TCT RUSSIA 2018 – XX Moscow's International Course on Endovascular Therapies
Moscow, Russia, May 18-20, 2018

Interventional Revolution in Treatment of Stroke

Horst Sievert,

Ilona Hofmann, Laura Vaskelyte, Sameer Gafoor, Stefan Bertog, Predrag Matić, Markus Reinartz, Bojan Jovanovic, Kolja Sievert, Iris Grunwald, Nalan Schnelle

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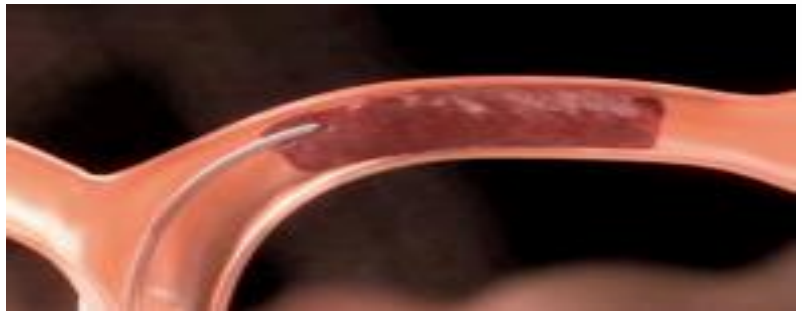
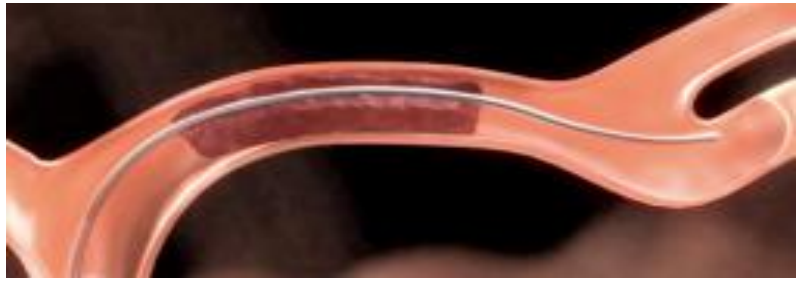
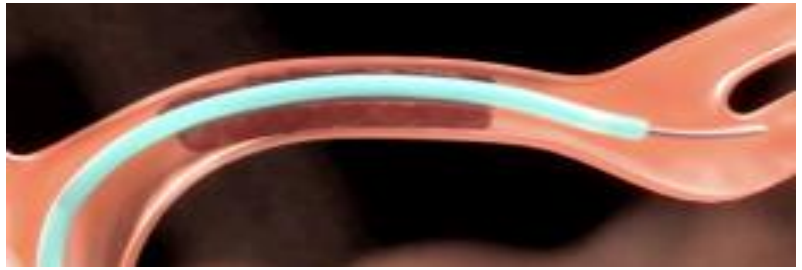
Intracranial Clot Retrieval

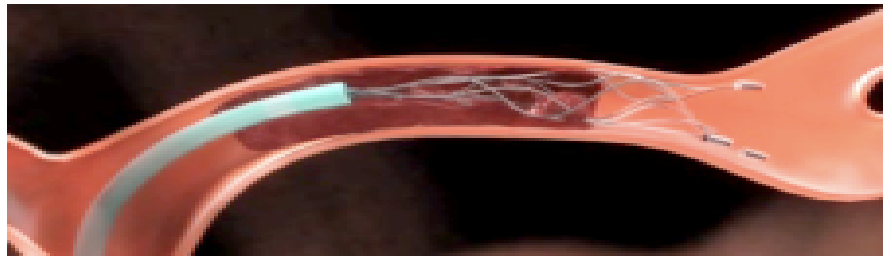
- A new era of interventional medicine
  - New devices have made a major progress
  - Huge evidence by randomized trials
- Much more important than any other intervention I did in the cath lab over the last 35 yrs
- Much more rewarding than PCI, TAVI, ….
- Cardiologists can and should be involved
- So if there is one lecture during this congress where you should not fall asleep
  - This is the one!

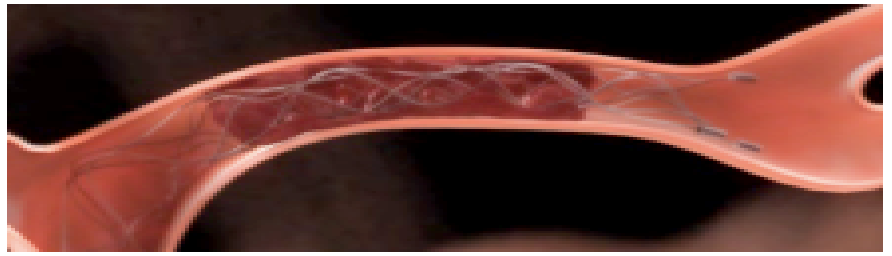
Break through: Stent Retrievers











Penumbra aspiration catheter

Stand alone or in combination with stent retrievers

2013:
3 negative trials

The NEW ENGLAND JOURNAL of MEDICINE

SYNTHESIS

ORIGINAL ARTICLE

ular Treatment for Acute Ischemic Stroke

ne, M.D., Luca Valvassori, M.D., Michele Nichelatti, Ph.D., oifo, Psy.D., Michela Ponzio, Ph.D., Roberto Sterzi, M.D., occardi, M.D., for the SYNTHESIS Expansion Investigators*

The NEW ENGLAND JOURNAL of MEDICINE

MR RESCUE

ORIGINAL ARTICLE

A Trial of Imaging Selection and Endovascular Treatment for Ischemic Stroke

Chelsea S. Kidwell, M.D., Reza Jahan, M.D., Jeffrey Gornbein, Dr.P.H., Jeffry R. Alger, Ph.D., Val Nenov, Ph.D., Zahra Ajani, M.D., Lei Feng, M.D., Ph.D., Brett C. Meyer, M.D., Scott Olson, M.D., Lee H. Schwamm, M.D., Albert J. Yoo, M.D., Randolph S. Marshall, M.D., Philip M. Meyers, M.D., Dileep R. Yavagal, M.D., Max Wintermark, M.D., Judy Guzy, R.N., Sidney Starkı and Jeffrey L. Saver, M.D., for the MR RESCUE Inves

IMS-III

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 MARCH 7, 2013 VOL. 368 NO. 10

