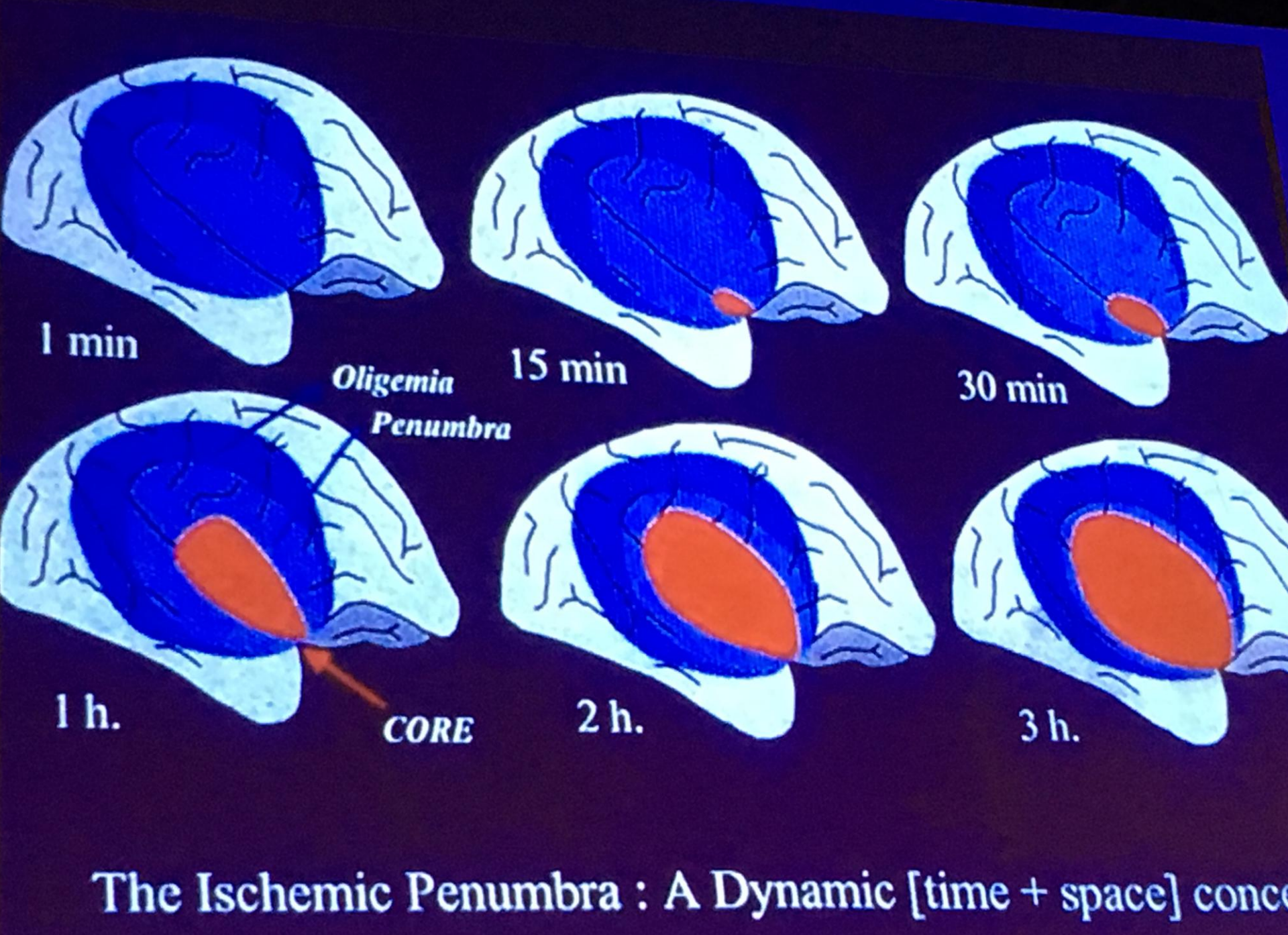
Katetrizační léčba akutního ischemického iktu

Petr Widimský, Boris Kožnar, Filip Roháč, Jakub Sulženko, Jana Vavrová, Josef Kroupa, Tomáš Peisker, Peter Vaško, Ivana Štětkářová

Kardiocentrum, 3.LF UK a FNKV

Praha



The Ischemic Penumbra : A Dynamic [time + space] conce

Natural course (without reperfusion therapy) of moderate-to-severe acute ischemic stroke (NIHSS ≥6)

- Mortality at 3 months: around 40%
- Survival with significant disability: around 45%
- Survival with mild disability: around 15%
- Full neurologic recovery: extremely rare

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European Heart Journal
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FASTTRACK CLINICAL RESEARCH
Vascular medicine

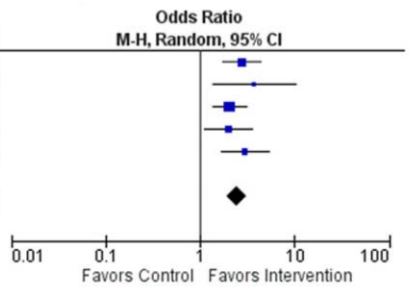
Endovascular therapy for acute ischaemic stroke: a systematic review and meta-analysis of randomized trials

Partha Sardar[1*†], Saurav Chatterjee[2†], Jay Giri[3], Amartya Kundu[4], Anwar Tandar[1], Parijat Sen[5], Ramez Nairooz[6], Jessica Huston[1], John J. Ryan[1], Riyaz Bashir[7], Sahil A. Parikh[8], Christopher J. White[9], Philip M. Meyers[10], Debabrata Mukherjee[11], Jennifer J. Majersik[12], and William A. Gray[13]

A

Study or Subgroup	Intervention Events	Intervention Total	Control Events	Control Total	Weight	Odds Ratio M-H, Random, 95% CI
ESCAPE 2015	87	164	43	147	26.1%	2.73 [1.71, 4.37]
EXTEND-IA 2015	25	35	14	35	5.8%	3.75 [1.38, 10.17]
MR CLEAN 2015	76	233	51	267	34.2%	2.05 [1.36, 3.09]
REVASCAT 2015	45	103	29	103	17.1%	1.98 [1.11, 3.53]
SWIFT PRIME 2015	59	98	33	98	16.9%	2.98 [1.66, 5.33]
Total (95% CI)		**633**		**650**	**100.0%**	**2.42 [1.91, 3.08]**
Total events	292		170			

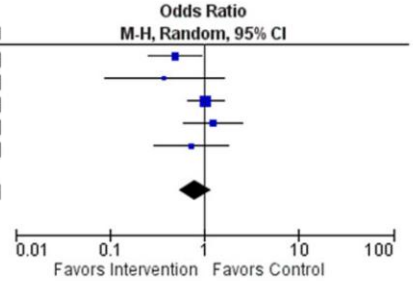
Heterogeneity: Tau² = 0.00; Chi² = 2.58, df = 4 (P = 0.63); I² = 0%
Test for overall effect: Z = 7.24 (P < 0.00001)



B

Study or Subgroup	Intervention Events	Intervention Total	Control Events	Control Total	Weight	Odds Ratio M-H, Random, 95% CI
ESCAPE 2015	17	164	28	147	23.5%	0.49 [0.26, 0.94]
EXTEND-IA 2015	3	35	7	35	6.7%	0.38 [0.09, 1.59]
MR CLEAN 2015	44	233	49	267	35.2%	1.04 [0.66, 1.63]
REVASCAT 2015	19	103	16	103	20.1%	1.23 [0.59, 2.55]
SWIFT PRIME 2015	9	98	12	98	14.4%	0.72 [0.29, 1.81]
Total (95% CI)		**633**		**650**	**100.0%**	**0.80 [0.54, 1.18]**
Total events	92		112			

Heterogeneity: Tau² = 0.06; Chi² = 5.79, df = 4 (P = 0.22); I² = 31%
Test for overall effect: Z = 1.12 (P = 0.26)



C

Study or Subgroup	Intervention Events	Intervention Total	Control Events	Control Total	Weight	Odds Ratio M-H, Random, 95% CI
ESCAPE 2015	6	165	4	150	19.0%	1.38 [0.38, 4.98]
EXTEND-IA 2015	0	35	2	35	3.3%	0.19 [0.01, 4.08]
MR CLEAN 2015	18	233	17	267	66.2%	1.23 [0.62, 2.45]
REVASCAT 2015	2	103	2	103	8.0%	1.00 [0.14, 7.24]
SWIFT PRIME 2015	0	98	3	98	3.5%	0.14 [0.01, 2.72]
Total (95% CI)		**634**		**653**	**100.0%**	**1.08 [0.62, 1.88]**
Total events	26		28			

Heterogeneity: Tau² = 0.00; Chi² = 3.42, df = 4 (P = 0.49); I² = 0%
Test for overall effect: Z = 0.26 (P = 0.80)

