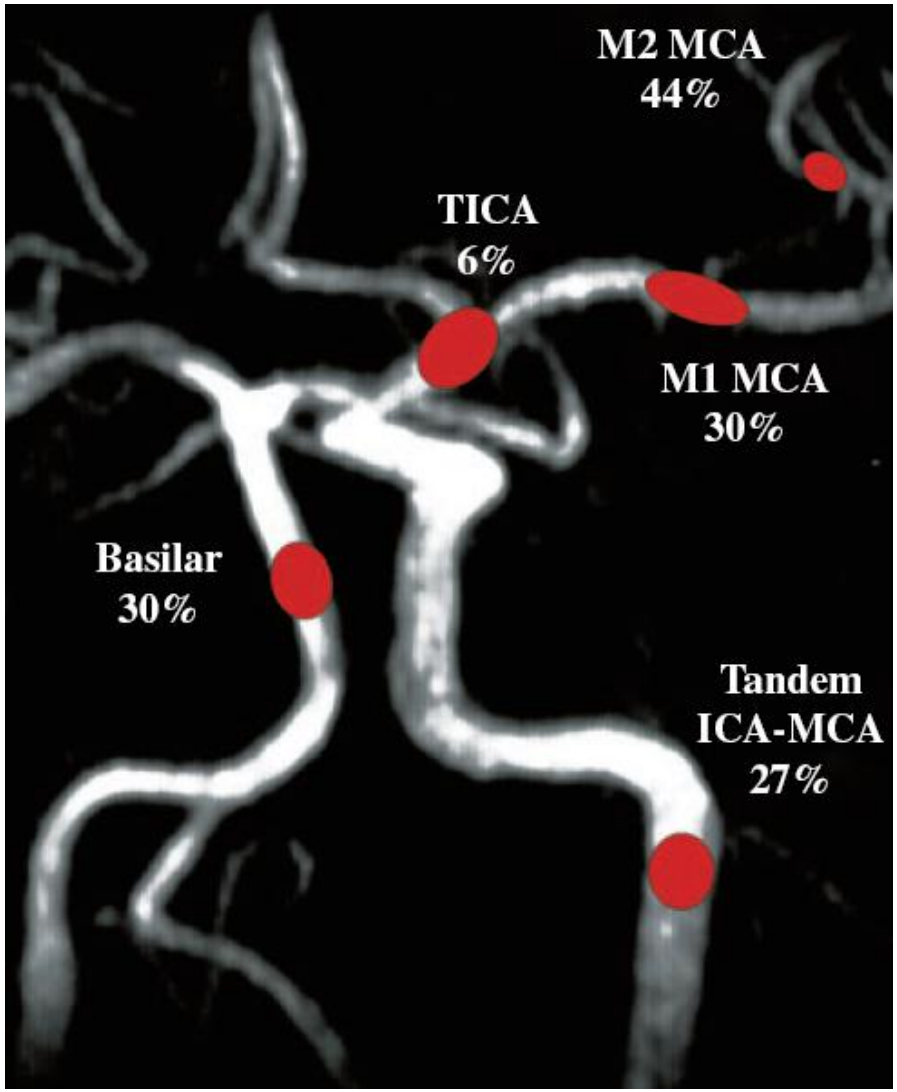
62 é felvételi CT

Egy nap múlva

2 nap múlva



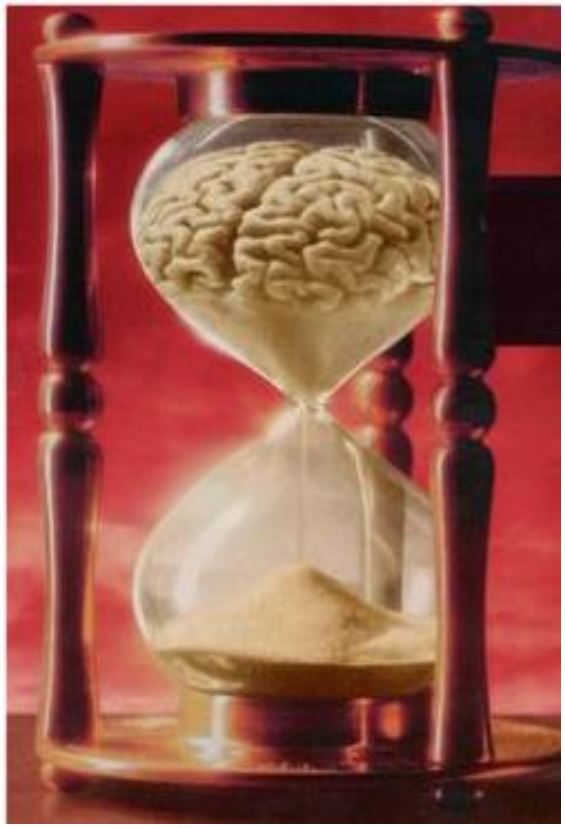
Nagyér elzáródás? A vénás lízis sikere kicsi..



Alexandrov , J Int. Medicine 267; 209–219 2010.

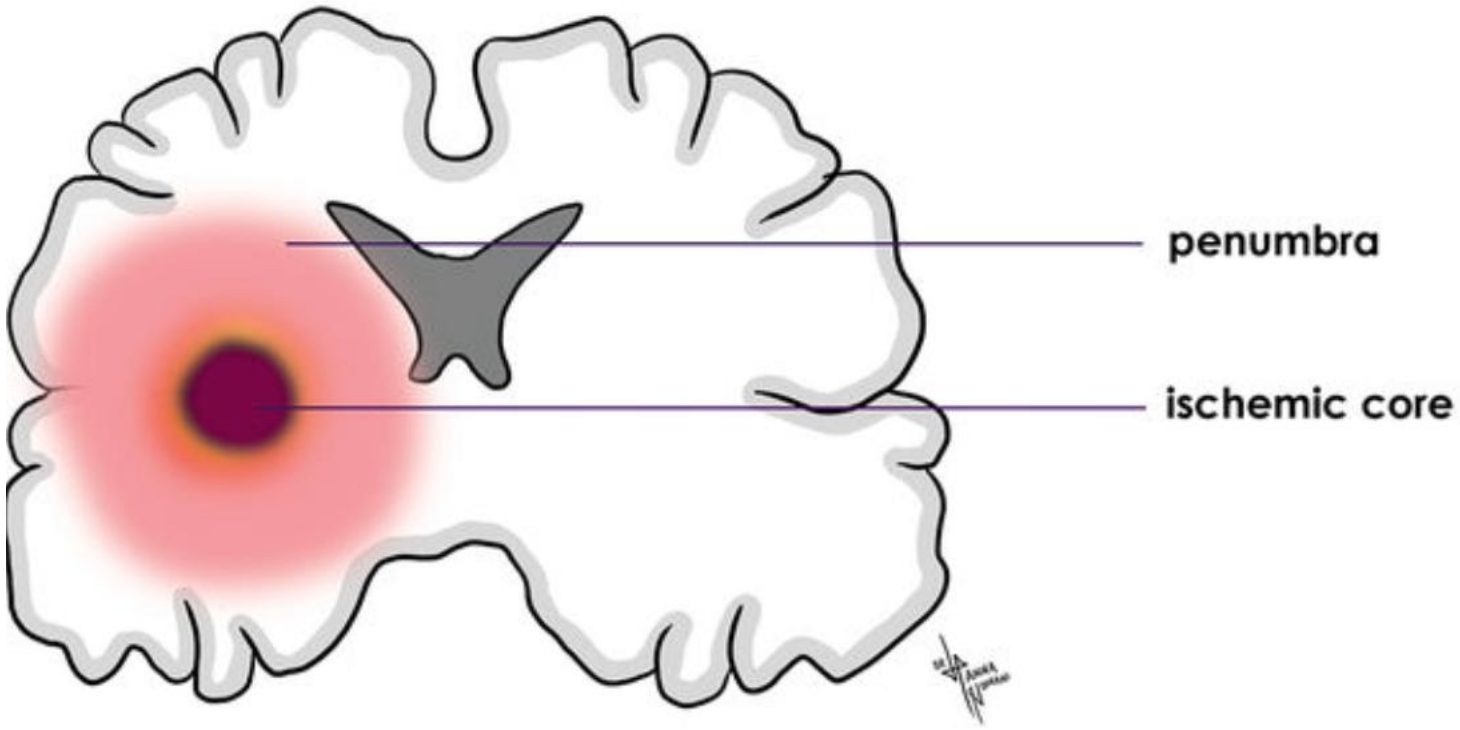
Ischemiás Stroke

- 700 km axon/óra↓
- 2 millió neuron/perc ↓



Az idő agy!