Endovascular Therapy after Intravenous t-PA versus t-PA Alone for Stroke

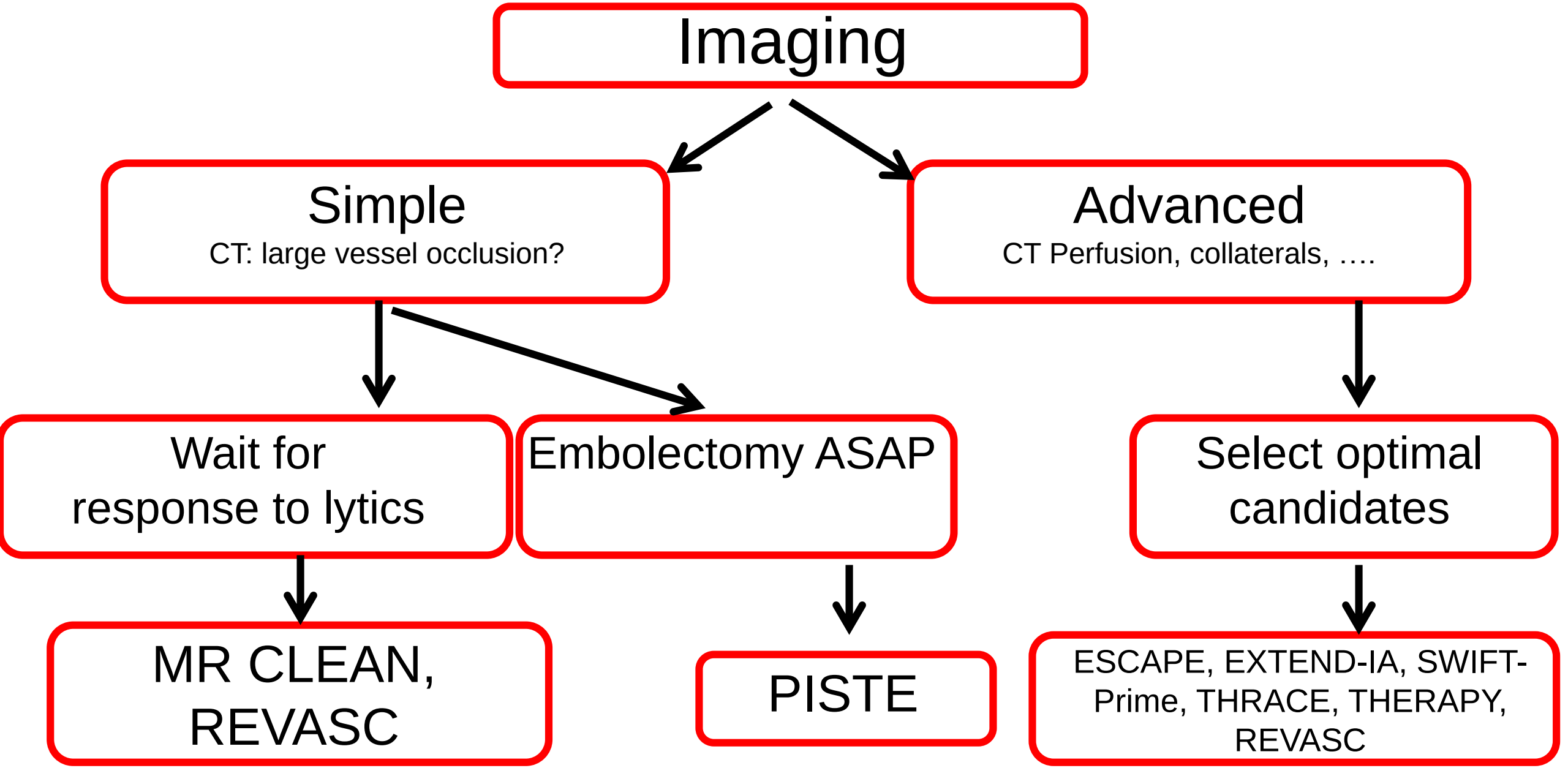
Joseph P. Broderick, M.D., Yuko Y. Palesch, Ph.D., Andrew M. Demchuk, M.D., Sharon D. Yeatts, Ph.D., Pooja Khatri, M.D., Michael D. Hill, M.D., Edward C. Jauch, M.D., Tudor G. Jovin, M.D., Bernard Yan, M.D., Frank L. Silver, M.D., Rüdiger von Kummer, M.D., Carlos A. Molina, M.D., Bart M. Demaerschalk, M.D., Ronald Budzik, M.D., Wayne M. Clark, M.D., Osama O. Zaidat, M.D., Tim W. Malisch, M.D., Mayank Goyal, M.D., Wouter J. Schonewille, M.D., Mikael Mazighi, M.D., Ph.D., Stefan T. Engelter, M.D., Craig Anderson, M.D., Ph.D., Judith Spilker, R.N., B.S.N., Janice Carrozzella, R.N., B.A., R.T.(R.), Karla J. Ryckborst, R.N., B.N., L. Scott Janis, Ph.D., Renée H. Martin, Ph.D., Lydia D. Foster, M.S., and Thomas A. Tomsick, M.D., for the Interventional Management of Stroke (IMS) III Investigators

Everything changed in 2015

5 positive randomized trials

In 2017

9 positive randomized trials


Imaging
Simple
CT: large vessel occlusion?
Advanced
CT Perfusion, collaterals, ….
Wait for response to lytics
Embolectomy ASAP
Select optimal candidates
MR CLEAN, REVASC
PISTE
ESCAPE, EXTEND-IA, SWIFT-Prime, THRACE, THERAPY, REVASC

KW Muir et al

Endovascular Treatment of Ischemic Stroke: An Updated Meta-Analysis of Efficacy and Safety

Simone Vidale, MD[1] and Elio Agostoni, MD[2]

Table 1. Baseline Characteristics of Included Trials.

	MR CLEAN		ESCAPE		EXTEND-IA		SWIFT PRIME		REVASCAT		THERAPY		THRACE		PISTE	
	Interv	CTRL	Interv	CTRL	Interv	CTRL	Interv	CTRL	Interv	CTRL	Interv	CTRL	Interv	CTRL	Interv	CTRL
Number analyzed	233	267	165	150	35	35	98	98	103	103	54	54	190	195	33	32
Age, years	65	65	71	70	68	72	65	66	65	67	67	70	62.6	62.9	67	64
Gender (F)	42.1	41.2	52.1	52.7	51	51	45	53	46.6	47.6	38.2	56.6	43.1	50	61	50
Median NIHSS at admission	17	18	16	17	17	13	17	17	17	17	17	18	18	17	18	14
mTICI 2b/3, %	79.6		72.4		86		88		79.6		73		68.8		87	
Time to groin puncture, minutes	260		241		210		224		269		–		250		208	

Abbreviations: CTRL, control; Interv, intervention; mTICI: modified treatment in cerebral ischaemia.