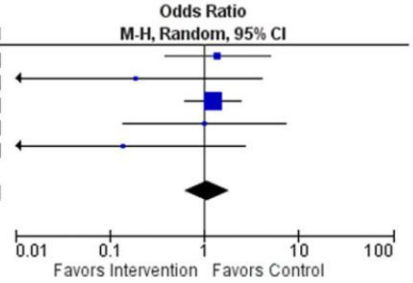
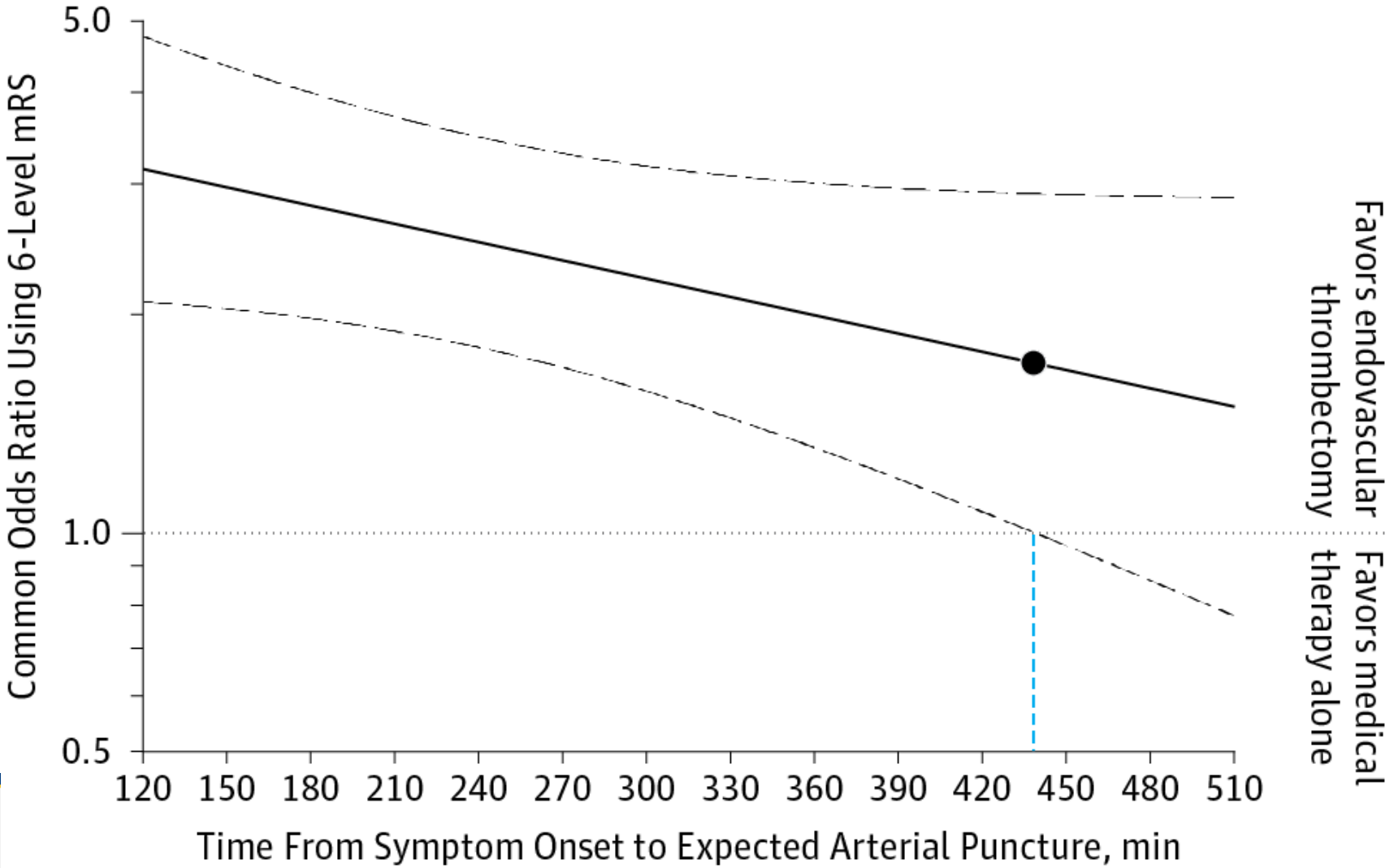


Figure 2 Analysis limited to newer (2014–15) trials: (*A*) functional independence (90-day mRS of 0–2) with EVT; (*B*) mortality with EVT; and (*C*) sICH with EVT.

A

Odds ratio for less disability at 3 mo in endovascular thrombectomy vs medical therapy alone groups by time to treatment

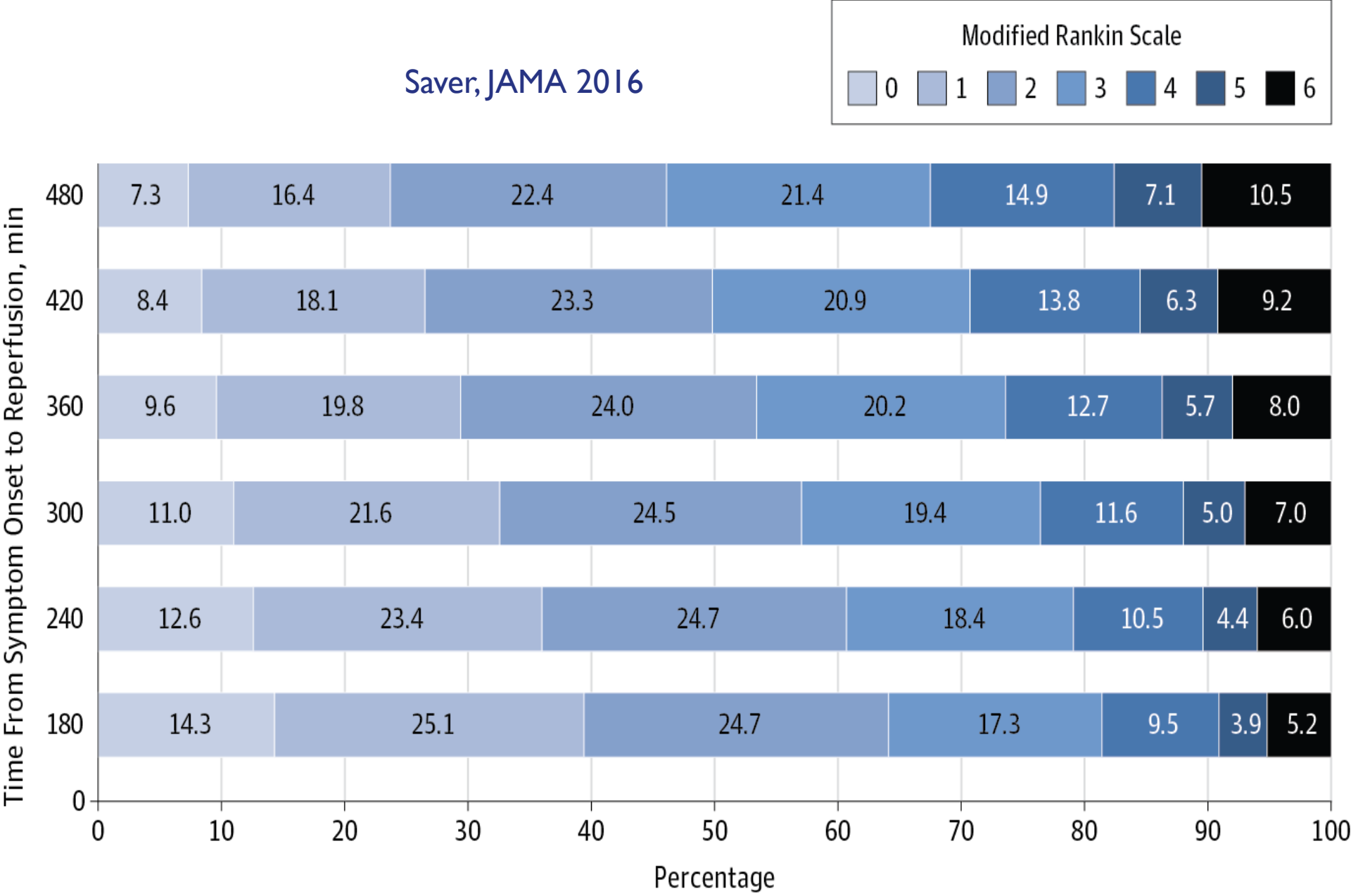
Saver, JAMA 2016



B

Percentage of Patients by mRS Range

Saver, JAMA 2016



	Trevo	MM	Treatment benefit (95% CI)	Bayesian probability of superiority
Day 90 weighted mRS	5.5 ± 3.8	3.4 ± 3.1	2.1 (1.20, 3.12)	>0.9999*
Day 90 mRS (0-2)	48.6%	13.1%	35.5% (23.9%, 47.0%)	>0.9999*