Ischemiás Stroke

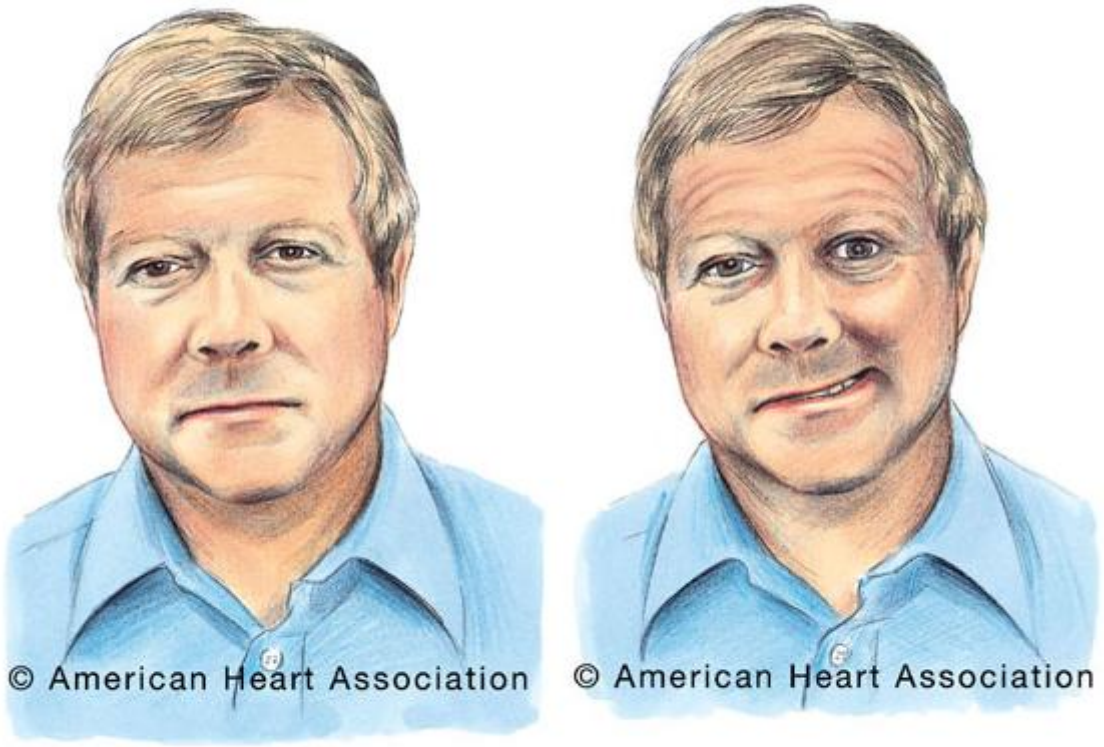


Tünetek

Cincinatti scale 1.

Cincinnati Stroke Scale

printable version PDF



Facial Droop

- *Normal*: Both sides of face move equally
- *Abnormal*: One side of face does not move at all

Cincinatti scale 2.

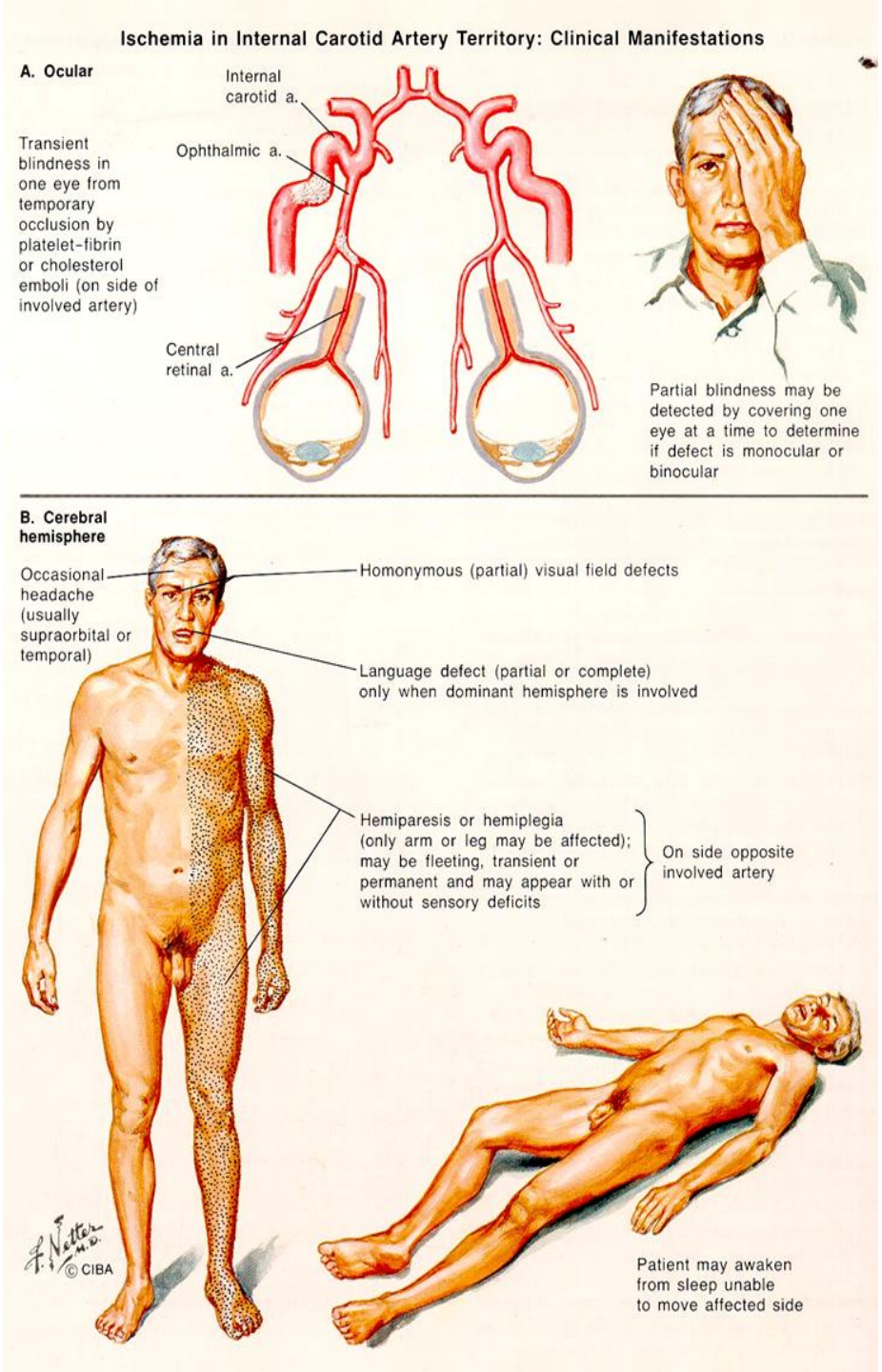
Arm Drift

- *Normal*: Both arms move equally or not at all
- *Abnormal*: One arm drifts compared to the other

Cincinatti scale 3.

- Nem érti a beszédet vagy nem találja a szavakat (aphasia)

Előagyi ischemia (ACI/ACM)

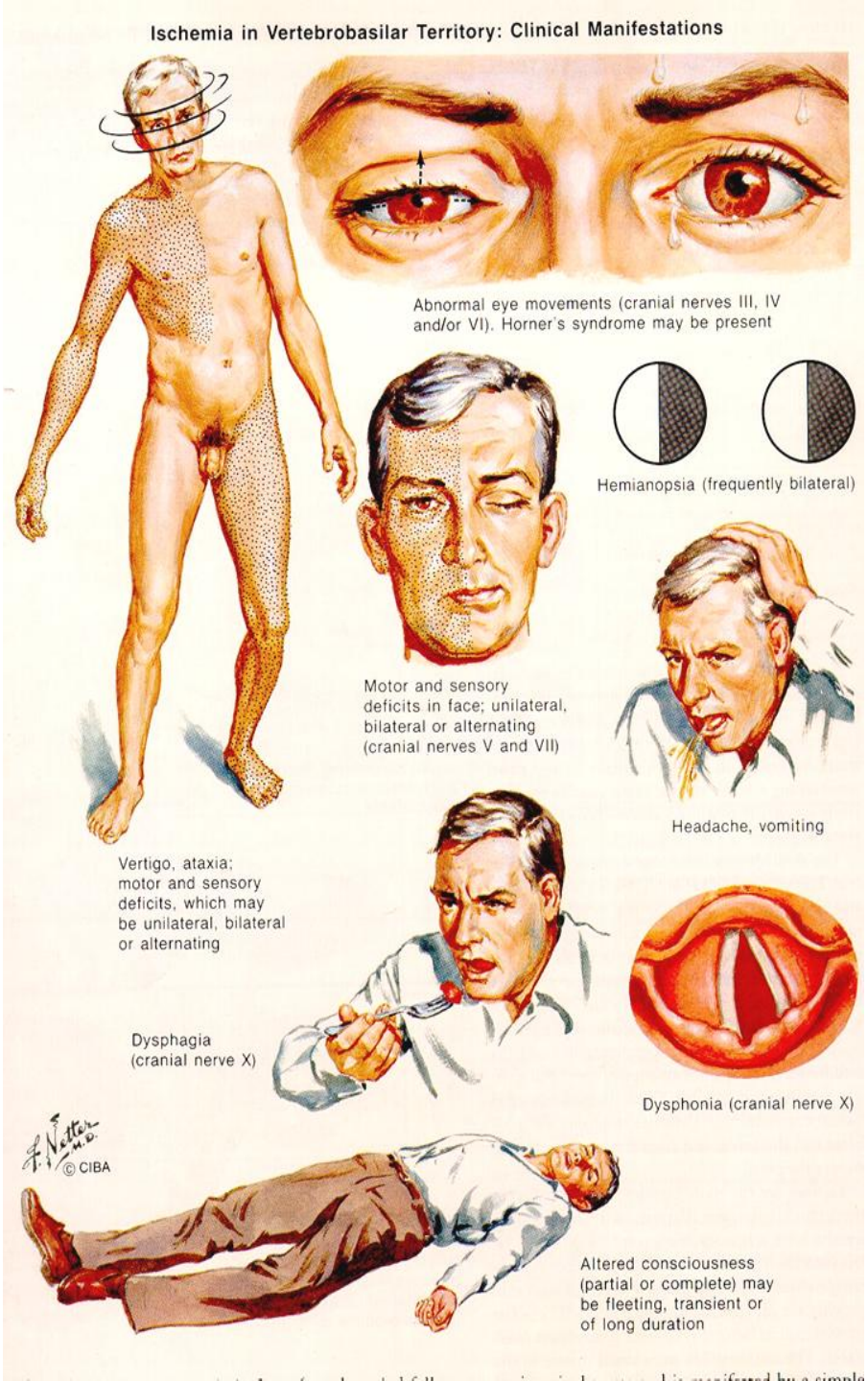


Netter, 1986

Hátsó skála

(vertebro-

basilaris)



Netter, 1986

TIA
(TRANSIENs ISCHEMIás ATT.)

