Hemorraagiline insult

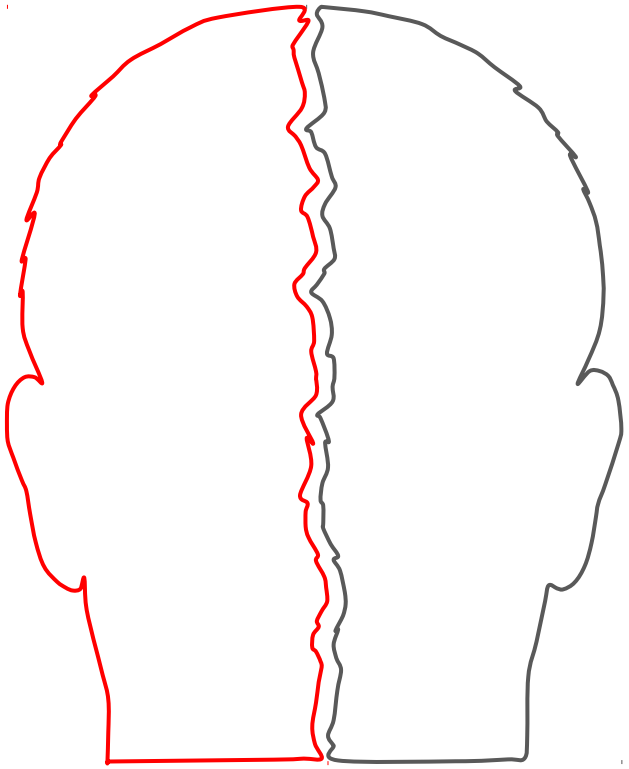
TOOMAS ASSER

11. MAI 2018

Insult

Hemorraagiline insult - 15%

Isheemiline insult - 85%

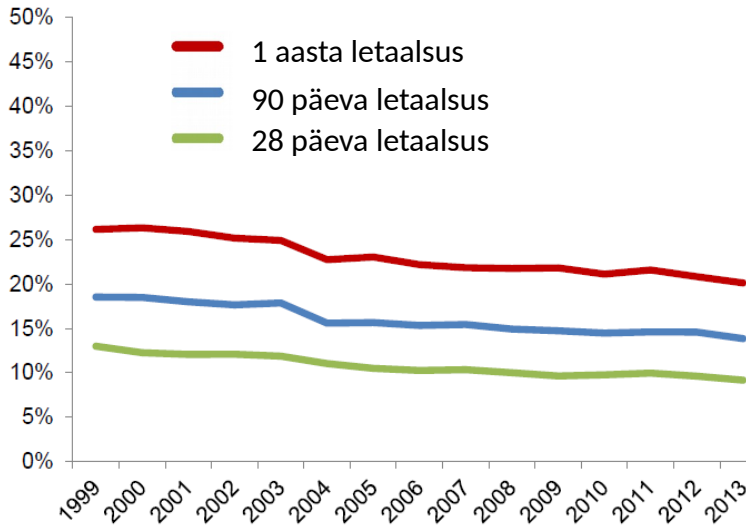


Intratserebraalne hemorraagia - 10%

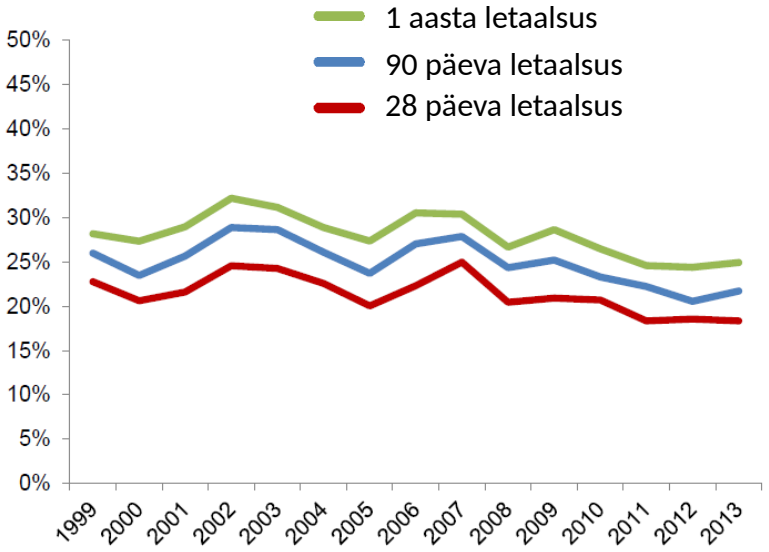
Subarahnoidaalne hemorraagia - 5%

28, 90 päeva ja 1 aasta esmasinsuldi letaalsus

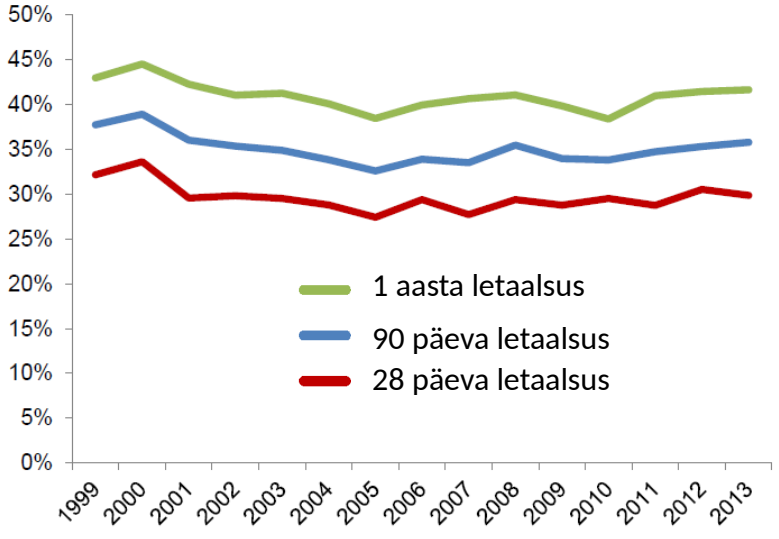
Isheemiline insult
1 aasta letaalsus: **26% → 20%**



Subarahnoidaalne hemorraagia
1 aasta letaalsus **28% → 25%**



Intratserebraalne hemorraagia aasta letaalsus **43% → 42%**

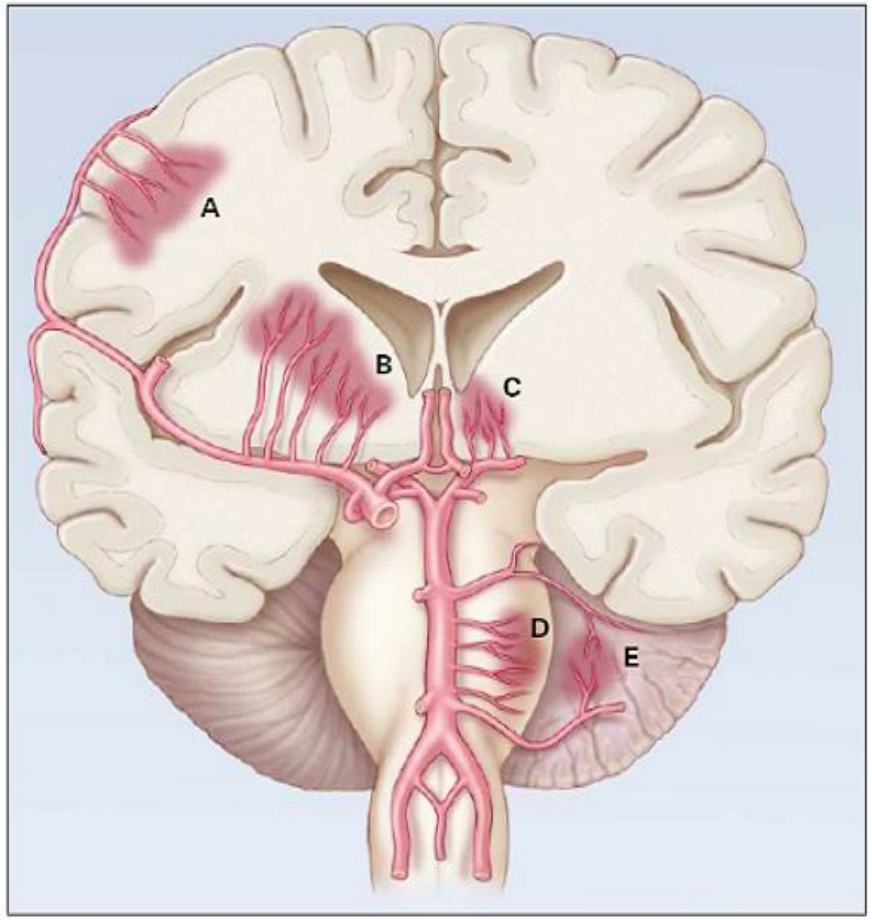


Meretoja et al. Ann Med. 2011;43(Suppl1):S22–S30, http://www.terveytemme.fi/perfect/

Spontaanne intratserebraalne hemorraagia

- 10-20/100000 a., Jaapan 50-55/100000 a.
- Varieeruv suurus ja avaldumine, lokalisatsioon, kliiniline tähendus, põhjus
- Vanus <45 a → tõenäone põhjus vaskulaarne patoloogia
- Supratentoriaalne - 30 päeva surevus 35-52%, nendest 50% esimese 48 t jooksul
- Intratserebraalne hemorraagia on sümptom – otsida põhjust

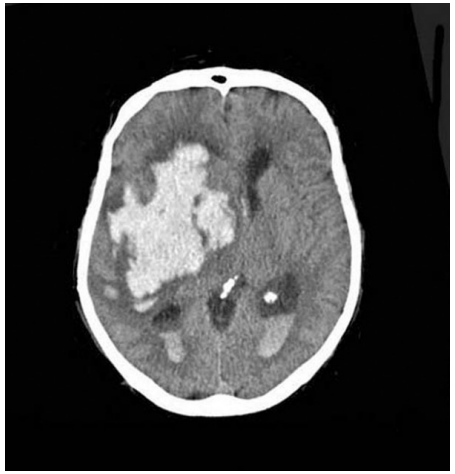
Spontaanne intratserebraalne hemorraagia