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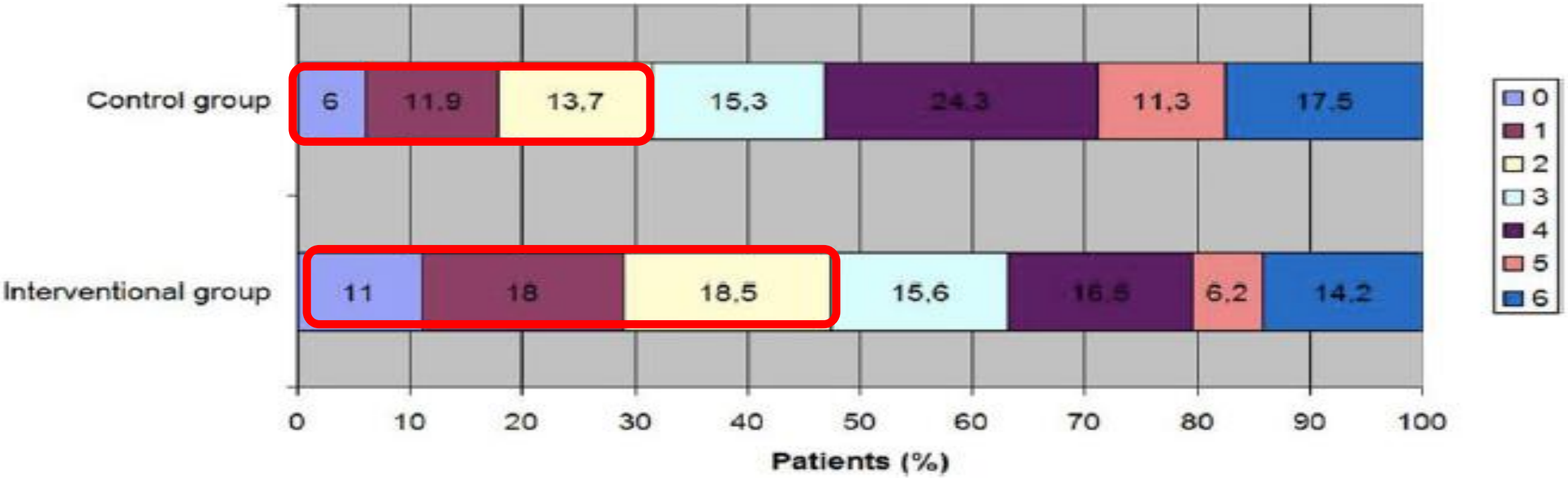
Metaanalysis of 9 randomized trials
Modified Rankin scale



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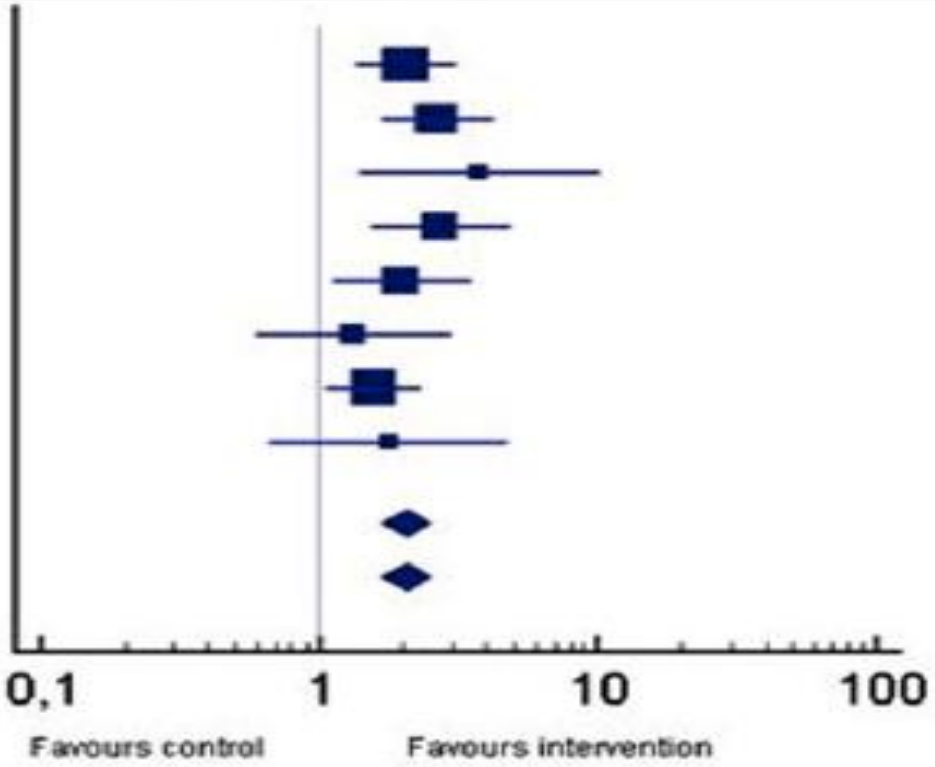
Odds Ratio 2 for the mRS

Study	Intervention group Events	Total	Control group Events	Total	Odds Ratio M-H, (95%CI)
MR CLEAN 2015	76	233	51	267	2.050 (1.361–3.089)
ESCAPE 2015	87	165	44	150	2.687 (1.687-4.281)
EXTEND-IA 2015	25	35	14	35	3.750 (1.383-10.169)
SWIFT PRIME 2015	59	98	35	98	2.723 (1.527-4.855)
REVASCAT 2015	45	103	29	103	1.980 (1.109-3.535)
THERAPY 2016	20	54	16	54	1.397 (0.625-3.121)
THRACE 2016	103	190	82	195	1.631 (1.090-2.441)
PISTE 2016	17	33	12	32	1.771 (0.659-4.761)
Total (fixed effect)	432	911	283	934	2.087 (1.718-2.535)
Total (random effect)	432	911	283	934	2.085 (1.716–2.535)



