

# Distal Mechanical Thrombectomy in Acute Ischemic Stroke Method and Benefit

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... with stent-retrievers is an evidence based therapy for intracranial **large** vessel occlusion as proven by several trials:

- MR CLEAN
- EXTEND-IA
- ESCAPE
- SWIFT-PRIME
- REVASCAT

Either primary or secondary occlusion of small branches may occur and may affect branches supplying eloquent brain tissue.

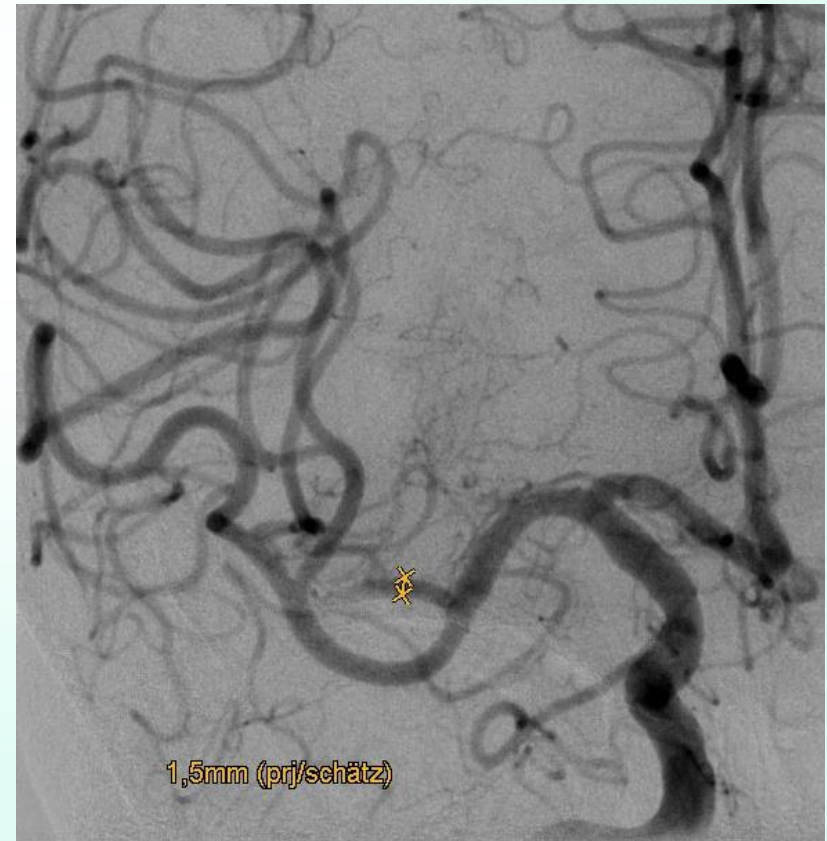
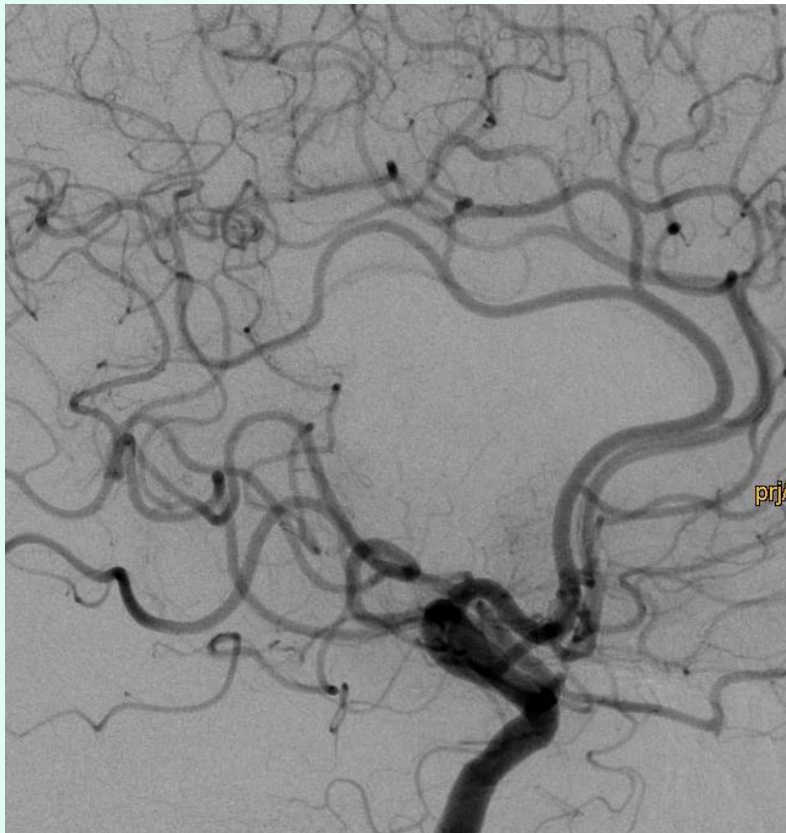
But most retrievers are only approved for vessels >2mm.....