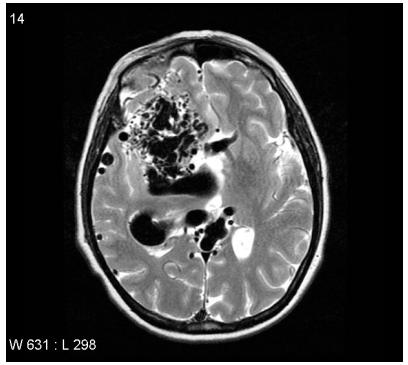
A Lobaarne (1**0-20%**) - kortikaalsed harud
B Basaalganglionid (**50%**) – keskmise ajuarteri harud
C Taalamus (**15%**) – tagumise ajuarteri harud
D Pons (**10-15%**) – basilaararteri harud
E Väikeaju – ülemise ajukese arteri harud

Spontaanse intratserebraalse hemorraagia põhjused

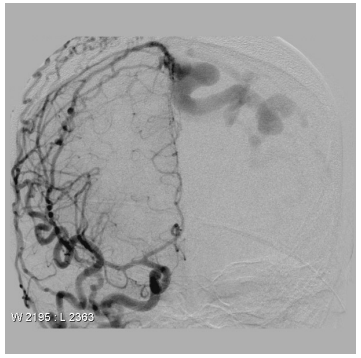
- Kõige sagedasem „väikeste soonte haigus“ e. „hüpertensiivne“
- Amüloid-angiopaatia
- AVM, dAVF, kavernoom
- Aneurüsm
- Tuumor - metastaasid, primaarsed KNS tuumorid
- Aju veenide ja siinuste tromboos



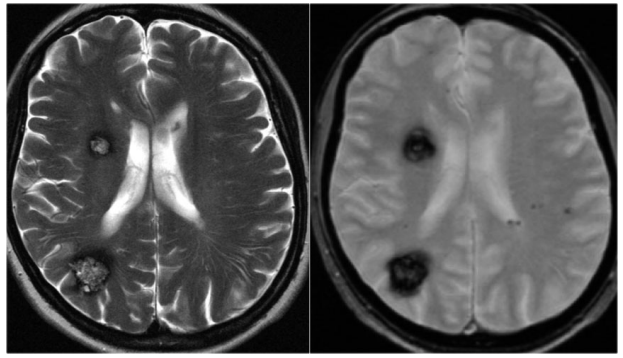
AVM



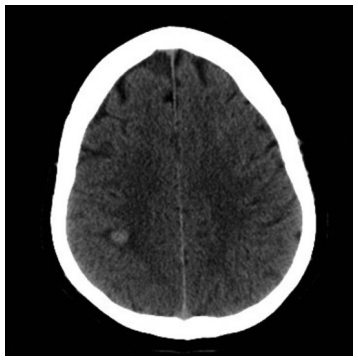
dAVF



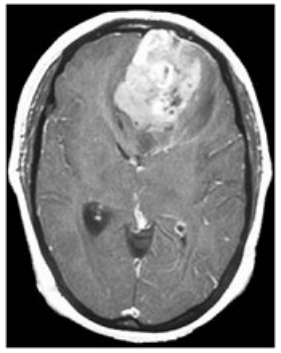
Kavernoom



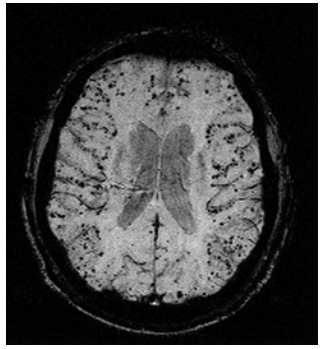
kortikaalse veeni tromboos



Tuumor



Amüloid-angiopaatia



‘Hüpertensiivne intratserebraalne hemorraagia’ - väikeste veresoonte haigus

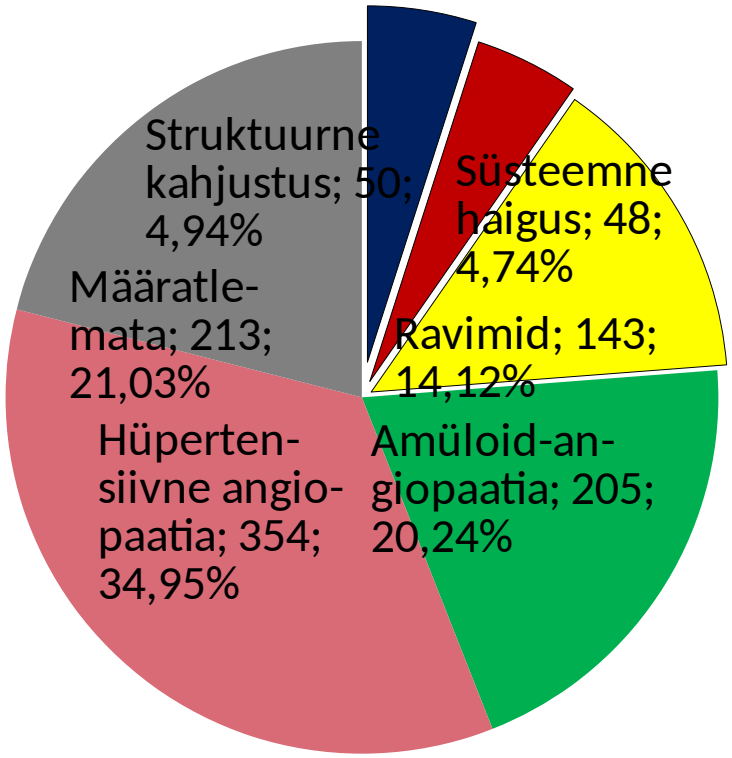
- Ajurterite väikeste perforaatorite (50-200µm) mikroangiopaatia
- Lipohüalinoos ja pseudoaneurüsmid
  - Basaalganglionid 2/3
  - Taalamus 10-15%
  - Ajusild, väikeaju 10%
  - Lobaarne 5(-15)%

KT on otsustava tähtsusega kuid ei välista muid põhjusi

Spetsiifiline sekundaarne etioloogia neljandikul patsientidest, n=1013

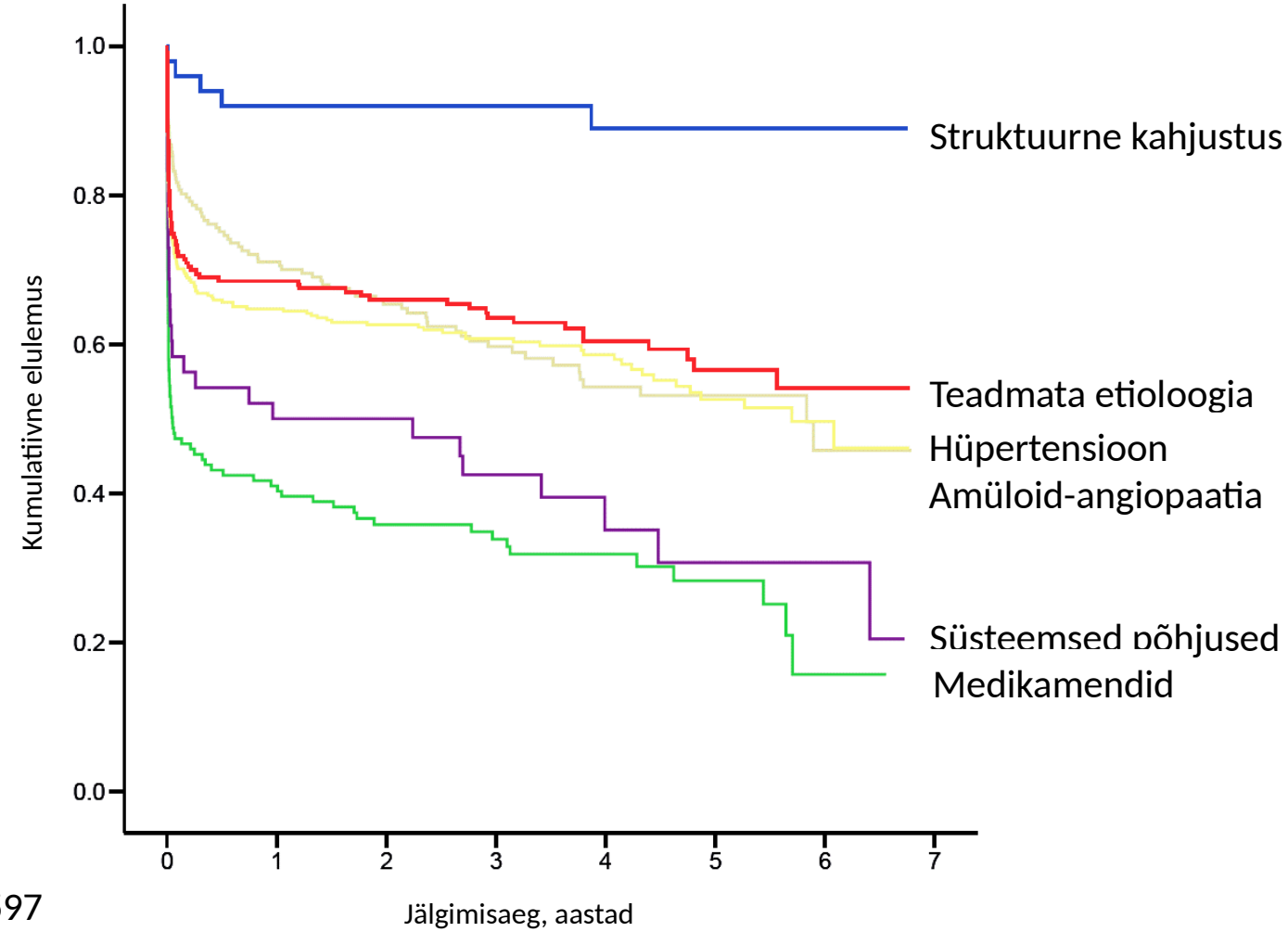
SMASH-U klassifikatsioon:

S	Struktuurne vaskulaarne põhjus: kavernoom, AVM
M	Medikamendid: antikoagulandid
A	Amüloid-angiopaatia
S	Süsteemsed haigused: maksatsirroos, trombotsütopeenia, muud harvad põhjused
H	Hüpertensioon
U	(Undetermined) teadmata etioloogia



Meretoja et al. Stroke 2012;43(10):2592-2597

Intratserebraalse hematoomi etioloogia mõju elulemusele



Meretoja et al. Stroke 2012;43(10):2592-2597

Metaanalüüs: 36 uuringut, 1983–2006

- Kokku 8145 intratserebraalse hemorraagiaga patsienti
- Esmashaigestumine ei ole 1980-2008 vähenenud, esmashaigestumiskordaja 24,6/100 000 a.
- 1 kuu surevuse mediaanväärtus 40,4%
- Funktsionaalne tulemus - kõrvalisest abist sõltumatud – 12-39%.