NNT for 90-day functional independence = 2.8

DAWN TRIAL

***Similar to p<0.0001**

Primary outcome

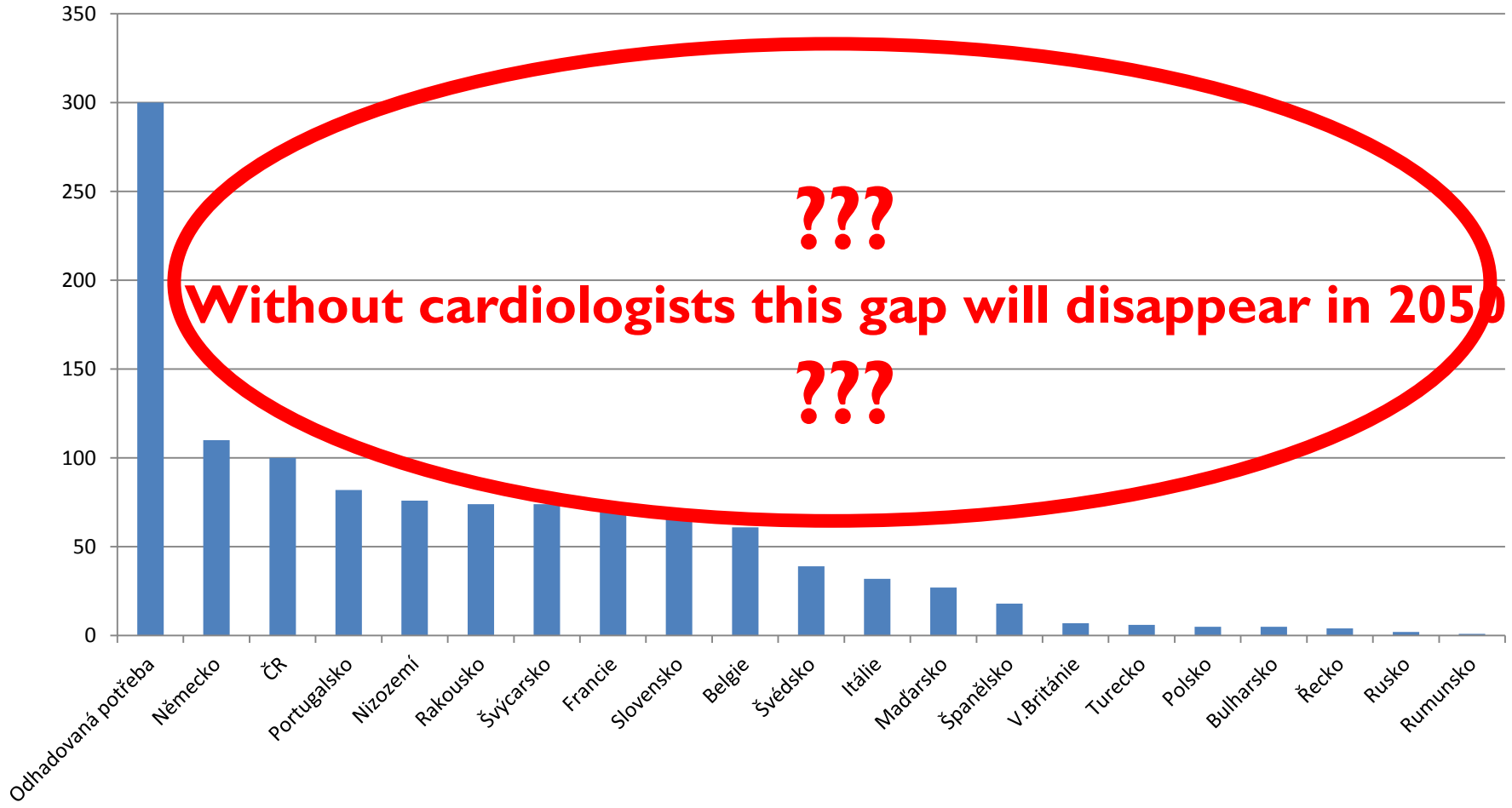
73% relative risk reduction of dependency in ADL's
NNT for any lower disability 2.0

DAWN TRIAL

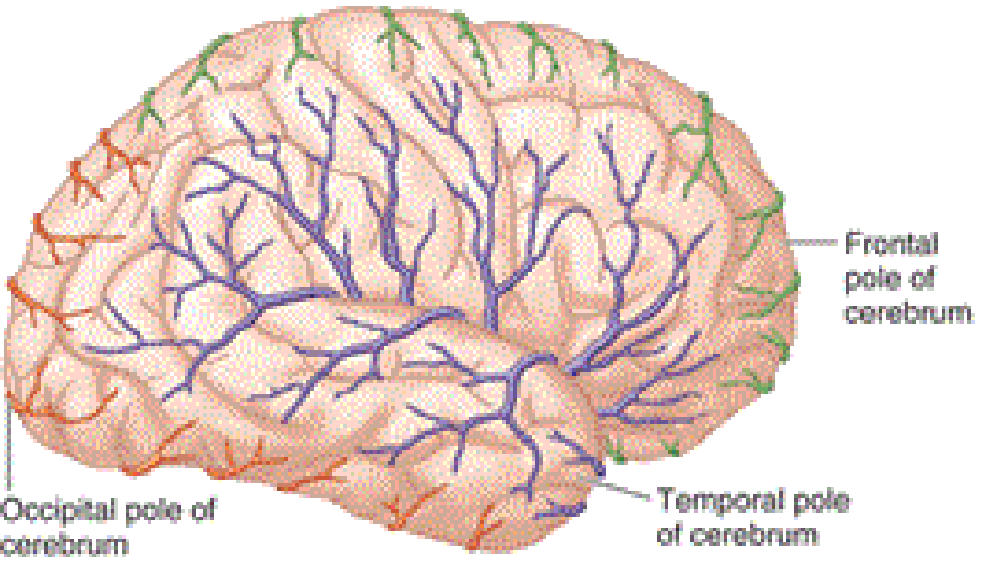
Inequalities in stroke care

ESO ESMINT EAN SAFE survey 2016 (ESO Congress Prague, 2017)

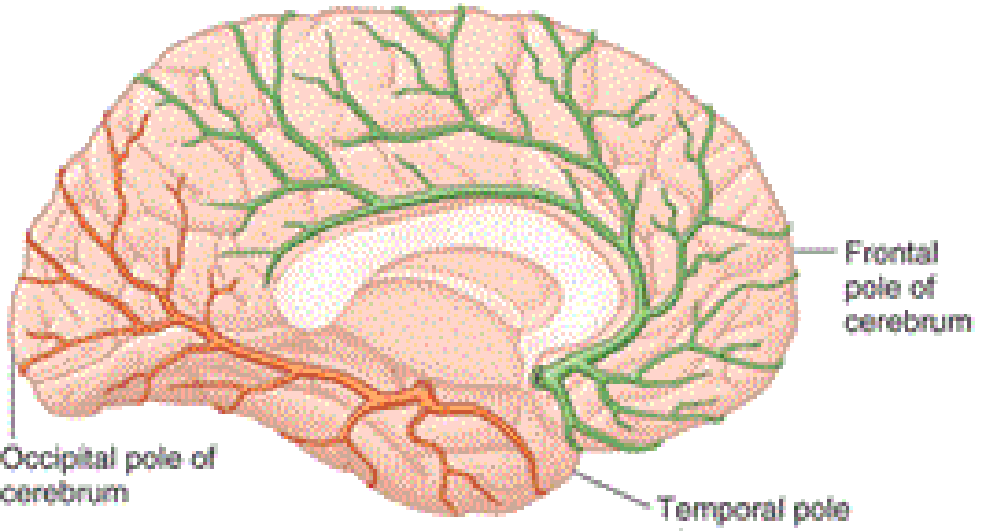
Thrombectomies per million population in 2015



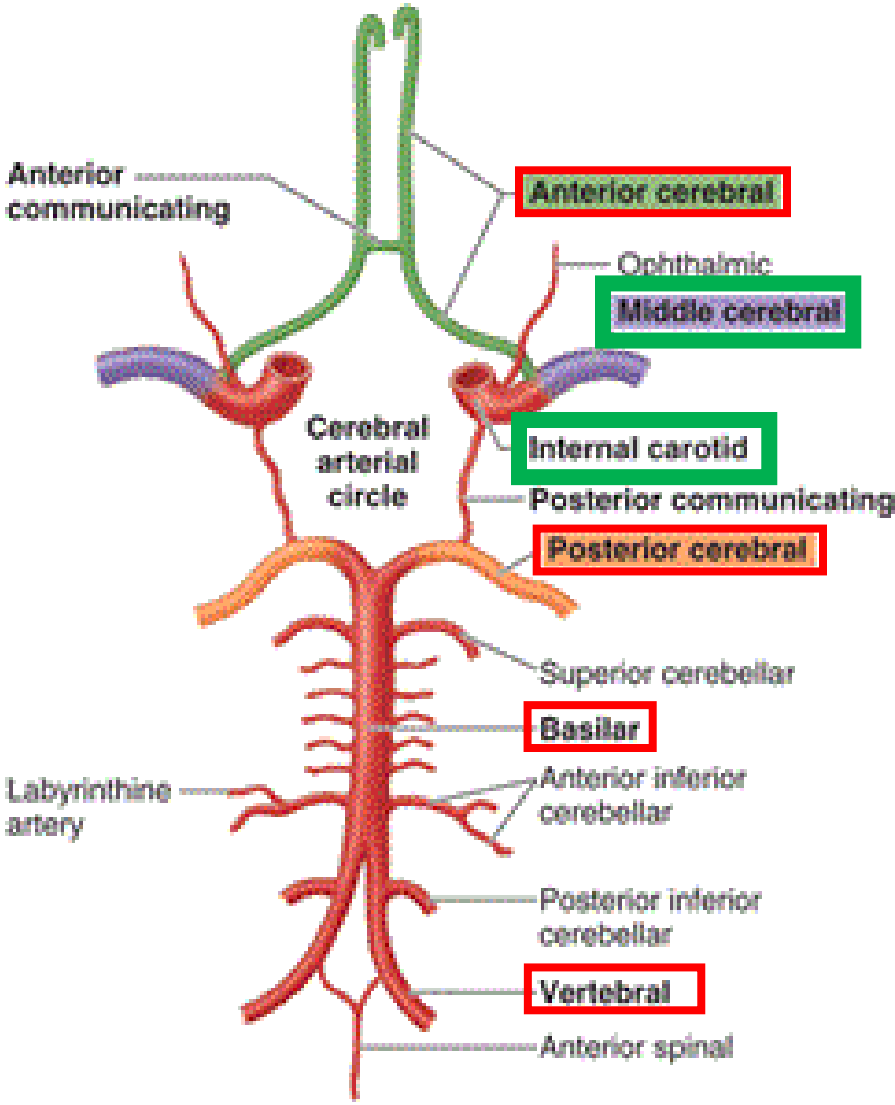
Vascular supply to the human brain: anatomy