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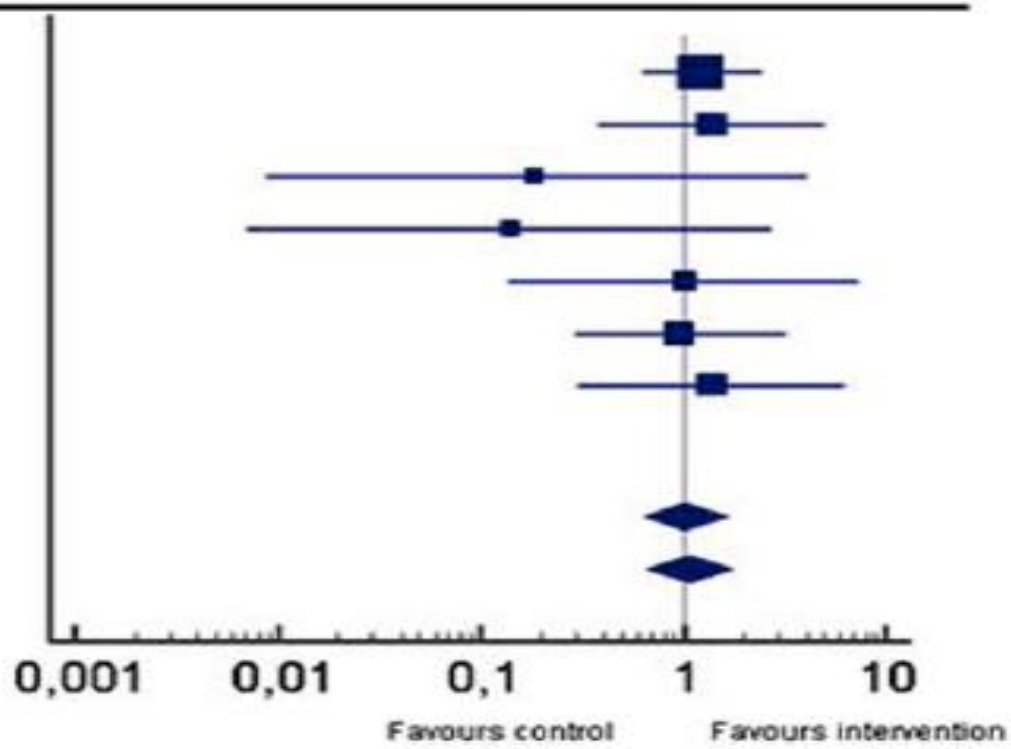
No increase in cerebral hemorrhage

Study	Intervention group Events	Total	Control group Events	Total	Odds Ratio M-H, (95%CI)
MR CLEAN 2015	18	233	17	267	1.231 (0.619–2.448)
ESCAPE 2015	6	165	4	150	1.337 (0.381-4.979)
EXTEND-IA 2015	0	35	2	35	0.189 (0.008-4.077)
SWIFT PRIME 2015	0	98	3	98	0.139 (0.007-2.718)
REVASCAT 2015	2	103	2	103	1.000 (0.138-7.238)
THERAPY 2016	6	54	6	54	0.959 (0.289-3.185)
THRACE 2016	4	190	3	195	1.367 (0.302-6.184)
PISTE 2016	0	33	0	32	-
Total (fixed effect)	36	911	37	934	1.021 (0.641-1.629)
Total (random effect)	36	911	37	934	1.082 (0.669–1.750)



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Conclusion from randomized trials

- Mechanical thrombectomy significantly increases the benefit of thrombolysis in patients with large vessel occlusion
- There is no increased bleeding risk
- No other safety issues
- The evidence for thrombectomy in acute stroke is stronger than for any other cardiovascular intervention

Nine randomized trials have proven that mechanical thrombectomy is superior to standard of care

There is no other interventional technique which has that level of evidence

But this evidence coming from randomized trials is nothing against the evidence coming from individual patients

Case Example

The case: R.O., born 1998

- 16 yrs old girl
- Lives in a small village close to Frankfurt with her parents and a dog named "Buzzi"
- Goes to high school, 10th grade
- Would like to study medicine
  - but she is not sure whether she can make it
- Tuesday, Aug 11, 2015 was her destiny day

R.O., born 1998

- In the evening of Aug 11, 2015 ….
- … she suffered from sudden weakness of her right arm followed by complete hemiparesis
- Awake but could not speak
- Her mother with the help of neighbors managed to bring her to the ER of the Sankt Katharinen Hospital

R.O., born 1998

- Complete hemiplegic at the time of arrival
- Could not speak
- CT showed (still) normal findings
- CT angio: left MCA occluded
- Door to lysis time 22 min
- But no improvement
- Discussion with the mother about the options ….

Neuro called me at 10:09pm: "Big stroke, 16 yrs old! Can you help?

"Please wait here - I will come to you later "