Asch et al. Lancet Neurol. 2010;9:167–76

Incidence, case fatality, and functional outcome of intracerebral haemorrhage over time, according to age, sex, and ethnic origin: a systematic review and meta-analysis

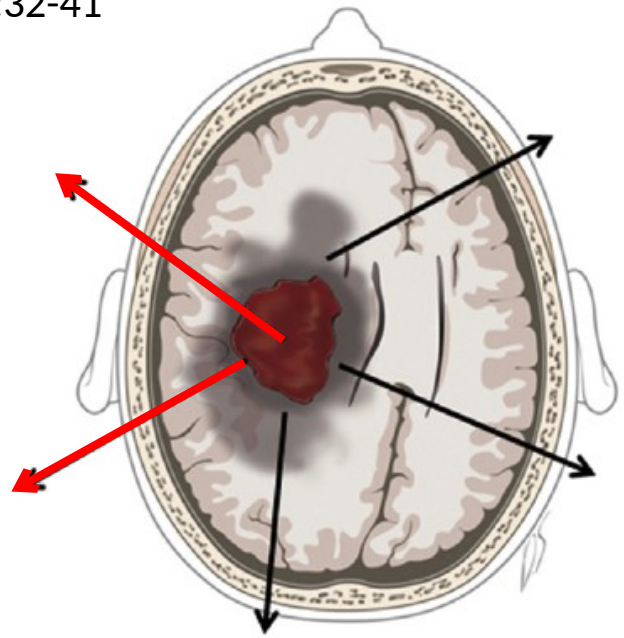
Charlotte J J van Asch, Merel J A Luitse, Gabriël J E Rinkel, Ingeborg van der Tweel, Ale Algra, Catharina J M Klijn

Summary
Background Since the early 1980s, imaging techniques have enabled population-based studies of intracerebral haemorrhage. We aimed to assess the incidence, case fatality, and functional outcome of intracerebral haemorrhage in relation to age, sex, ethnic origin, and time period in studies published since 1980.

Lancet Neurol 2010; 9: 167–76
Published Online
January 6, 2010
DOI:10.1016/S1474-

Davis et al. Neurology. 2006; 66:1175- 1181
Kim et al. World Neurosurg. 2016; 94:32-41

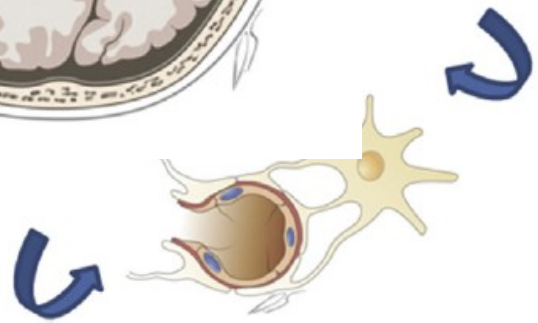
Mehaaniline ajukoe kahjustus



Hemoglobiini laguproduktid →
Vabad raikaalid, HEB kahjustus

Koagulatsioonikaskaadi aktivatsioon →
Versoonte permeaabelsus suureneb

Massiefekt, isheemia, CPP ↓

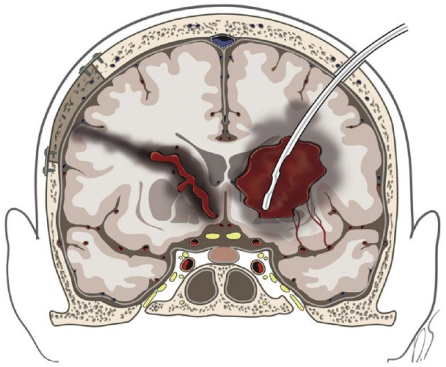


Põletikureaktsioon → HEB kahjustus

- Esmane neuroloogilise kahjustus - neuronite otsesest mehaanilisest vigastusest. Ei ole mõjustatav.
- Hematoomi laienemine.
  - 1 tunniga 26% patsientidest hematoomi maht suurem 33% või enam
  - Järgneva 20 tunni jooksul veel 12% patsientidest hematoomi maht suurem 33% või enam
- Sekundaarne kahjustus hematoomi ümber

Intratserebraalse hemorraagia kirurgiline ravi

- 1961, McKissock et al. Esimene randomiseeritud uuring neurokirurgias (180 pt.)
  - Kirurgilise ravitulemused halvemad kui konservatiivsel ravil
  - Domineeriv seisukoht aastakümneteks



The Lancet · Saturday 29 July 1961

PRIMARY INTRACEREBRAL HÆMORRHAGE
A Controlled Trial of Surgical and Conservative Treatment in 180 Unselected Cases

WYLIE MCKISSOCK
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NEUROLOGICAL SURGEON, ST. GEORGE'S HOSPITAL, LONDON, S.W.1

ALAN RICHARDSON
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JULIEN TAYLOR
M.B. Lond., F.R.C.S.

- 1989 – Auer – endoskoopiline ravi 100 haigel. Vastupidised tulemused. Ca. 10 uuringut veel ning rida väiksemahulisi töid.

Early surgery versus initial conservative treatment in patients with spontaneous supratentorial lobar intracerebral haematomas (STICH II): a randomised trial

A David Mendelow, Barbara A Gregson, Elise N Rowan, Gordon D Murray, Anil Gholkar, Patrick M Mitchell, for the STICH II Investigators

Mendelow et al. Lancet 365:387-397, 2005
Mendelow et al. Lancet 382:397-408, 2013

- 2005 a. **STICH** (**S**urgical **T**rial in **I**ntracerebral **H**aemorrhage) uuring.
  - Varane kirurgiline vs. konservatiivne ravi supratentoriaalse hematoomi korral. n=1033.
  - 2/3 patsientides halb kliiniline tulemuse või surid
  - Võimalik, et pidmiste hematoomide korral võib olla tulemus parem
- 2013 **STICH II**
  - Randomiseeriti 601 patsienti pindmise hematoomiga. Varane kirurgiline vs. konservatiivne ravi
  - Kirurgilises grupis 59% halb kliiniline tulemuse või surid
  - Konservatiise ravi grupis 61% halb kliiniline tulemuse või surid
- Kirurgilise ja medikamentoosse ravi efektiivsus jätkuvalt ebaselge. Surevus ei ole vähenenud

Fiorella et al. World Neurosurg. 2015; 84, 4:1136-1141.

CrossMark

Intracerebral Hemorrhage: A Common and Devastating Disease in Need of Better Treatment

Dave Fiorella[1], Scott L. Zuckerman[2], Imad S. Khan[3], Nishant Ganesh Kumar[2], J. Mocco[4]

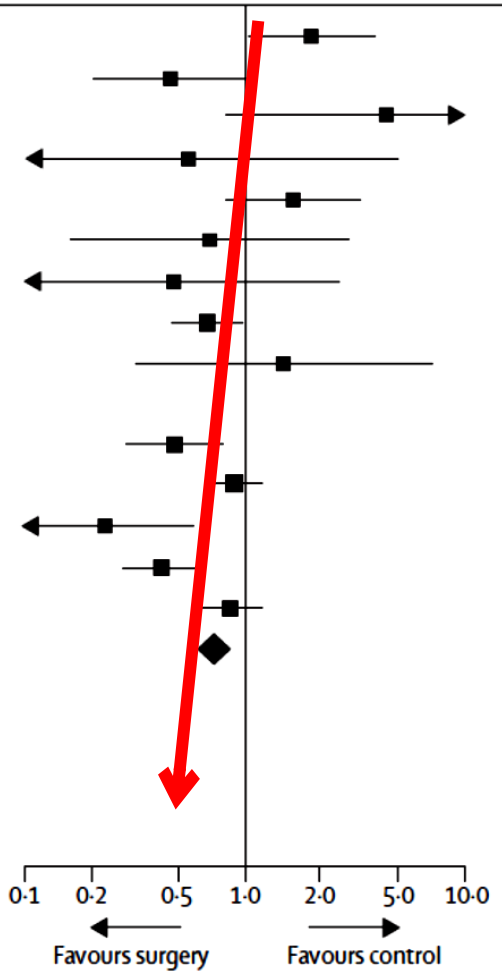
Metaanalüüs 15 uuringut Opereeritud n=3366

	Surgery	Control	Peto odds ratio (95% CI)
McKissock, et al[15] (1961)	71/89	60/91	2·00 (1·04–3·86)
Auer, et al[11] (1989)	28/50	37/50	0·46 (0·20–1·04)
Juvela, et al[14] (1989)	25/26	21/26	4·39 (0·81–23·65)
Batjer, et al[12] (1990)	6/8	11/13	0·55 (0·06–4·93)
Chen, et al[19] (1992)	40/64	31/62	1·66 (0·82–3·34)
Morgenstern, et al[16] (1998)	9/15	11/16	0·69 (0·16–2·94)
Zuccarello, et al[17] (1999)	4/9	7/11	0·48 (0·09–2·69)
Chen, et al[13] (2001)	86/263	97/230	0·67 (0·46–0·96)
Teernstra, et al[18] (2001)	33/36	29/33	1·51 (0·32–7·12)
Hosseini, et al[32] (2003)	0/1	0/1	Not estimable
Hattori, et al[33] (2004)	60/121	82/121	0·47 (0·28–0·79)
Mendelow, et al[20] (2005)	346/468	378/496	0·89 (0·66–1·19)
Pantazis, et al[34] (2006)	36/54	49/54	0·24 (0·10–0·60)
Wang, et al[35] (2009)	87/194	120/181	0·42 (0·28–0·63)
Mendelow, et al (2013)	174/297	178/286	0·86 (0·62–1·20)
Total (95% CI)	**1695**	**1671**	**0·74 (0·64–0·86)**