(A) Right lateral view of right hemisphere

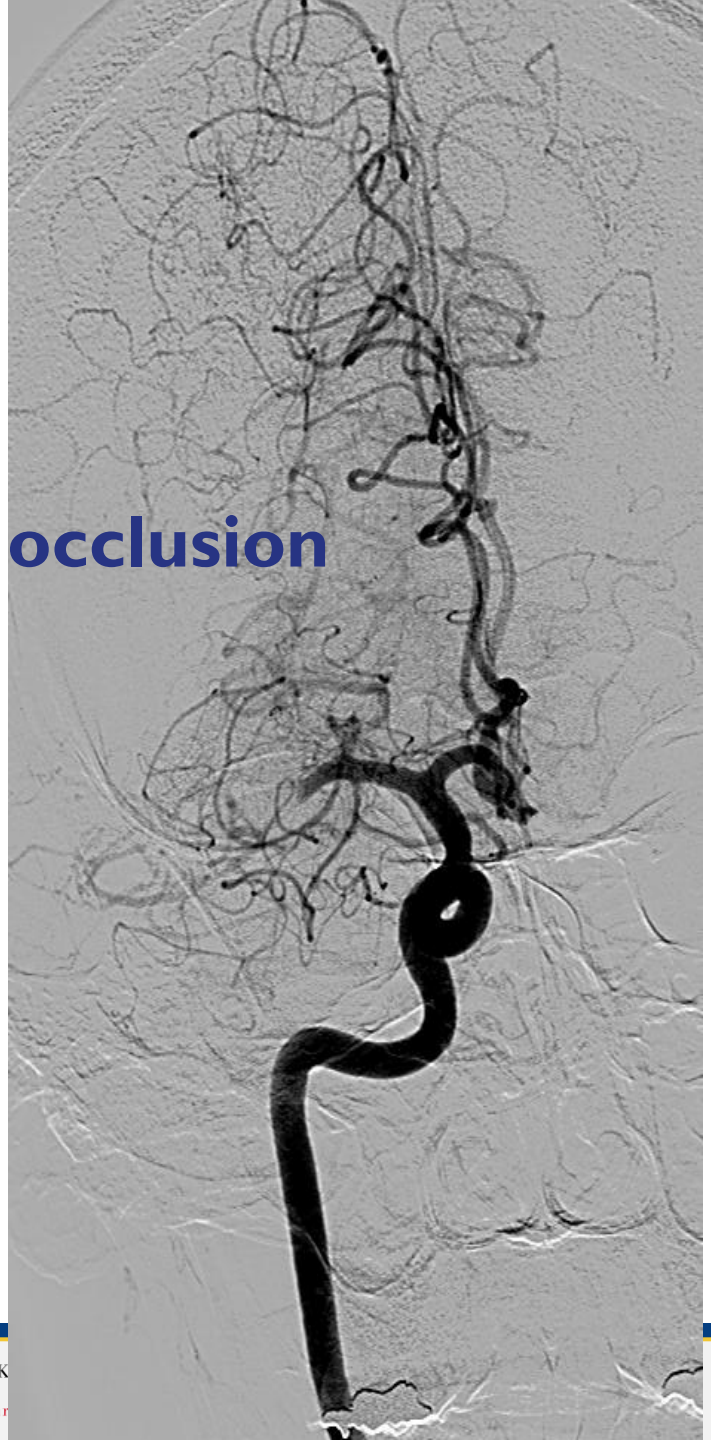


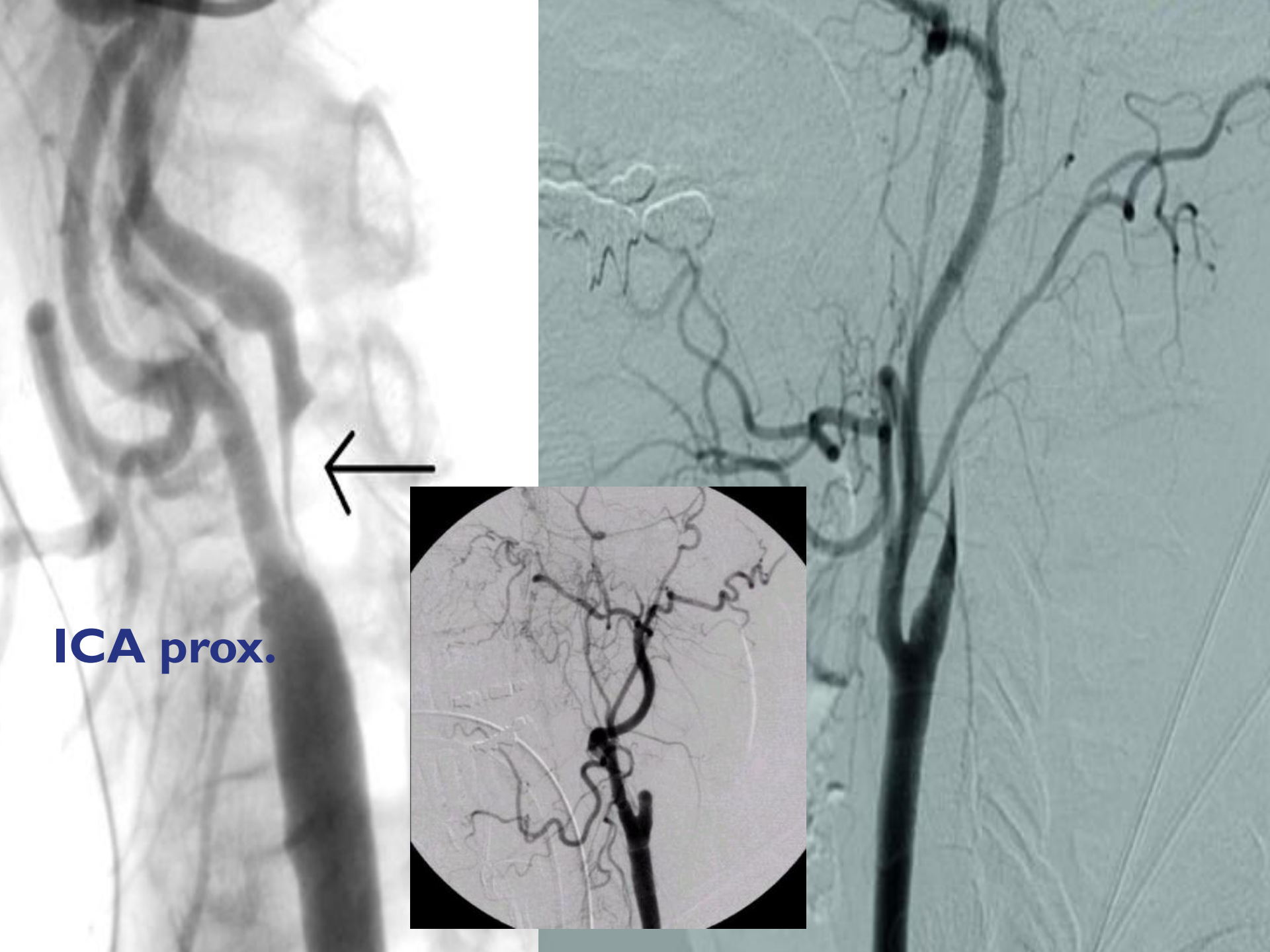
(B) Medial view of left hemisphere



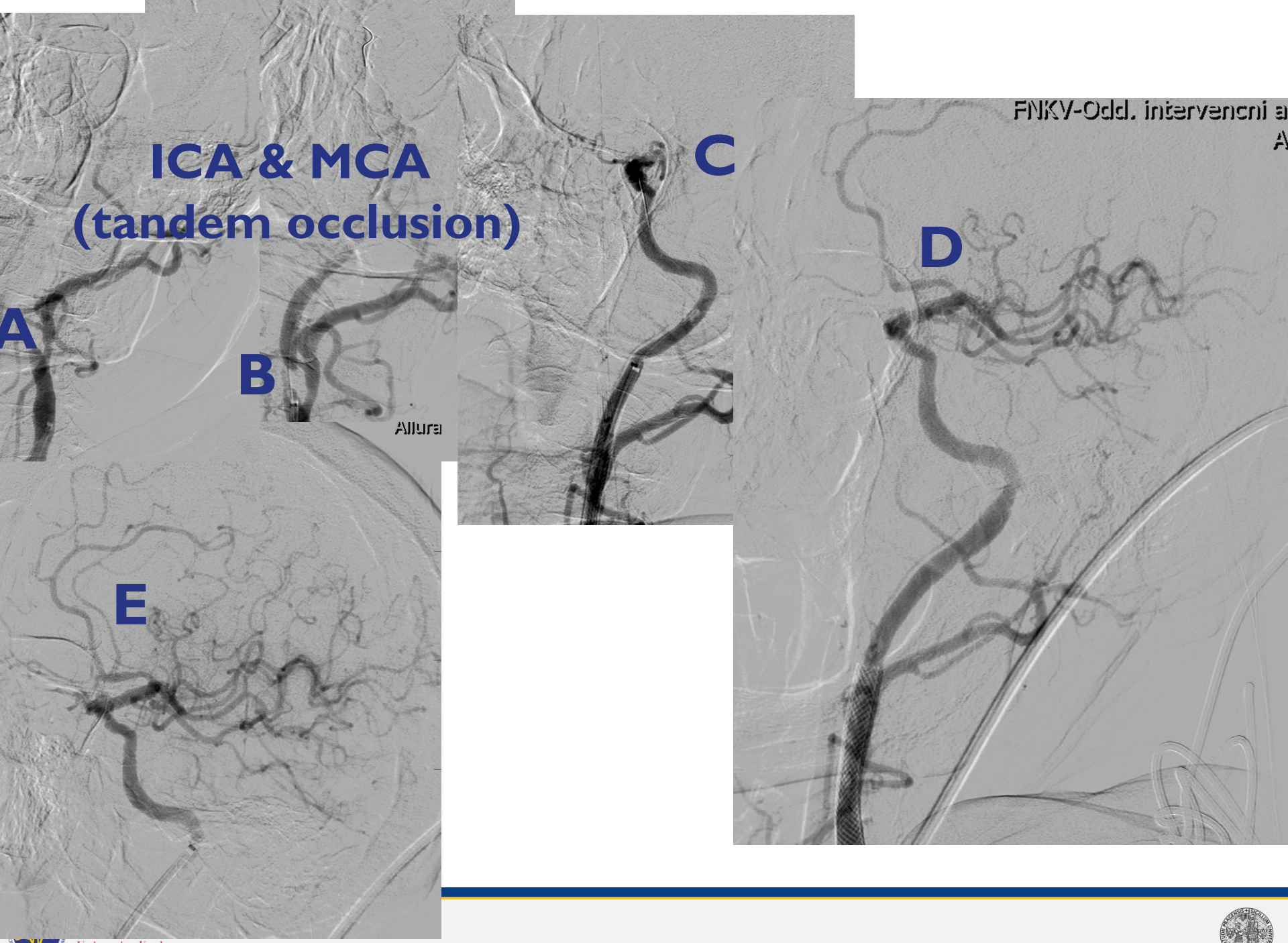
(C) Inferior view