- Transiens tünetek
- percek
- Nincs rezidualis (MRI)

TIA sürgősség!!! Magas stroke rizikó!

Minden idegvédő kudarcos!

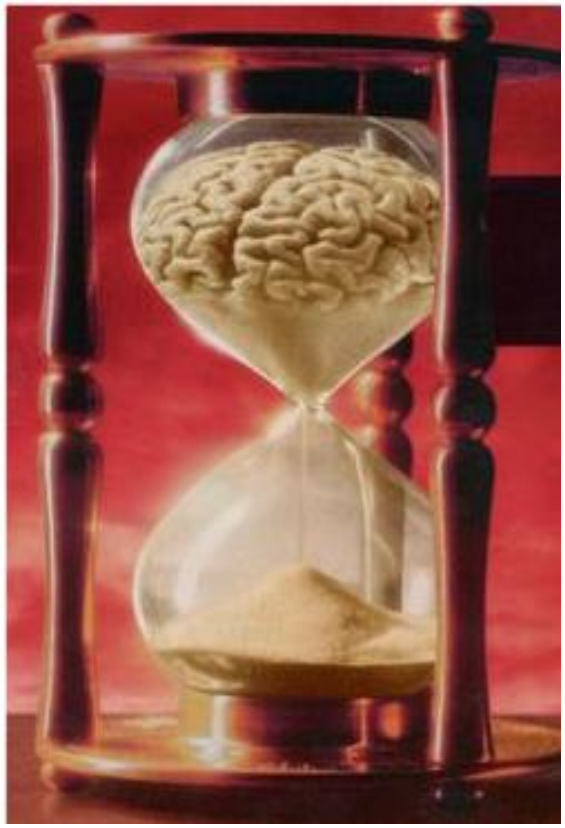
Hogyan?

Meg kell nyitni az eret!

- iv. thrombolysis (t-PA)
- Ia. Intraarterialis
- mechanicus thrombectomia
- kombináció

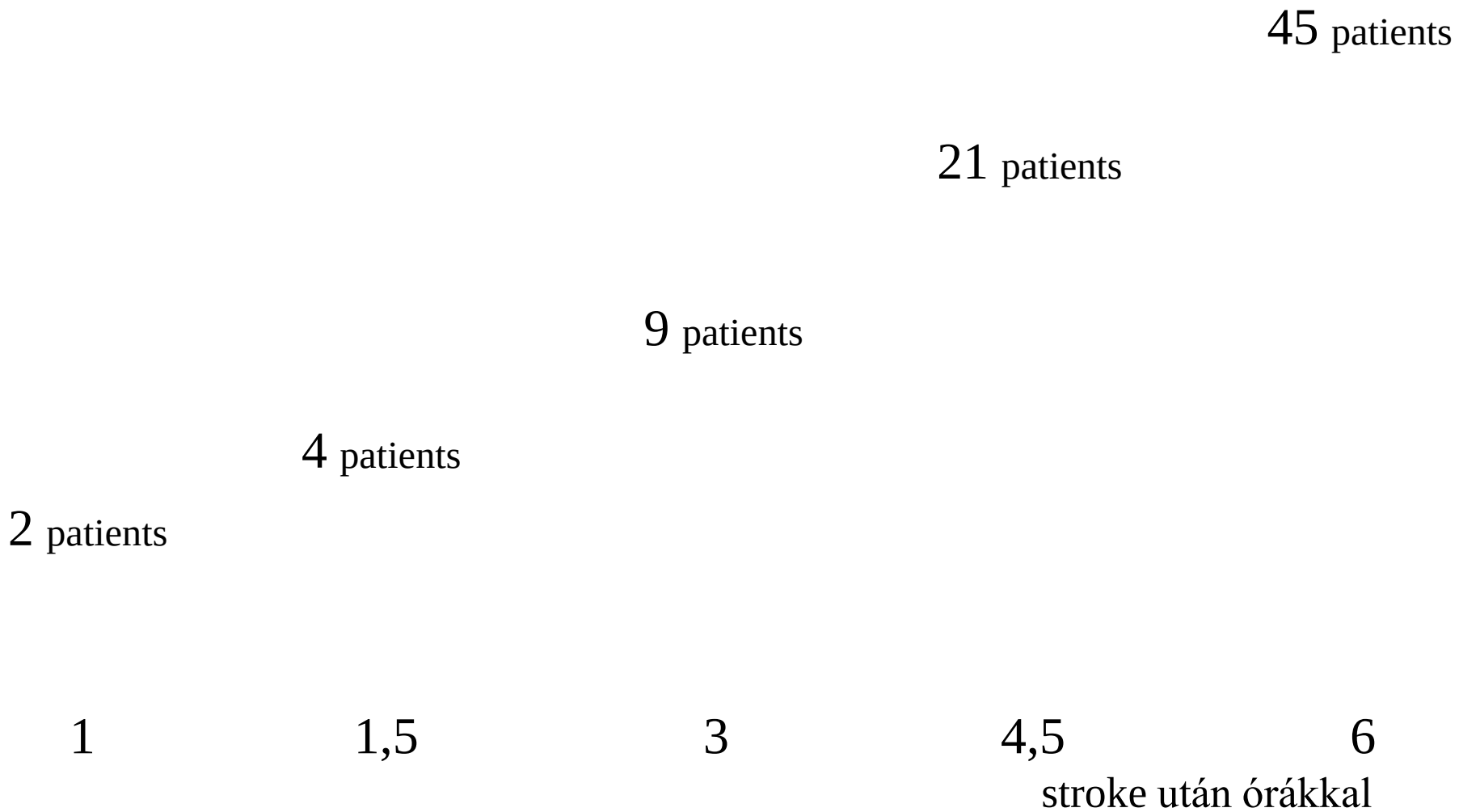
Ischemiás Stroke

- 700 km axon/óra↓
- 2 millió neuron/perc ↓

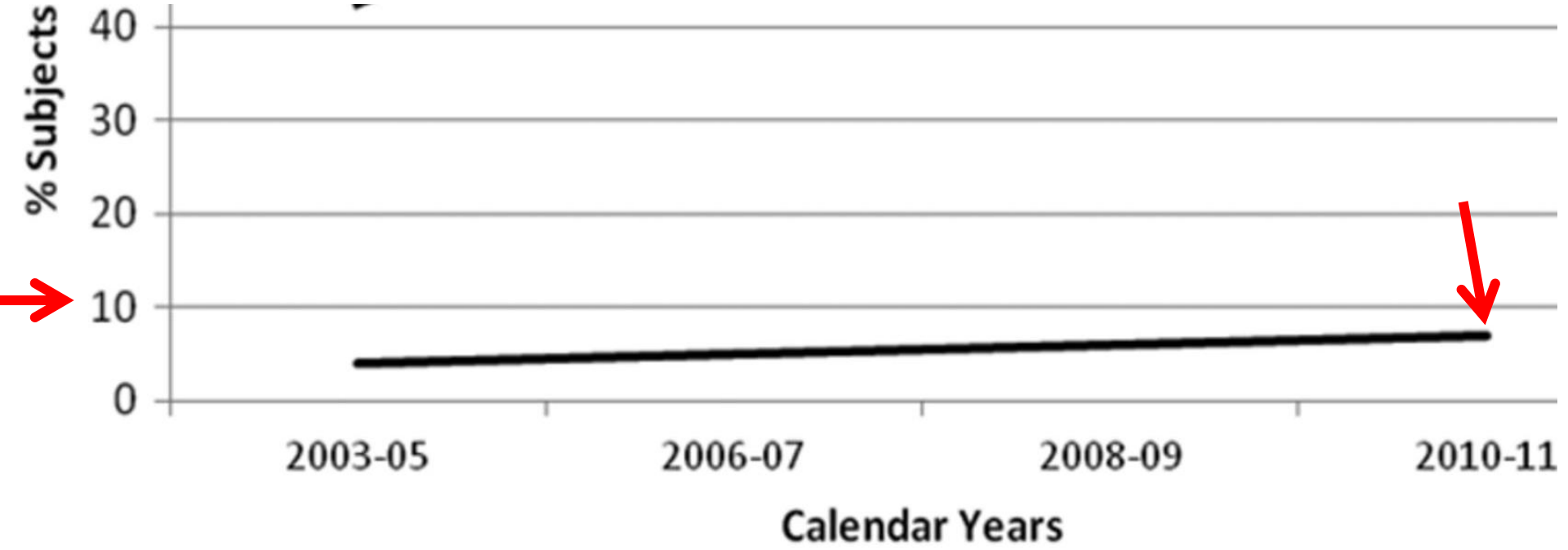


Az idő agy!

Minél hamarabb megnyitni



Lysis: USA



Lee H. Schwamm et al. Circ Cardiovasc Qual Outcomes. 2013;6:543-549

iv. Thrombolysis Debrecenben

2011	2012	2013	2014	2015	2016.12.12.
133	142	113	131	147	216
(%)	20	20	17	18	19%	23%

Több 1300 iv. lysis!

Debrecen stroke

stroke

A lánc ereje a leggyengébbtől függ

Ambulancia!

CT-!
CT+CT angio!

Stroke unit

Personalised:

Iv?
intraarterialis?
iv+ia?
mechanical thrombectomy

Mennyi az időablak?
Az elzáródott értől és az eltelt időtől függ.?

4,5 óra (egyes esetekben csak 3 óra) **iv.** lysis
ha kis ér van elzáródva

6-8 óra ha ACI vagy ACM ovan elzáródva:intraarterialis vagy mechanikus thrombectomia de kezdjünk iv. !!

12 h ha basilaris van elzáródva **iv vagy ia. lysis**

idő

Időablakon túl vagyunk?