Total events: 1005 (surgery), 1111 (control)

Test for heterogeneity: χ^2=39·29, df=13 (p=0·0002), I^2=66·9%

Test for overall effect: Z=4·00 (p<0·0001)



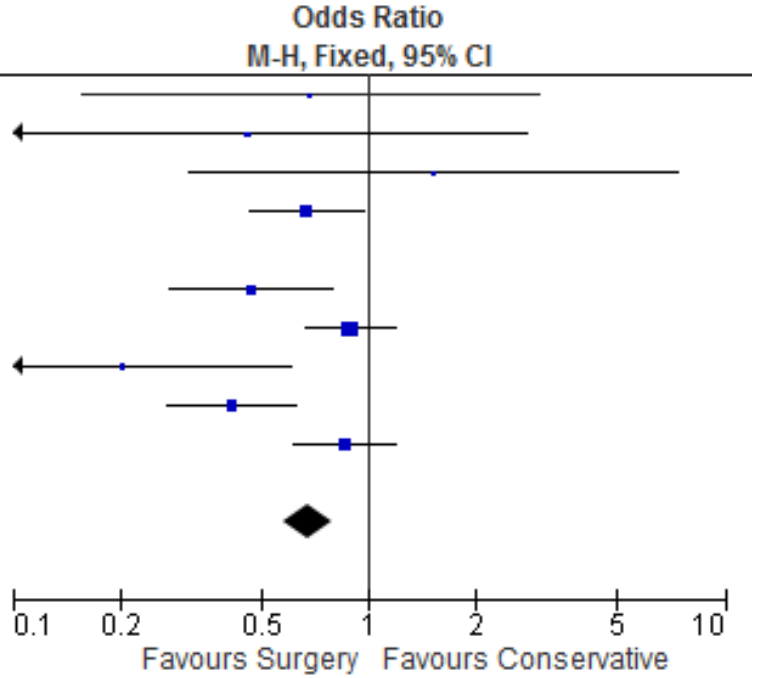
Mendelow et al. Lancet 2013; 382: 397–408

Metaanalüüs: viimase 25 a opereeritud, n=2887

Study or Subgroup	Surgery Events	Surgery Total	Conservative management Events	Conservative management Total	Odds Ratio M-H, Fixed, 95% CI	Year
Morgenstern 1998	9	15	11	16	0.68 [0.16, 2.99]	1998
Zuccarello 1999	4	9	7	11	0.46 [0.08, 2.76]	1999
Teernstra 2001	33	36	29	33	1.52 [0.31, 7.35]	2001
Chen 2001	86	263	97	230	0.67 [0.46, 0.96]	2001
Hosseini 2003	0	1	0	1	Not estimable	2003
Hattori 2004	60	121	82	121	0.47 [0.28, 0.79]	2004
Mendelow 2005	346	468	378	496	0.89 [0.66, 1.19]	2005
Pantazis 2006	36	54	49	54	0.20 [0.07, 0.60]	2006
Wang 2009	87	194	120	181	0.41 [0.27, 0.63]	2009
Mendelow 2013	174	297	178	286	0.86 [0.62, 1.20]	2013
Total (95% CI)		**1458**		**1429**	**0.68 [0.58, 0.79]**	
Total events	835		951			

Heterogeneity: $Chi^2 = 18.40$, df = 8 (P = 0.02); $I^2 = 57\%$

Test for overall effect: Z = 4.87 (P < 0.00001)



Calculated from Mendelow et al. Lancet 2013; 382: 397–408. (Meretoja 2017)

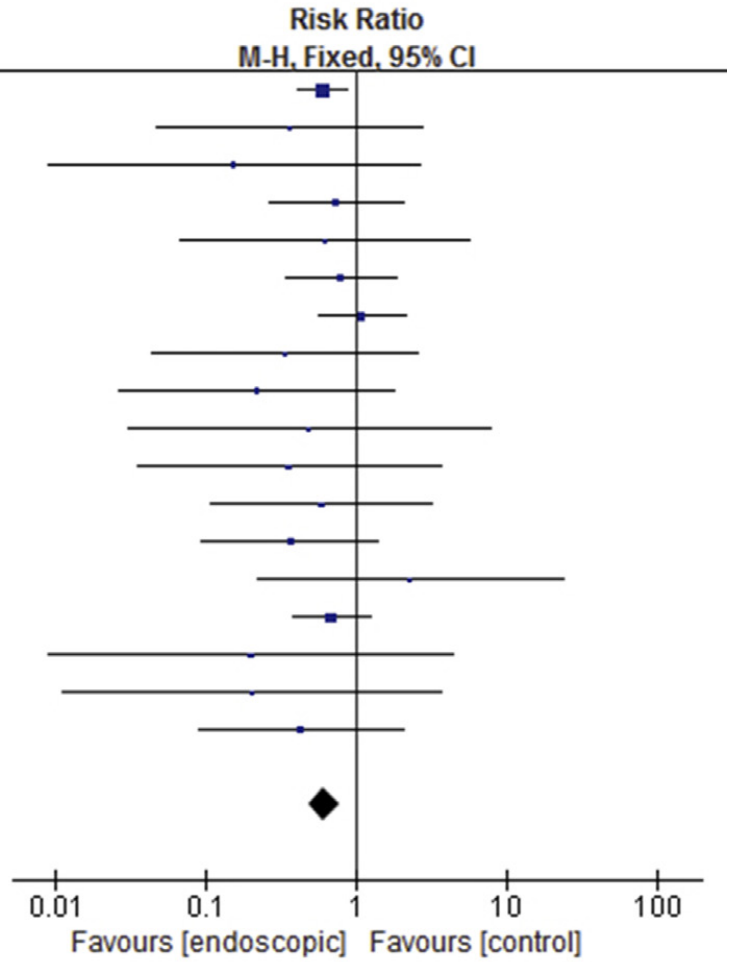
Endoskoopiline vs. mitte-endoskoopiline. Surevus Metaanalüüs: n=1213 pt.

Mantel-Haenszel; CI, confidence interval

Study or Subgroup	endoscopic Events	endoscopic Total	control Events	control Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Auer 1989	21	50	35	50	27.5%	0.60 [0.41, 0.87]
Cai 2017	1	20	6	43	3.0%	0.36 [0.05, 2.78]
Cho 2006	0	30	6	60	3.4%	0.15 [0.01, 2.60]
Feng 2016	6	93	8	91	6.3%	0.73 [0.27, 2.03]
Kim 1998	1	8	2	10	1.4%	0.63 [0.07, 5.72]
Li(Y) 2017	6	32	16	67	8.1%	0.79 [0.34, 1.82]
Li(Z) 2017	14	58	12	54	9.7%	1.09 [0.55, 2.14]
Miller 2008	1	6	2	4	1.9%	0.33 [0.04, 2.56]
Nagasaka 2011	1	23	4	20	3.4%	0.22 [0.03, 1.79]
Nakano 2003	0	6	6	43	1.4%	0.48 [0.03, 7.67]
Nishihara 2007	1	24	2	17	1.8%	0.35 [0.03, 3.60]
Qiu 2003	2	25	3	22	2.5%	0.59 [0.11, 3.20]
Vespa 2016	2	13	11	26	5.8%	0.36 [0.09, 1.40]
Wang 2015	2	21	1	24	0.7%	2.29 [0.22, 23.44]
Xu 2017	15	78	18	64	15.5%	0.68 [0.38, 1.25]
Yamashiro 2015	0	14	1	8	1.5%	0.20 [0.01, 4.40]
Zhang 2014	0	21	3	30	2.3%	0.20 [0.01, 3.70]
Zhu 2012	2	28	5	30	3.8%	0.43 [0.09, 2.03]
Total (95% CI)		**550**		**663**	**100.0%**	**0.61 [0.48, 0.78]**
Total events	75		141			