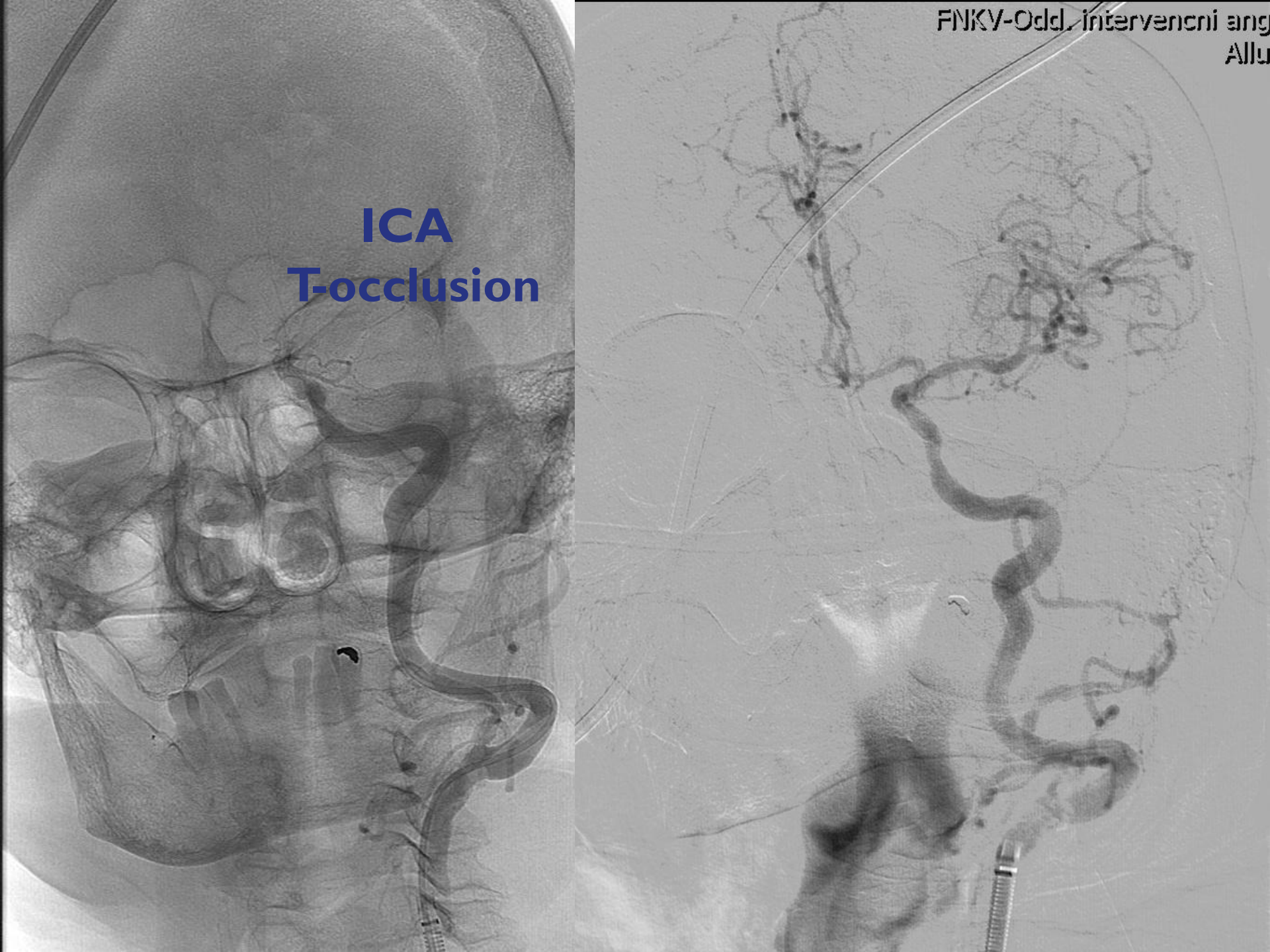
MCA occlusion




ICA prox.

ICA & MCA (tandem occlusion)

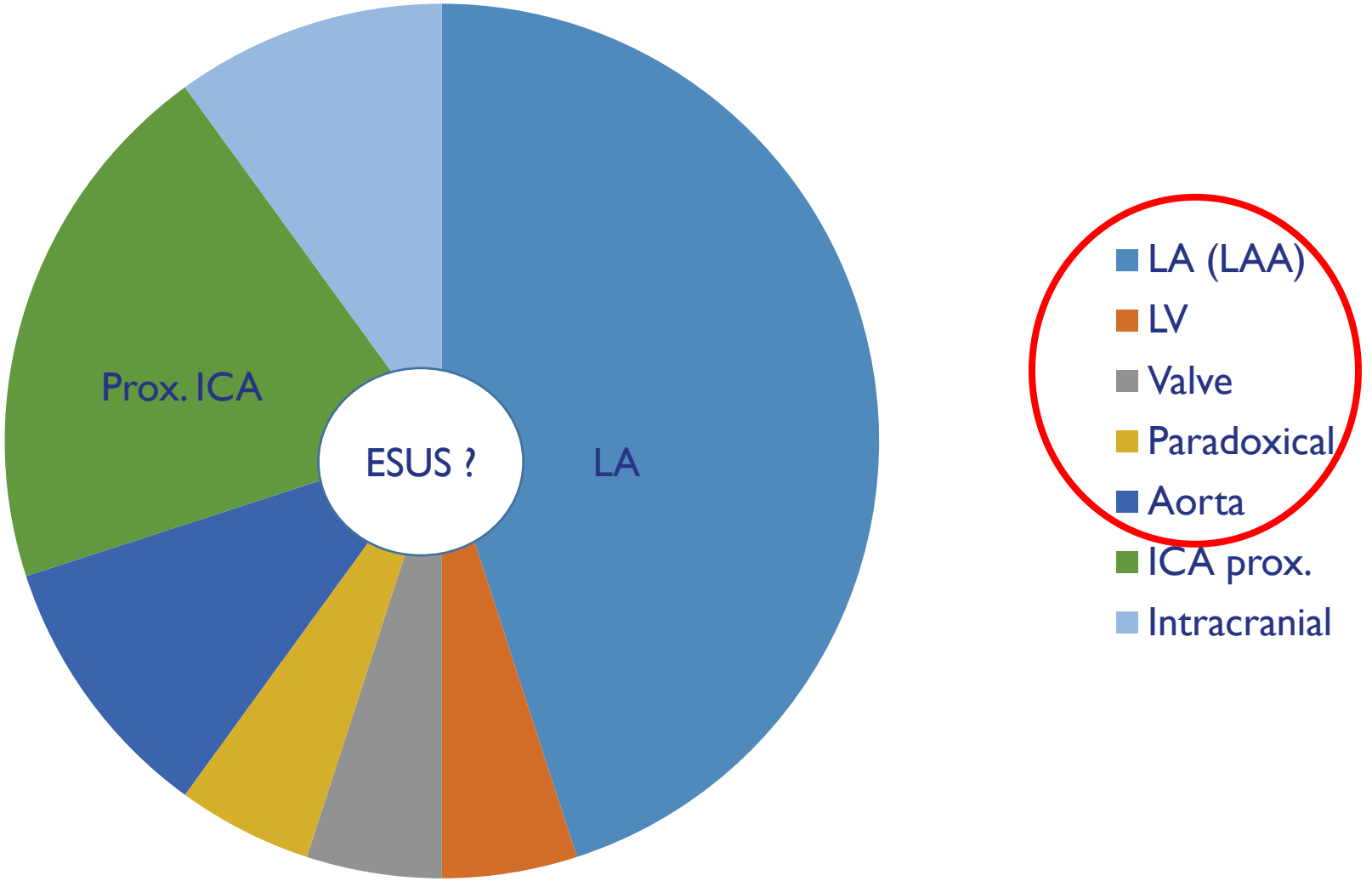



ICA
T-occlusion
FNKV-Odd. intervenční ang
Allu

BA occlusion

Where the clot is formed ?

