Subarachnoidali vérzés korszerű medzselése

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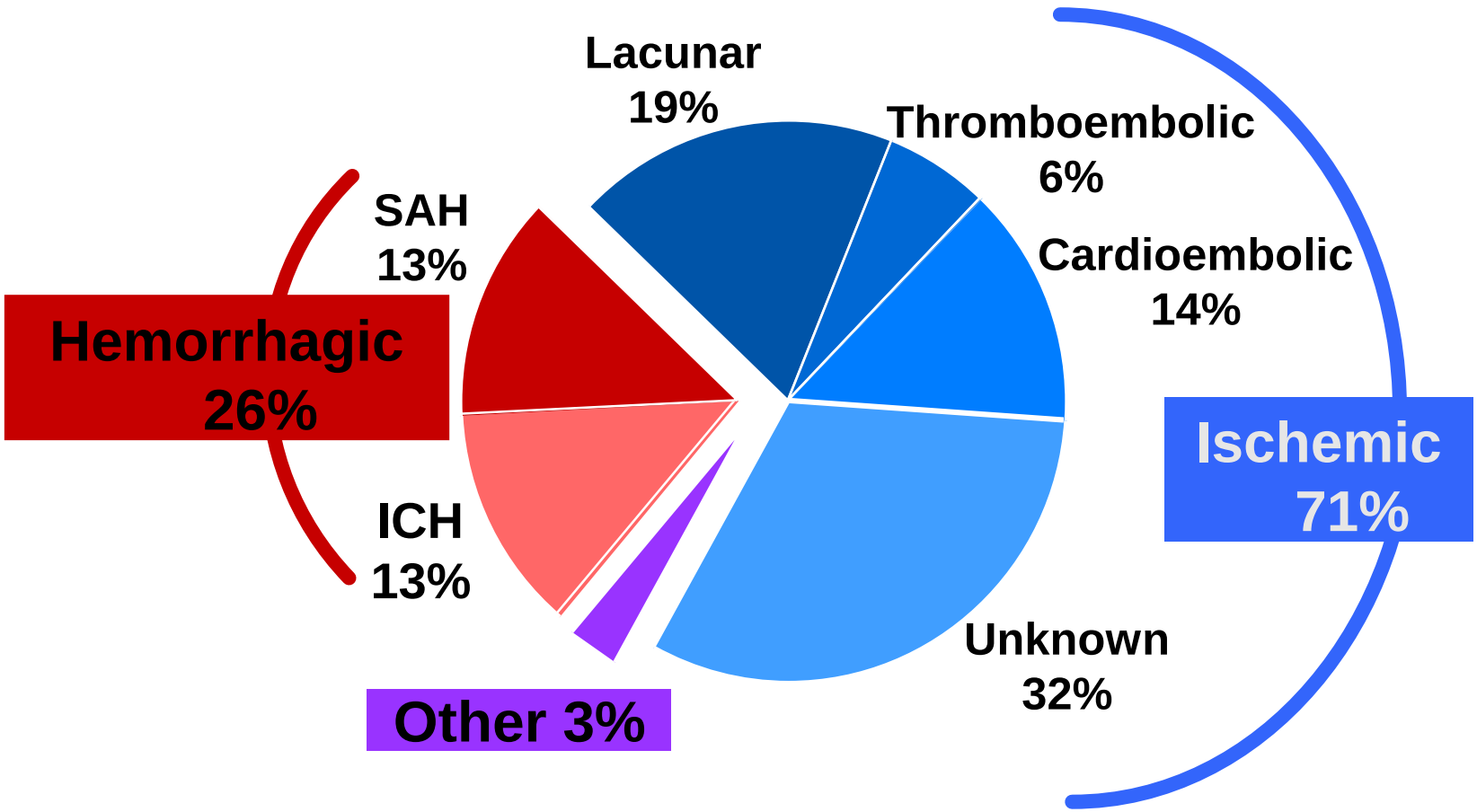
Semmelweis Egyetem ÁOK
Idegsebészeti Tanszék

„**Korszerű eljárások az idegsebészeti diagnosztikában és terápiában”**
kötelező szintentartó tanfolyam
2019. December 4-6

Stroke típusok



Subarachnoidalis vérzés - aneurysmák

- Gyakoriság: 6-16/év/100000 lakos
  - Kockázati tényezők: kor, nem, dohányzás, kezeletlen hypertonia
- Meg nem repedt aneurysma ruptura
  - valószínűsége 1-2%/év
    - Függ a mérettől

Guidelines for the Management of Aneurysmal Subarachnoid Hemorrhage

A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association

Conclusions—aSAH is a serious medical condition in which outcome can be dramatically impacted by early, aggressive, expert care. The guidelines offer a framework for goal-directed treatment of the patient with aSAH. **(*Stroke*. 2012;43:1711-1737.)**

Risk Factors for and Prevention of aSAH: Recommendations

1. Treatment of high blood pressure with antihypertensive medication is recommended to prevent ischemic stroke, intracerebral hemorrhage, and cardiac, renal, and other end-organ injury *(Class I; Level of Evidence A)*.

2. Hypertension should be treated, and such treatment may reduce the risk of aSAH *(Class I; Level of Evidence B)*.

3. Tobacco use and alcohol misuse should be avoided to reduce the risk of aSAH *(Class I; Level of Evidence B)*.

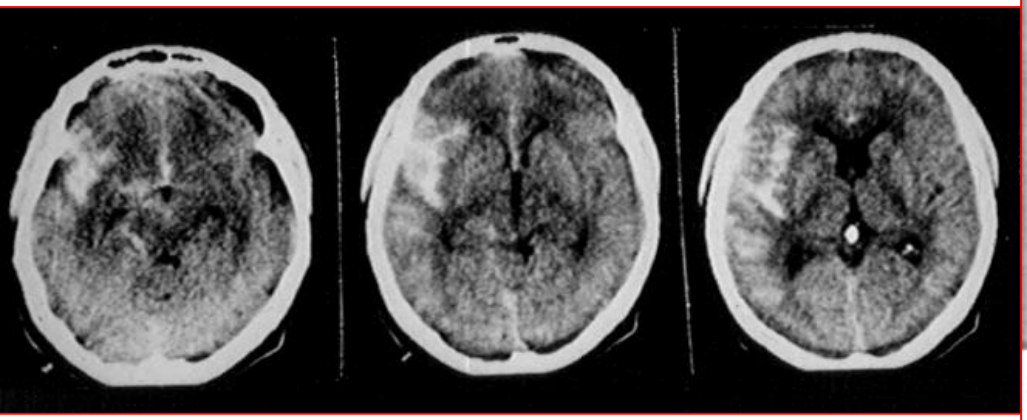
Natural History and Outcome of aSAH: Recommendations

1. The initial clinical severity of aSAH should be determined rapidly by use of simple validated scales (eg, Hunt and Hess, World Federation of Neurological Surgeons), because it is the most useful indicator of outcome after aSAH *(Class I; Level of Evidence B)*.

2. The risk of early aneurysm rebleeding is high, and rebleeding is associated with very poor outcomes. Therefore, urgent evaluation and treatment of patients with suspected aSAH is recommended *(Class I; Level of Evidence B)*.

3. After discharge, it is reasonable to refer patients with aSAH for a comprehensive evaluation, including cognitive, behavioral, and psychosocial assessments *(Class IIa; Level of Evidence B)*. (New recommendation)

35y F



Up to date management of intracranial aneurysms – the quest for best available strategies Clip or coil?

International Subarachnoid Aneurysm Trial (ISAT) of neurosurgical clipping versus endovascular coiling in 2143 patients with ruptured intracranial aneurysms: a randomised trial

THE LANCET • Vol 360 • October 26, 2002 • www.thelancet.com

*International Subarachnoid Aneurysm Trial (ISAT) Collaborative Group**

P = 0.0019
relative risk reduction 22.6%
absolute risk reduction 6.9%

	Endovascular treatment	Neurosurgery
Before first procedure	14 (7)	23 (16)
After procedure up to 30 days	20 (10)	6 (3)
30 days to 1 year	6 (5)	4 (2)
Total up to 1 year	40 (22)	33 (21)
After 1 year	2 (0)	0

Numbers in parentheses indicate deaths. All deaths from rebleeding occurred within first week except for one at 20 days. Rebleeding was confirmed on CT scanning in all cases.

Table 7: **Non-procedural bleeding from target aneurysm**

	Endovascular treatment (n=801)	Neurosurgery (n=793)
Modified Rankin scale		
0 No symptoms	207 (25·8%)	152 (19·2%)
1 Minor symptoms	217 (27·1%)	220 (27·7%)
2 Some restriction in lifestyle	187 (23.4%)	178 (22·4%)
(0–2 inclusive)	*611 (76·3%)*	*550 (69·4%)*
3 Significant restriction in lifestyle	80 (10·0%)	106 (13·4%)
4 Partly dependent	24 (3·0%)	32 (4·0%)
5 Fully dependent	21 (2·6%)	25 (3·2%)
6 Dead	65 (8·1%)	80 (10·1%)
(3–6 inclusive)	*190 (23·7%)*	*243 (30·6%)*

Data in Italics are primary outcome.

Table 6: **Outcome at 1 year in 1594 patients (primary outcome)**

Clipping Versus Coiling for Ruptured Intracranial Aneurysms

A Systematic Review and Meta-Analysis

Hui Li, MD*; Rui Pan, MD*; Hongxuan Wang, MD; Xiaoming Rong, MD; Zi Yin, MD; Daniel P. Milgrom, MD; Xiaolei Shi, MD; Yamei Tang, MD, PhD*; Ying Peng, MD, PhD*

Background and Purpose—Endovascular treatment has increasingly been used for aneurismal subarachnoid aneurismal hemorrhage. The aim of this analysis is to assess the current evidence regarding safety and efficiency of clipping compared with coiling.

Methods—We conducted a meta-analysis of studies that compared clipping with coiling between January 1999 and July 2012. Comparison of binary outcomes between treatment groups was described using odds ratios (OR; clip versus coil).

Results—Four randomized controlled trials and 23 observational studies were included. Randomized controlled trials showed that coiling reduced the 1-year unfavorable outcome rate (OR, 1.48; 95% confidence interval [CI], 1.24–1.76). However, there was no statistical deference in nonrandomized controlled trials (OR, 1.11; 95% CI, 0.96–1.28). Subgroup analysis revealed coiling yielded better outcomes for patients with good preoperative grade (OR, 1.51; 95% CI, 1.24–1.84) than for poor preoperative patients (OR, 0.88; 95% CI 0.56–1.38). Additionally, the incidence of rebleeding is higher after coiling (OR, 0.43; 95% CI, 0.28–0.66), corresponding to a better complete occlusion rate of clipping (OR, 2.43; 95% CI, 1.88–3.13). The 1-year mortality showed no significant difference (OR, 1.07; 95% CI, 0.88–1.30). Vasospasm was more common after clipping (OR, 1.43; 95% CI, 1.07–1.91), whereas the ischemic infarct (OR, 0.74; 95% CI, 0.52–1.06), shunt-dependent hydrocephalus (OR, 0.84; 95% CI, 0.66–1.07), and procedural complication rates (OR, 1.19; 95% CI, 0.67–2.11) did not differ significantly between techniques.

Conclusions—Coiling yields a better clinical outcome, the benefit being greater in those with a good preoperative grade than those with a poor preoperative grade. However, coiling leads to a greater risk of rebleeding. Well-designed randomized trials with special considerations to the aspect are needed. **(*Stroke*. 2013;44:00-00.)**

This article has been updated from its originally published version to correct an error in the abstract and in Table 2.

See the corresponding editorial in this issue, pp 139–145.

See the corresponding erratum notice, **DOI:** 10.3171/2013.11.JNS12683a, for full details.

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The Barrow Ruptured Aneurysm Trial: 3-year results

Clinical article

Robert F. Spetzler, M.D.,[1] Cameron G. McDougall, M.D.,[1] Felipe C. Albuquerque, M.D.,[1] Joseph M. Zabramski, M.D.,[1] Nancy K. Hills, Ph.D.,[2,3] Shahram Partovi, M.D.,[4] Peter Nakaji, M.D.,[1] and Robert C. Wallace, M.D.[4]

Divisions of [1]Neurological Surgery, and [4]Neuroradiology, Barrow Neurological Institute, St. Joseph's Hospital and Medical Center, Phoenix, Arizona; and Departments of [2]Neurology and [3]Epidemiology and Biostatistics, University of California, San Francisco, California

Object. The authors report the 3-year results of the Barrow Ruptured Aneurysm Trial (BRAT). The objective of this ongoing randomized trial is to compare the safety and efficacy of microsurgical clip occlusion and endovascular coil embolization for the treatment of acutely ruptured cerebral aneurysms and to compare functional outcomes based on clinical and angiographic data. The 1-year results have been previously reported.

Methods. Two-hundred thirty-eight patients were assigned to clip occlusion and 233 to coil embolization. There were no anatomical exclusions. Crossovers were allowed based on the treating physician's determination, but primary outcome analysis was based on the initial assignment to treatment modality. Patient outcomes were assessed independently using the modified Rankin Scale (mRS). A poor outcome was defined as an mRS score > 2. At 3 years' follow-up 349 patients who had actually undergone treatment were available for evaluation. Of the 170 patients who had been originally assigned to coiling, 64 (38%) crossed over to clipping, whereas 4 (2%) of 179 patients assigned to surgery crossed over to coiling.