- 100-300 mg aspirin
- Vérnyomás és EKG monitorozás
- 220/110 Hgmm-ig NE csökkentsük a vérnyomást!
- Pulsoximetria, 2-4 lit oxigen, ha kisebb mint 94%
- Normoglycemia
- LMWH vagy heparin MVT megelőzésére
- Nasogastricus szonda ha nyelészavaros
- Lázcsökkentés
- Ha görcsantiepilept.
- antibiotikum

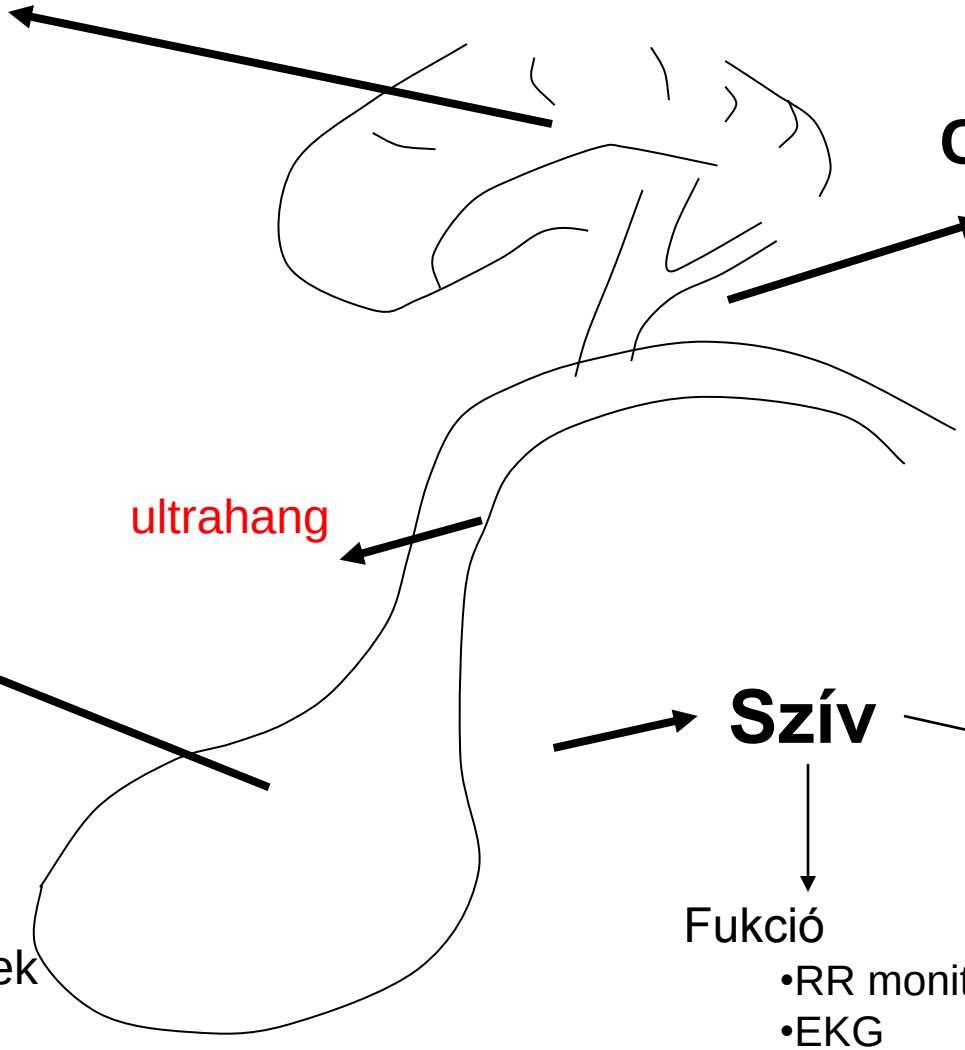
Megnyitás után a következő kérdés:

mi okozta a stroke-ot?

Stroke:diagnosis

Képalkotás

- CT
- MRI
  - Diff. WI
  - TCD
- DSA angiogr.



Carotis, vertebr-

- ultrahang
- CT AG
- MRA
- DSA

ultrahang

Vér

- vvt htc
- Glucose, ionok
- Alvadás?
- lipidek
- Immunol. tesztek

Szív

morfologia
- TTE
- TEE

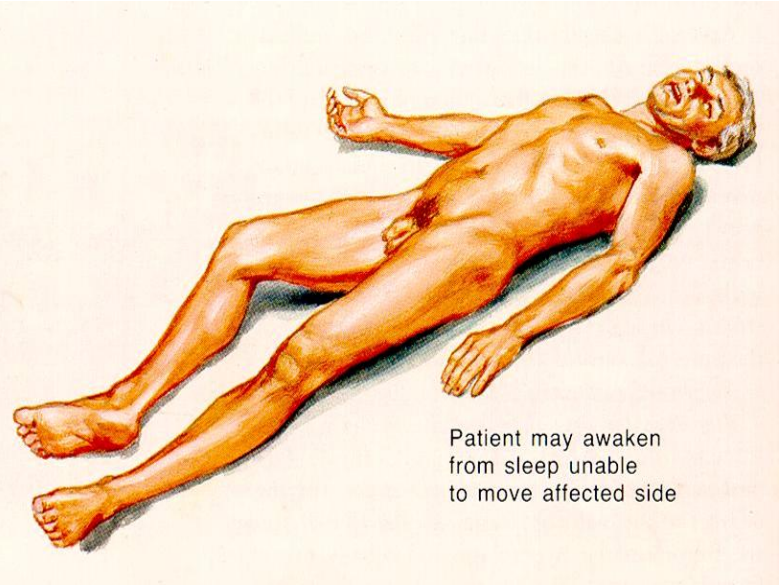
Fukció
- RR monitor.
- EKG
- Holter EKG

A 2 stroke megelőzése?

Rekurrens stroke

- 1 hó 30%
- 1 év 10%
- Utána 6-8%

A 2. stroke megelőzése?



1. Vérlemezkegátlás
   - asp+DP>aspirin mono
   - clopidogrel 75 mg
   - triflusal
2. Antihypertensive th.
   - ACE inhib+diureticum
   - E.g.perindopril+indapamide
3. Statin
4. PF v. kardiogén emboliaforrás→ AC INR 2-3
5. Carotis stenosis stent vagy CEA 2 héten belül

   70-99% stenosis

   Csak ha TIA vagy minor stroke

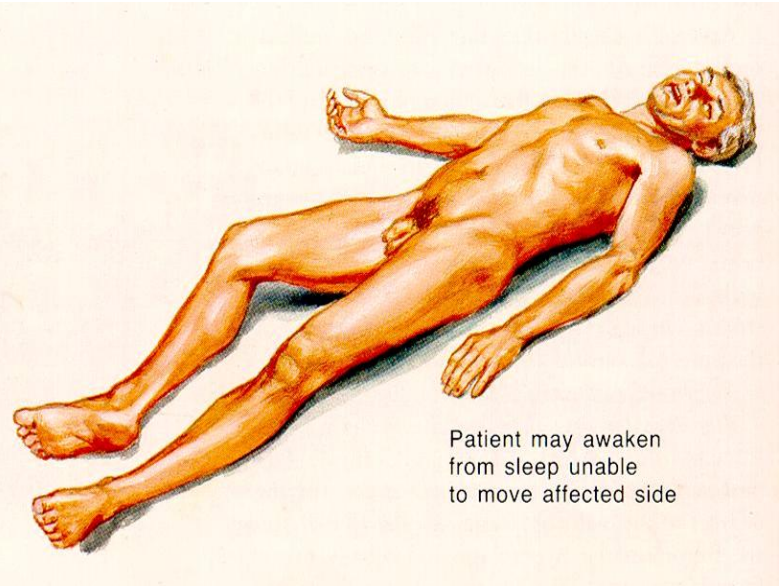
   Occlusio? Nem!! Béna?Nem!!

1.Vérlemezkegátlás

- 2x aspirin (25mg)+ ER dipyridamol (200 mg) prevents 1 pts/100 pts 1 éven belül

- aspirin + Clopidogrel? Ne!

A 2. stroke megelőzése?



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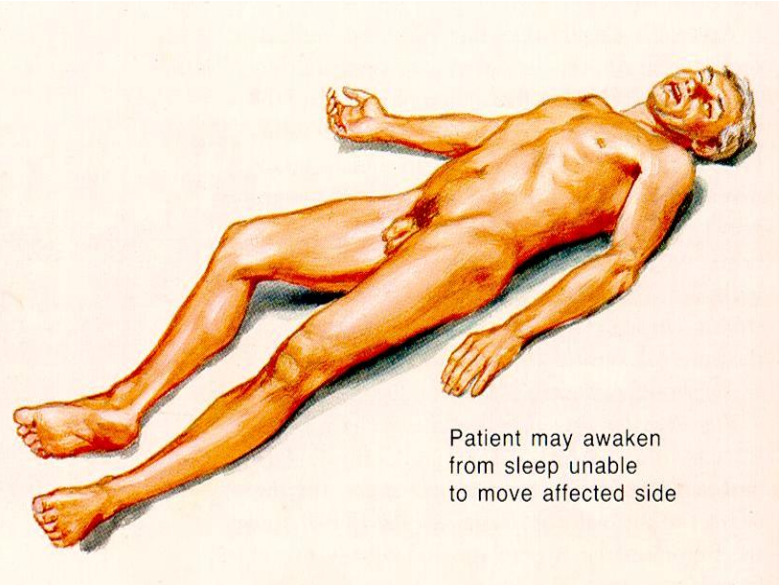
2. BP

- stroke rizikó ↑ha >115 Hgmm
- ↓ ha 10/5 Hgmm BP stroke rizikó ↓ 30-40%
- Cél? – 120/80 vagy ↓
- Vízhajtó egyedül +ACE inhib

A 2. stroke megelőzése?