(Cardio-embolization vs. in situ thrombosis)



Data from our registry

Angiographic outcomes

	d-CBT	bridging TL + CBT
Mean periprocedural UFH dose [units]	2765	1886
Tandem occlusion (ICA + MCA) or T-occlusion (terminal ICA, or MCA + ACA)	40%	30%
Isolated MCA occlusion	51%	30%
Isolated proximal ICA occlusion	4%	20%
Angiographic success (TICI 2b-3 at the end of procedure)	**75%**	**85%**

Clinical outcomes per treatment

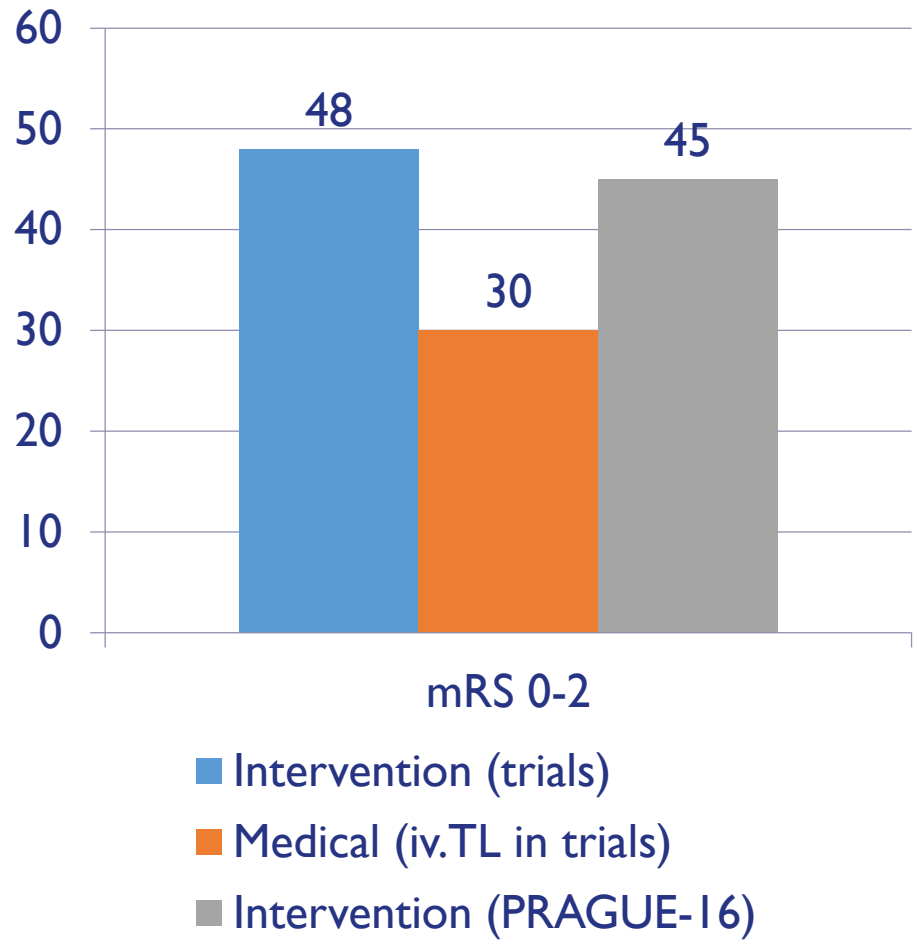
	d-CBT	bridging TL + CBT
Mean delta↓ NIHSS 24 h	5.4	1.6
Procedure-related complications (SAH, vessel perforation or dissection, symptomatic stent thrombosis within 24 hours, carotico-cavernous fistula, embolism to other territory)	9%	16%
Any symptomatic intracranial hemorhage (NIHSS change >3)	11%	8%
mRS 0-2 after 90 days	45%	42%

Overall results

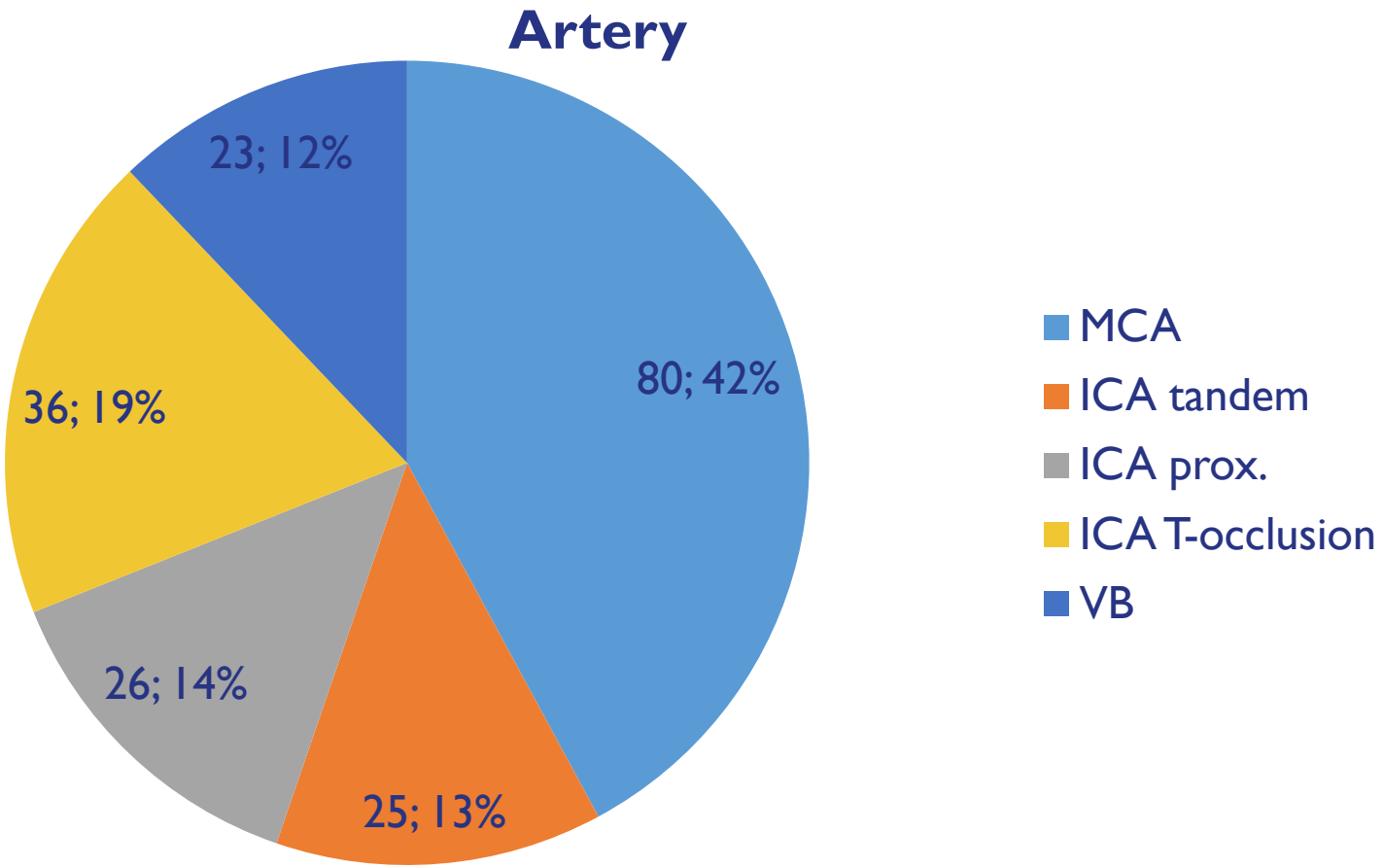
Neurologic recovery (mRS 0-2) – incl. posterior strokes	45%
Procedural success (TICI 2b-3)	74%
90-days mortality	28%
Intraparenchymal bleeding (not related to mechanical complications)	10%
I.c. bleeding related to mechanical complications	2%
ICA dissection	2%
ICA-cavernous fistula	1%
ICA stent thrombosis within 24 hours	1%
Minor embolization to other territory	5%