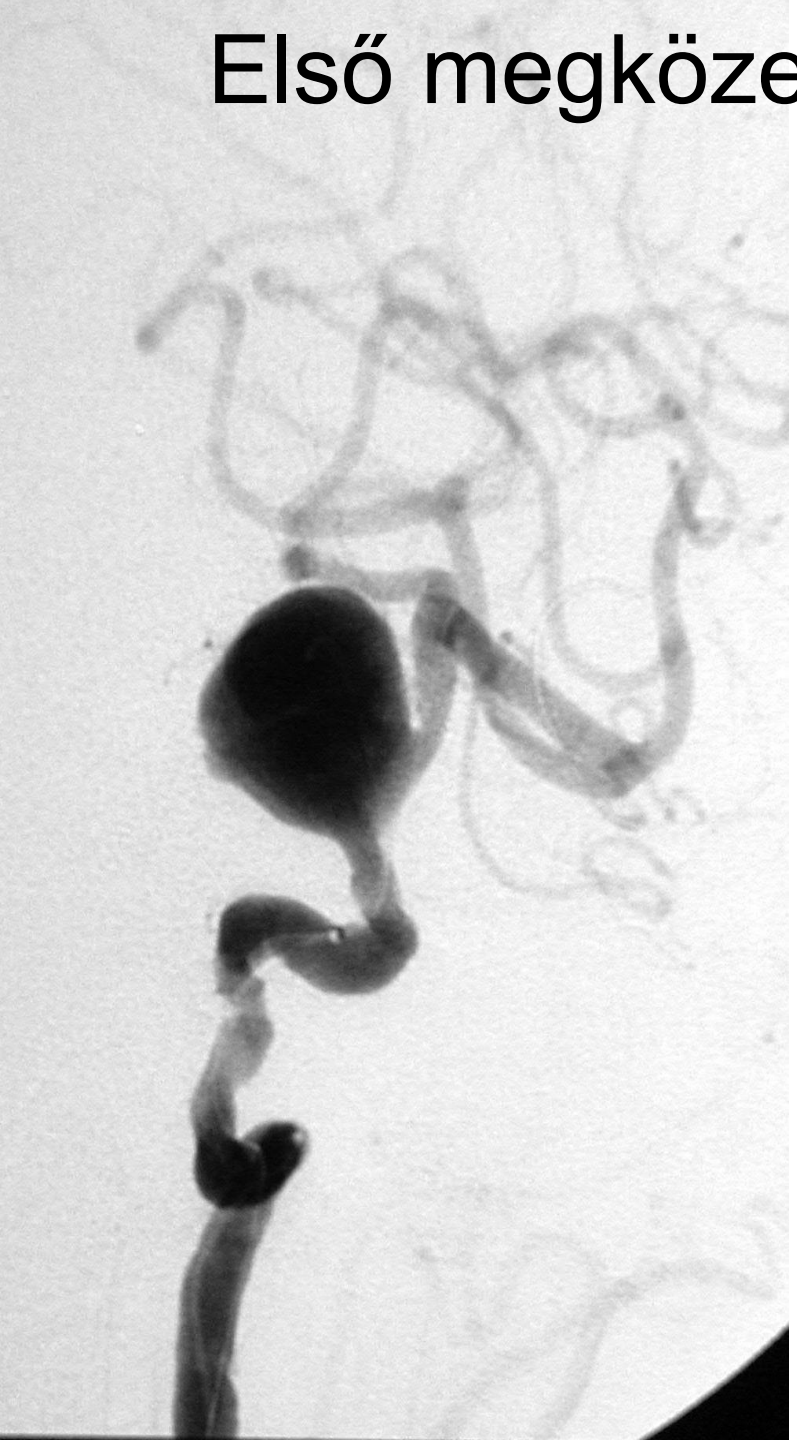
Results. The risk of a poor outcome in patients assigned to clipping compared with those assigned to coiling (35.8% vs 30%) had decreased from that observed at 1 year and was no longer significant (OR 1.30, 95% CI 0.83–2.04, p = 0.25). In addition, the degree of aneurysm obliteration (p = 0.0001), rate of aneurysm recurrence (p = 0.01), and rate of retreatment (p = 0.01) were significantly better in the group treated with clipping compared with the group treated with coiling.

When outcomes were analyzed based on aneurysm location (anterior circulation, n = 339; posterior circulation, n = 69), there was no significant difference in the outcomes of anterior circulation aneurysms between the 2 assigned groups across time points (at discharge, 6 months, 1 year, or 3 years after treatment). The outcomes of posterior circulation aneurysms were significantly better in the coil group than in the clip group after the 1st year of follow-up, and this difference persisted after 3 years of follow-up. However, while aneurysms in the anterior circulation were well matched in their anatomical location between the 2 treatment arms, this was not the case in the posterior circulation where, for example, 18 of 21 posterior inferior cerebellar artery aneurysms were in the clip group.

Conclusions. Based on mRS scores at 3 years, the outcomes of all patients assigned to coil embolization showed a favorable 5.8% absolute difference compared with outcomes of those assigned to clip occlusion, although this difference did not reach statistical significance (p = 0.25). Patients in the clip group had a significantly higher degree of aneurysm obliteration and a significantly lower rate of recurrence and retreatment. In post hoc analysis examining only anterior circulation aneurysms, no outcome difference between the 2 treatment cohorts was observed at any recorded time point. Clinical trial registration no.: NCT01593267 (ClinicalTrials.gov).
(http://thejns.org/doi/abs/10.3171/2013.3.JNS12683)

BRAT-study

Első megközelítés - endovascularis



200+ aneurysma ellátása évente

esetek 2/3-a endovascularis

Mely csoportok tartoznak ide?

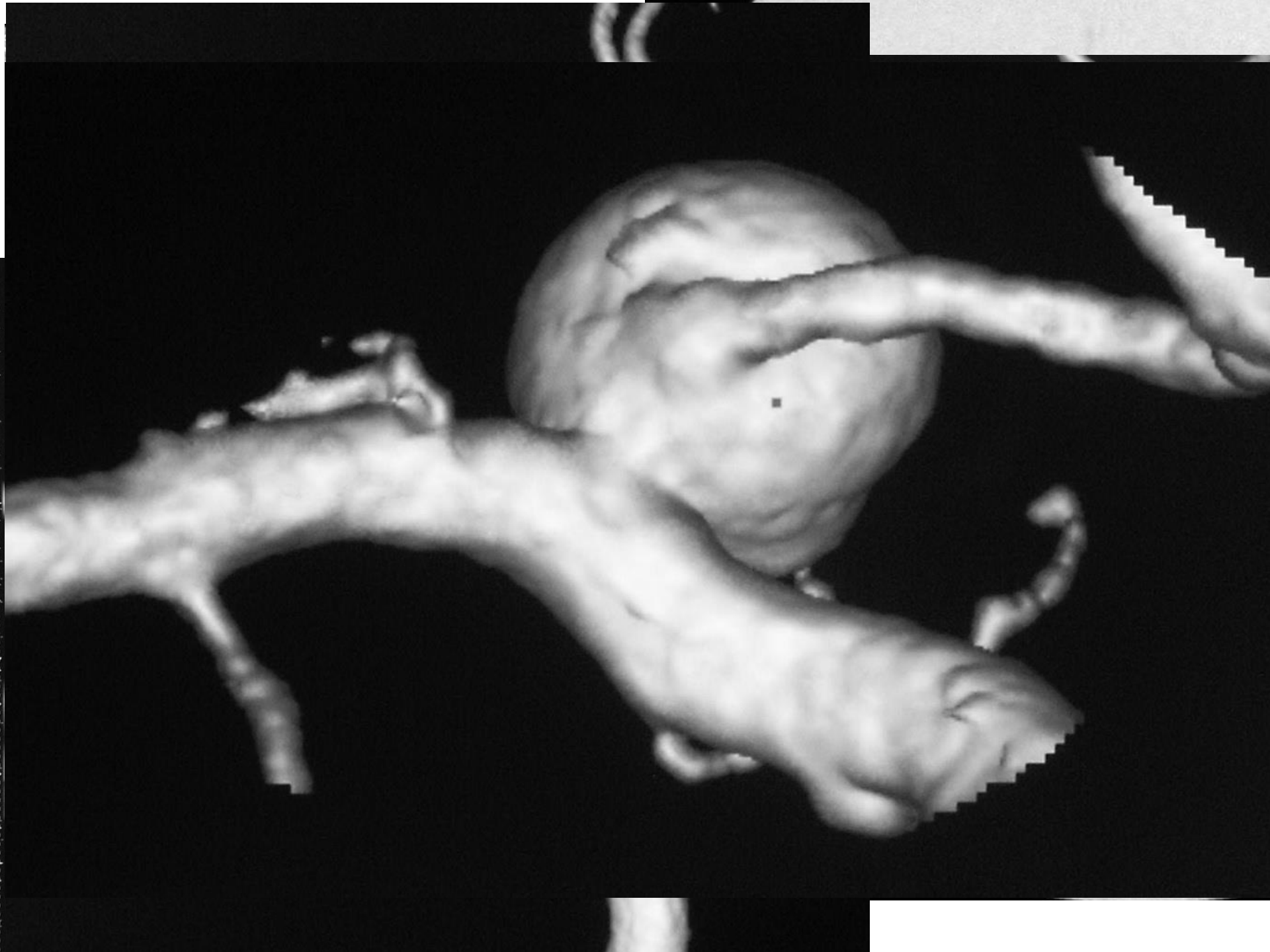
- Endovascularis ellátásra kevésbbé alkalmas (nem óriás) aneurysmák
  - Lokalizáció (pl. a.cerebri media)
  - Széles, az oszlásra terjedő nyak, fusiformis tágulatok
  - Finanszírozás

- Óriás aneurysmák > 2.5 cm

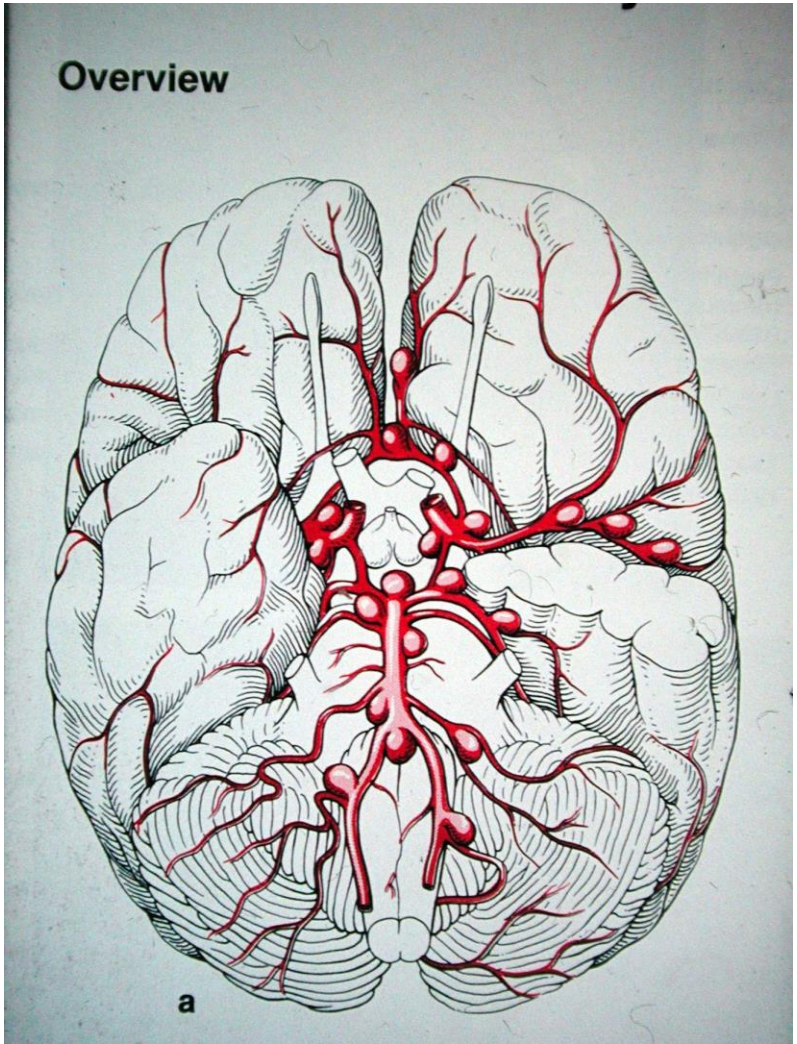
- Endovasculararis kezelés után clippelt aneurysmák