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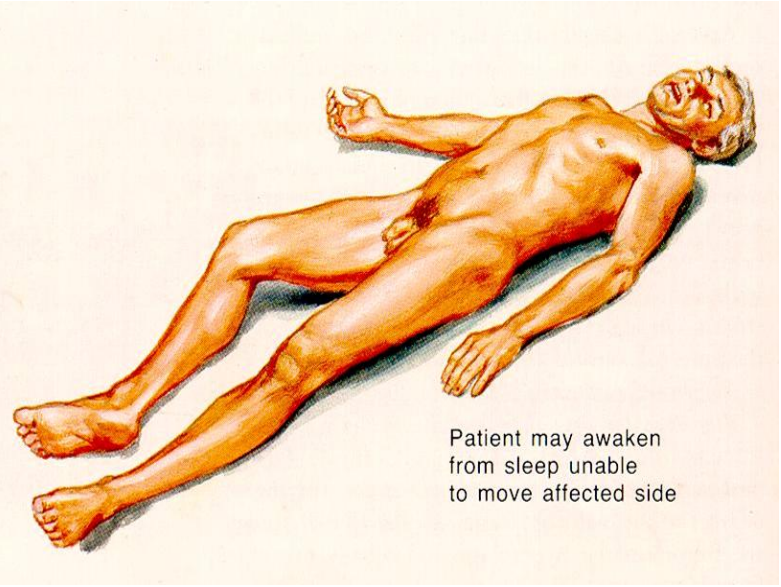
3.Statin

- Statin ha ≥LDL 2.6 mmol/l vagy arteriosclerosis jelei
- cél: LDL < 1.8 mmol/l
- Niacin vagy gemfibrosil ha HDL-C alacsony

A 2. stroke megelőzése?



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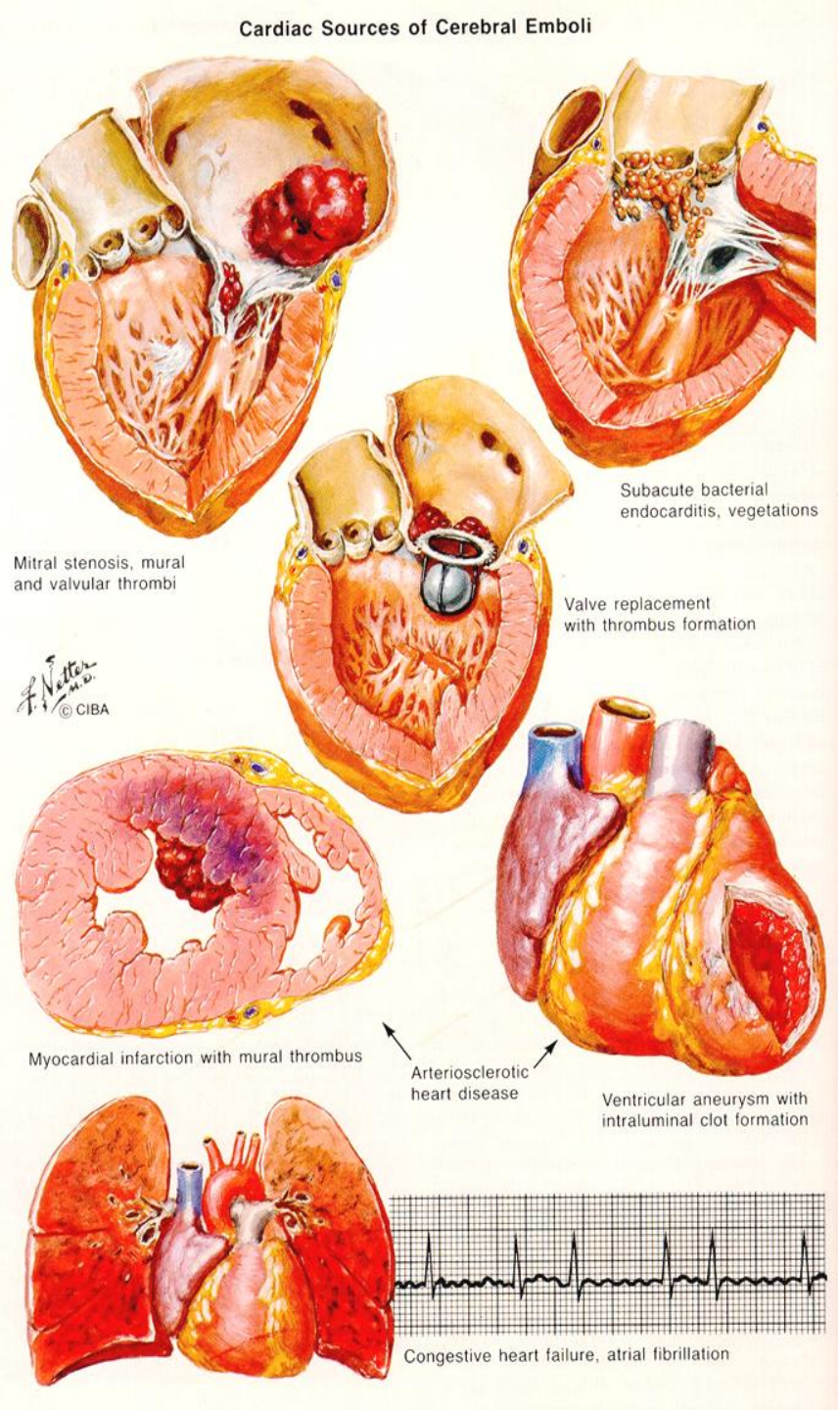

Cardiac Sources of Cerebral Emboli
Mitral stenosis, mural and valvular thrombi
Subacute bacterial endocarditis, vegetations
Valve replacement with thrombus formation
F. Netter M.D.
© CIBA
Myocardial infarction with mural thrombus
Arteriosclerotic heart disease
Ventricular aneurysm with intraluminal clot formation
Congestive heart failure, atrial fibrillation

Netter, 1986

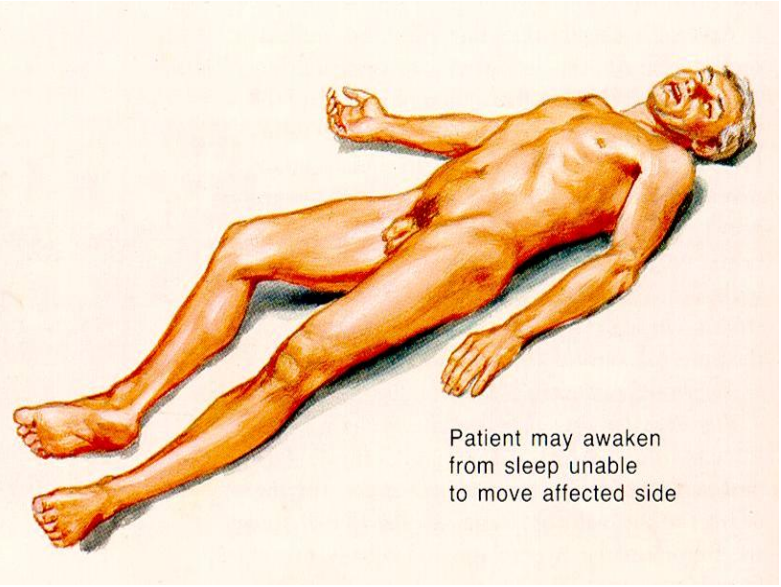
4. Ha post-stroke PF

- Aspirin NEM elég—lehetőleg AK!
- Mivel:
  - acenocumarol
  - warfarin
  - Vagy NOAC (dabigatran, rivaroxaban, apixaban, edoxaban----mint a warfarin de kevesebb a vérzés
  - És nem kell INR-t ellenőrizni)

Antikoaguláció
A kardiogén stroke felét PF okozza

- Ha a szív emboliaforrás
  - warfarin
  - dabigatran
  - apixaban
  - rivaroxaban
  - edoxaban
- Melyiket? Individualis!
  - vese? máj?
  - Interakciók?

A 2. stroke megelőzése?



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Carotid Stent vagy CEA

TIA vagy minor stroke után

>70 é CEA>CAS

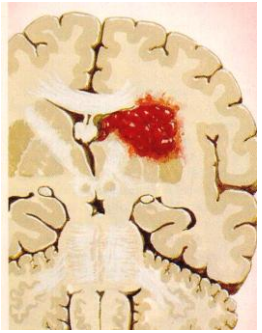
ha
Periproceduralis
stroke+mort.
<6%

<70 év

DE! Elemezze a carotis plaque-ot!!!!

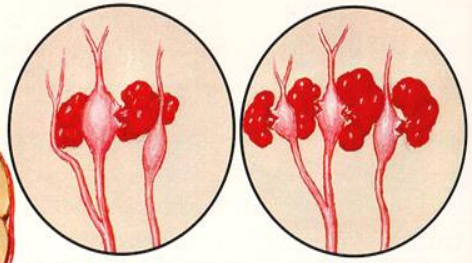
Fizikoterápia
(aktív és passzív de NE electroterápia)

sp. Hemorrhage 10-15%



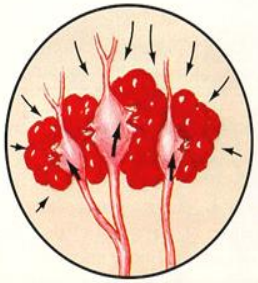
Intracerebral Hemorrhage (Hypertensive): Pathogenesis

A. Microaneurysm formed in parenchymal artery of brain as result of hypertension. Lenticulostriate vessels (shown) most commonly involved, but similar process may occur in other parts of brain, especially lobar white matter, thalamus, pons and cerebellum