# Stent retriever for small vessels

	Diameter (mm)	Length (mm)	Min. vessel diameter (mm)	Min. ID of microcatheter (inch)
Catch+ mini (Balt)	3	15	1.5	0.017
Baby Trevo* (Stryker)	3	20	n.a.	0.017
pREset LITE (phenox)	3	20	>1.5 mm	0.017
pREset LITE (phenox)	4	20	>1.5 mm	0.017

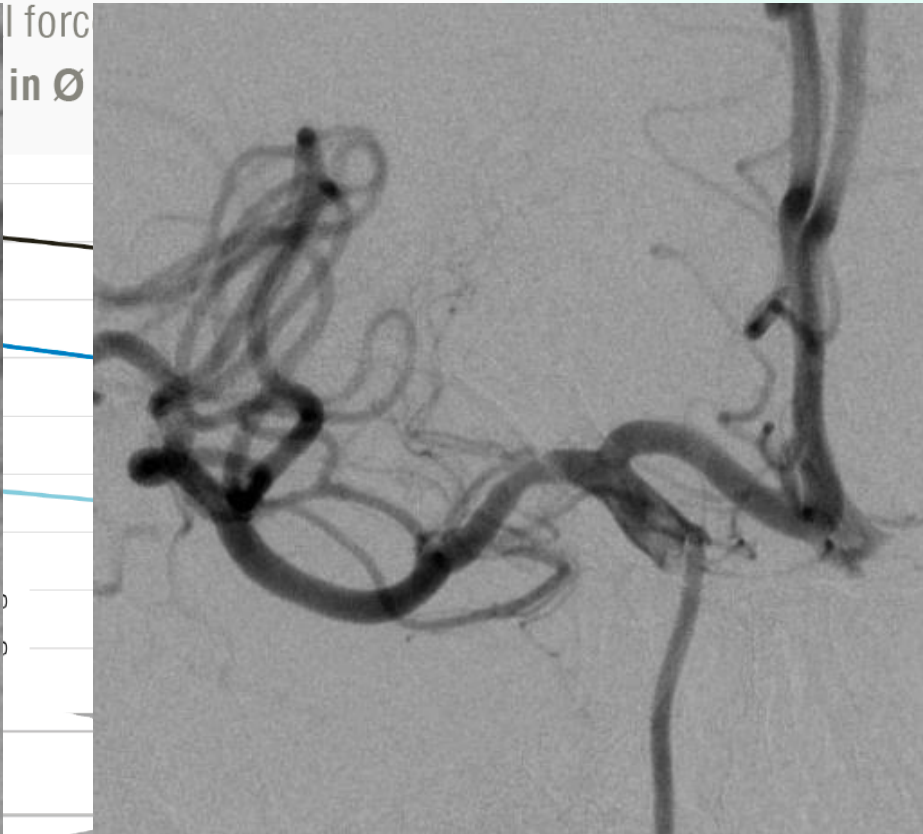
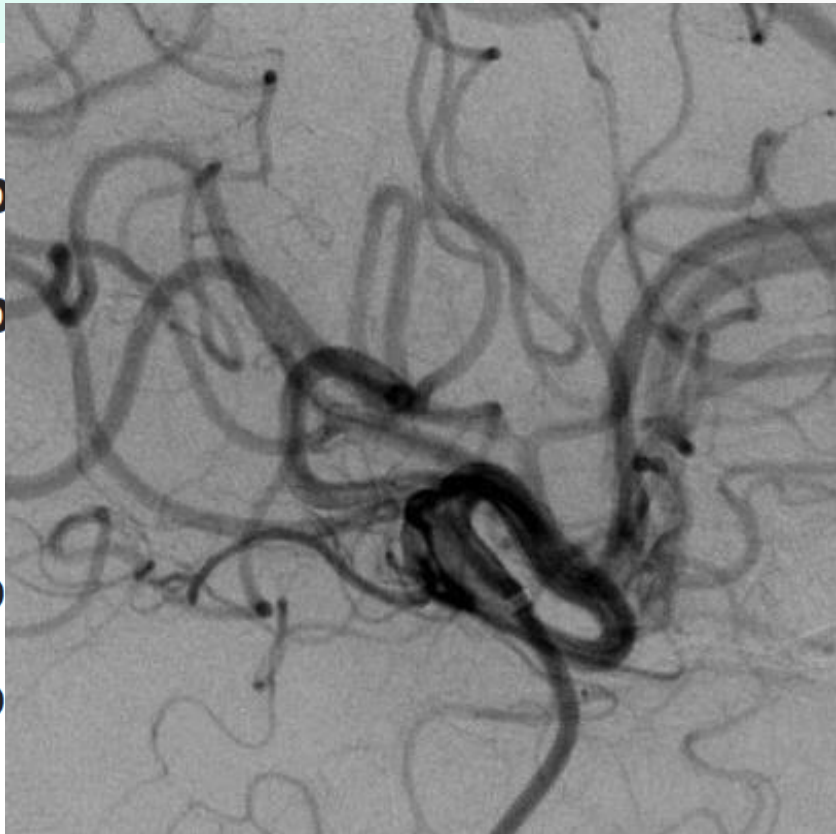
\* Haussen D, Lima A, Nogueira R, JNIS 2015 (8 cases)