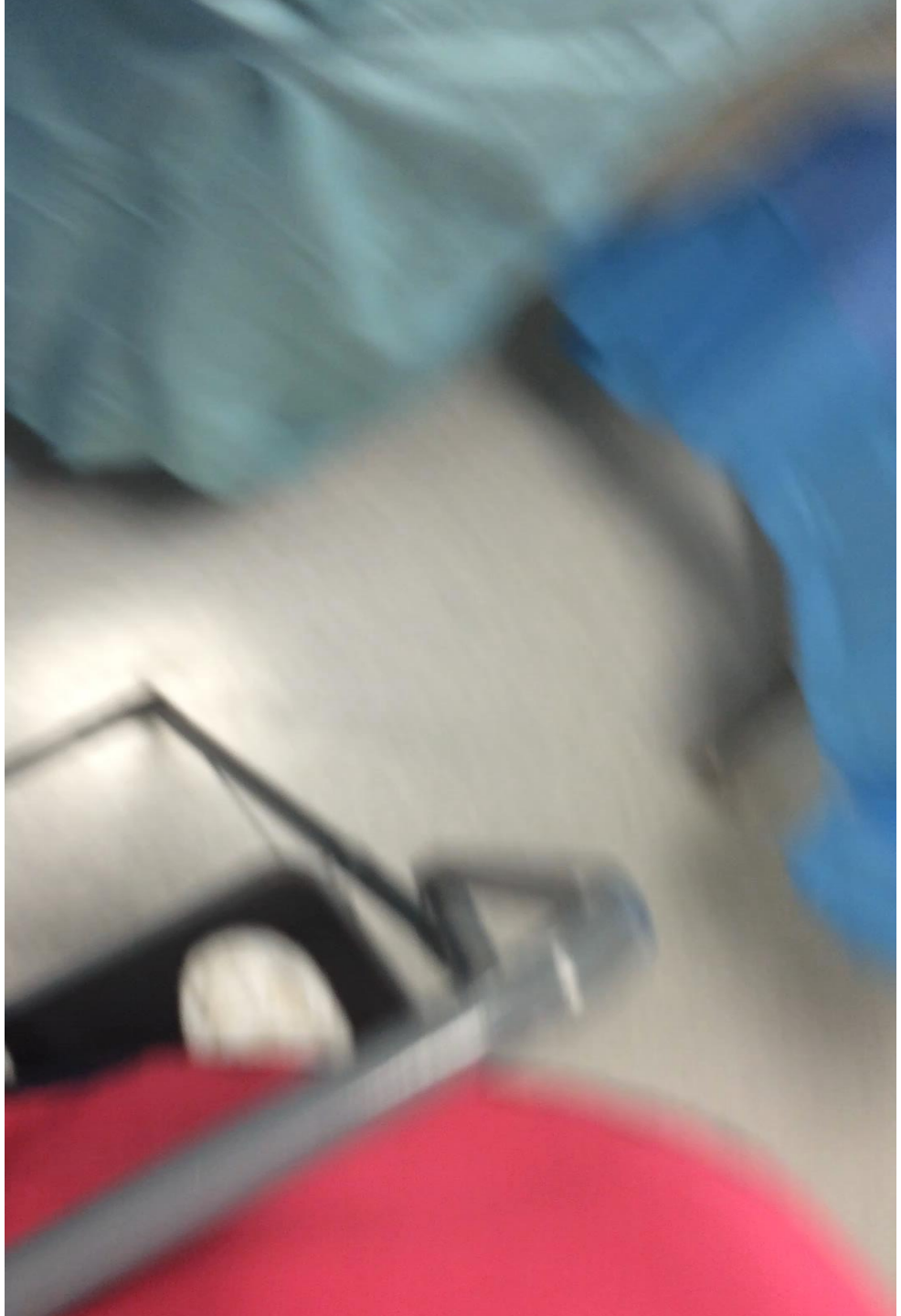
10:12pm Arrival in the cath lab

- In this case it was a really difficult femoral puncture!
- First angio of left carotid
  - Carotid angiography is not much different from cannulating the subclavian artery for IMA angio!
  - MCA occluded

Exchange for an 8F Cello balloon tipped guide

Groin hematoma due to difficult puncture + lytics

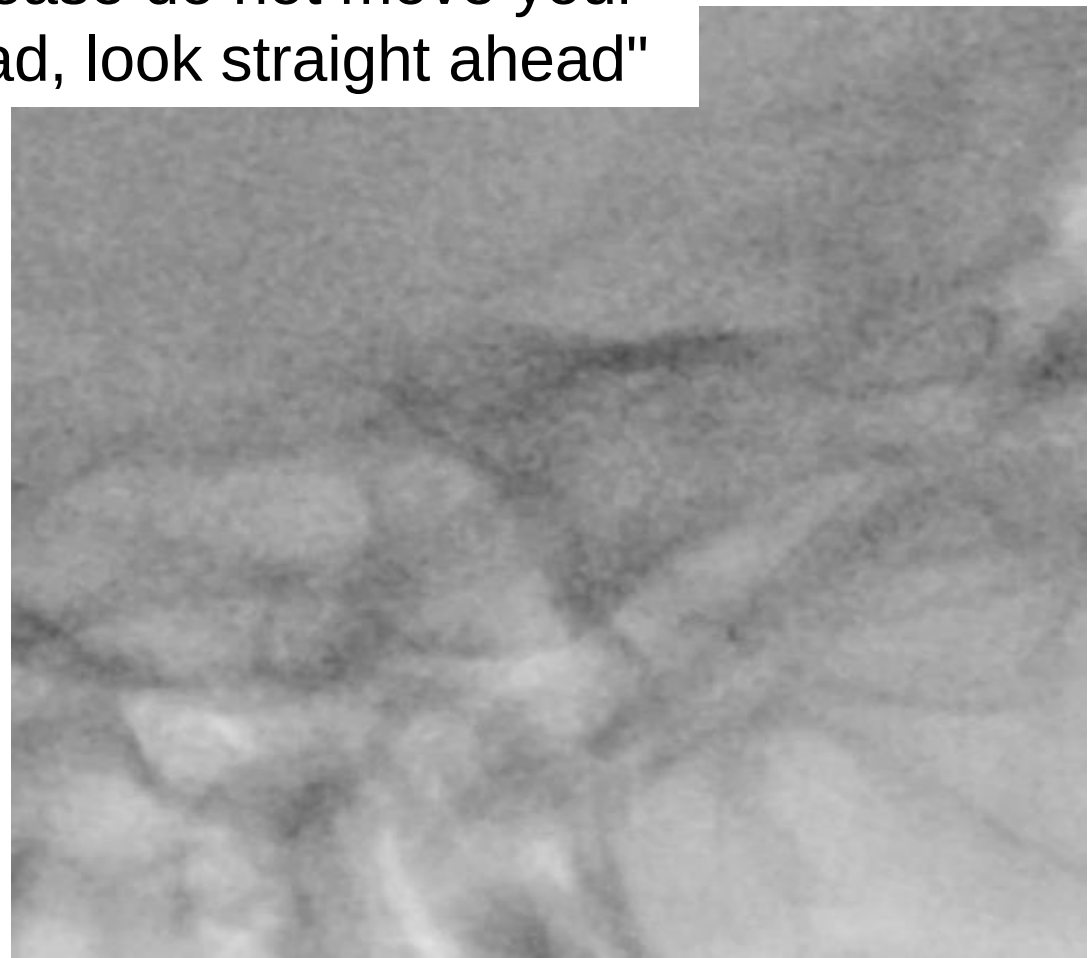
Someone had to compress



Microcatheter REBAR-027
Coronary Whisper wire MS 0.014"

Like a very tortious right coronary artery, vessels are very fragile – like an ulcerated plaque

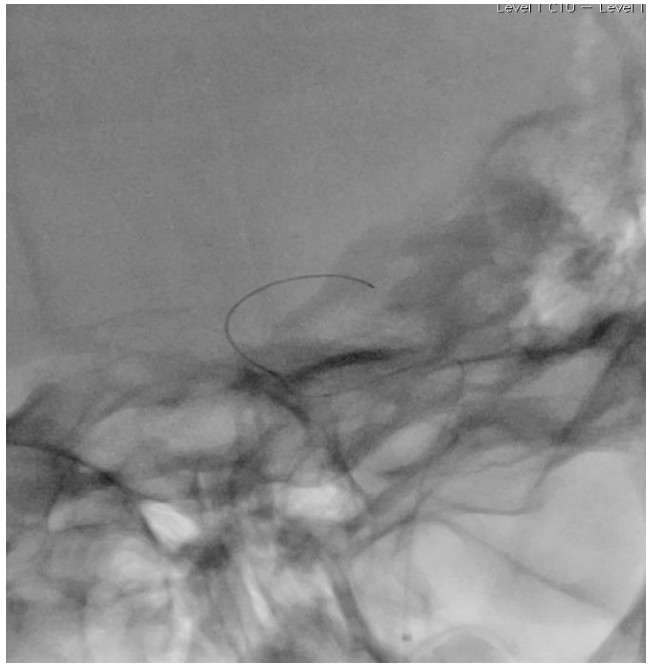
"Please do not move your head, look straight ahead"