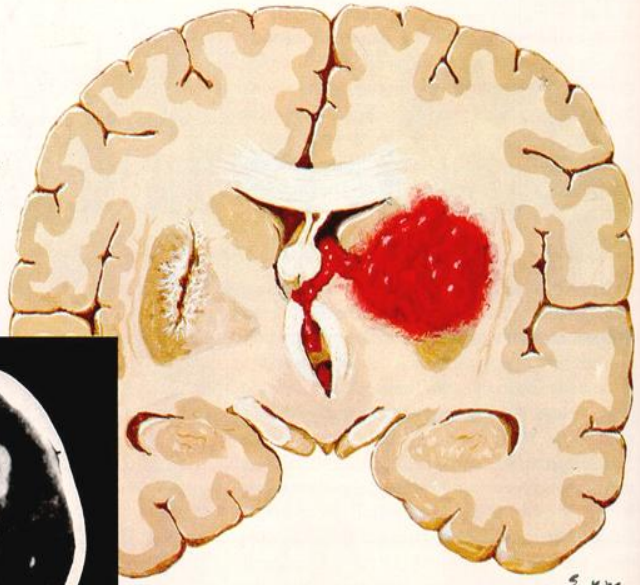
B. Microaneurysm ruptures, causing pressure on adjacent (satellite) vessels

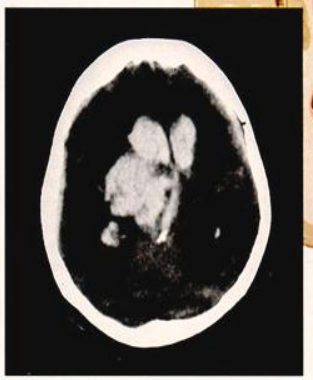
C. Satellite vessels rupture



D. Amount of blood extravasated into brain tissue depends on tissue turgor opposed to intravascular blood pressure

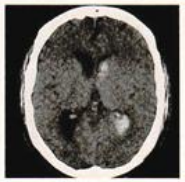
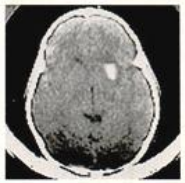
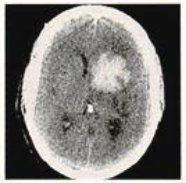
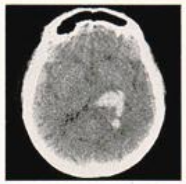
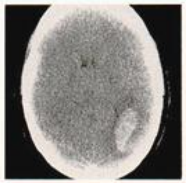
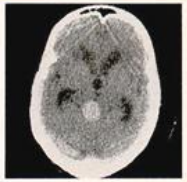
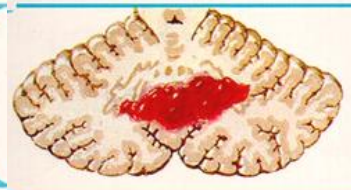
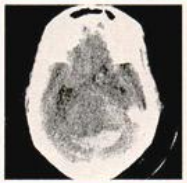
Moderate-sized intracerebral hemorrhage involving left putamen, with rupture into lateral ventricle. Brain distorted to opposite side. Scar of healed hemorrhage on right side





CT scan showing large putaminal hemorrhage with blood in ventricles

Netter, 1986

	Pathology	CT scan	Pupils	Eye movements	Motor and sensory deficits	Other
Caudate nucleus (blood in ventricle)			Sometimes ipsilaterally constricted	Conjugate deviation to side of lesion. Slight ptosis	Contralateral hemiparesis, often transient	Headache, confusion
Putamen (small hemorrhage)			Normal	Conjugate deviation to side of lesion	Contralateral hemiparesis and hemisensory loss	Aphasia (if lesion on left side)
Putamen (large hemorrhage)			In presence of herniation, pupil dilated on side of lesion	Conjugate deviation to side of lesion	Contralateral hemiparesis and hemisensory loss	Decreased consciousness
Thalamus			Constricted, poorly reactive to light bilaterally	Both lids retracted. Eyes positioned downward and medially. Cannot look upward	Slight contralateral hemiparesis, but greater hemisensory loss	Aphasia (if lesion on left side)
Occipital lobar white matter			Normal	Normal	Mild, transient hemiparesis	Contralateral hemianopsia
Pons			Constricted, reactive to light	No horizontal movements. Vertical movements preserved	Quadriplegia	Coma
Cerebellum			Slight constriction on side of lesion	Slight deviation to opposite side. Movements toward side of lesion impaired, or sixth cranial nerve palsy	Ipsilateral limb ataxia. No hemiparesis	Gait ataxia, vomiting

F. Netter, M.D. © CIBA

Netter, 1986

ICH

- Képalkotás: CT vagy MRI
- CT AG és contrastos CT mérlegelhető ha a hematoma növekedése várható
  - Structuralis károsodás?
  - érmalformáció?
  - tumor?

VII

- FVIIa mérsékelheti a hematoma expansiot
- Növeli a thromboemboliár veszélyt
- rFVIIa nem ajánlott
- Intermittáló pneumatikus kompresszió +elasztikus zokni
- *Ha már nem vérzik,alacsonydózisú sc. LMW heparin vagy UFH megelőzni az ----- 1-4 nap múlva!!!!*

Guidelines for the Management of Spontaneous Intracerebral Hemorrhage ASA/AHA 2015

For ICH patients presenting with SBP between 150 and 220 mm Hg and without contraindication to acute BP treatment, acute lowering of SBP to 140 mm Hg is safe *(Class I; Level of Evidence A)* and can be effective for improving functional outcome *(Class IIa; Level of Evidence B)*. (Revised from the previous guideline)

Initial monitoring and management of ICH patients should take place in an intensive care unit or dedicated stroke unit with physician and nursing neuroscience acute care expertise *(Class I; Level of Evidence B)*. (Revised from the previous guideline)

(*Stroke*. 2015;46:2032-2060. DOI: 10.1161/STR.0000000000000069.)

Intravenous Medications That May Be Considered for Control of Elevated Blood Pressure in Patients with ICH

Drug	Intravenous Bolus Dose	Continuous Infusion Rate
Labetalol	5 to 20 mg every 15 min	2 mg/min (maximum 300 mg/d)
Nicardipine	NA	5 to 15 mg/h
Esmolol	250 μg/kg IVP loading dose	25 to 300 $\mu g \cdot kg^{-1} \cdot min^{-1}$
Enalapril	1.25 to 5 mg IVP every 6 h*	NA
Hydralazine	5 to 20 mg IVP every 30 min	1.5 to 5 $\mu g \cdot kg^{-1} \cdot min^{-1}$
Nipride	NA	0.1 to 10 $\mu g \cdot kg^{-1} \cdot min^{-1}$
Nitroglycerin	NA	20 to 400 μg/min

American Stroke Association
A Division of American Heart Association

Egyebek

- normoglycemia (4.4 - 6,1 mmol/L)
- Görcs esetén antiepileptikum
- Profilaktikus görcsoldó nem ajánlott

Sebészet

- Glasgow Coma Scale 8 +transtentorialis beékelődés klinikai jelei
- Szignifikáns kamravér(IVH)
- Vagy hydrocephalus
- Kamra drainage ha rosszabbodik a tudat

Sebészet 2

- bizonytalan
- Kivéve a rosszabbodó kisagyi vérzést
  - Agytörzsi kompresszióval
  - és/vagy hydrocephalus GYORSAN!

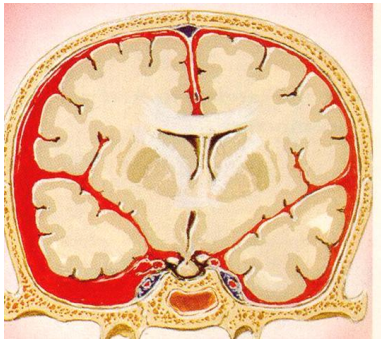
Vérömleny eltávolítás

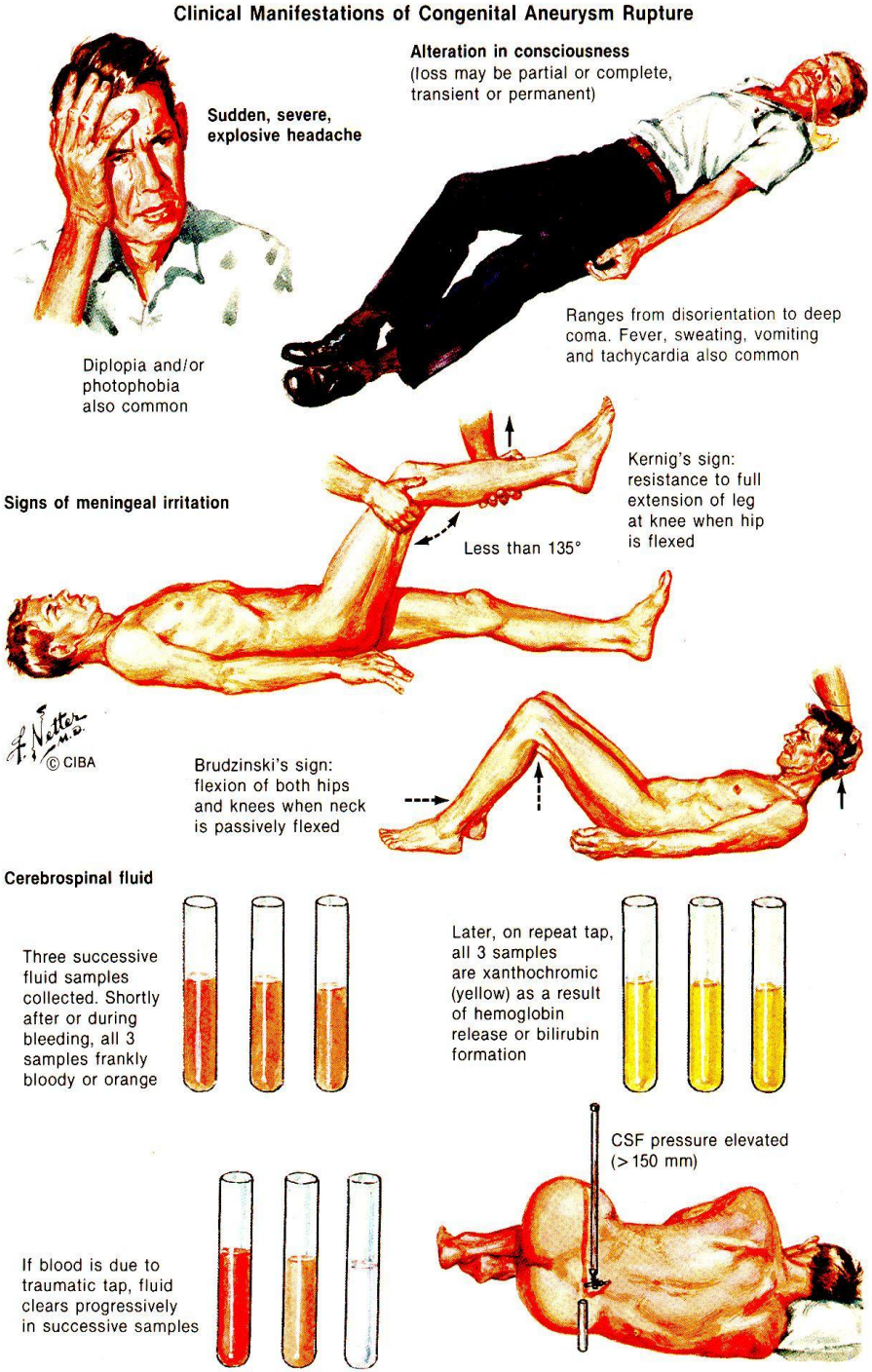
- ha>30 ml és 1 cm a felszín alatt, craniotomia mérlegelhető
- Minimálisan invázív vérömleny kiszívás?
- Stereotaxiás?
- Endoscopos aspiratio thrombolyticummal vagy anélkül?