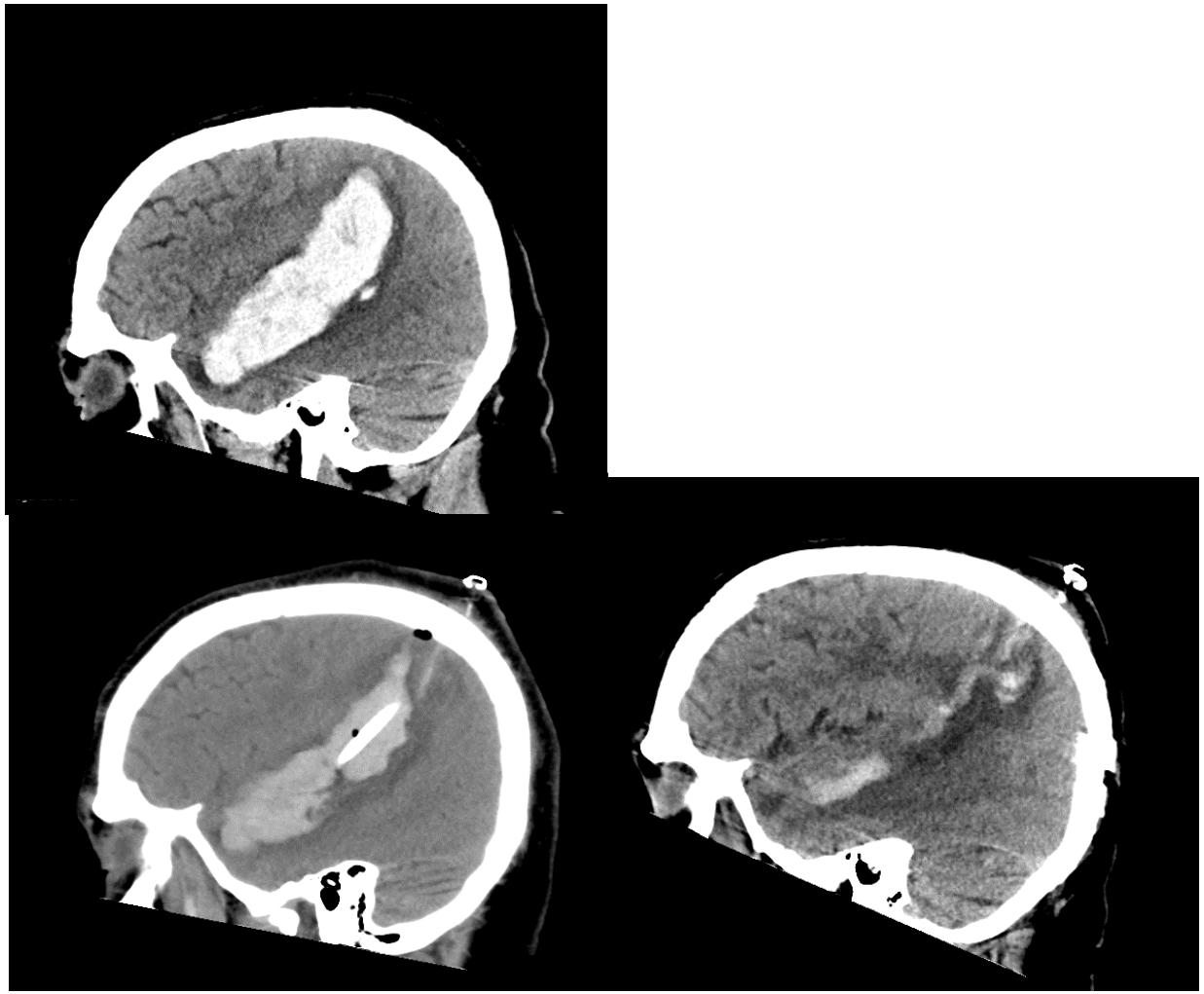
Heterogeneity: $Chi^2 = 9.11$, df = 17 (P = 0.94); $I^2 = 0\%$

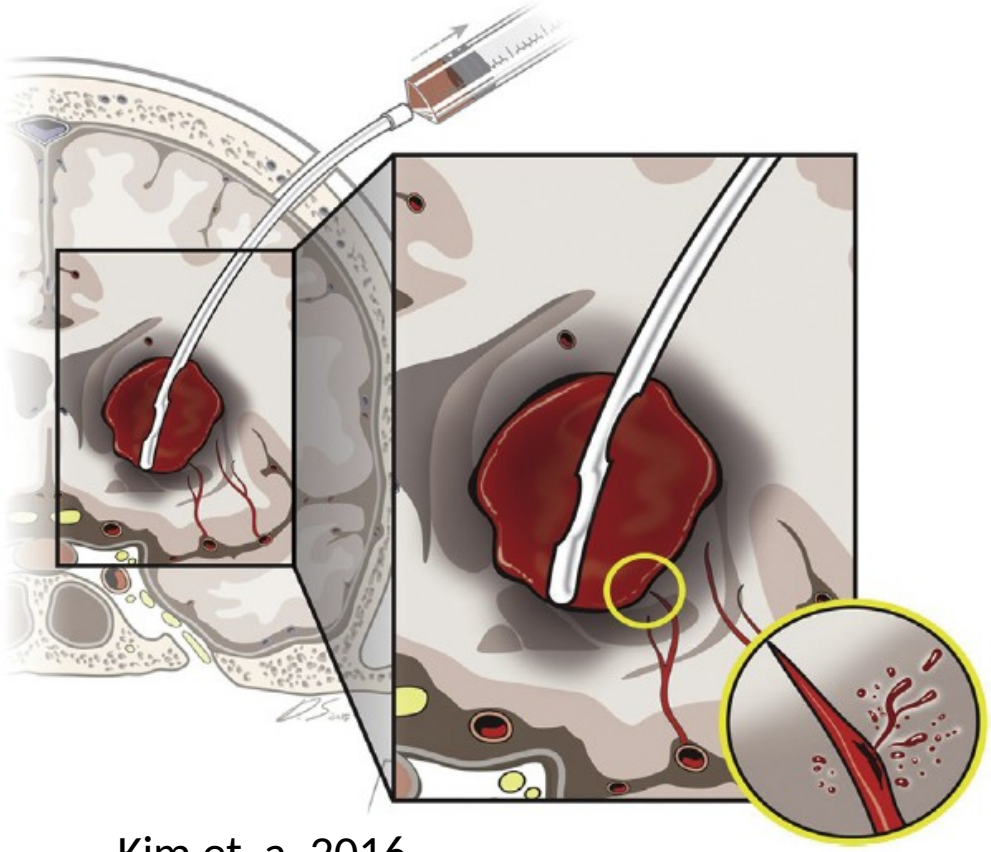
Test for overall effect: Z = 3.91 (P < 0.0001)



Yao et al. World Neurosurgery 2018; 113: 348-356

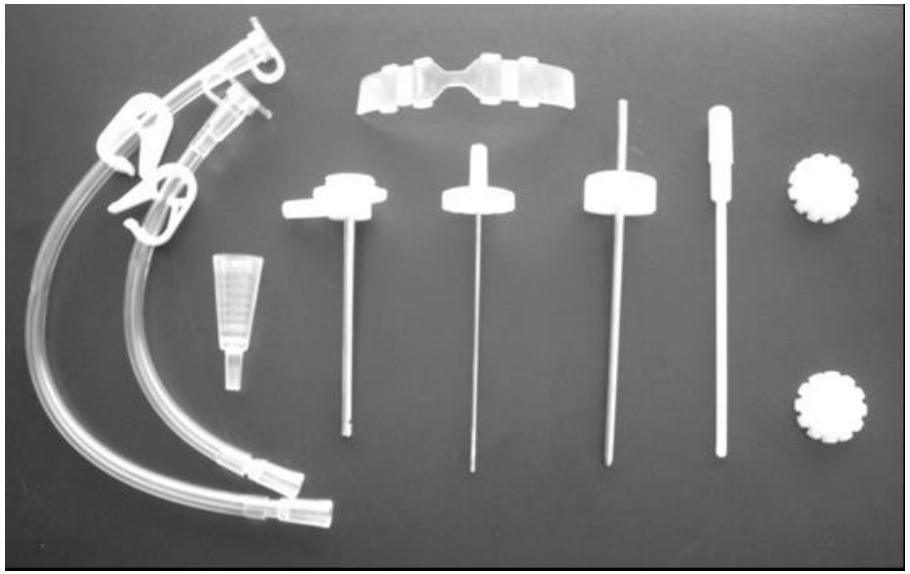
Mini-invasiivne kirurgia: stereotaktiline hematoomi väline drenaaž + tPA





Kim et a. 2016

Kraniopunktsioon, Üle 150 000 patsiendi



Original article

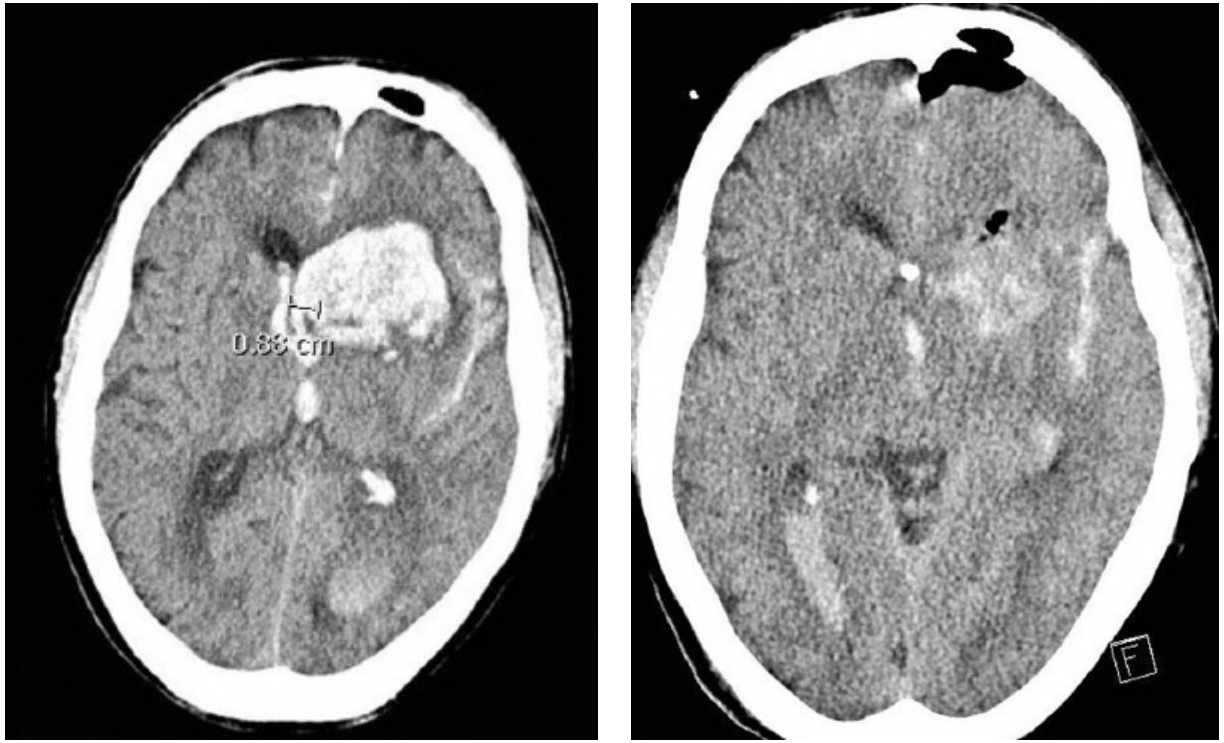
Minimally invasive craniopuncture therapy vs. conservative treatment for spontaneous intracerebral hemorrhage: results from a randomized clinical trial in China