I.Aneurysmák amelyek kevésbbé alkalmasak endovascularis ellátásra

Vérzést okozó fusiformis vertebralis aneurysma



Aneurizmák
Előfordulás



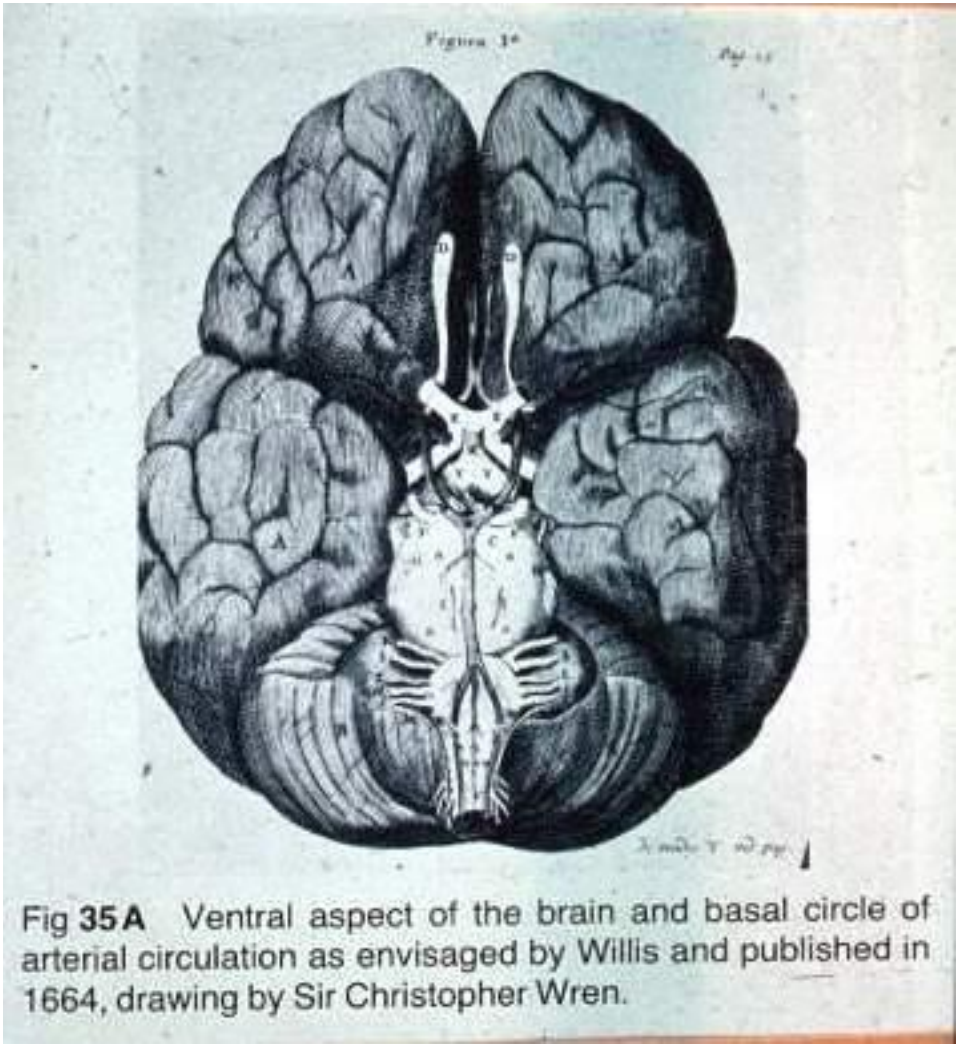
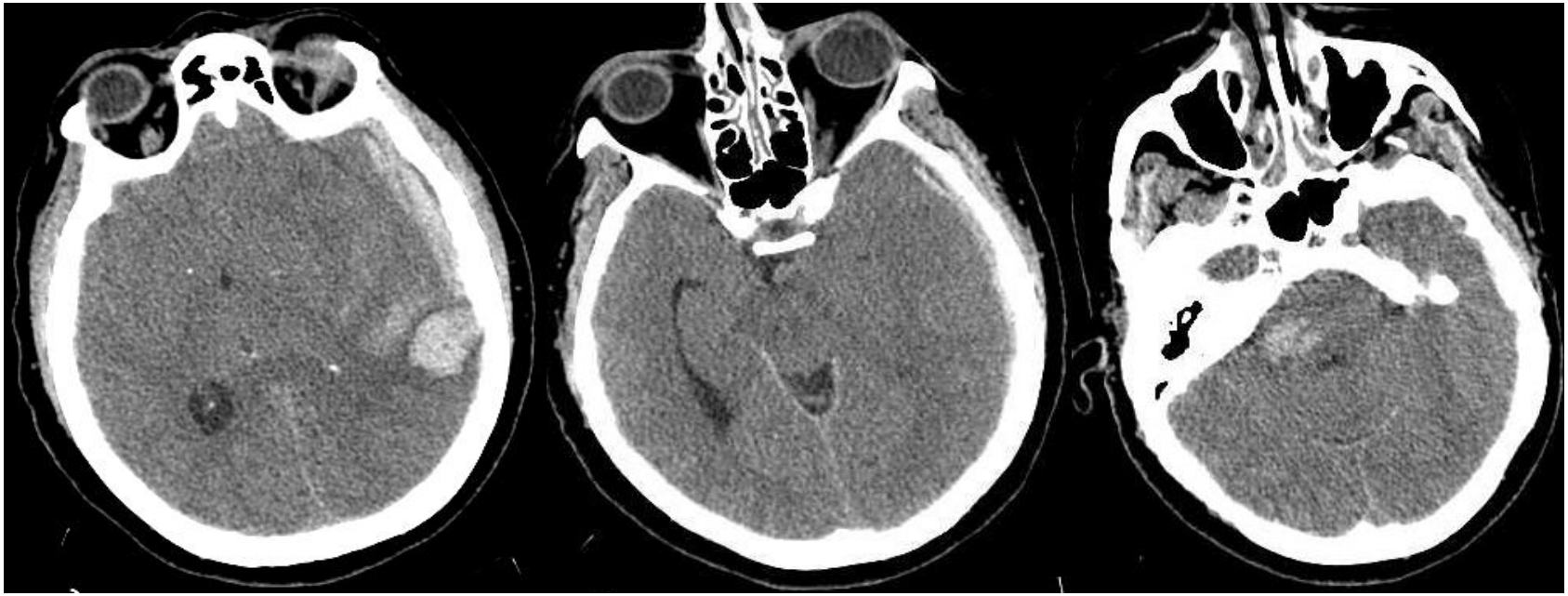
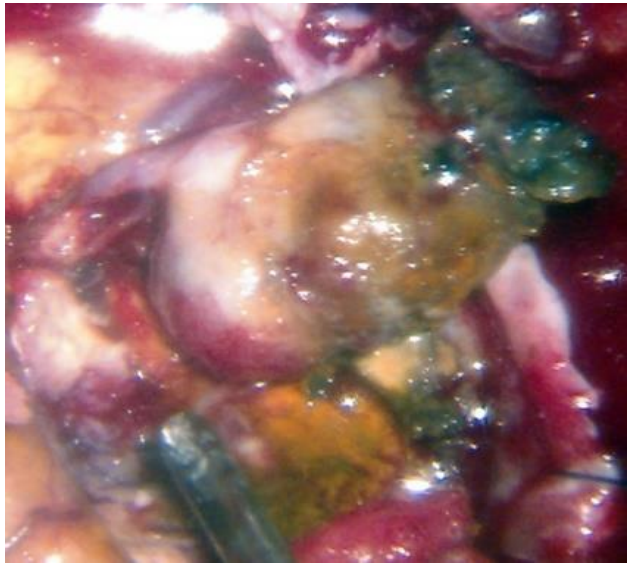


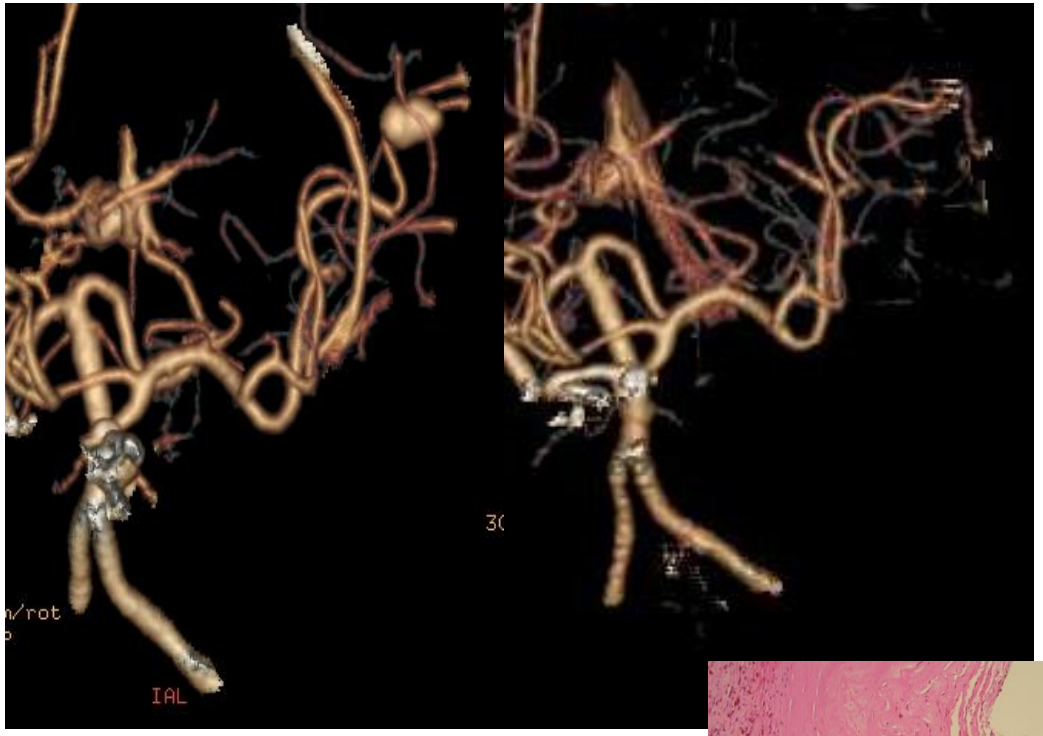
Fig **35A** Ventral aspect of the brain and basal circle of arterial circulation as envisaged by Willis and published in 1664, drawing by Sir Christopher Wren.

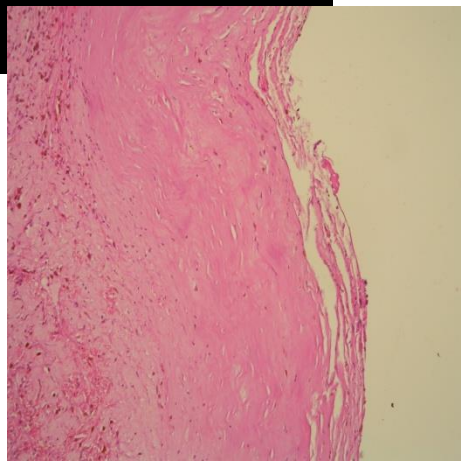
Perifériás a.cer.med. aneurysma ritka esete 1.



Perifériás a.cer.med. aneurysma ritka esete 2.







II. Giant (óriás ameurysmák)

Giant aneurysmák I: előfordulás

- Definíció: > 2.5 cm átmérőjű

  Locksley HB, J Neurosug, 1966

Előfordulás: az intracranialis aneurizmák 5 %-a, 18%-ban több aneurizmával együtt

Nő/ féfi arány: 2/1

ACoA: 15%

ACI 45%

ACM: 22%

Basilaris: 8%

P2, Vertebralis: 10%

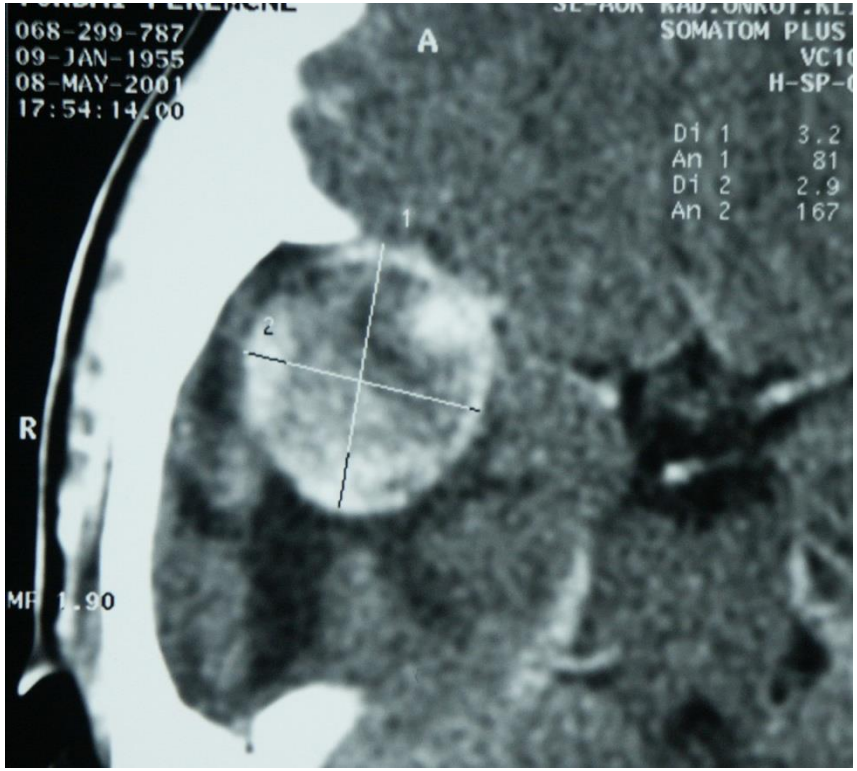
Klinikai tünetek

- 25%-ban SAV
- 75%-ban compressios tünet (LT kiesés, visusromlás, szemizomparesis, agyidegtünetek, neuralgia, bulbaris tünetek, agytörzsi compressio)
- 8%-ban thrombo-emboliás események (anya-ér elzáródás, retrográd trombosis, TIA-a zsák, mint embolia forrás)
- Ritkábban epilepszia, hydrocephalus

Differenciál diagnózis - kivizsgálás

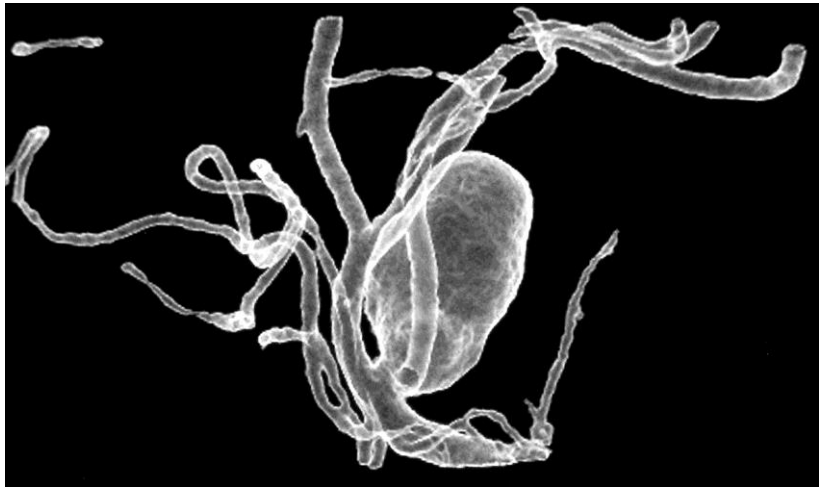
A CT vizsgálat alapján gyakran más patológia merül fel (hypoph. tu.,CRF, PCB tu., kisszárny meningeoma)

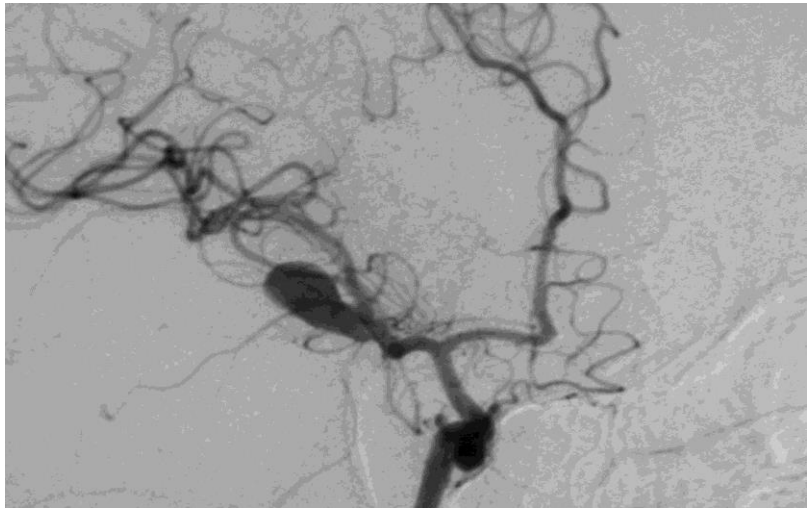
Kalcifikációt mutatja, a laesio határa 70%-ban halmoz.