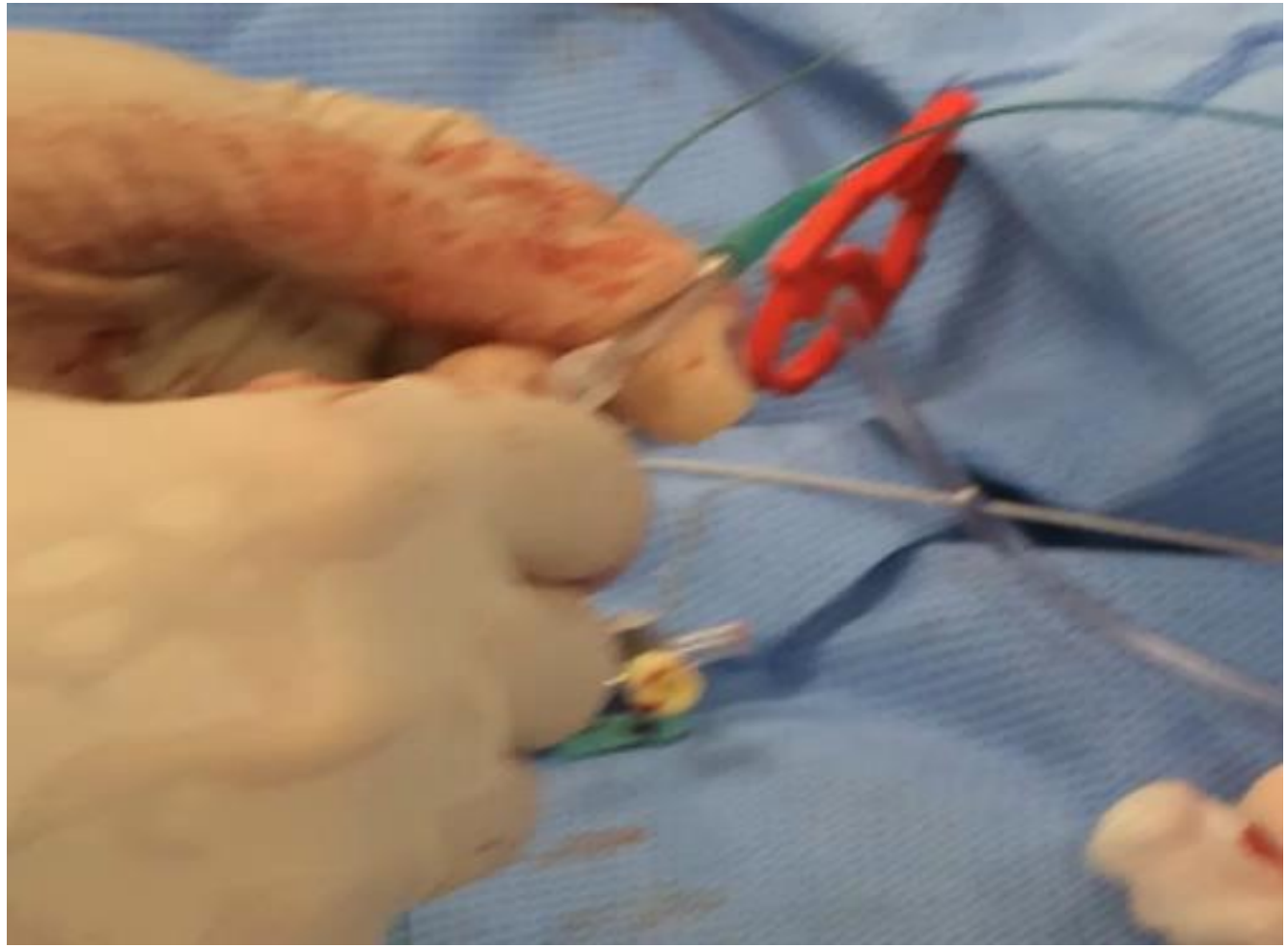
10:34pm

25min
after the initial call

Whisper wire inside of a microcatheter in front of the MCA occlusion



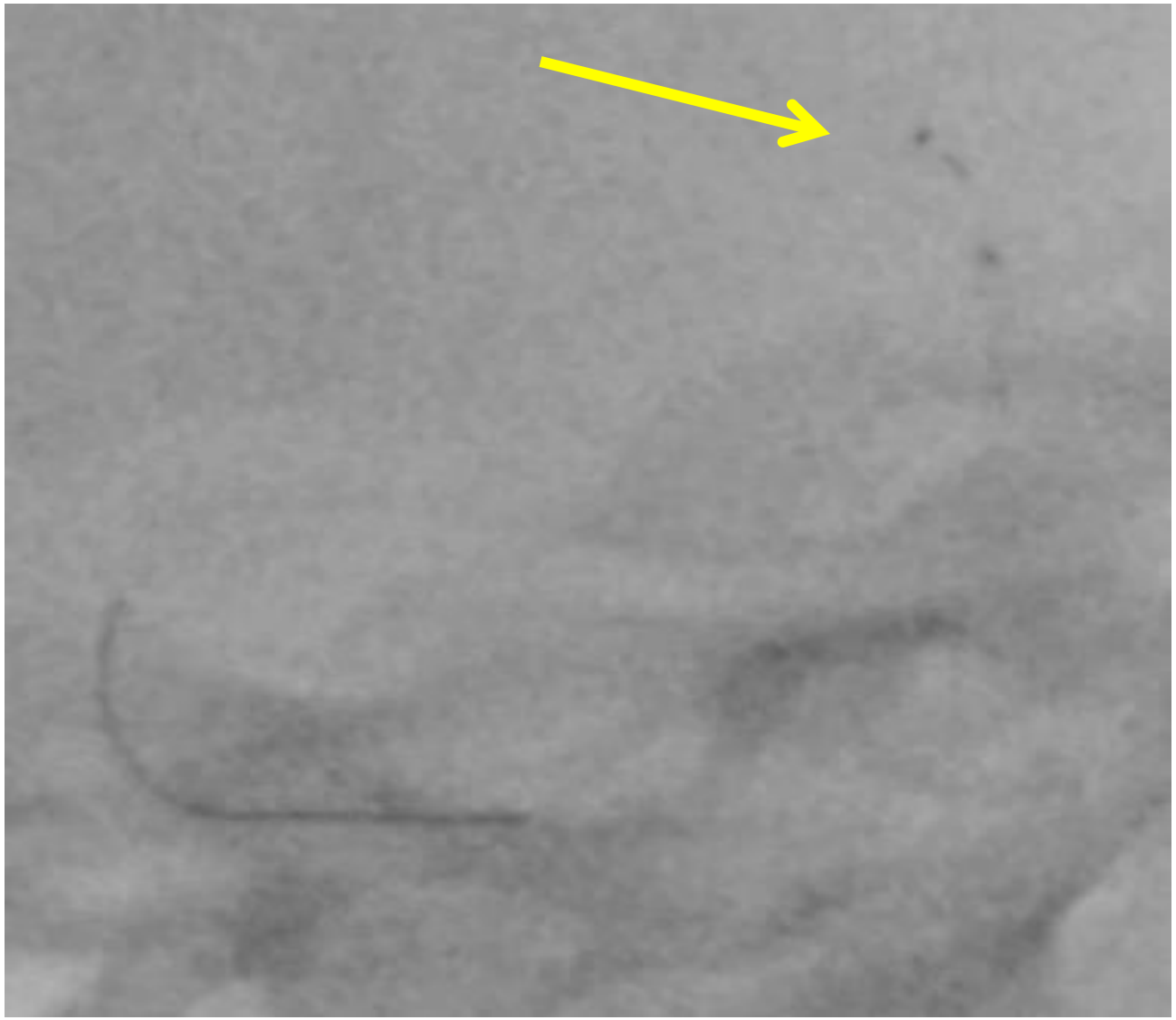
Preparation of a 6x30 mm Solitaire



Tip of the microcatheter is in a distal branch

Deployment of 6x30 mm Solitaire