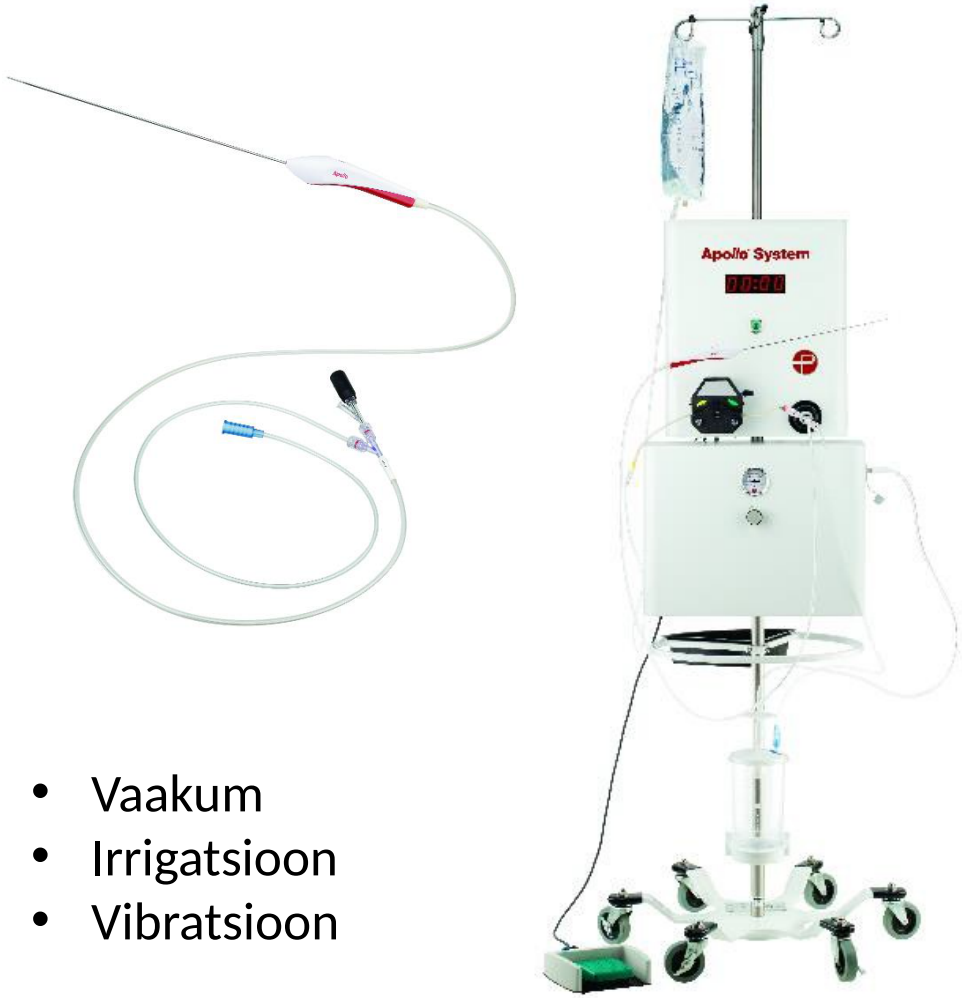
Wen-Zhi Wang[1,2]*, Bin Jiang[2], Hong-Mei Liu[1], Di Li[1], Chuan-Zhen Lu[3], Ya-Du Zhao[4], and J. W. Sander[5]

Väikeste basaalganglionide hematoomide korral
KT
Punktsioon
Aspiratsioon
urakinaas 10000-50000 U

Wang et al. International Journal of Stroke. 4; 2009: 11–16

Apollo® System





- Vaakum
- Irrigatsioon
- Vibratsioon

Spiotta et al. Neurosurgery. 2015;11 Suppl 2:243-51.

Millal kahtlustada „makrovaskulaarset“ patoloogiat?

- Vanus <40-50 a.
- Puudub hüpertensioon või koagulopaatia
- SAH või intraventrikulaarse vere olemasolu
- Hematoom temporaal- või frontaalsagaras
- Halpin et al. 1994. Üle 20% leiti verdumise põhjus hilisematel DSA, MRT uuringutel

Stroke. 2010;41:685-690

	AVMs		Aneurysms	
	Percent	95% CI	Percent	95% CI
Overall	20	17 to 23	13	11 to 16
Age*				
Young (<50 y)	27	19 to 37	30	21 to 40
Old (≥50 y)	18	13 to 24	20	14 to 27
Blood pressure†				
Hypertensive	6	3 to 10	8	5 to 13
Normotensive	28	24 to 33	13	10 to 17
Location‡				
Lobar	31	25 to 37	20	16 to 26
Deep	11	6 to 18	3	1 to 8
Posterior fossa	37	23 to 54	0	0 to 10

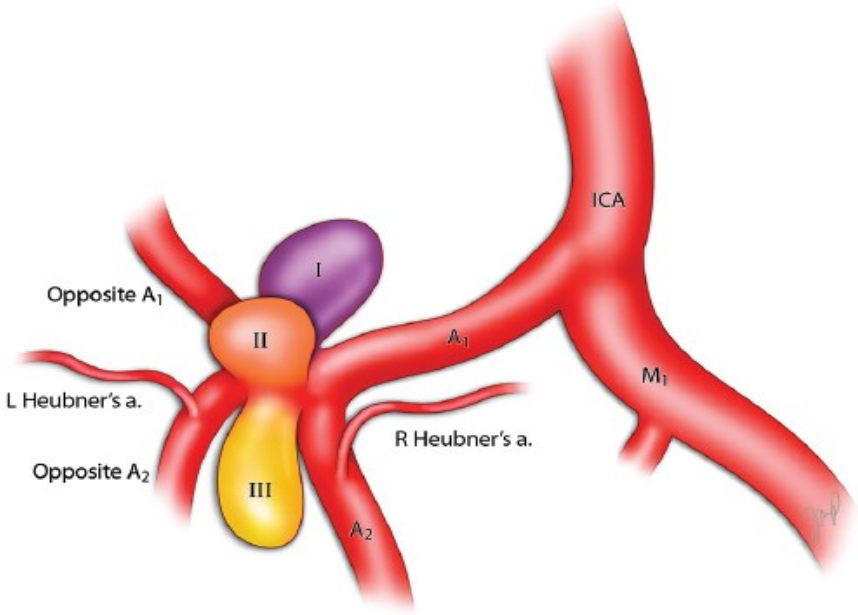
Radiological Investigation of Spontaneous Intracerebral Hemorrhage

Systematic Review and Trinational Survey

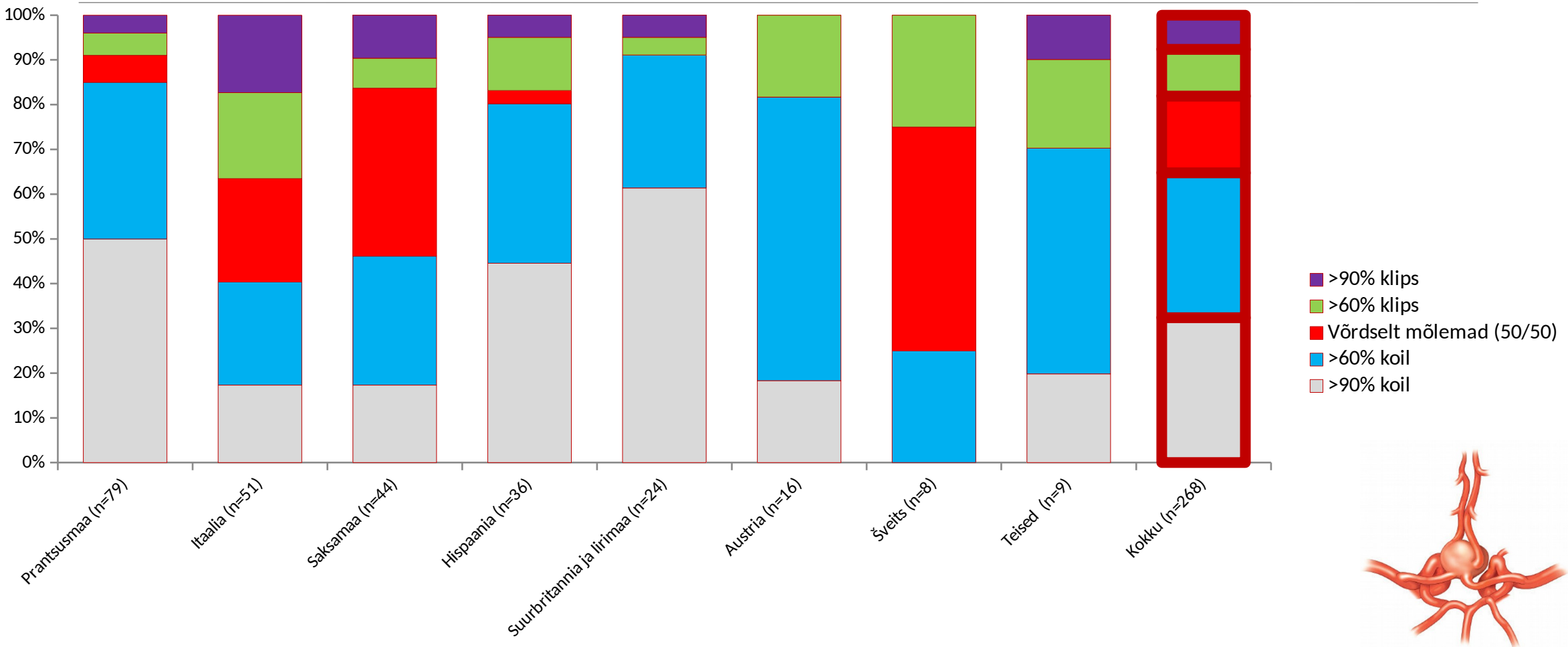
Charlotte Cordonnier, MD, PhD; Catharina J.M. Klijn, MD, PhD; Janneke van Beijnum, MD; Rustam Al-Shahi Salman, MA, PhD, FRCP Edin