Kivizsgálás II- DSA

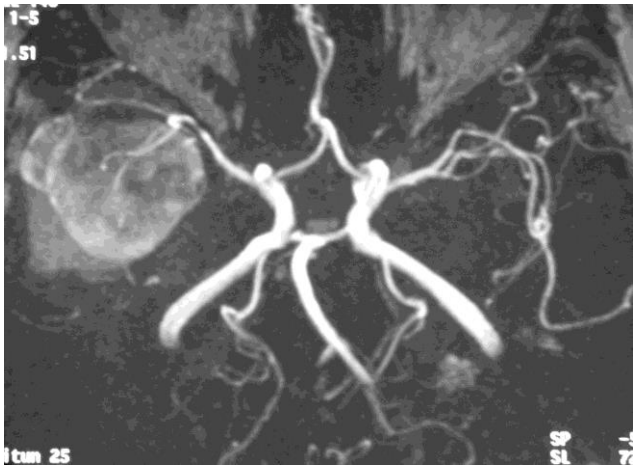
- Fontos információt ad: nyak helyzete, mérete, tápláló erek, elmenők anatómiája
- Keresztkeringés vizsgálata (esetleges elzárásnál, temporary clipping)
- Méret szempontjából kevésbé informativ (trombotizált zsák)





Kivizsgálás III - MR

- Pontos képet ad:
  teljes méret,
  konfiguráció,
  trombotizált részek,
  agyi struktúrákhoz
  való viszony, pl.
  agytörzsi compressio,
  oedema



Kezelés

- Speciális szempontok:

- A nyak nehezen vizualizálható a zsák mérete miatt, ezért a zsákot kisebbíteni kell
- Széles vagy nehezen összenyomható nyak, nyakat kell képezni
- Kifeszített perforátorok, lelépők, sérülékenyebb szülő-erek
- Proximalis kontroll: nyaki carotis, endovascularis is lehet, basis csontjainak elvételét igényelheti
- Ha elértük:----

Kezelés II

- A zsák megnyitása, kisebbítése: punctio,trombectomia vagy resectio: gyors manipulációt igényel
- Temporer clip gyakran szükséges- anaesth megfontolások- cardiac arrest
- Nyak képzése
- Kifinomult klippelési technika
  – speciális klipek
- Szülő erek reconstructioja

Kezelés III

Ha clippelés nem lehetséges:

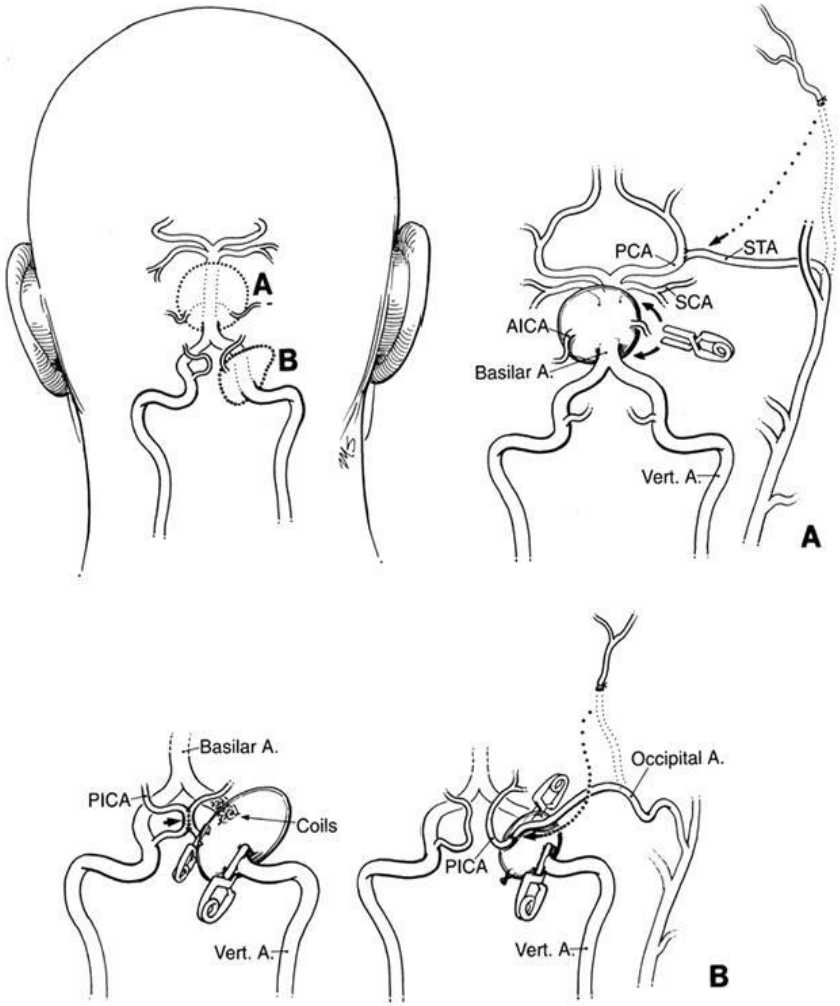
1. Trapping: a zsákot kirekesztik a keringésből a szülő ér egy rövid szakaszával együtt

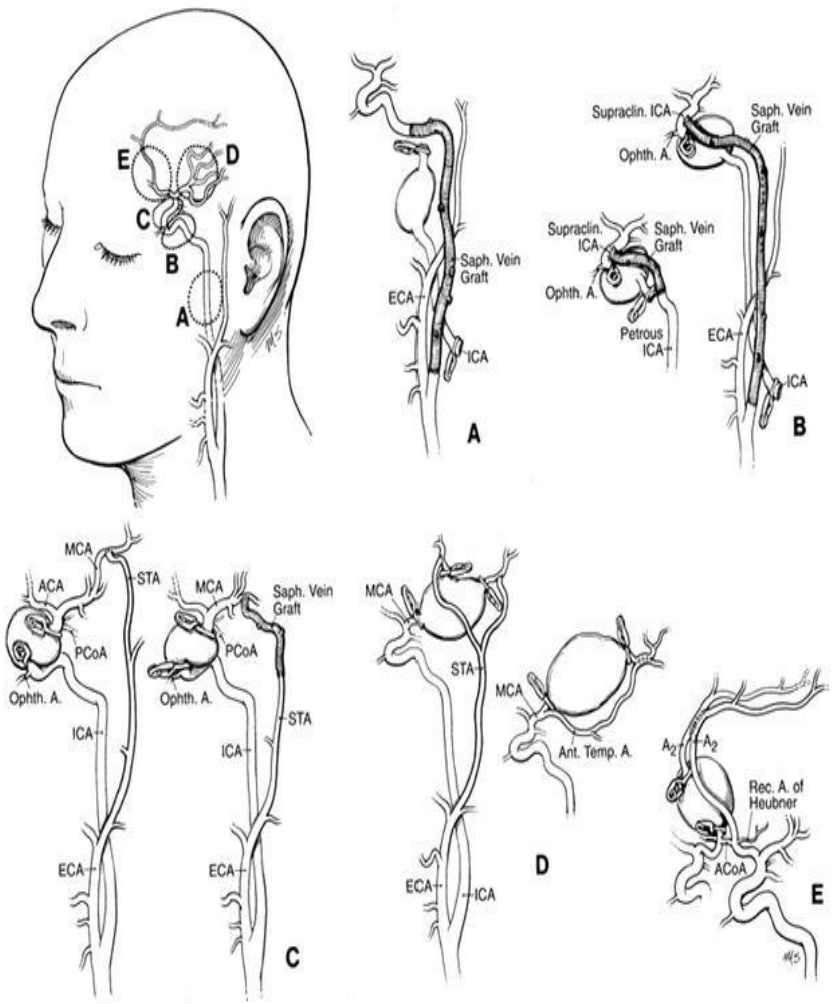
2. A zsák kivágása

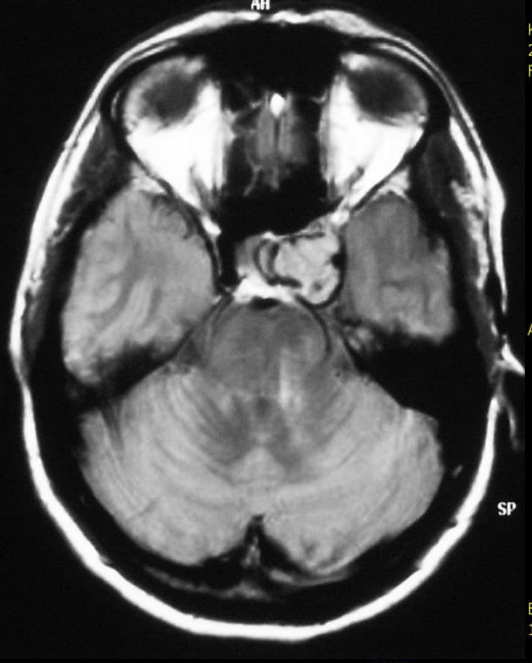
Ezeknél az eljárásoknál azonnali revascularizációs eljárás lehet szükséges :

- End-to-end, vagy end to side anastomosis
- Bypass műtétek: petrosus-supraclinoid, cervical-supraclinoid, STA- MCA, A2-A2, SAT- PCA, STA- SCA
- High-flow

Különböző bypass lehetőségek



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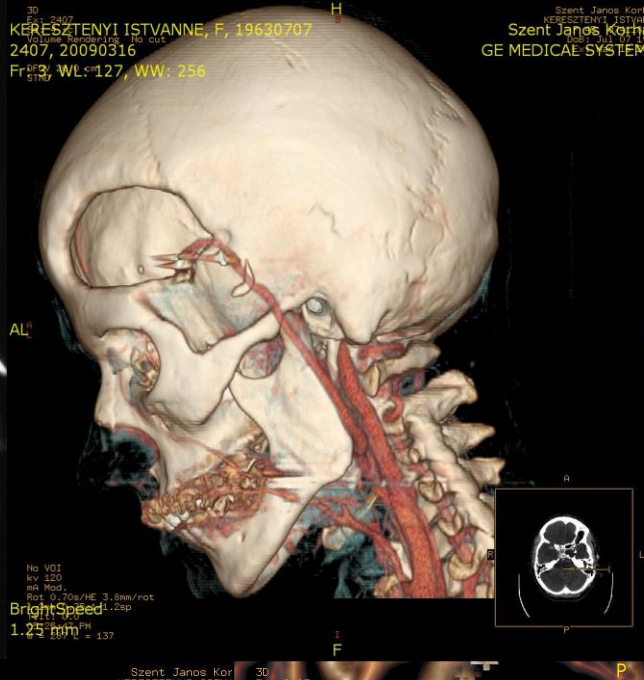
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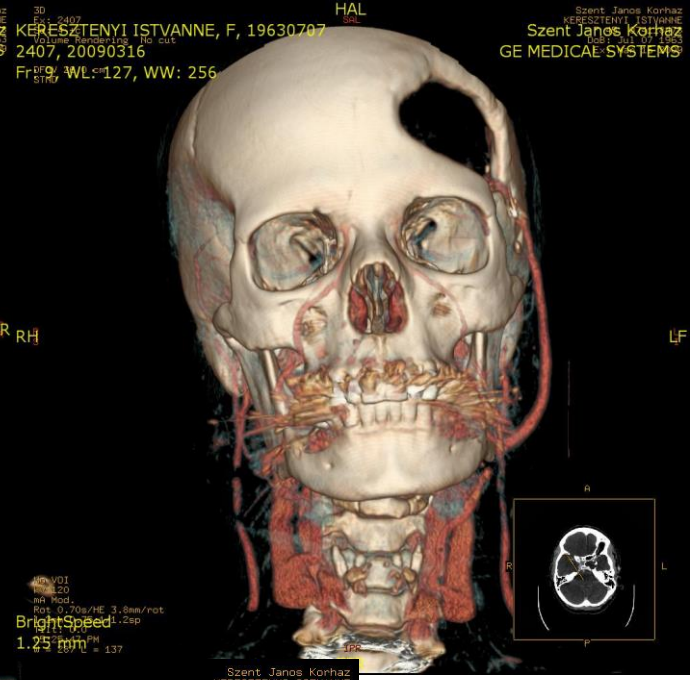
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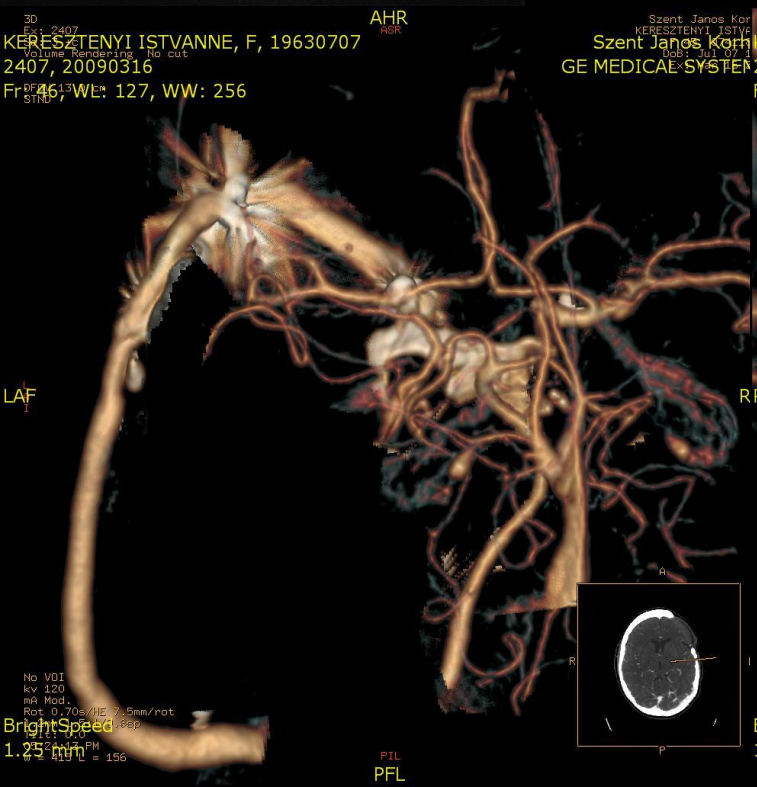
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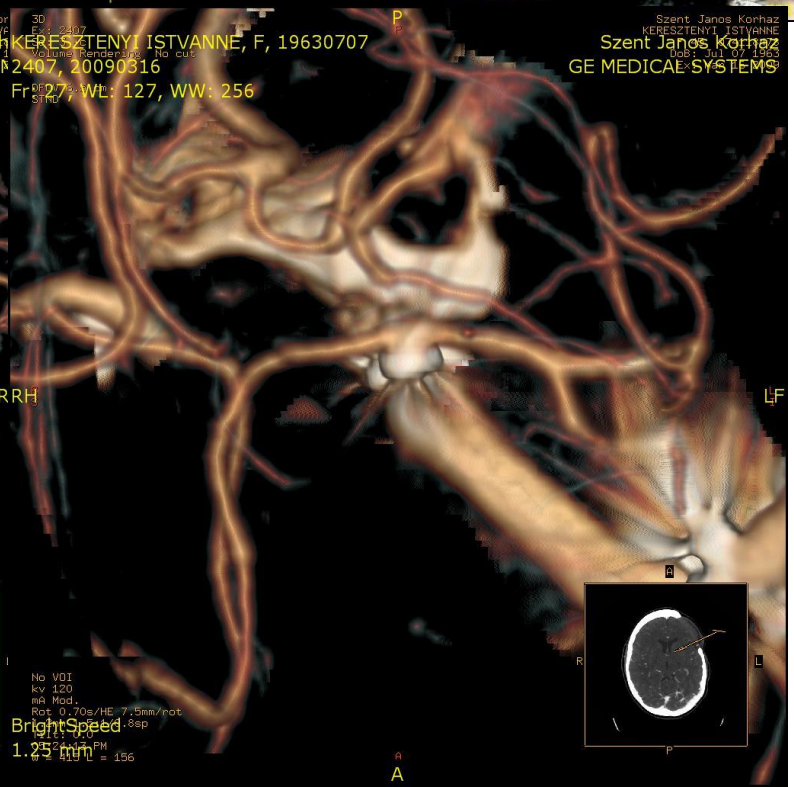
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42N