Recurrens ICH megelőzése

- Az ismétlődés nagyobb veszélye
  - Lebeny
  - Idős kor,
  - AK,
  - apolipoprotein E ε2 vagy ε4 allel
  - Mikrovérzések (MRI!!)
- Akut ICH periodus után BP <140/90
- De <130/80 ha diabetes vagy vesebeteg

Subarachnoidalis vérzés SAV





SAV

10-20/100 000

- Megsemmisítő fejfájás
- haányás, photophobia
- Fizikai erőfeszítés

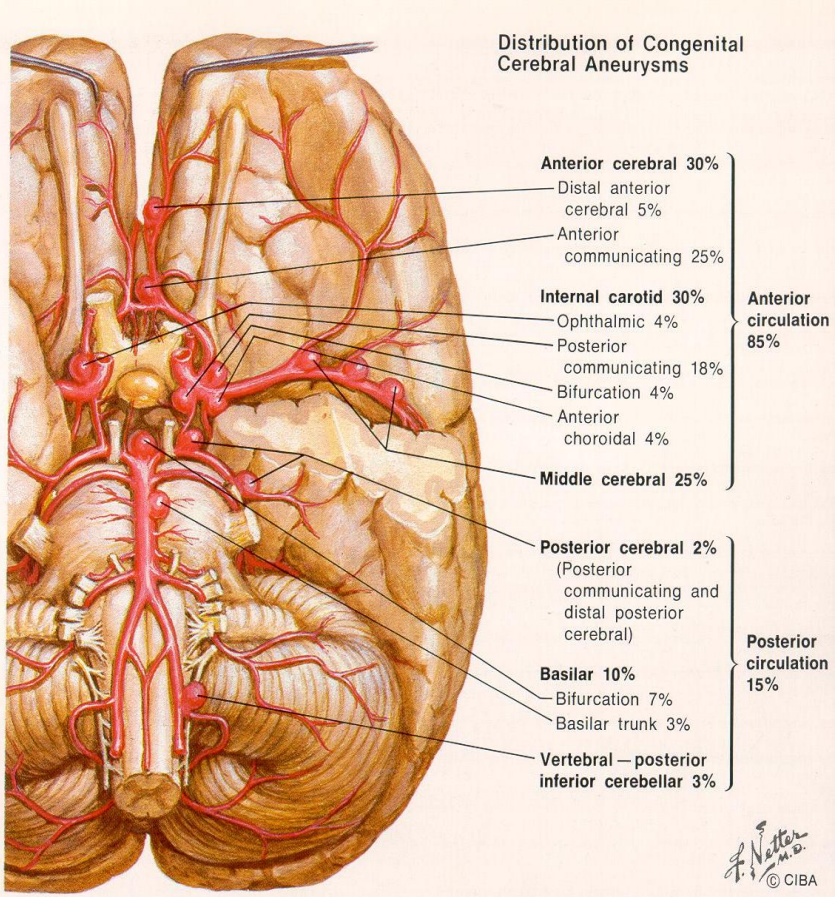
Nemmindíg!

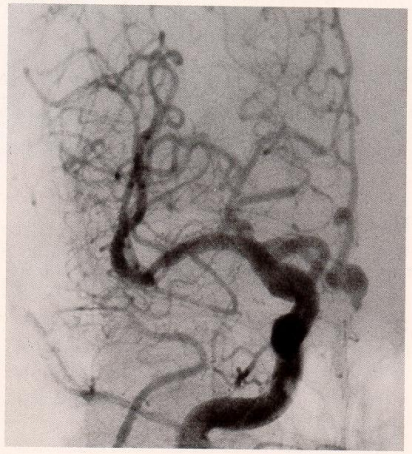
- tarkókötöttség
- néha paresis

A CT néha negativ!! Lp!
aneurysma multiplex?
Vasospasmus 4-11 nap?

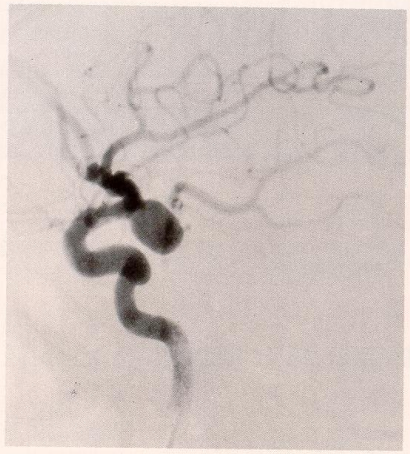
Netter 1986

SAV





Frontal carotid arteriogram disclosing bilobate aneurysm of anterior communicating artery



Different patient: lateral view showing large aneurysm of internal carotid artery at origin of posterior communicating artery

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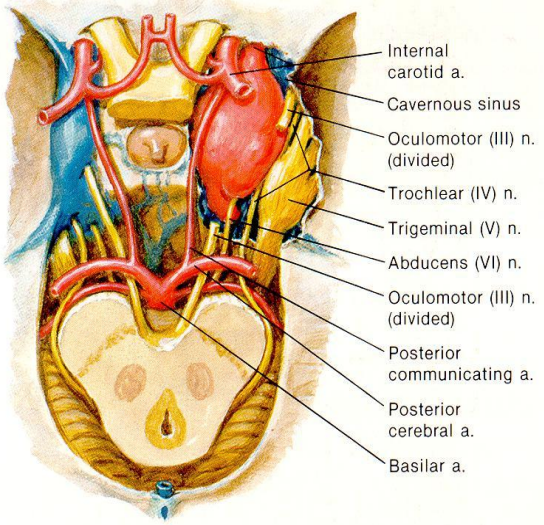
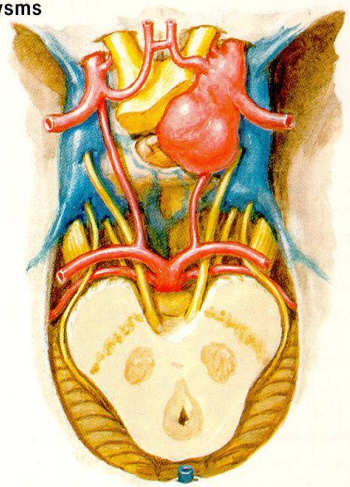
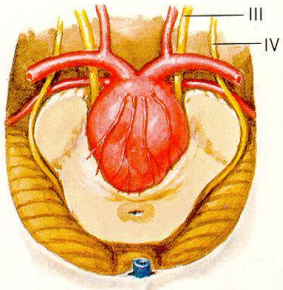
Giant Congenital Aneurysms



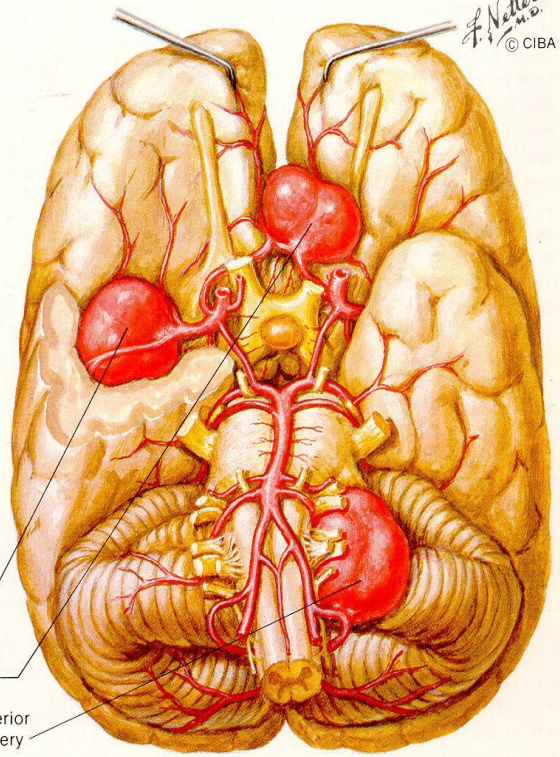
A. Intracavernous (infraclinoid) internal carotid aneurysm compressing abducens (VI) nerve. Oculomotor (III), trochlear (IV) and trigeminal (V) nerves may also be affected. Trigeminal involvement may cause facial pain



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



C. Aneurysm of basilar bifurcation projecting posteriorly, invading peduncles and compressing cerebral aqueduct. Corticospinal tracts may be affected, resulting in paralysis or paresis