Comparison with data from recent large randomized trials

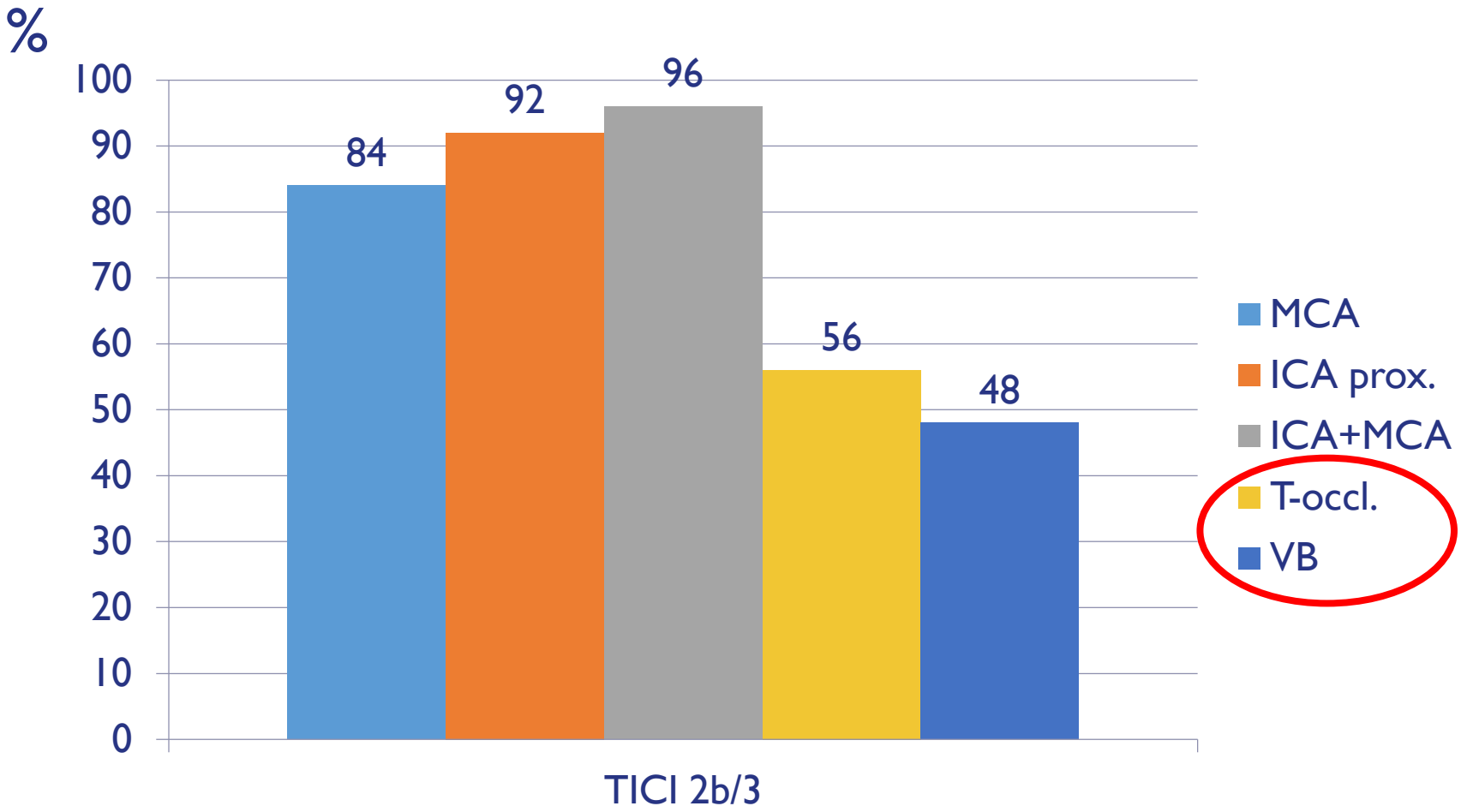
	Intervention + medical therapy (recovered / all patients)	Medical therapy alone (recovered / all patients)
MR CLEAN	77 / 233	51 / 267
ESCAPE	89 / 164	43 / 147
EXTEND IA	25 / 35	14 / 35
SWIFT PRIME	59 / 98	33 / 93
REVASCAT	45 / 103	29 / 103
THERAPY	17 / 41	12 / 41
THRACE	103 / 190	82 / 195



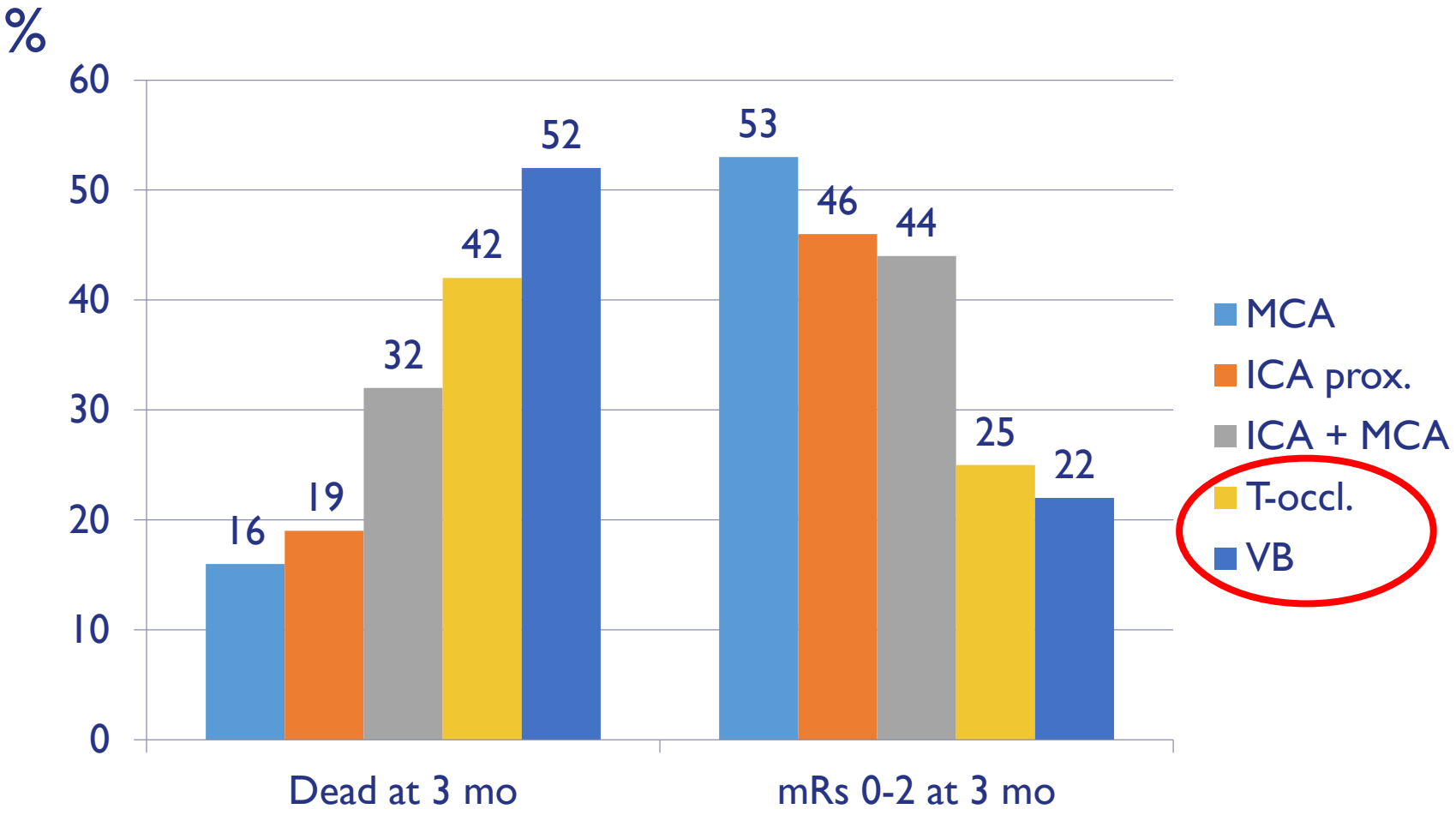
PRAGUE-16 registry: occluded arteries in acute stroke



PRAGUE-16 registry: angiographic outcomes per occluded artery



PRAGUE-16 registry: clinical outcomes at 90 days per occluded artery



Data from literature

Vessel Patency at 24 Hours in REVASCAT Trial

Millán M et REVASCAT Investigators, Stroke 2017

Table 1. Complete Revascularization Rate at 24 h According to the Baseline Occlusion Site by Treatment Groups and tPA Administration

Baseline Occlusion Location	Thrombectomy (n=95)			Control (n=94)			*P* Value*
	IV tPA	No IV tPA	Total	IV tPA	No IV tPA	Total	
Terminus ICA	6/11 (54.5)	9/12 (75)	15/23 (65.2)	3/19 (15.7)	0/4 (0)	3/23 (9.1)	<0.001
Tandem (ICA+MCA)	9/13 (69.2)	2/4 (50)	11/17 (64.7)	0/9 (0)	0/2 (0)	0/11 (0)	0.001
M1-MCA	32/44 (72.7)	14/17 (82.4)	46/61 (75.4)	11/46 (23.9)	2/15 (13.3)	13/61 (21.3)	<0.001
M2-MCA	3/8 (37.5)	2/2 (100)	5/10 (50)	3/5 (60)	2/3 (66.7)	5/8 (62.5)	0.596
Total population	42/64 (65.6)	25/31 (80.6)	67/95 (70.5)	17/72 (23.6)	4/22 (18.2)	21/94 (22.3)	<0.001

Values are presented as number (proportions). ICA indicates internal carotid artery; MCA, middle cerebral artery; and tPA, tissue-type plasminogen activator.
**P* values are given for differences in total patients between treatment groups.

Carotid stenting in acute stroke: The Karolinska experience with tandem lesions.