GIANT INTRACRANIAL ANEURYSMS
Patient material

- Budapest Aneurysm Registry

3411 operated cases since 1977

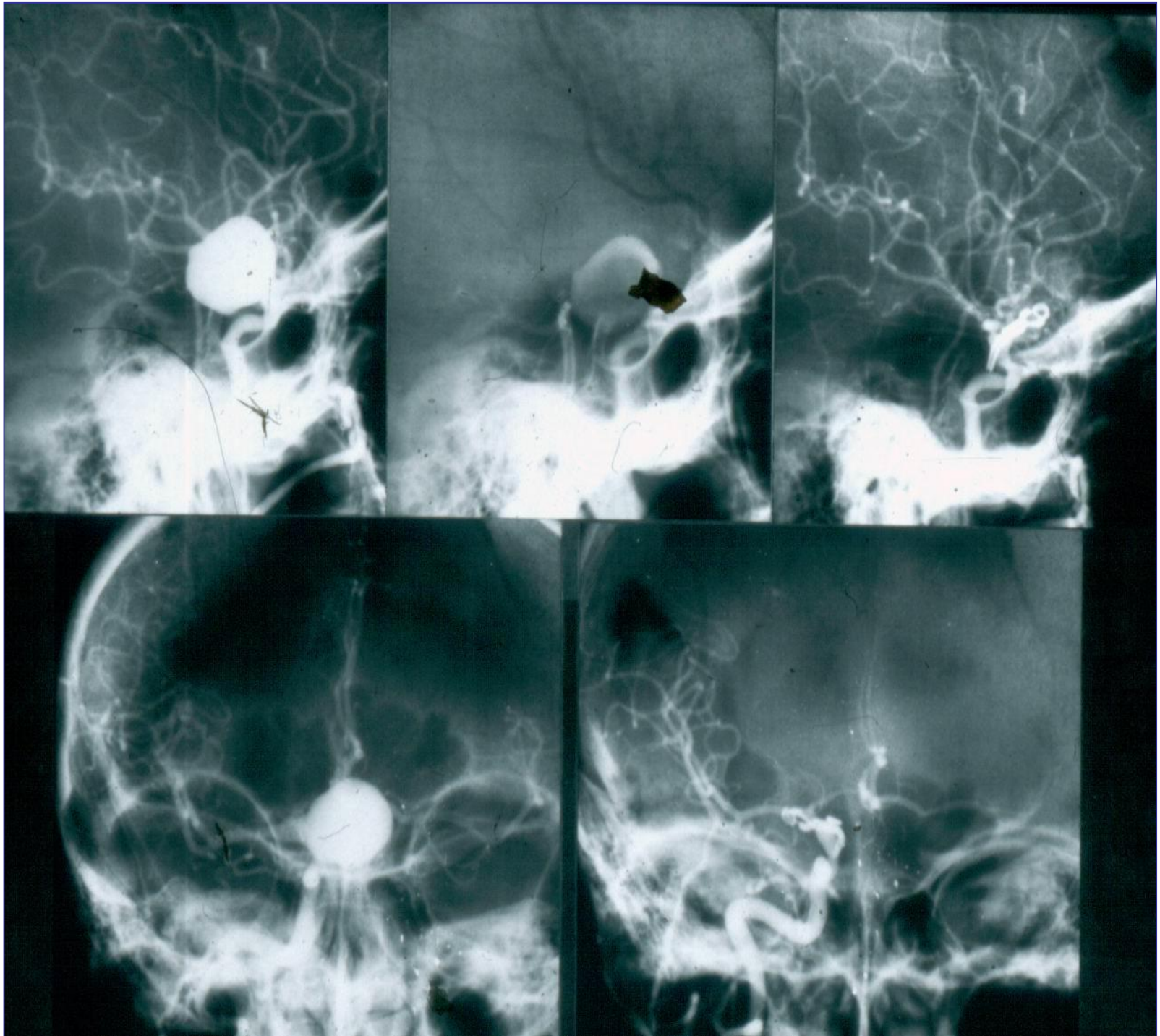
- 148 giant occurrences 4.3% of total
- M/F 96/52
- SAH in 89 cases (60.1 %)
- In 26 cases multiple
- 35% thrombosed and/or sclerotic
- Localization of giant aneurysms

Ac	15%
B	6%
C	25%
M	22%
O	24%
P2	4%
V	5%

A Sebészi kezelés eredményei

Author/reference	Total patients	Outcome		
		excellent/ good	fair/ poor	dead
Sundt [49]	315	80%	6%	15%
Peerless *et al.* [37]	305	67%	22%	11%
Hosobuchi [17]	82	84%	9%	7%
Ausman *et al.* [3]	62	84%	11%	5%
Kodama and Suzuki [23]	49	61%	16%	22%
Symon and Vajda [50]	36	86%	6%	8%
Yasargil [52]	30	67%	23%	10%
Heros [14]	28	82%	7%	5%
Lawton and Spetzler [30]	171	87%	8%	5%