REF	A: Shaft Diameter [mm]	B: Working Length [mm]	C: Shaft Length [mm]	D: Insertion Wire Length [mm]	E: Marker Distance [mm]	Min. ID Microcatheter [inch]	Min. vessel diameter [mm]
PRE-4-20	4	20	30	1800	1260	0.021	>2
PRE-6-30	6	30	48	1800	1275	0.021	>3

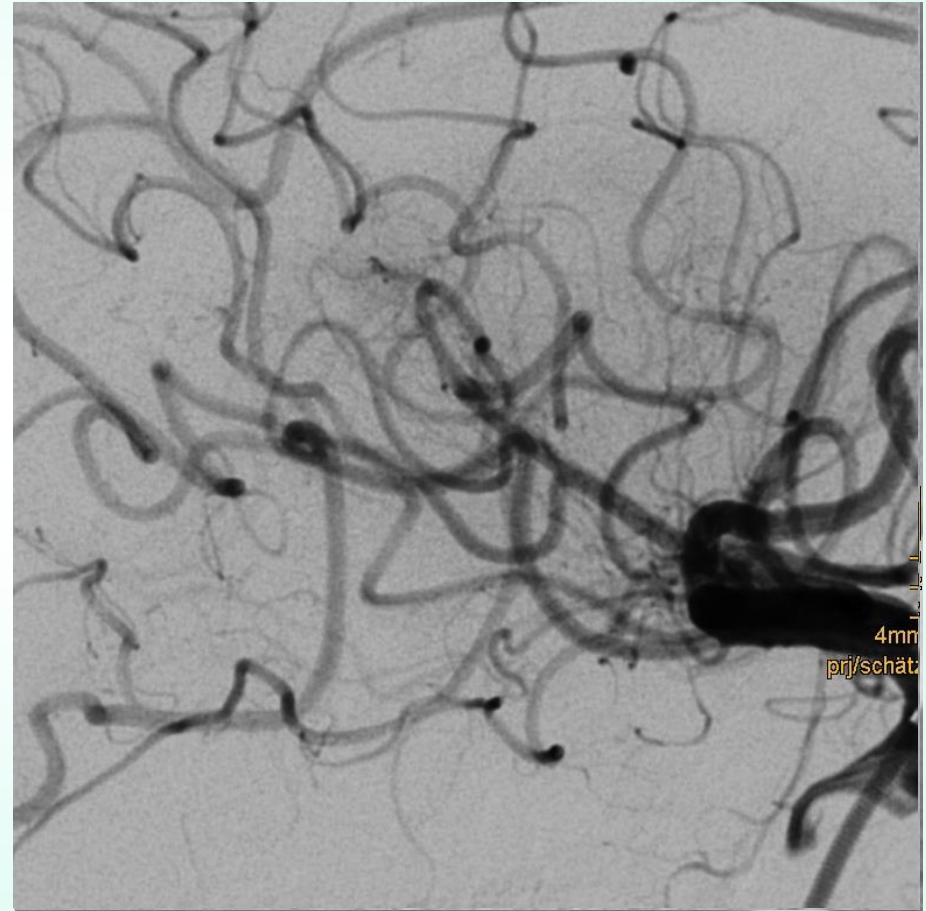
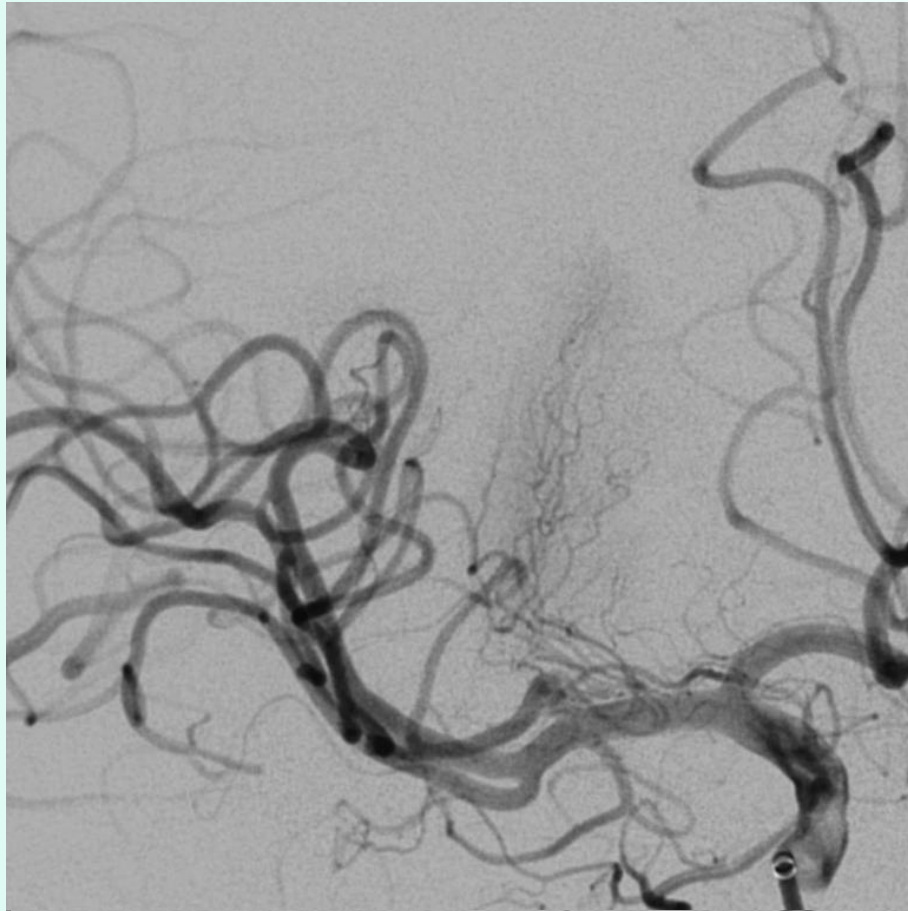