Aneurüsmid

- Asukoht
- Suurus
- Suund
- Lubistused
- Kaela ja koti läbimõõt
- Lähtesoonte ja aneurüsmi suhe
- Arteri harude lähtumine aneurüsmi kotist, perforaatorite olemasolu

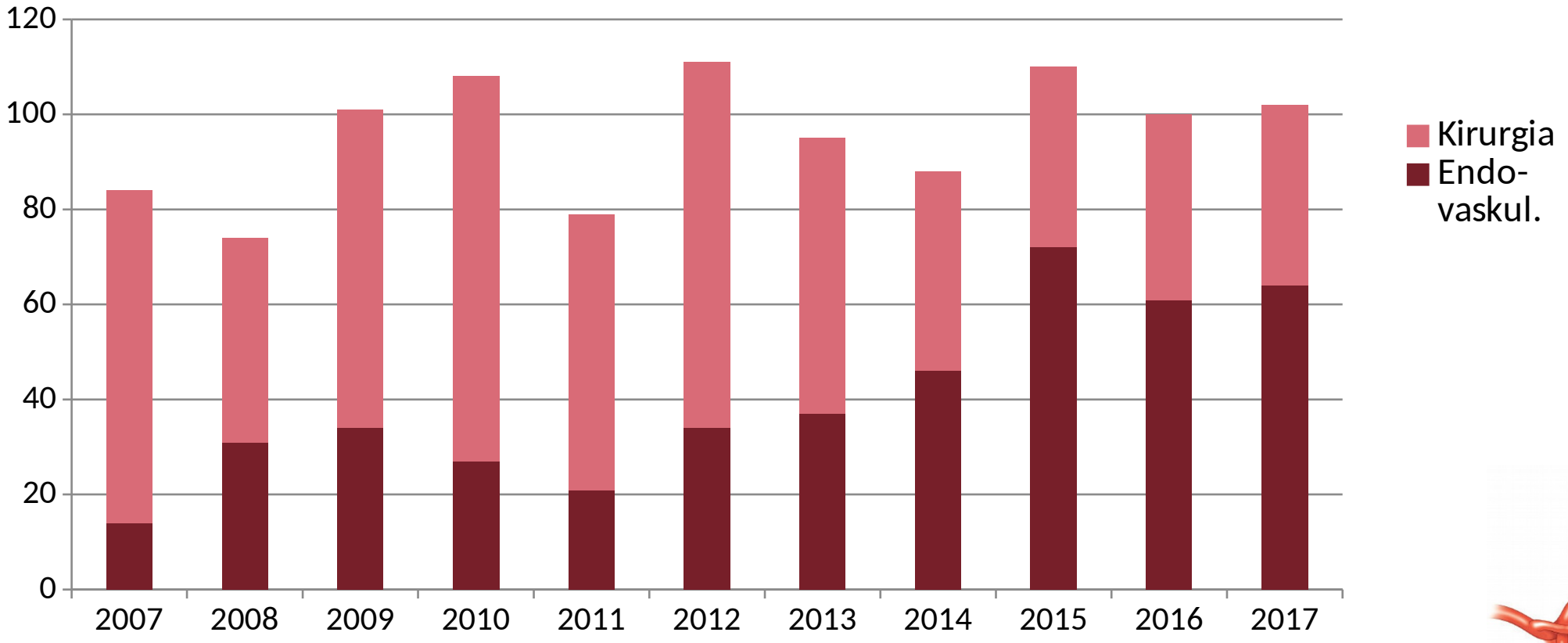


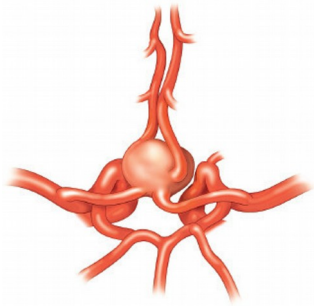
Aneurüsmide käsitlus Euroopa maades klips : koil



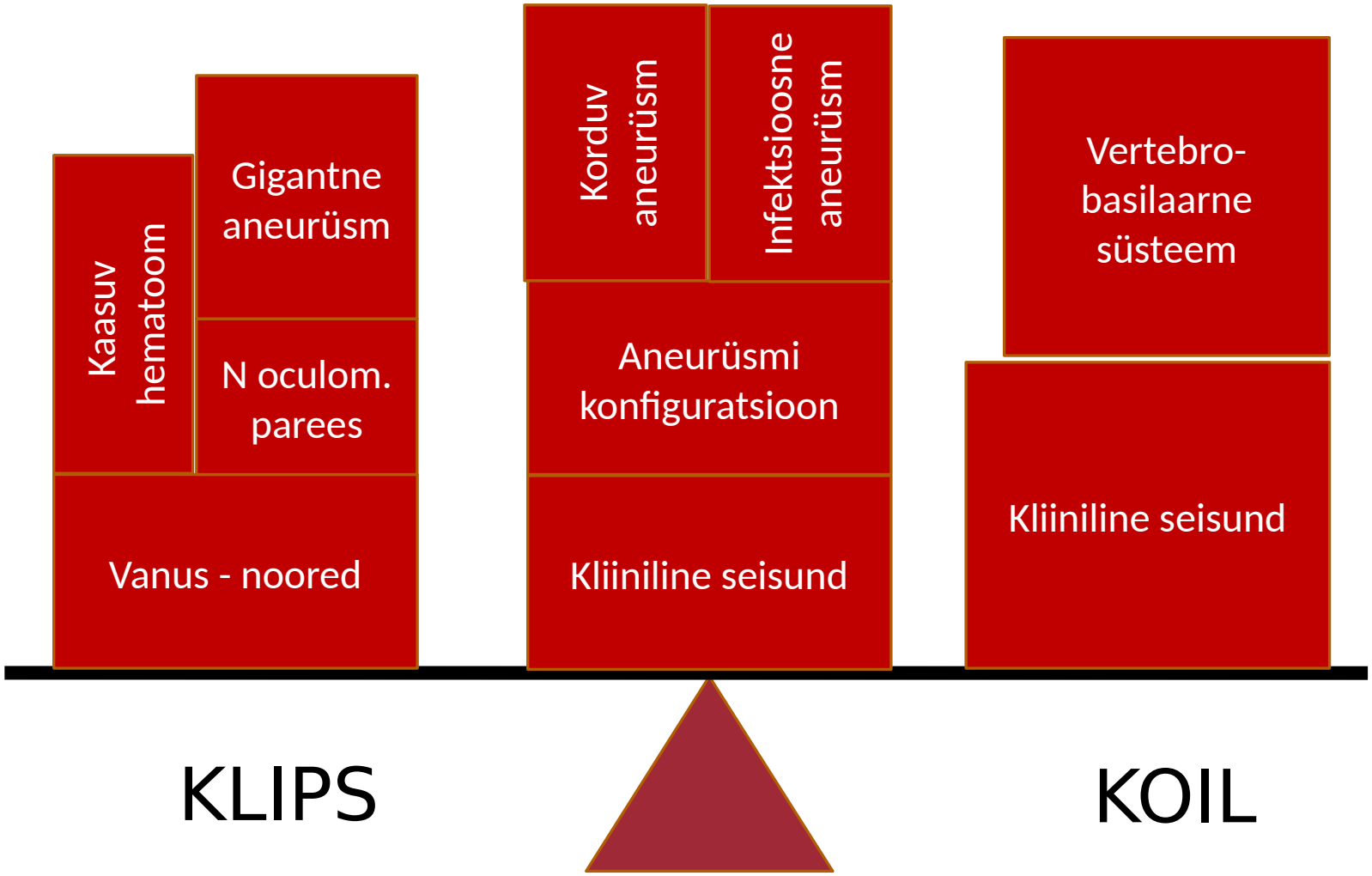
Velly LJ et al. Eur J Anaesthesiol 2015; 32:168–176