Budapest sorozat	148	70%	13%	17%

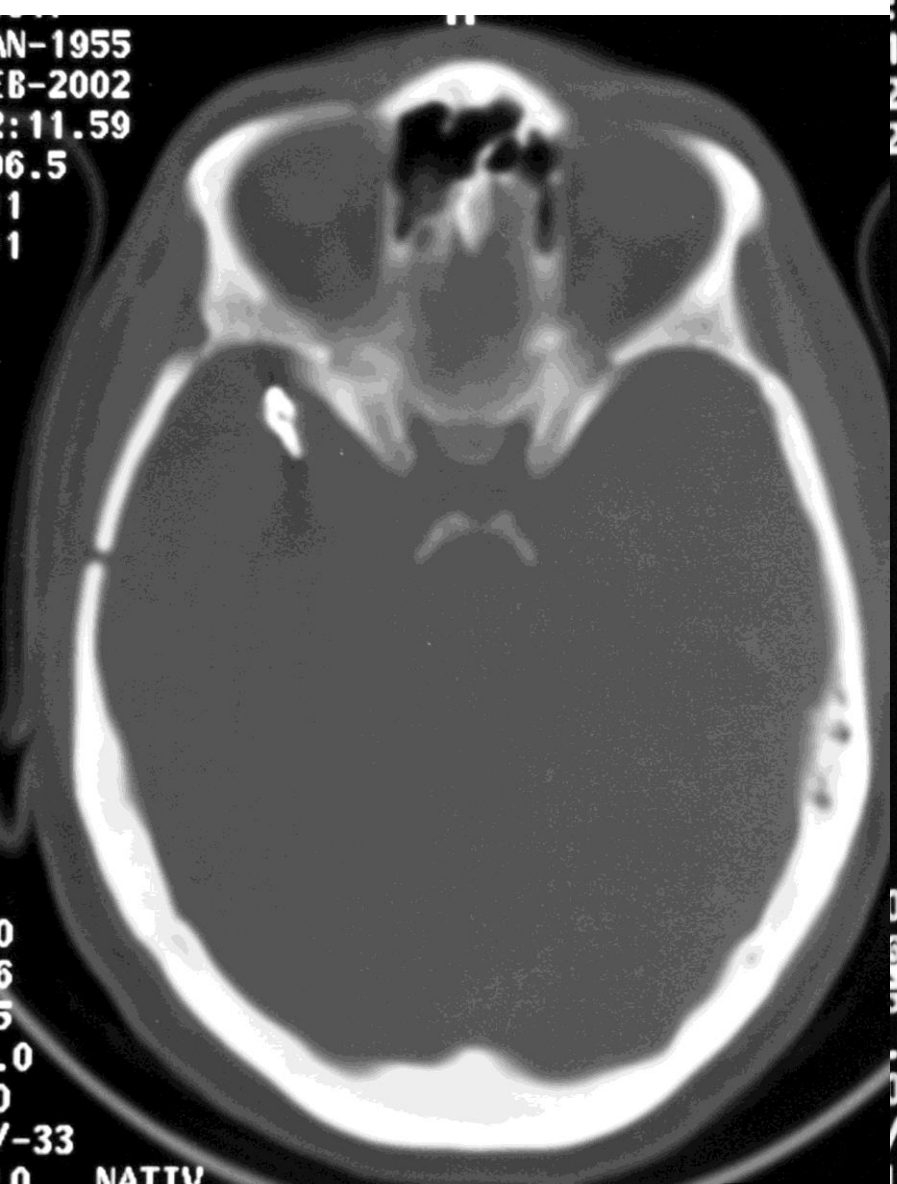


66 y F

Fejfájás és jobboldali trigeminus neuralgia

46 y N

Fejfájás



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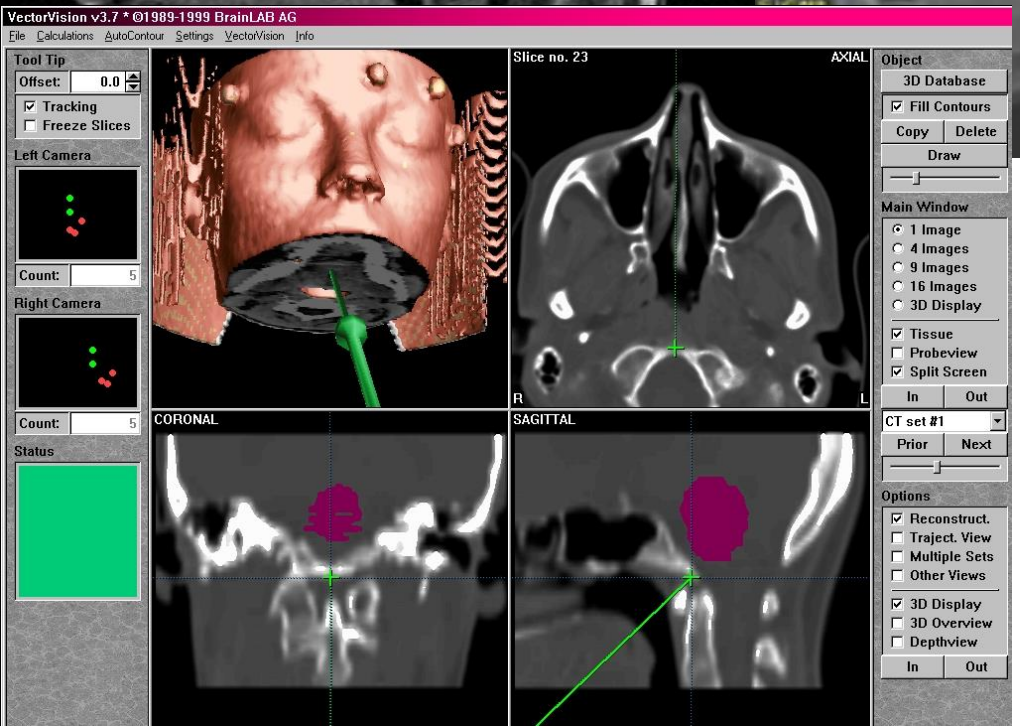
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SAGITTAL
Object
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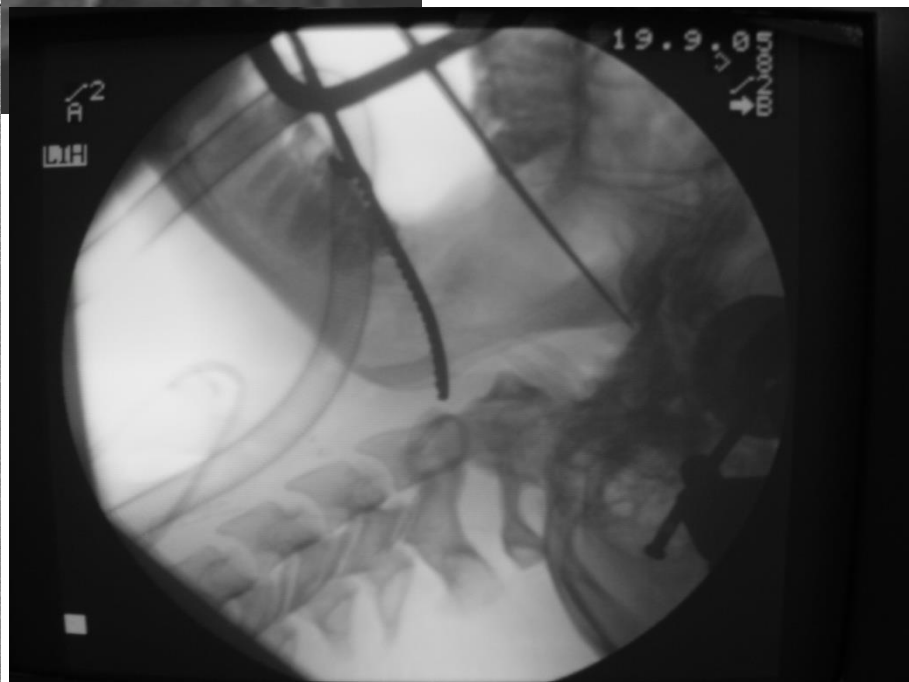
Fill Contours
Copy Delete
Draw
Main Window
1 Image
4 Images
9 Images
16 Images
3D Display
Tissue
Probeview
Split Screen
In Out
CT set #1
Prior Next
Options
Reconstruct.
Traject. View
Multiple Sets
Other Views
3D Display
3D Overview
Depthview
In Out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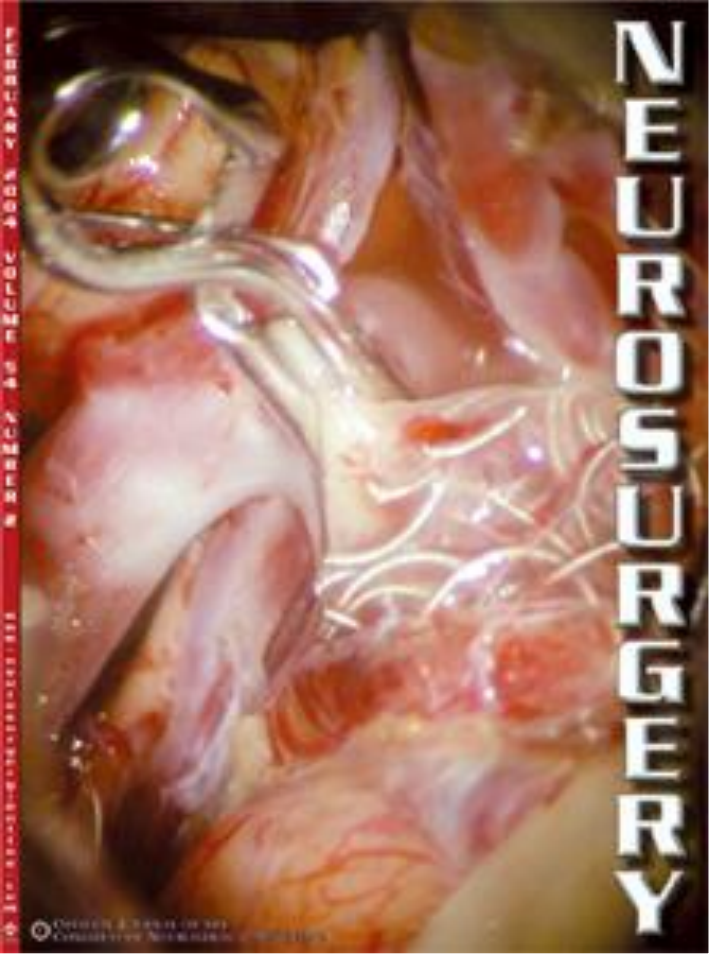

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SURGICALLY TREATED ANEURYSMS PREVIOUSLY COILED: LESSONS LEARNED

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OBJECTIVE: Intravascular coil embolization of cerebral aneurysms has proved to be a safe and effective treatment in certain patient groups; however, this treatment is relatively new, and the long-term outcomes are unknown. One of the known complications is refilling of the aneurysm dome, which is seen in follow-up studies. This patient population poses unique technical difficulties for the neurosurgeon. We present a series of 18 patients who underwent surgery for residual aneurysms after coil remobilization.

METHODS: During a 5-year period, we performed surgery in 18 patients who had previously undergone coil embolization for their aneurysms. Of these aneurysms, four were in the anterior communicating artery, five were in the posterior communicating artery, three were in the internal carotid artery, three were in the posteroinferior cerebellar artery, and three were in the middle cerebral artery. One patient presented with rupture, one presented with acute IIIrd cranial nerve palsy, and the rest of the aneurysms were found on routine follow-up angiograms. Fifteen aneurysms were clipped, and in three patients, they were wrapped because the clip could not be placed adequately.

RESULTS: There were no major complications in any of the patients, and all had uneventful recoveries. The presence of coils in the aneurysm dome and/or neck made clipping and exposure of the aneurysm neck difficult, resulting in incomplete neck obliteration in three patients.

CONCLUSION: Operative clipping after previous coil embolization in aneurysms poses a unique problem for neurosurgeons. With the increasing use of coil embolization, this patient population will undoubtedly increase. The neurosurgeon should be aware of the difficulties and pitfalls encountered in these patients.

KEY WORDS: Aneurysm recurrence, Cerebral aneurysm, Endovascular treatment, Microsurgery

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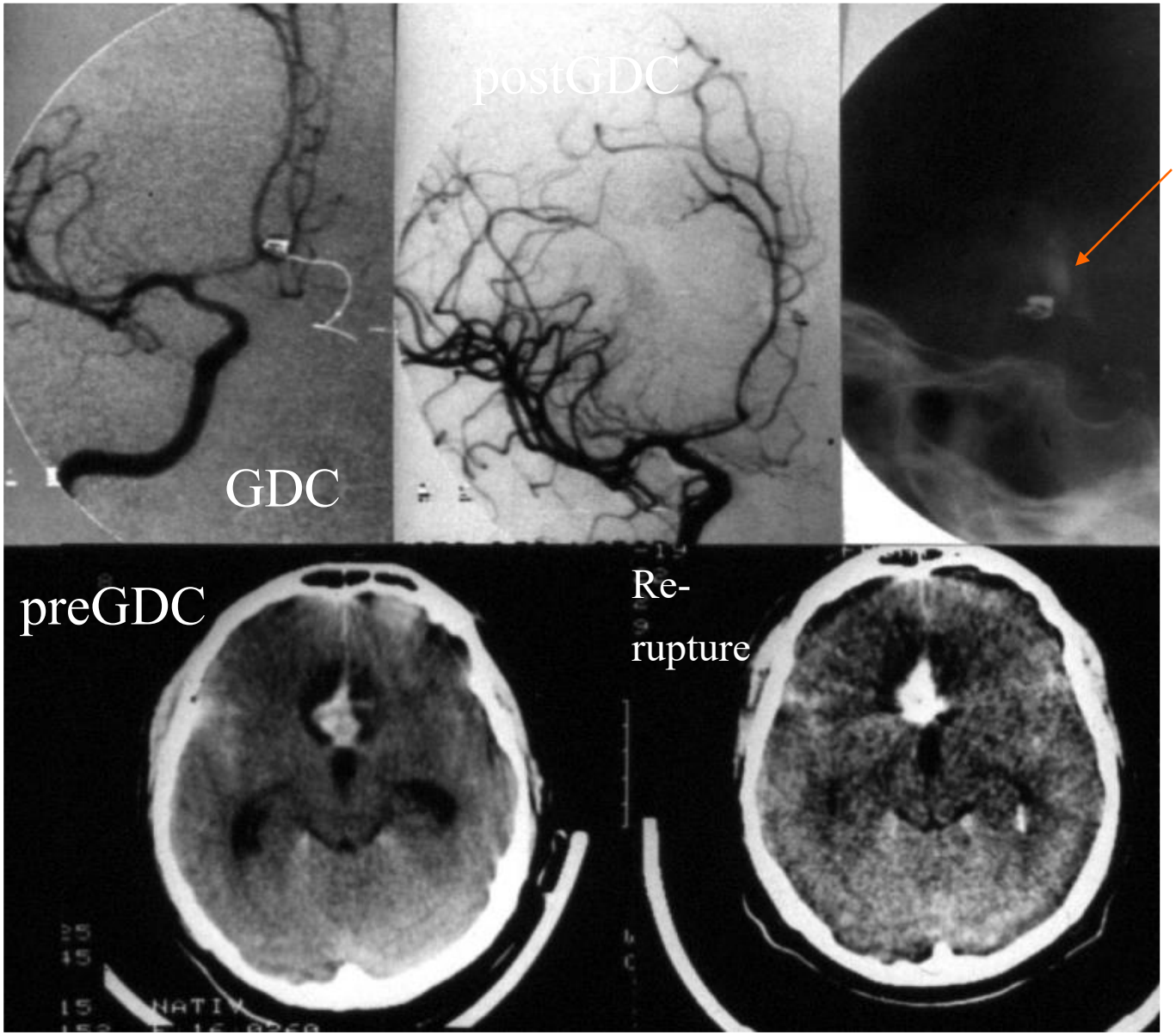
Esetek csoportosítása

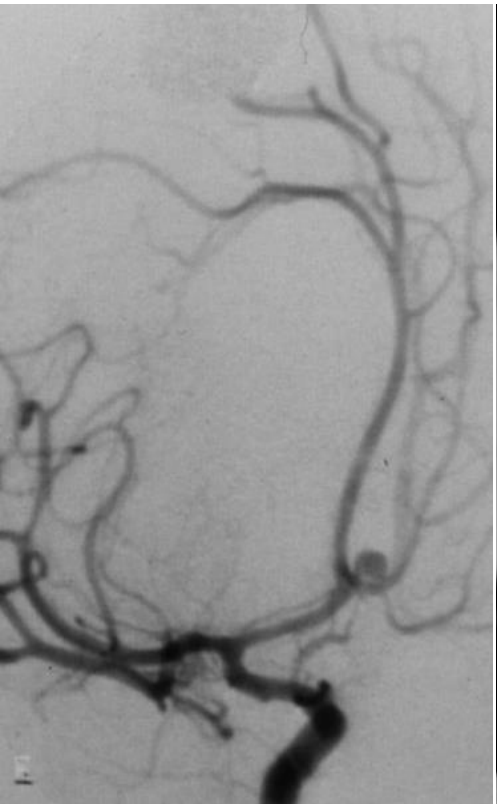
- Endovascularis elzárás akut sikertelensége (4 eset)
  - Reruptura – tömeges vérzéssel vagy anélkül
  - Sürgős műtét
    - Komplikált és nehéz klippelés (zsákot kitöltő coil)
    - Haematoma kiürítés, később shunt

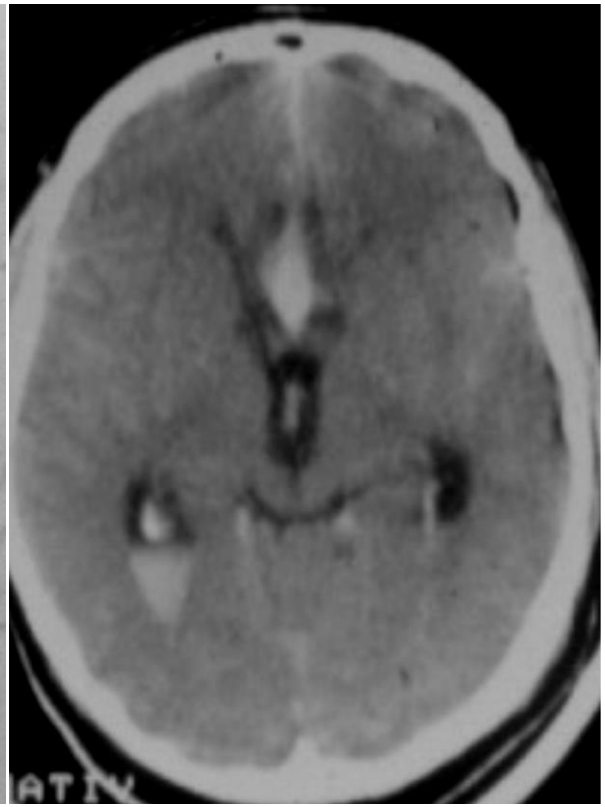
- Aneurysma újratelődés (4 eset)
  - *Kérdés: mikor és egyáltalán kell-e operálni?*