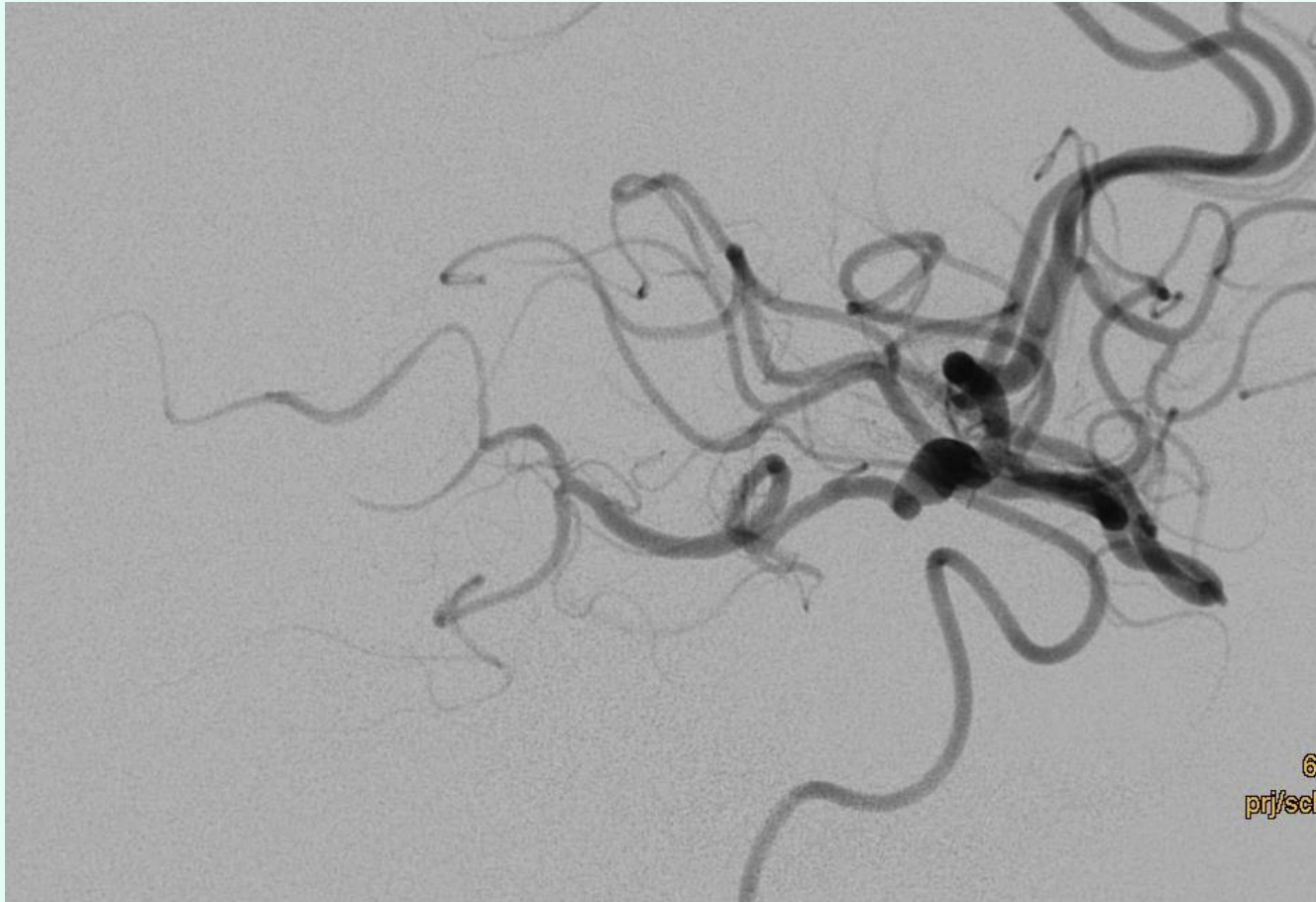
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PRE-LT-3-20	3	20	30	1800	1255	0.0165	>1.5
PRE-LT-4-20	4	20	30	1800	1255	0.0165	>1.5