Aneurüsmide, AVM ravi Eestis. endovaskulaarne : kirurgia 60:40%

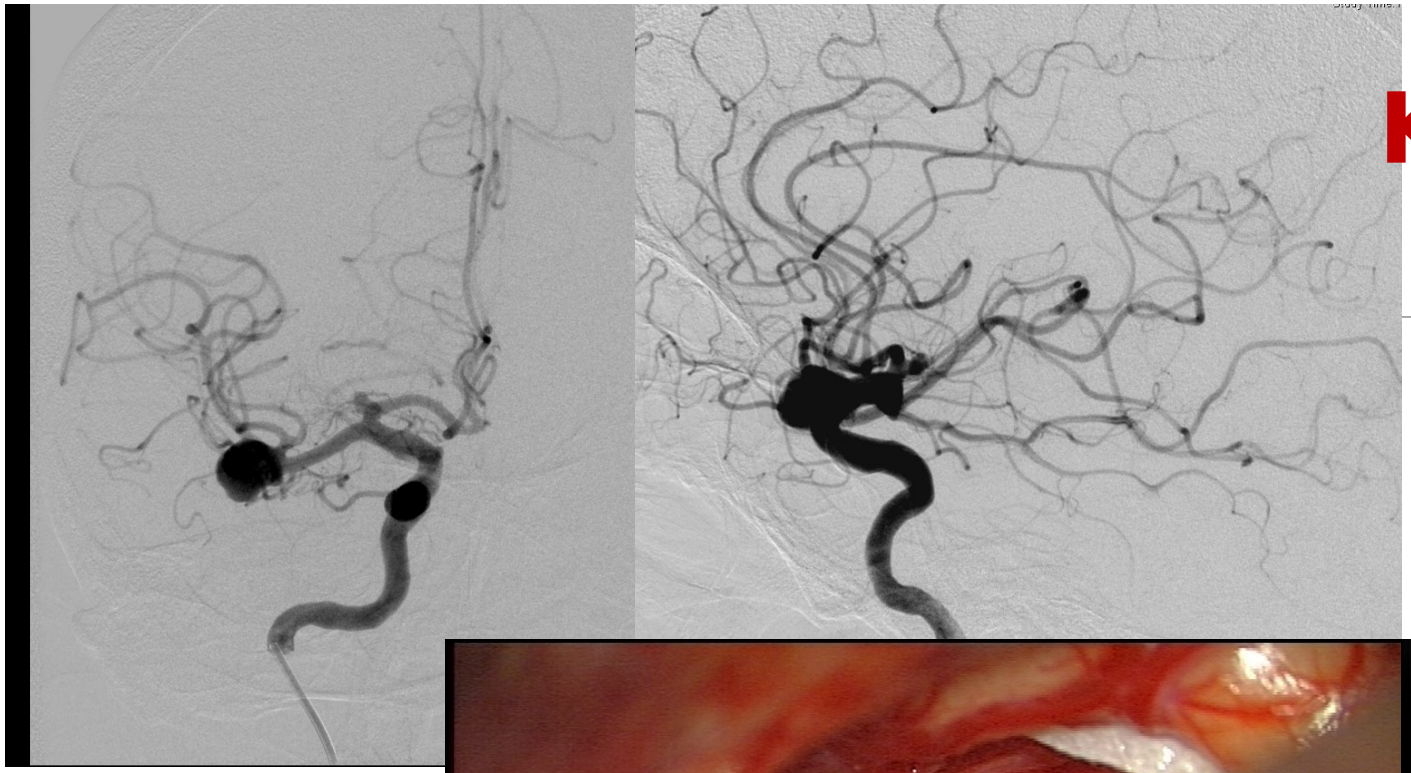


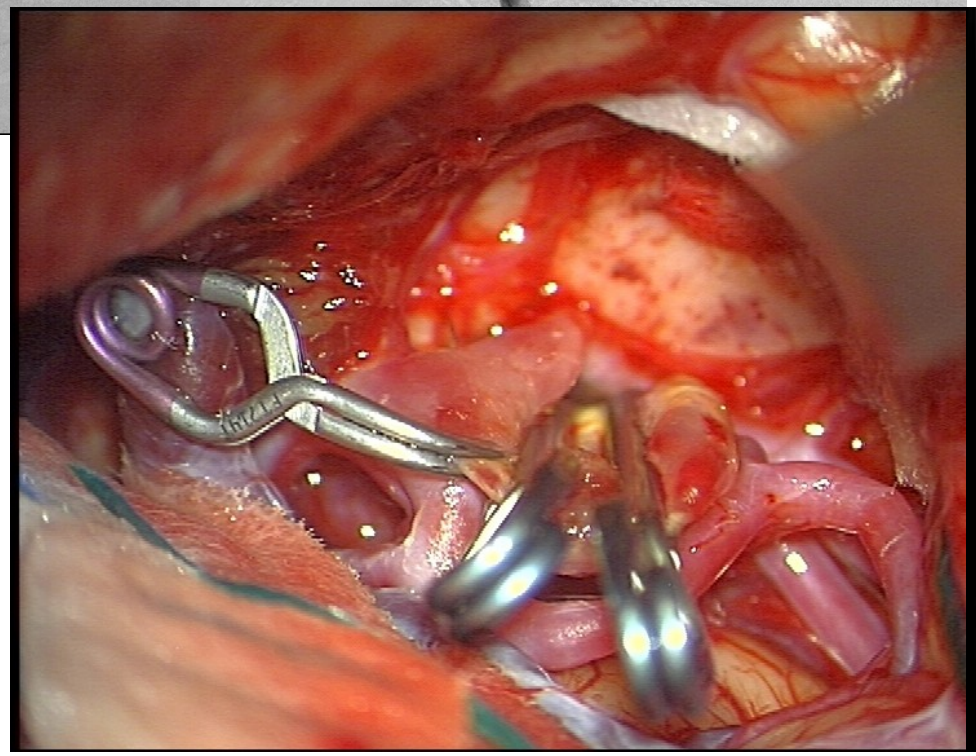


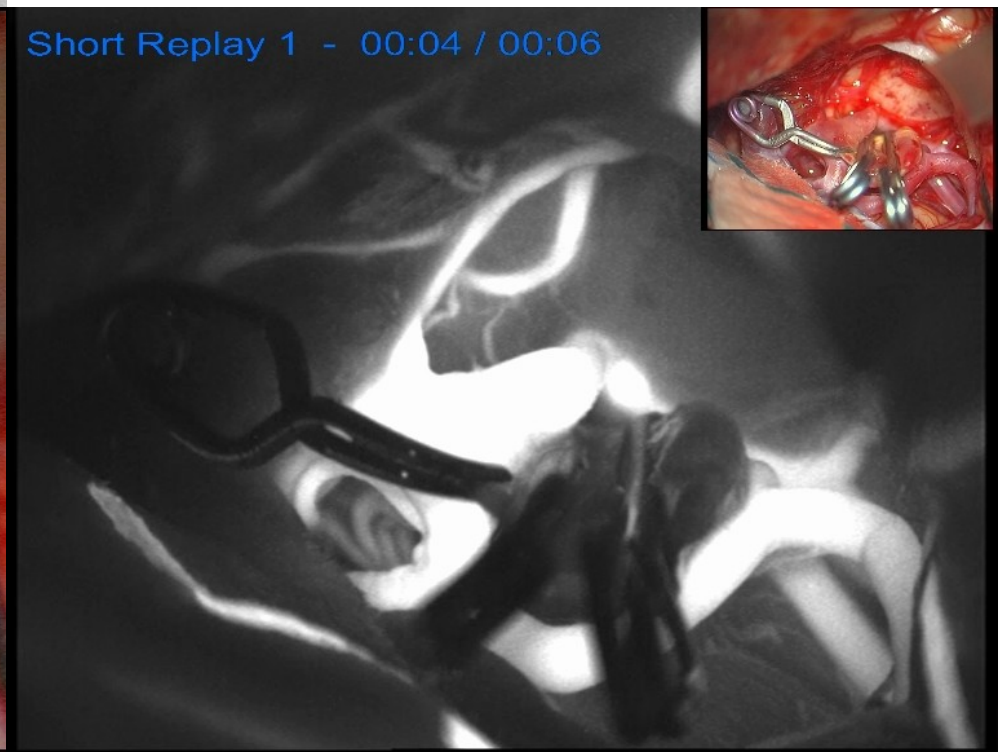
Aneurüsmide käsitlus – klips või koil



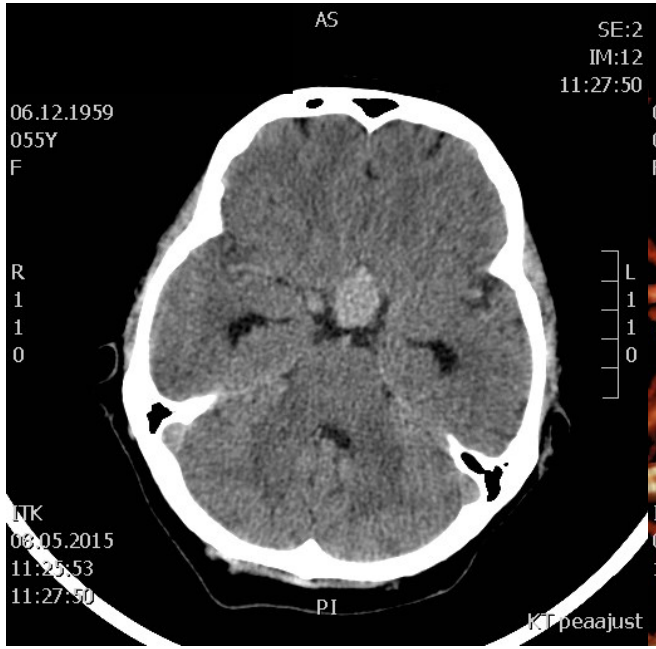
Keskmise ajuarteri aneurüsm

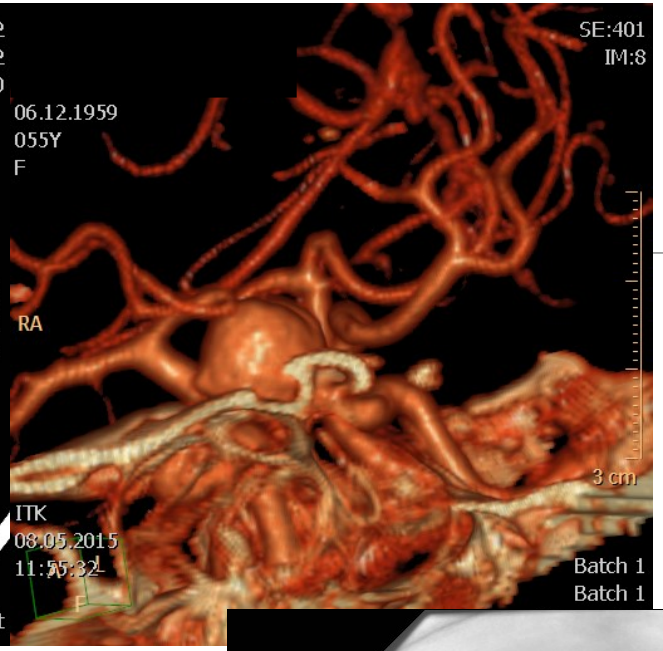






Seesmise unearteri aneurüsm





Stroke
Journal of the American Heart Association

American Heart Association | American Stroke Association

Guidelines for the Management of Spontaneous Intracerebral Hemorrhage

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

The American Academy of Neurology affirms the value of this guideline as an educational tool for neurologists.

Endorsed by the American Association of Neurological Surgeons, the Congress of Neurological Surgeons, and the Neurocritical Care Society

Stroke. 2015;46:2032-2060

http://stroke.ahajournals.org/content/46/7/2032.long

Kokkuvõte

- Intratserebraalne hemorraagia - teiste haiguste sümptom
- Otsida ‘ravitavaid’ põhjusi korduva verdumise ennetamiseks, eriti lobaarsete hematoomide korral
- Esmased uuringud - KT ja KTA. MRT on alternatiiv
- Negatiivne KTA (või MTR) ei välista AVM
- Siinuste tromboosi korral: MRT või KTA/venograafia või DSA
- MRT on valikmeetod kavernoomi, amüloid-angiopaatia, tuumori kahtlusel
- ‘Noortel’ lobaarse hematoomiga - DSA või MRA 6-8-12 nädalat pärast verdumist