Mpotsaris A et al., Interv Neuroradiol 2017

- 63 pts with tandem lesions
- 52% had iv. thrombolysis
- Median NIHSS 14
- Stroke onset - recanalization 408 minutes (range 165-1846 minutes).
- 5% post-procedural symptomatic intracerebral haemorrhage.
- 87% TICI 2b/3 achieved.
- 13% pts died (8% during the acute phase).
- **46% pts favourable outcome (mRs 0-2) after three months.**

Thrombectomy in basilar artery occlusion: ADAPT vs stent retriever.

Gory B, Mazighi M, ETIS Investigators. J Neurosurg 2018

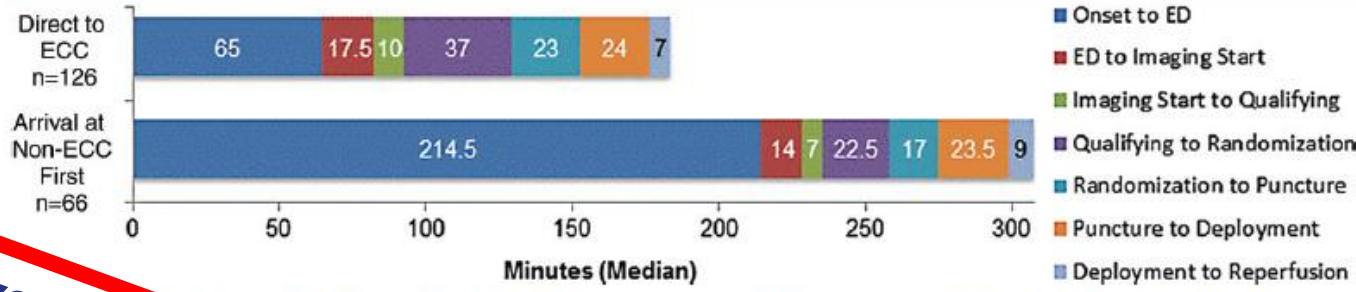
- 100 pts basilar artery occlusion treated with thromectomy.
- 46 pts. treated with ADAPT (rescue stent-retriever used in 26%)
- 54 pts. treated with stent retriever.
- TICI 2b/3 achieved in 79%
- Favorable outcome in 36.8%

- Higher rate of complete reperfusion (TICI 3) in the ADAPT group.
- Procedure duration shorter in the ADAPT group (median 45 minutes vs. 56 minutes)
- Lower rate of periprocedural complications with ADAPT (4.3% vs 25.9%, p = 0.003).
- Symptomatic intracranial hemorrhage (0% vs 4%, p = 0.51)
- 90-day all-cause mortality (46.7% vs 42.0%, p = 0.65)

Souhrn

- Včasná trombektomie **a. cerebri media** a/nebo prox. úseku **a. carotis int.** (izolované uzávěry či tandemové okluze) docílí výborných angiografických (reperfuze ve >80%) a klinických (neurologická úprava >50%) výsledků.
- Trombektomie **intrakranialního úseku a. carotis int.** („T-uzávěry“) je méně úspěšná (50% reperfuze, 30% neurologická úprava)
- Ikty v zadním povodí **(a.basilar, a. vertebralis, a. cerebri post.)** jsou nejhůře léčitelné (jak technicky – nižší angiografická úspěšnost, tak i klinicky – vysoká molrtalita), přesto se zdá, že i pro tyto nemocné je intervence jedinou reálnou nadějí na záchranu života a obnovu neurologických funkcí.

Figure 2



...f time intervals in patients treated within the same institution (an ECC) versus those who were transferred from a... ...intravenous tPA therapy. *Deployment* = device deployment, *puncture* = groin puncture, *qualifying* = qualifying ...

Stop in non-interventional center = 95 minutes delay in reperfusion !!

Analysis of Workflow and Time to Treatment and the Effects on Outcome in Endovascular Treatment of Acute Ischemic Stroke: Results from the SWIFT PRIME Randomized Controlled Trial[1]

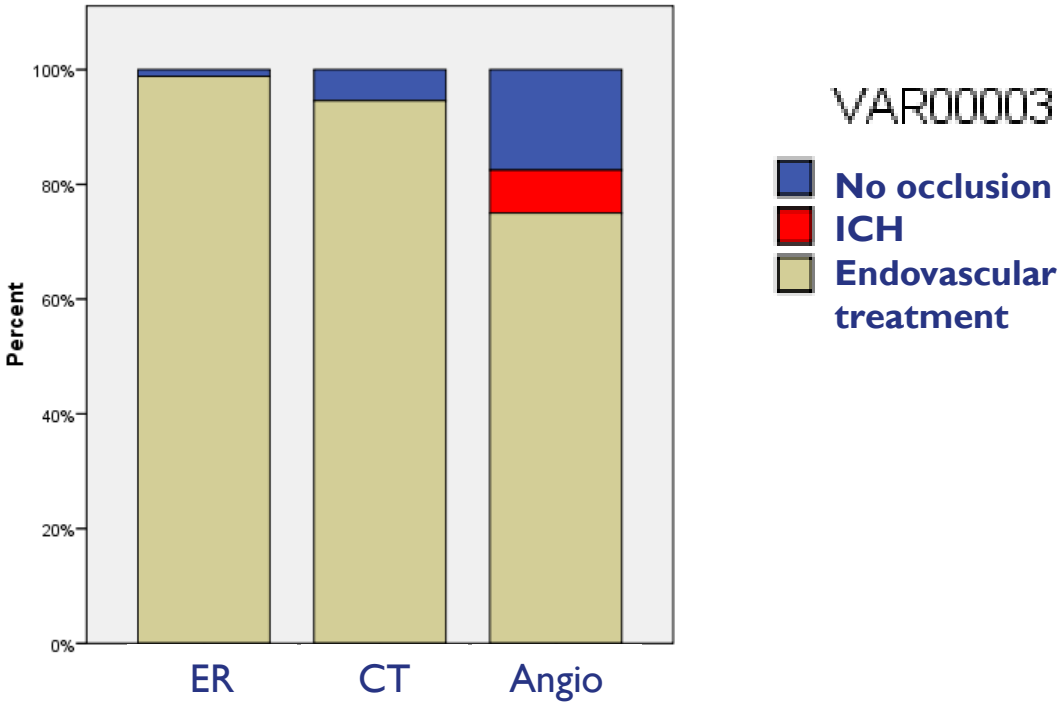
Mayank Goyal, MD, FRCPC
Ashutosh P. Jadhav, MD, PhD
Alain Bonafe, MD
Hans Diener, MD
Vitor Mendes Pereira, MD
Elad Levy, MD
Blaise Baxter, MD
Tudor Jovin, MD
Reza Jahan, MD
Bijoy K. Menon, MD
Jeffrey L. Saver, MD
For the SWIFT PRIME investigators

Purpose: To study the relationship between functional independence and time to reperfusion in the Solitaire with the Intention for Thrombectomy as Primary Endovascular Treatment for Acute Ischemic Stroke (SWIFT PRIME) trial in patients with disabling acute ischemic stroke who underwent endovascular therapy plus intravenous tissue plasminogen activator (tPA) administration versus tPA administration alone and to investigate variables that affect time spent during discrete steps.

Materials and Methods: Data were analyzed from the SWIFT PRIME trial, a global, multicenter, prospective study in which outcomes were compared in patients treated with intravenous tPA alone or in combination with the Solitaire device (Covidien, Irvine, Calif). Between December 2012 and November 2014, 196 patients were enrolled. The relation between time from *(a)*

Results: In the stent retriev... ...symptom onset to reperfusion time of 150 min... ...stimated probability of functional independence, ...reased by 10% over the next hour and by 20% with ev... ...subsequent hour of delay. Time from arrival at the emergency department to arterial access was 90 minutes (interquartile range, 69–120 minutes), and time to reperfusion was 129 minutes (interquartile range, 108–169 minutes). Patients who initially arrived at a referring facility had longer symptom onset to groin puncture times compared with patients who presented directly to the endovascular-capable center (275 vs 179.5 minutes, $P < .001$).

Direct transfer to angio cathlab: Shortening delay to reperfusion at the price of 20-25% false positive interventional team activations



Catalunya, Marta Rubiera del Fueyo
Presented in Prague, January 6, 2017

Indikace ke katetrizační léčbě akutního iktu

- Normální neurologická funkce před touto příhodou
- NIHSS >5
- ASPECTS >5
- Max. doba od začátku příznaků do zavedení katetrů 7 h
- Kontraindikace u velkých iktů se špatnou prognozou nejsou žádné

- Mezi 7.-24.hodinou lze léčbu zvážit při příznivém nálezu na perfuzním CT nebo na DWI-MR (studie DAWN)
- Při možnosti zahájit intervenci do <3 h od začátku příznaků (a typické hemipareze) zvážit transfer přímo na angiografii (M. Ribo, Barcelona)

Co dělat, když Vám blízký člověk dostane akutní iktus ?

- Ihned volat 155 a upozornit je, že jde nejspíše o ischemický iktus vhodný k intervenční léčbě
- Po dohodě se ZZS kontaktovat centrum schopné provést okamžitě trombektomii
- Nedávat v přednemocniční fázi žádná antitrombotika !
- Pacient by měl jet rovnou do komplexního cerebrovaskulárního centra a tam přímo na CT !
- Z CT by měl pacient jít okamžitě na angio sál !
- Až po intervenci na JIP !