# Example #2

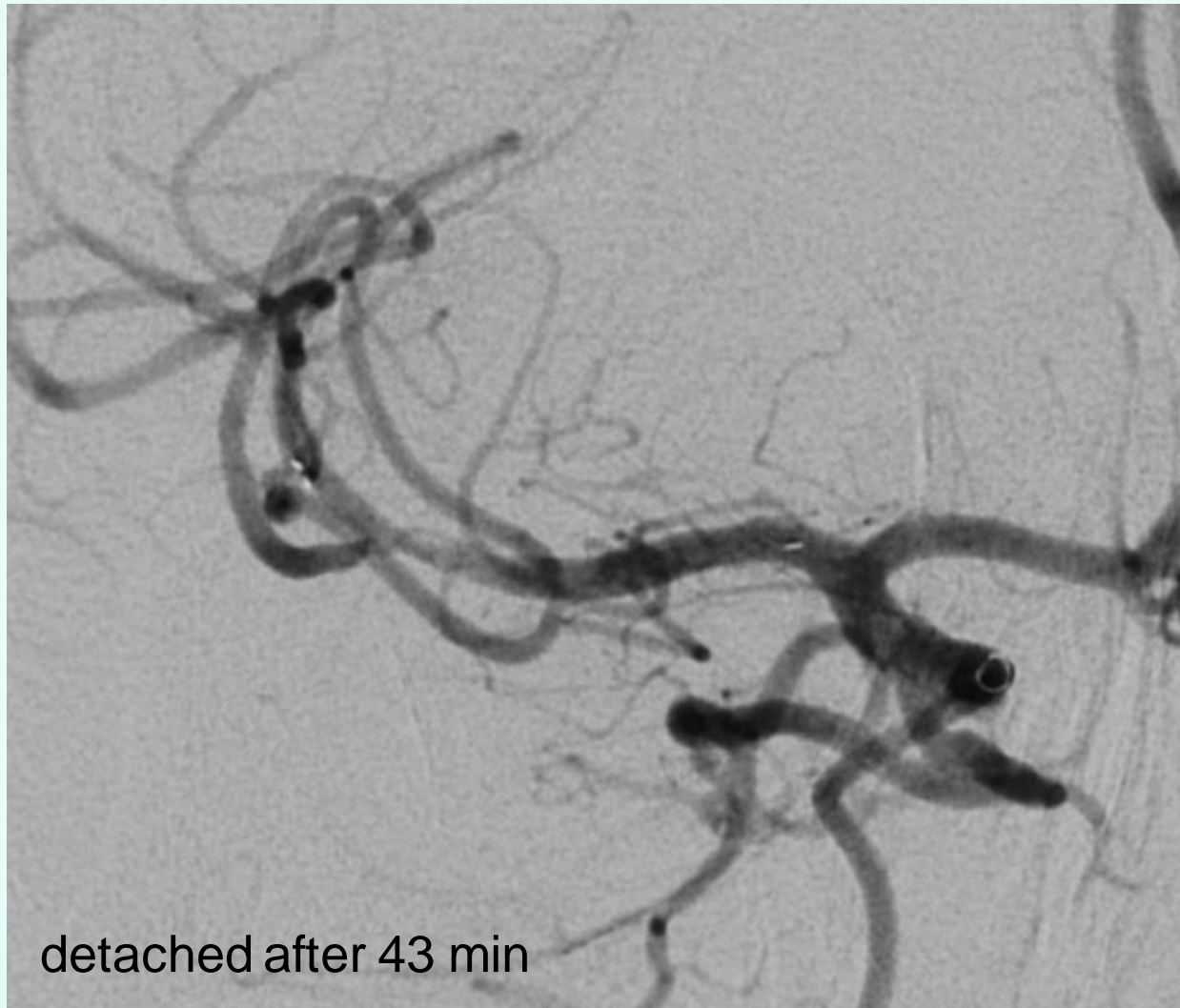


# Example #3