Like unsheathing a self-expanding stent



10:43pm

After deployment of the Solitaire

33 min after the initial call

"Ich kann wieder sprechen!!!! "

"I can speak again!!!!"

10:45pm

36 min
after the initial call

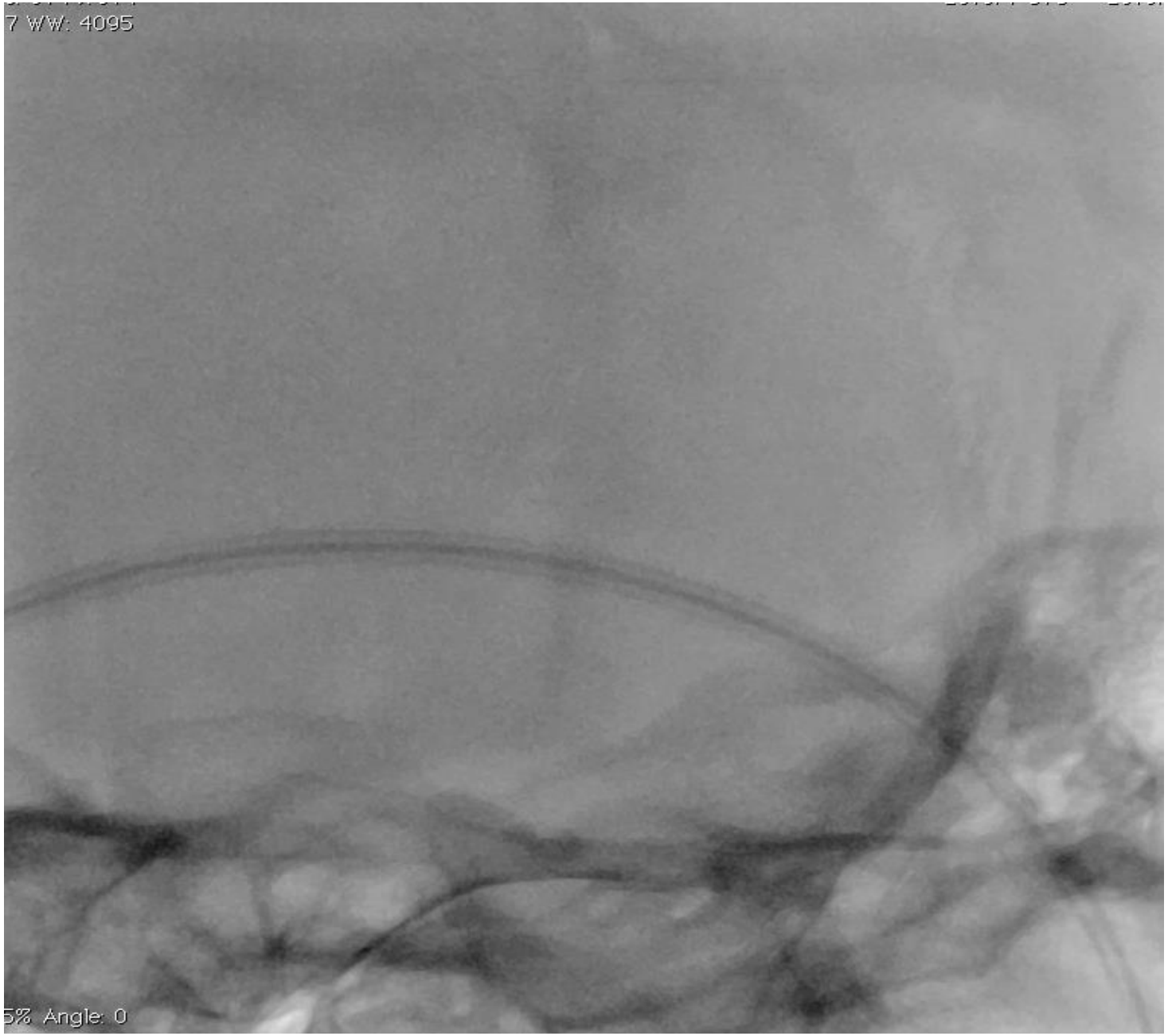
- Please move your right hand!
- Yes, very good!