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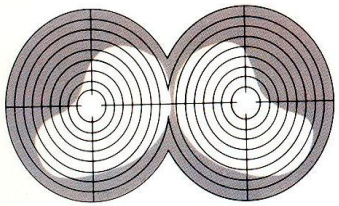
Ophthalmologic Manifestations of Cerebral Aneurysms

A. Neuromuscular disorders

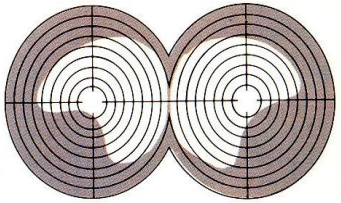
Abducens nerve palsy: affected eye turns medially. May be first manifestation of intracavernous carotid aneurysm. Pain above eye or on side of face may be secondary to trigeminal (V) nerve involvement

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

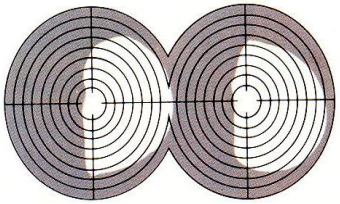
B. Visual field disturbances



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



Inferior bitemporal quadrantanopia caused by compression of optic chiasm from above



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

F. Netter M.D.
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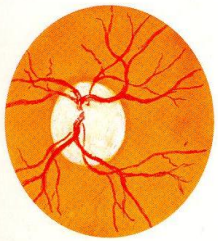
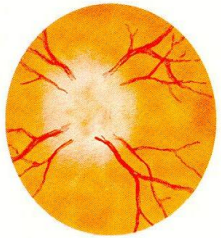
C. Retinal changes



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



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

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

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HUNT AND HESS SCALE.

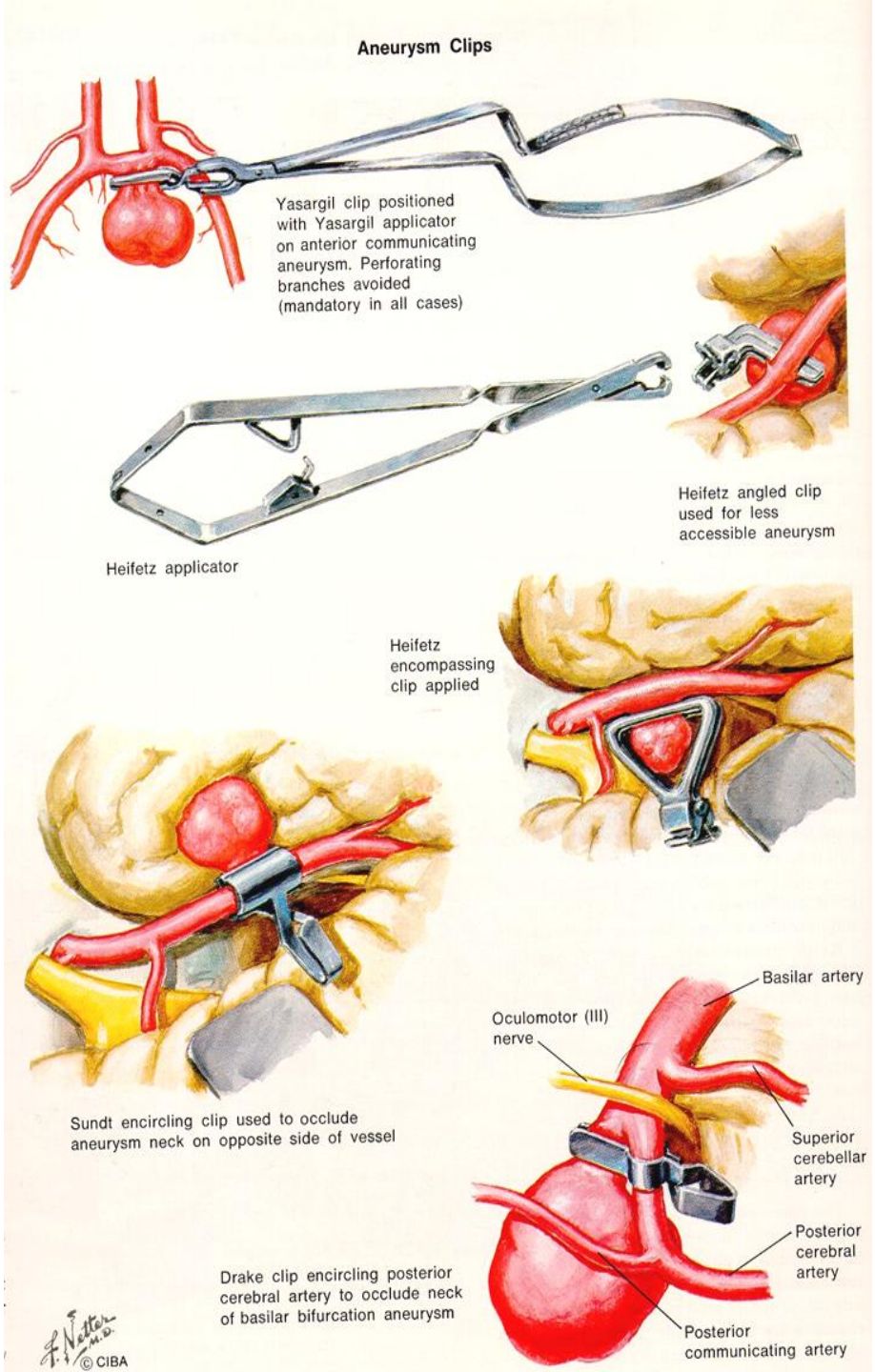
I - Asymptomatic or with mild headache

II-Moderate or severe headache, nuchal rigidity

III-Confusion, drowsiness, or mild focal deficit (discounting third nerve palsy)

IV-Stupor or hemiparesis, early decerebrate rigidity

V-Deep coma, extensor posturing


Aneurysm Clips
Yasargil clip positioned with Yasargil applicator on anterior communicating aneurysm. Perforating branches avoided (mandatory in all cases)
Heifetz angled clip used for less accessible aneurysm
Heifetz applicator
Heifetz encompassing clip applied
Sundt encircling clip used to occlude aneurysm neck on opposite side of vessel
Basilar artery
Oculomotor (III) nerve
Superior cerebellar artery
Posterior cerebral artery
Drake clip encircling posterior cerebral artery to occlude neck of basilar bifurcation aneurysm
Posterior communicating artery
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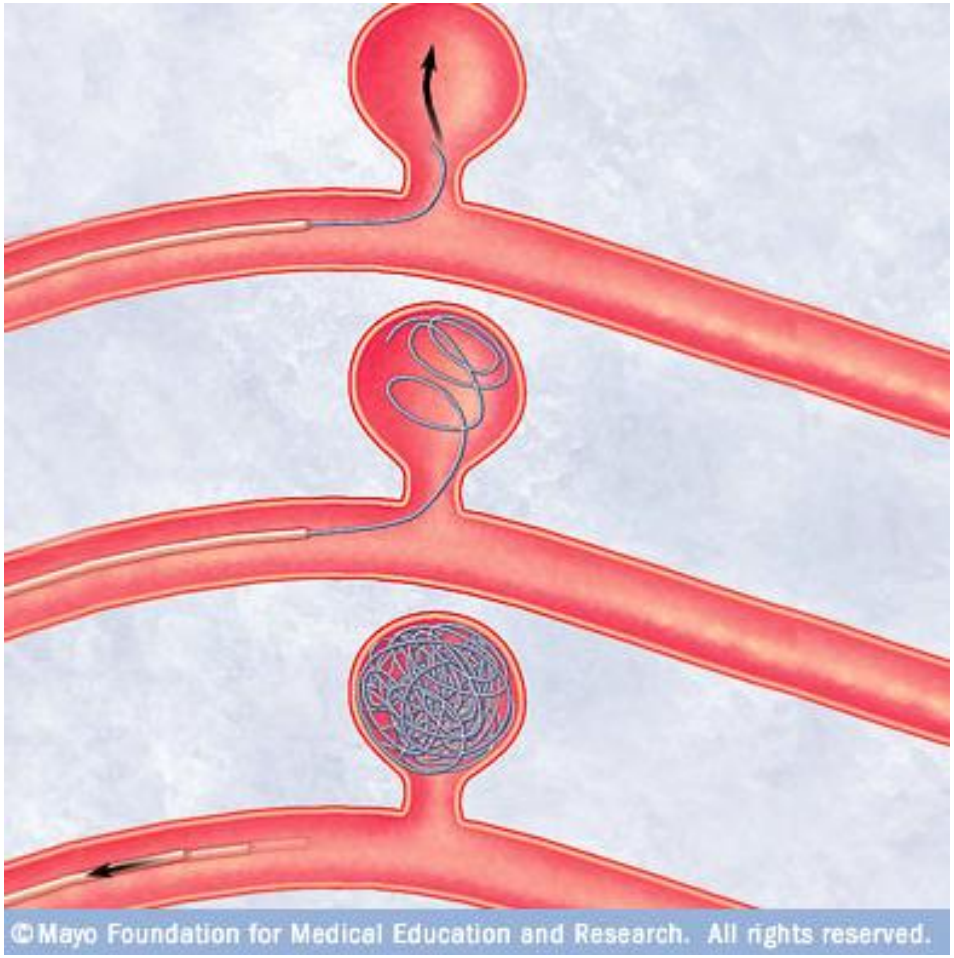

Konzervatív therapia

- Anti-HT (eg, IV beta blokkoló.) ha RR > 130
- Nitrit ne!
- Hydralazine és calcium blokkoló
- ACE
- Intubatio
- Mannisol
- furosemide
- IV steroid (ellentmondásos)

Szövődmények

- Rávérzés
- Vasospasmus (4-11. nap, Transcran Doppler) nimodipine
- Hydrocephalus
- Hyponatremia
- Görcsök
- Tüdő-ödéma, MI