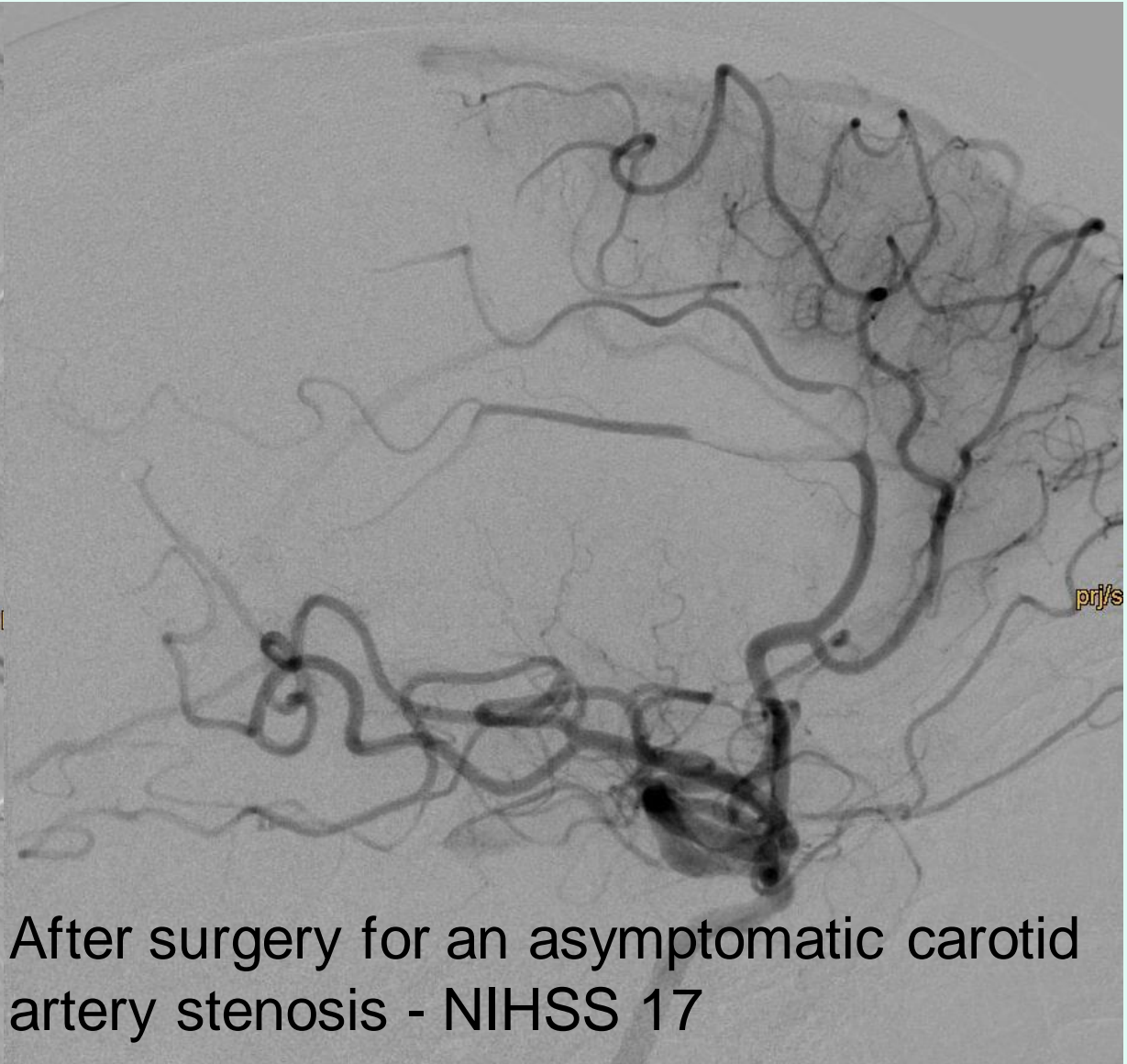




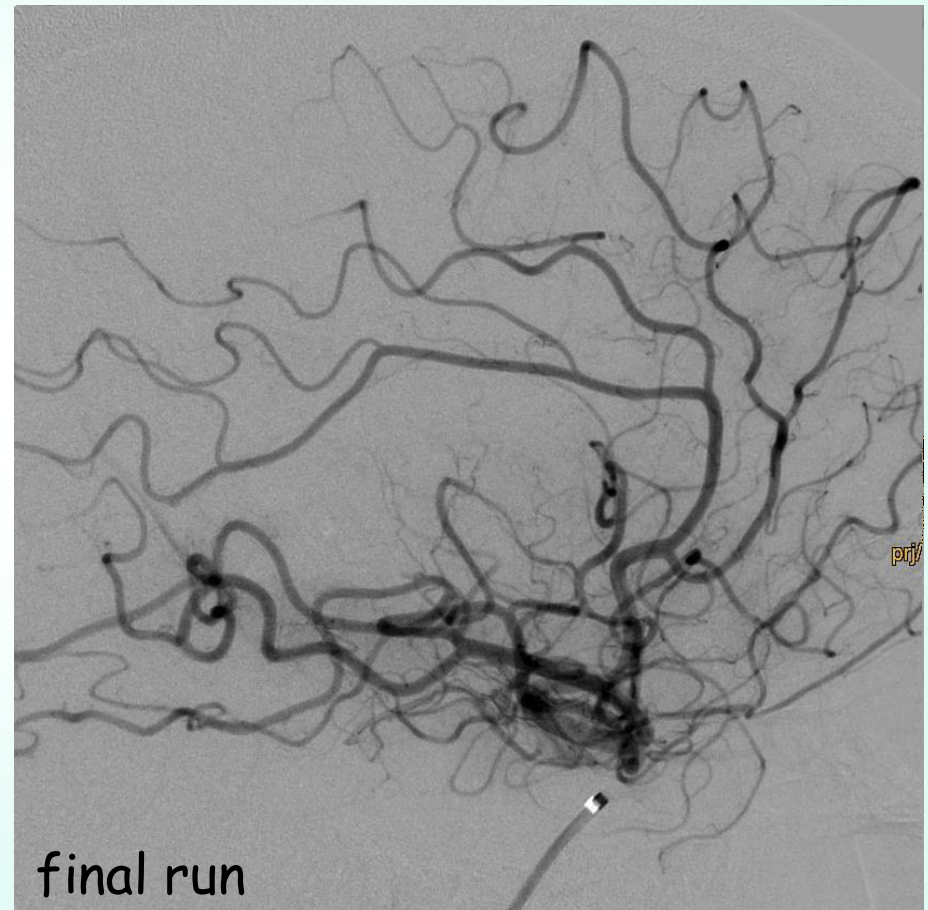