Case #1 47M HH5

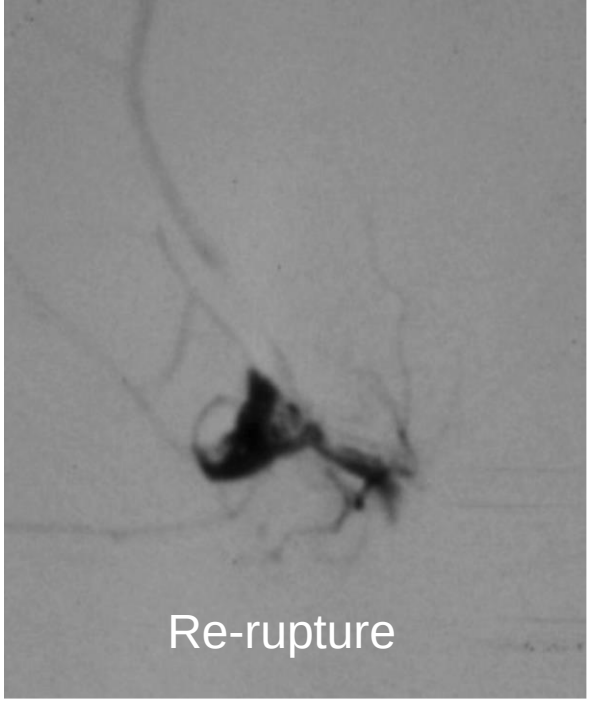


Contrast material leakage during coiling

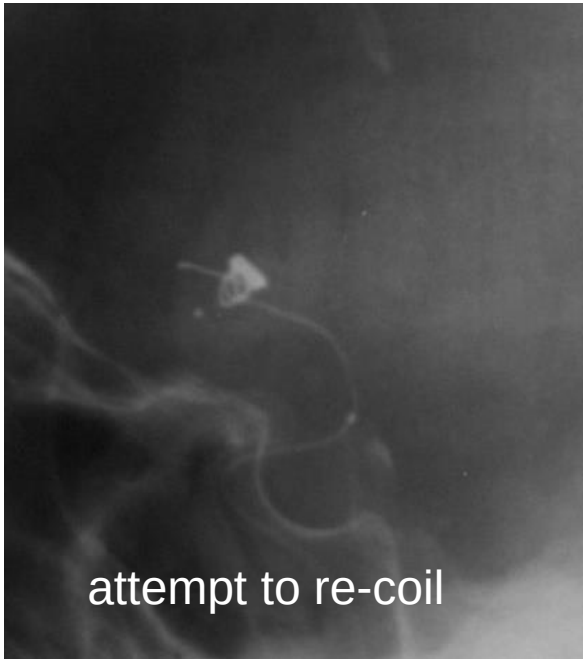




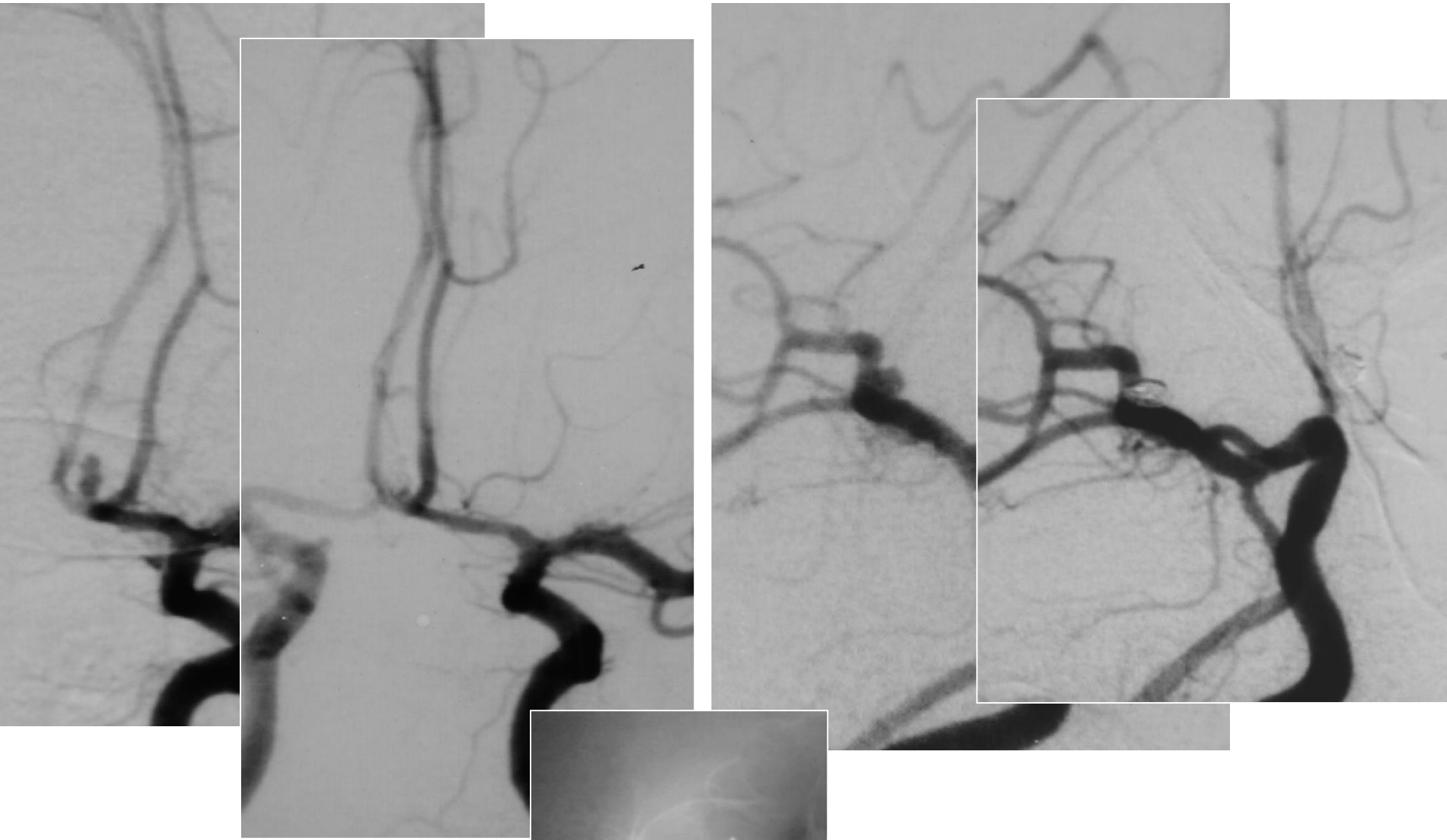
Pre GDC



Re-rupture

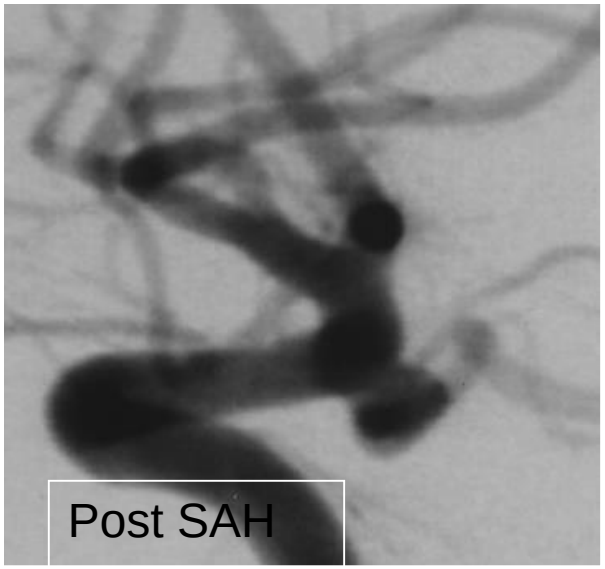


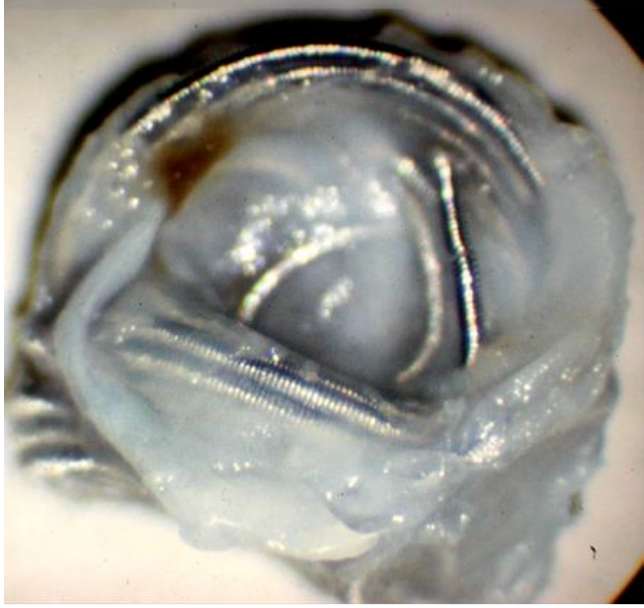
attempt to re-coil

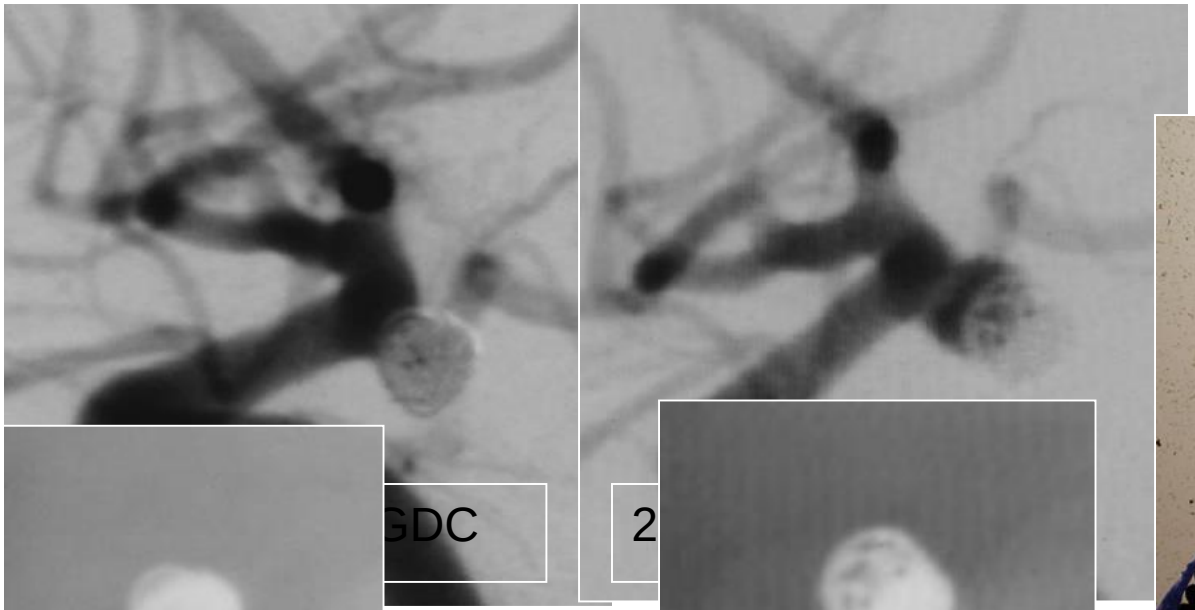


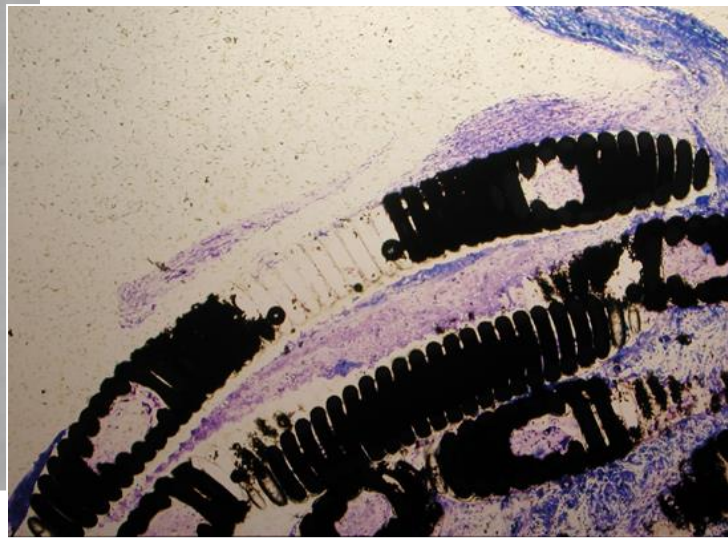
Case #2 56M HH3

Case #5
39M HH4









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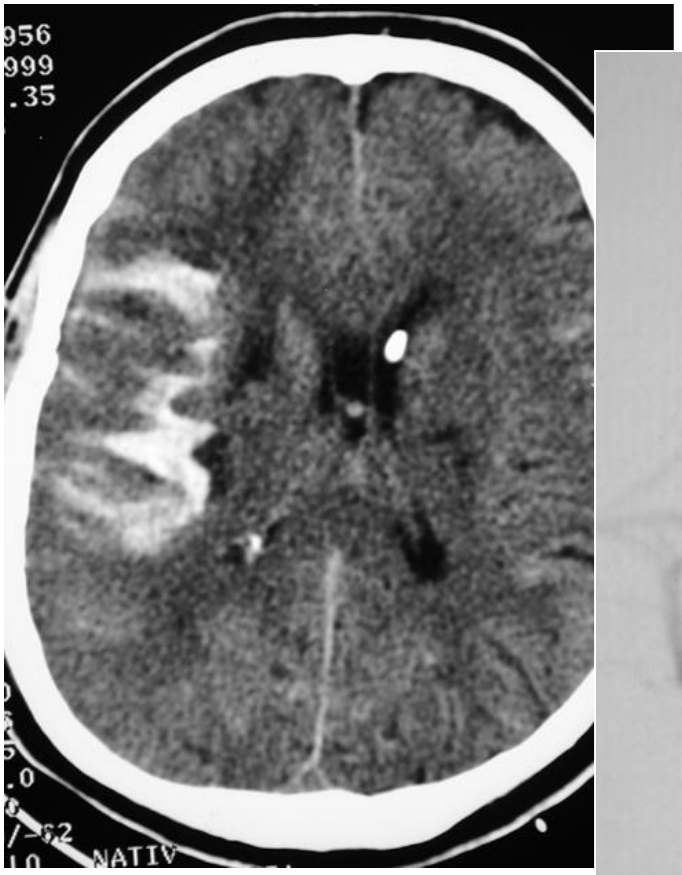
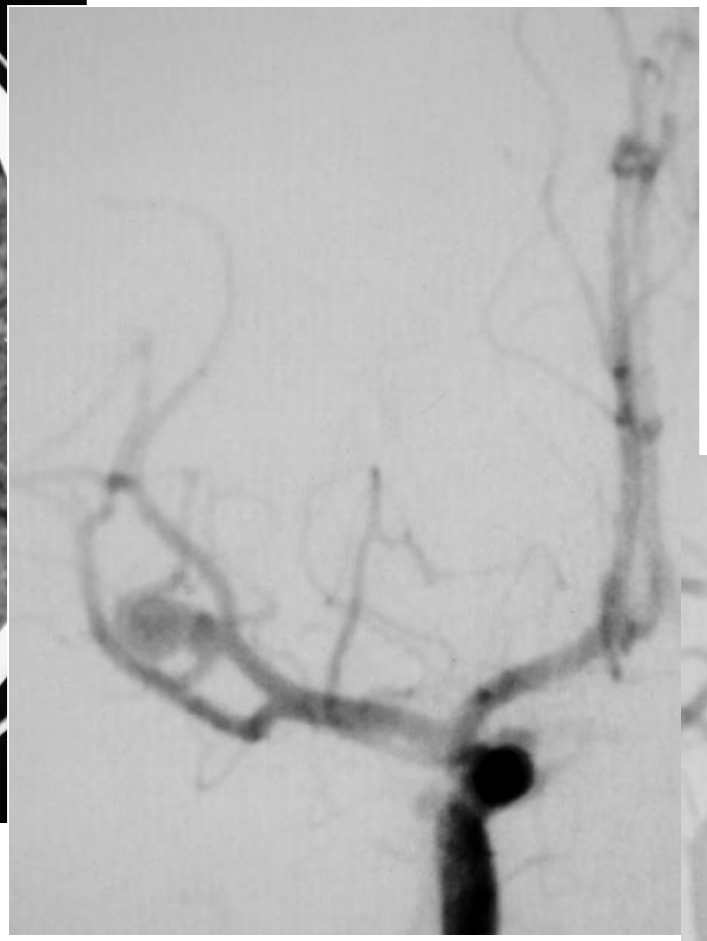