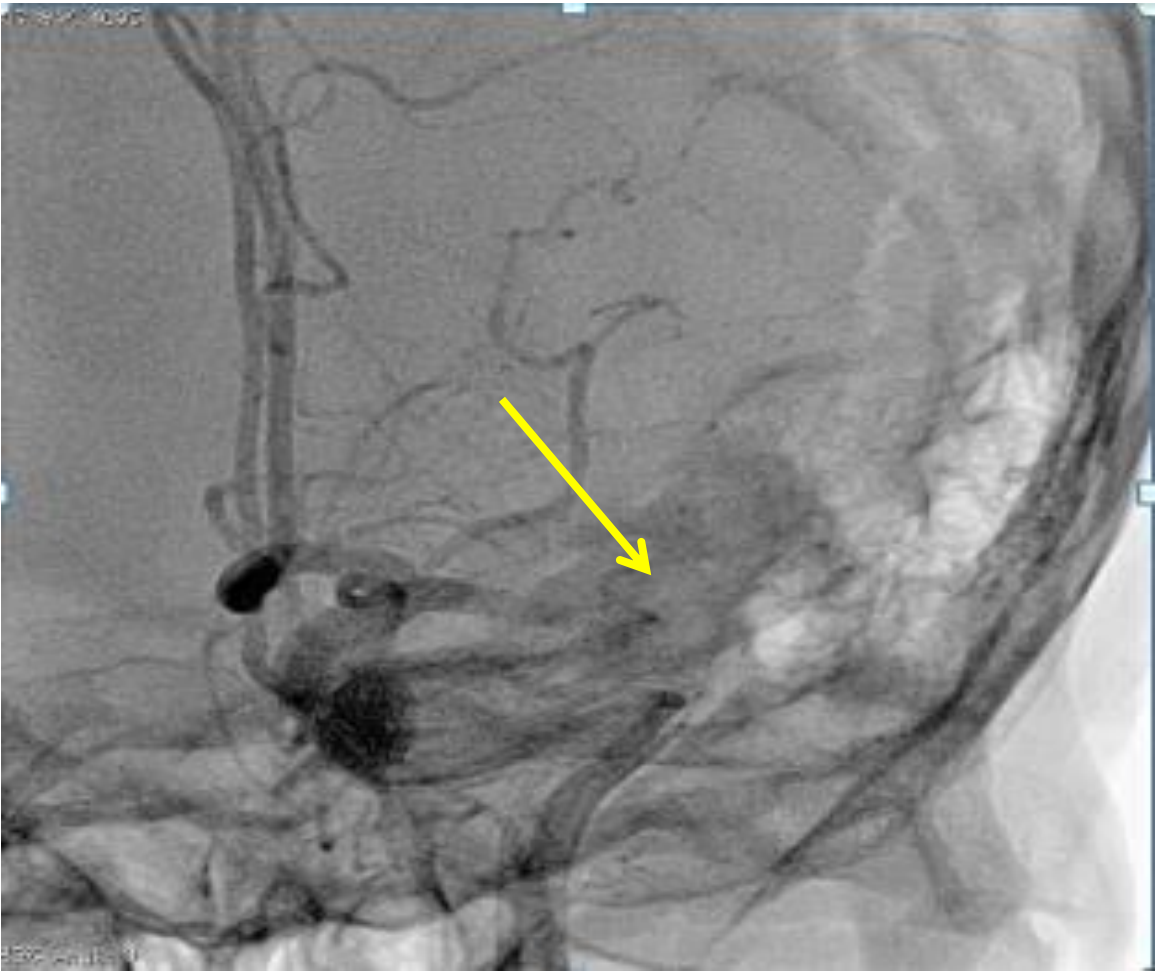
Aspiration with a big syringe and Solitaire retrieval

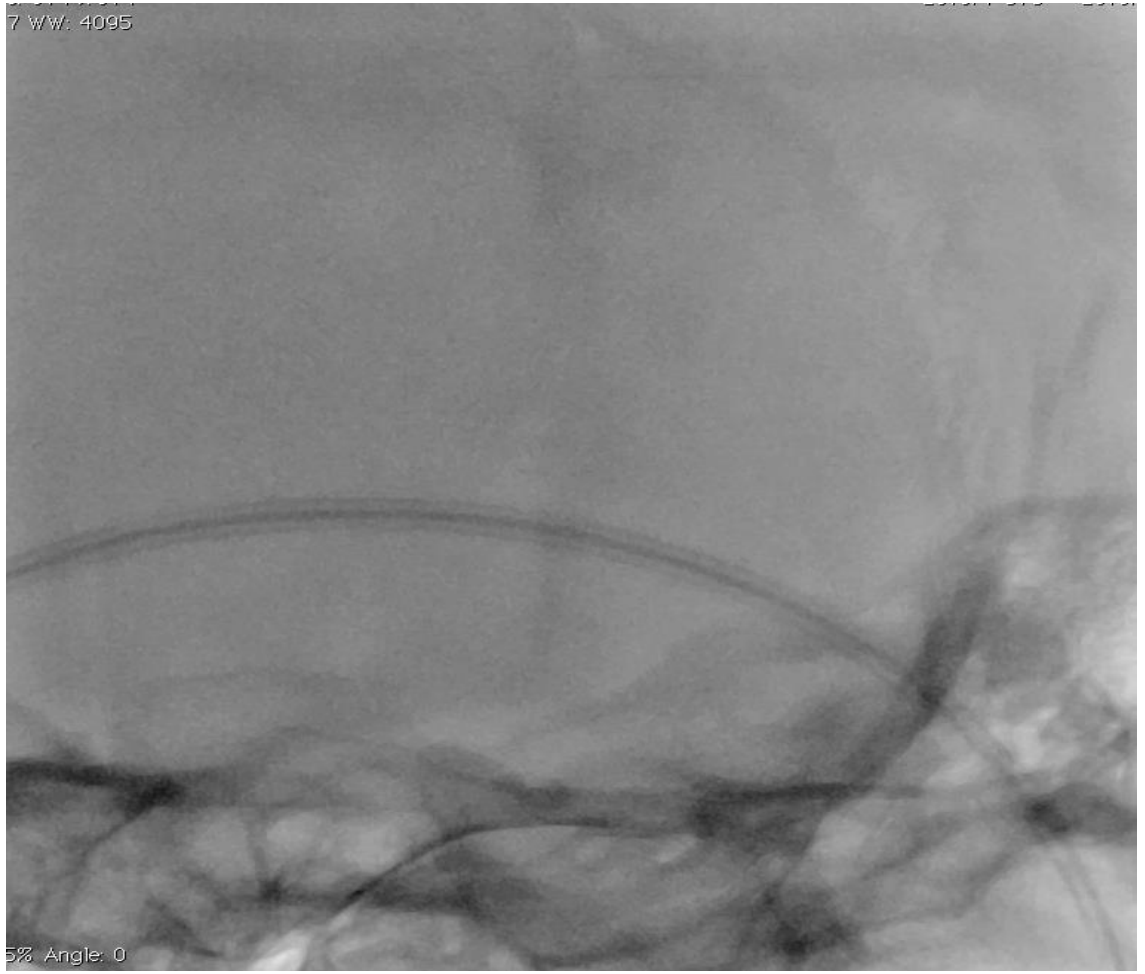
Deflation of the Cello balloon

Small clot – big event

Final angio







before

after

45 min after the initial call

Hands up again, straight up!

Now turn your hands upwards like this!

Close your eyes!

I can not do it because this hurts me!

That was very good!

R.O., born 1998

- Complete recovery!
- We do not know whether she will make it into medical school
- But if not, it will not be due to her stroke
- In any case, she will have an otherwise normal life

Thank you for your time!

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