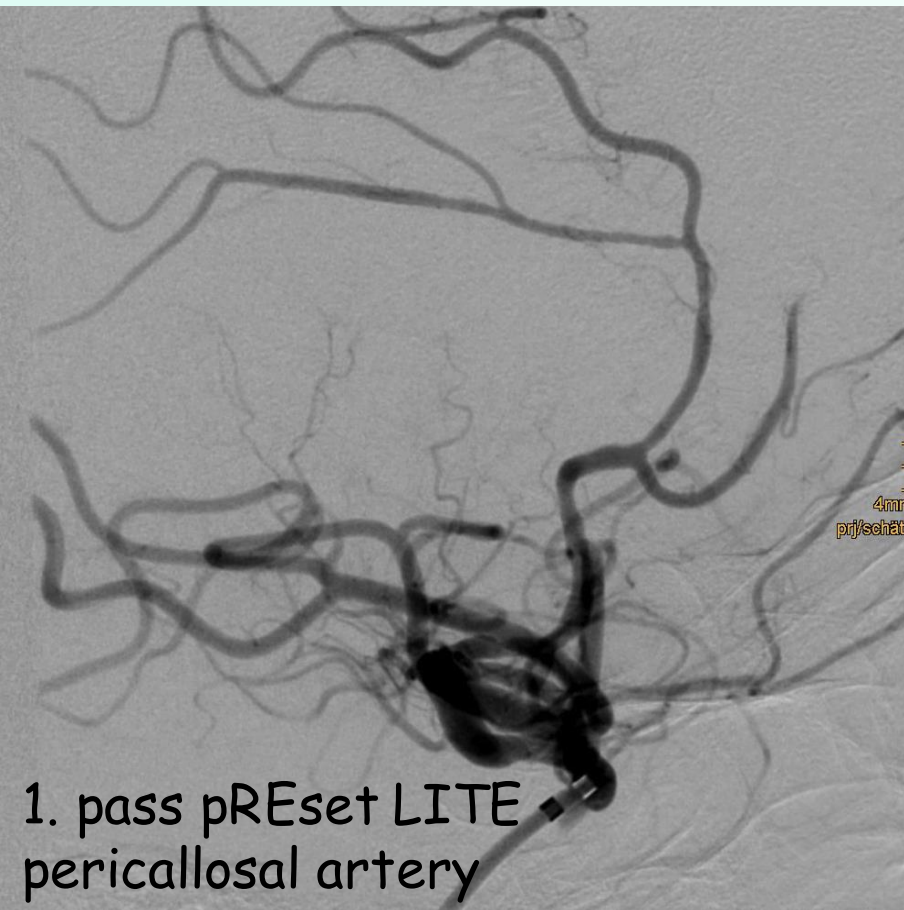
## Example #4 - no success