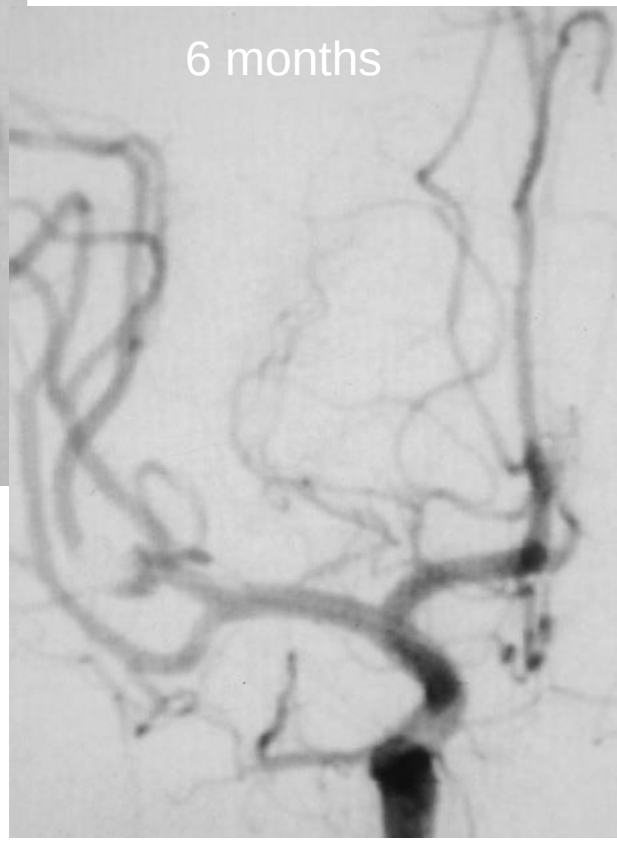
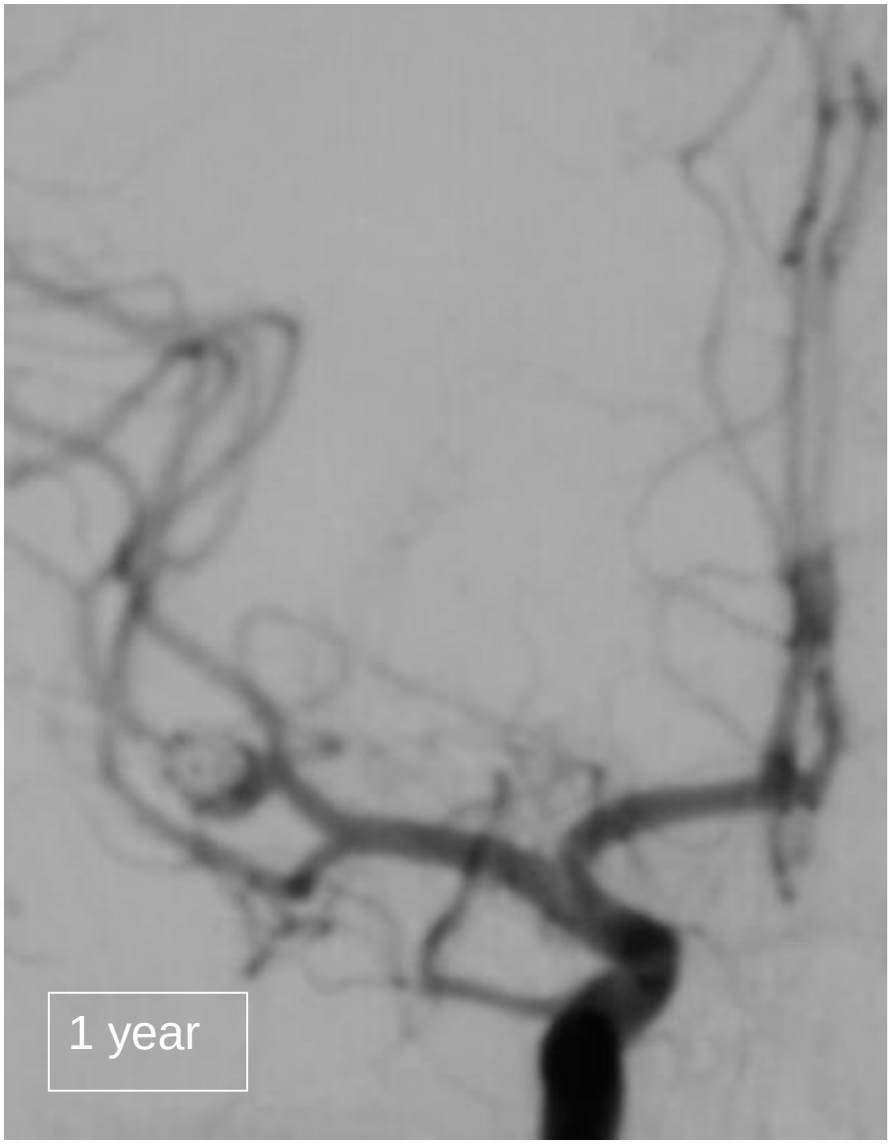
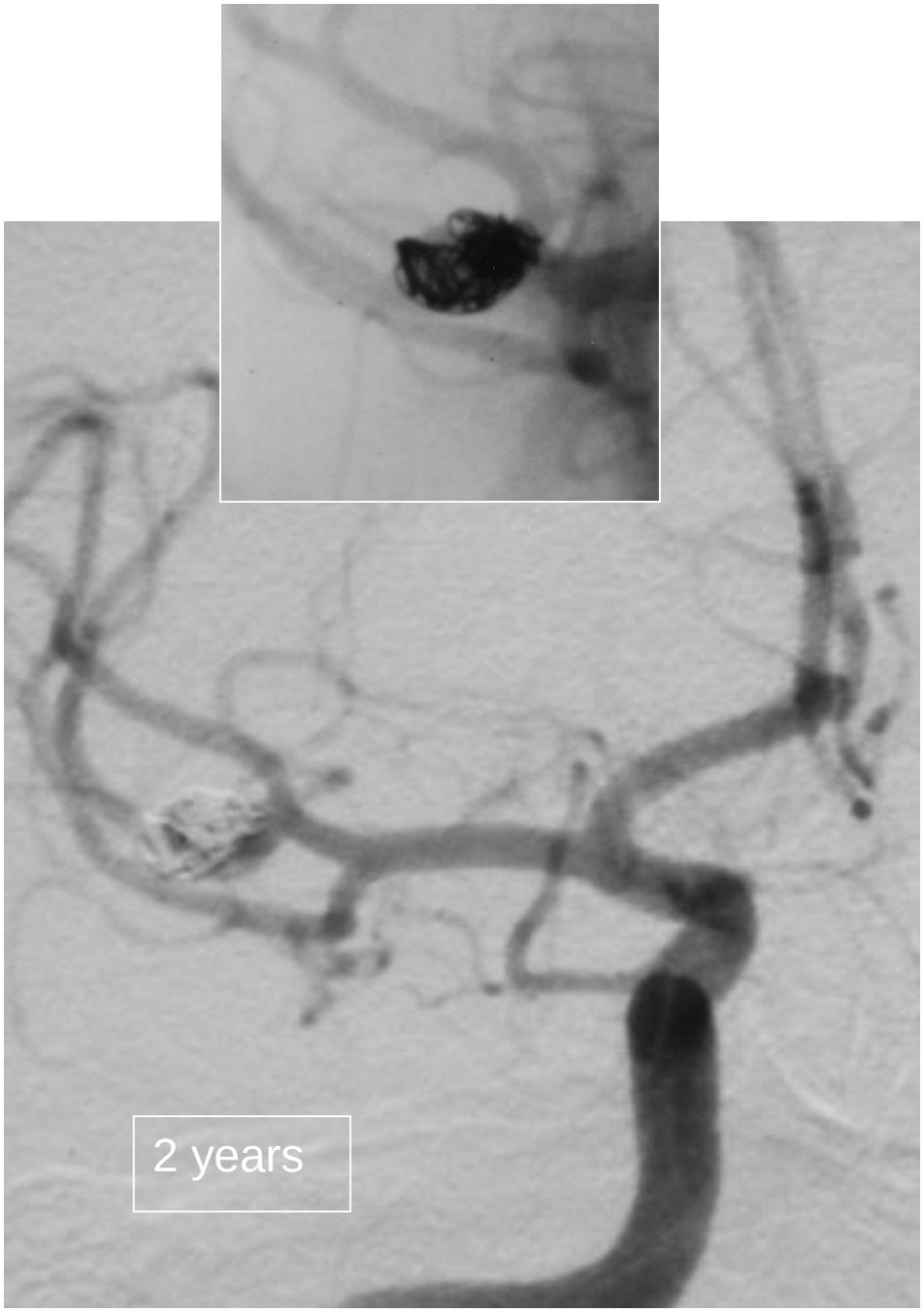






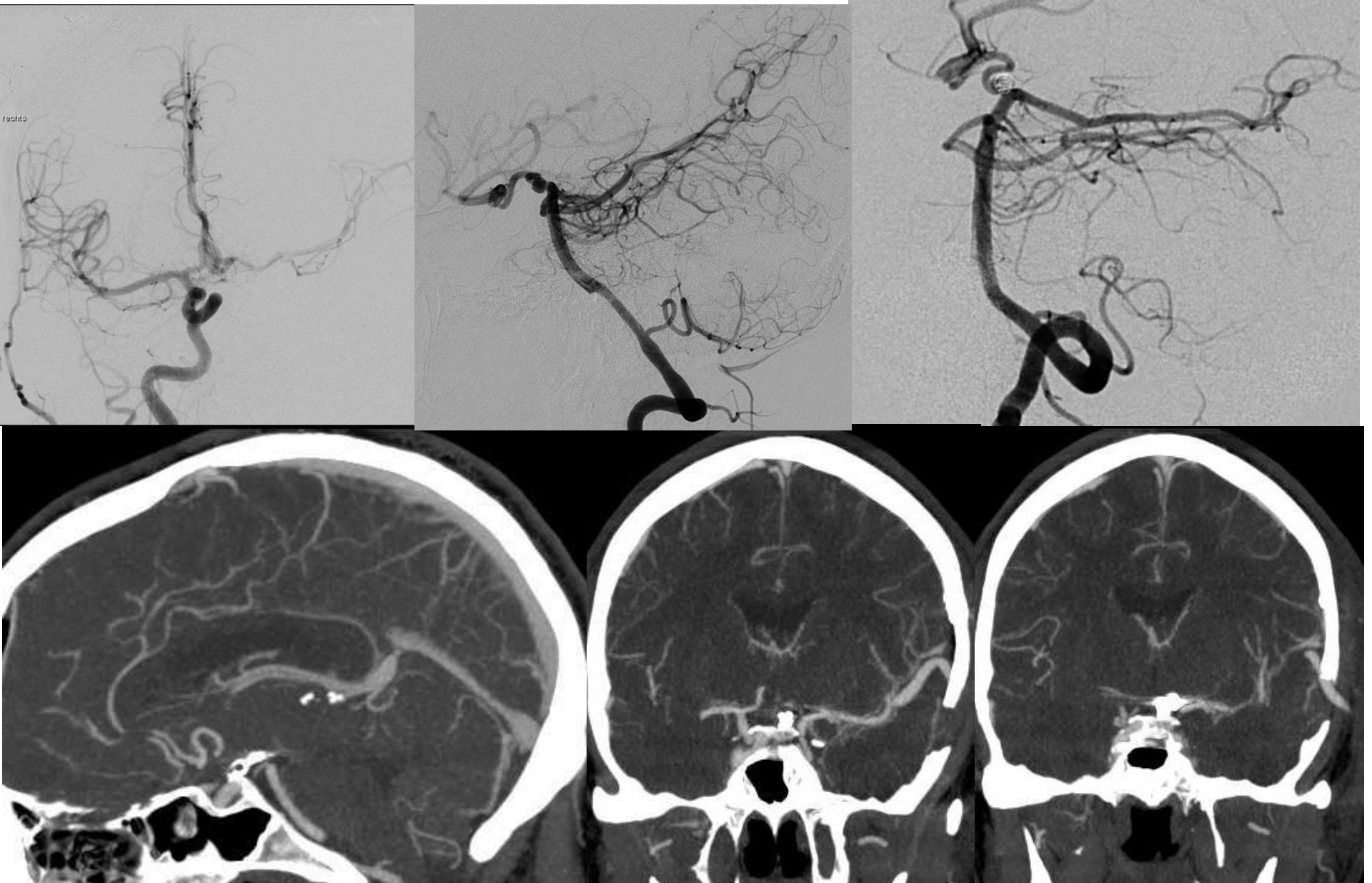
Case #6 43M HH3


1 year


2 years

Apowersoft
Video Converter

32F



Összefoglalás

- Endovascularis gyakorlat mellett a nehezen vagy éppen legnehezebben kezelhető aneurysmák maradnak mikrosebészeti ellátásra
- Ezeknek a zsákoknak az ellátása nagy gyakorlatot igényel – ennek a gyakorlatnak megszerzése egye nehezebb
- ?
- Erősen koncentrálni kell az ellátást
- Új képzési formák


Köszönöm a figyelmet!