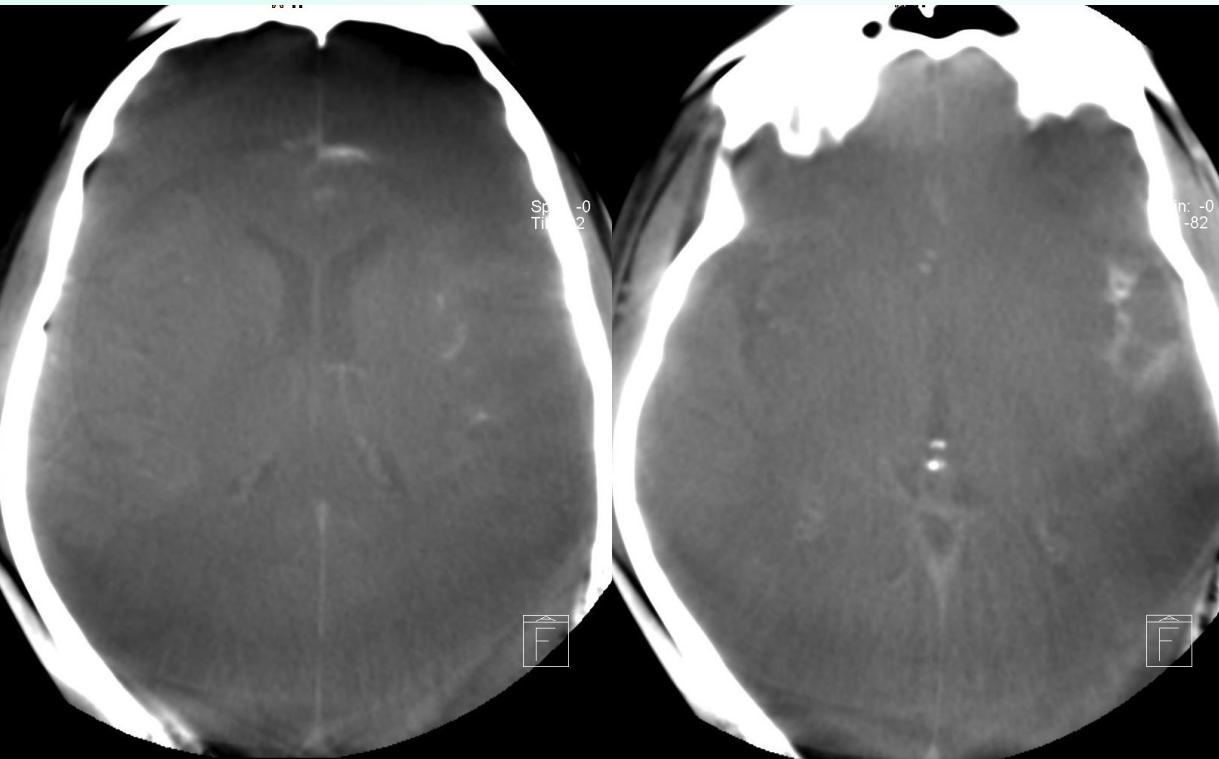
# Example #5 - hemorrhage



After surgery for an asymptomatic carotid artery stenosis - NIHSS 17









- RECANALIZATION
- SAFETY

of mechanical thrombectomy in small intracranial vessels ( $\leq 2\text{mm}$ ) using

- pREset LITE

Cases were extracted from an institutional database of all endovascular stroke treatments:

- pREset LITE used during thrombectomy
- diameter of target vessel  $\leq 2\text{mm}$

Analysis:

- recanalization of target vessel (TICI score)
- any device related complications
- hemorrhage on follow up imaging

# General treatment protocol

general anaesthesia

anterior circulation: 8 F + intermediate catheter

posterior circulation: 6 F/8 F -/+ intermediate catheter

microcatheter: PX Velocity, Echelon 14, Trevo pro 18

wire: Synchro 14

stent retriever: various/for small vessels only pREset LITE

5 min device incubation and 0,5-1 mg glyceroltrinitrat i.a.

slow device retraction with simultaneous distal aspiration

no recanalization after several retrievals → PTA/stenting

**N = 76 patients**

Average age	71 years	36-93
Female	34	44.7%
Average onset to treatment	255 min	112-486 min
unknown time window fluctuating or progressive symptoms	21	27.6%
Median NIHSS	14	0-27
Not assessed	3	3.9%
Intubated	5	6.6%



# Primary target vessels and results

Target vessels		n = 79 targets
T-occlusion	17	21.5%
M1	31	39.2%
M2	20	25.3%
Pericallosal artery	2	2.5%
Basilar artery	4	5.1%
P1 or P2 segment of the PCA	5	6.3%
Recanalization		
TICI 2b/3	69	87.3%
Stent angioplasty		n = 76 patients
cervical	16	21.1%
intracranial	9	11.8%
mRS at 90 days		n = 54 patients
0-2	25	32.9%
6	19	25.0%

# pREset LITE target vessels

n = 90		
M1	1	1.1%
Temporal MCA branch	1	1.1%
M2	61	67.8%
A2	4	4.4%
Pericallosal artery	10	11.1%
Callosomarginal artery	2	2.2%
Frontopolar artery	1	1.1%
Basilar artery	1	1.1%
P1 segment of the PCA	2	2.2%
P2 segment of the PCA	7	7.8%
Average vessel diameter	1.6 mm	1.3 - 2.0 mm

# Recanalization results pREset LITE

n=90		
TICI 0	21	23.3%
TICI 1	1	1.1%
TICI 2a	5	5.6%
TICI 2b	14	15.6%
TICI 3	49	54.4%
<b>TICI 2b/3</b>	<b>63</b>	<b>70%</b>
Average number of passes per target	1.3	0 - 4

n=1 pREset LITE could not be advanced (tortuous vessels anatomy)

n=1 pREset LITE 4/20 could not be advanced but pREset LITE 3/20

# Device associated side effects

	n =	Per treated vessel	Per patient
<b>Significant vasospasm</b>  (all resolved spontaneously or with i.a. vasodilators)	6	6.7%	7.9%
<b>Vessel dissection</b>  (all occurring in patients presenting with cervical artery dissection, both dissections treated with stents)	2	2.2%	2.6%
<b>Extravasation</b>  (self limiting)	1	1.1%	1.3%
<b>Spread of thrombus</b>	3	3.3%	3.9%



# Hemorrhage on follow-up imaging

	n =	Per treated vessel	Per patient
<b>Focal SAH at treated vessel segment</b> (no clinical impact)	<b>12</b>	<b>13.3%</b>	<b>15.8%</b>
<b>PHI at treated vessel segment</b> (no clinical impact)	<b>2</b>	<b>2.2%</b>	<b>2.6%</b>
SAH unrelated	3	3.3%	3.9%
PHI unrelated	3	3.3%	3.9%
PHII unrelated	5	5.6%	6.6%

- $\approx 70\%$  successful recanalization
- Frequency of device related complications within the expected range:
  - 6.3% vasospasm
  - 2.2% dissection
  - 1.1% perforation
  - 3.3% new emboli (per treated vessel)
- A higher rate of SAH on follow up imaging compared to other studies but so far without impact on the clinical outcome

pREset LITE is a useful complementary device for the endovascular treatment of small vessel occlusions in acute stroke.

Given the slightly increased rate of SAH (although without clinical impact up to now), recanalization of small branches should only be performed after careful risk-benefit assessment.