Carotis stentning:
Den akutte stroke patient

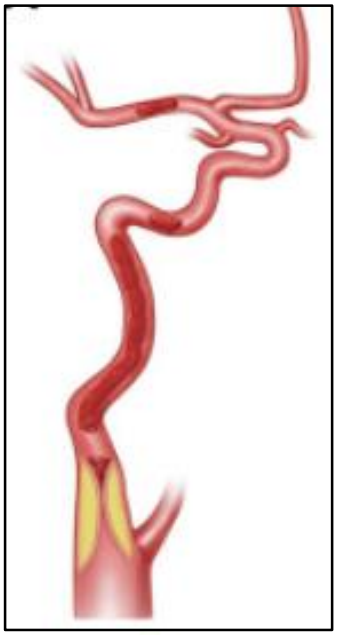
Willy Altinok Krone

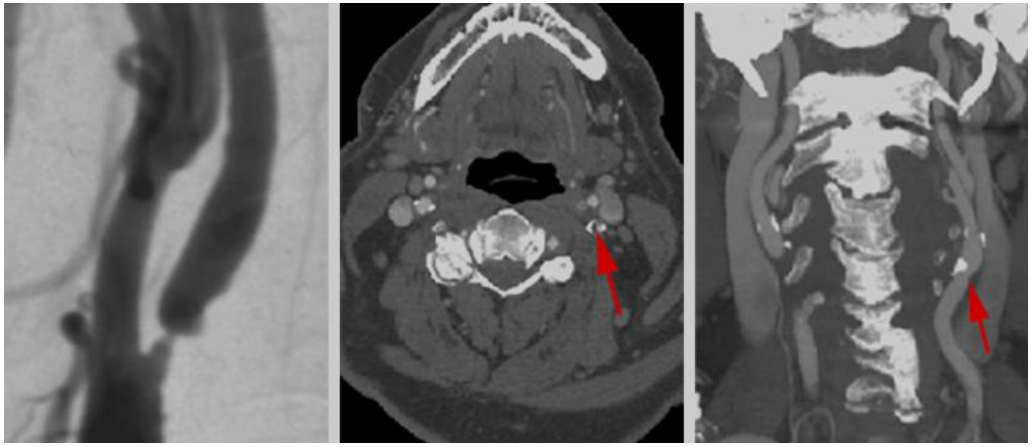
DFIR's Årsmøde 2024

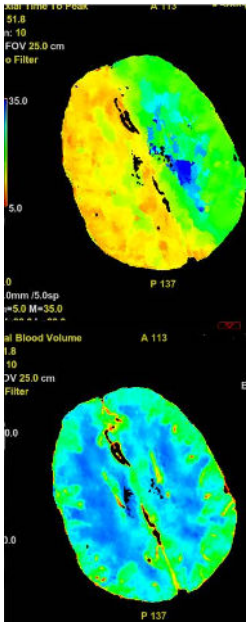
Hvornår overvejes stentning af ICA hos den akutte stroke patient?

<u>Tandem okklusion:</u>
-okklusion/nærokklusion af ICA med intrakraniel LVO

<u>Hypoperfusion:</u>
-hæmodynamisk betydende okklusion/nærokklusion af ICA uden intrakraniel LVO







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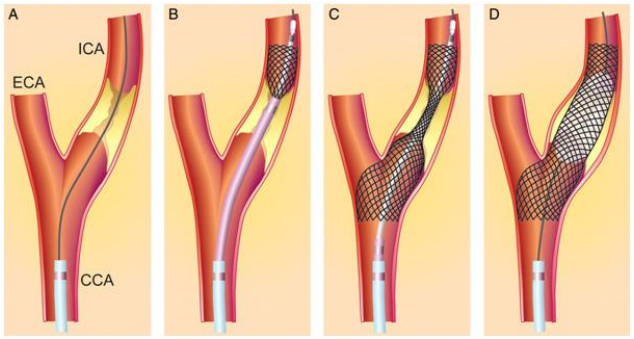
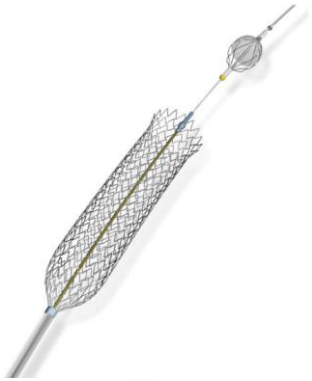
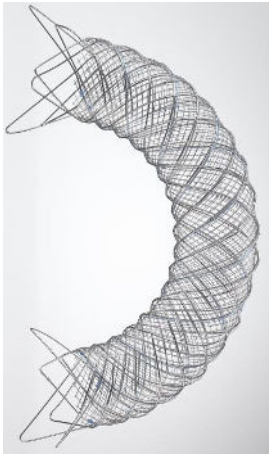
Tekniske aspekter

Udstyr







Blodfortyndende behandling

Ischemic stroke

Original research

Antithrombotic regimen in emergent carotid stenting for acute ischemic stroke due to tandem occlusion: a meta-analysis of aggregate data

Francesco Diana [1,2] Mohamad Abdalkader [3] Daniel Behme [4] Wei Li [5] Christoph Johannes Maurer [6] Raoul Pop [7] Yang-Ha Hwang [8] Bruno Bartolini [9] Valerio Da Ros [10] Sandra Bracco [11] Luigi Cirillo [12] Gaultier Marnat [13] Aristeidis H Katsanos [14] Johannes Kaesmacher [15] Urs Fischer [15] Diana Aguiar de Sousa [16] Simone Peschillo [17,18] Andrea Zini [19] Alejandro Tomasello [1,2] Marc Ribo [2,20] Thanh N Nguyen [3,21] Michele Romoli [22] for the APT-eCAS collaboration

In this meta-analysis, we provide insights into the safety and clinical outcomes of antithrombotic medications in patients who underwent emergent carotid stenting in acute tandem occlusions, using data from 35 studies enrolling 1670 patients with AIS due to tandem occlusion. Our meta-analysis suggests that good functional outcome is comparable across antithrombotic treatment regimens, with trends favoring GPI—and marginally DAPT—over SAPT in terms of good functional outcome. DAPT and GPI seem not to carry a significant increase in the risk of sICH. There was also no impact of previous IVT on the relationship between antithrombotics and sICH, a finding to some extent reassuring given the caveats concerning its co-administration after IVT.

J Neurointervent Surg: first published as 10.1136/jnis-2023-

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Er der evidens?

- Skal vi lave mekanisk trombektomi ved tandem okklusion?

Ja

Endovascular thrombectomy after large-vessel ischaemic stroke: a meta-analysis of individual patient data from five randomised trials

Mayank Goyal, Bijoy K Menon, Wim H van Zwam, Diederik W J Dippel, Peter J Mitchell, Andrew M Demchuk, Antoni Dávalos, Charles B L M Majoie, Aad van der Lugt, Maria A de Miquel, Geoffrey A Donnan, Yvo B W E M Roos, Alain Bonafe, Reza Jahan, Hans-Christoph Diener,

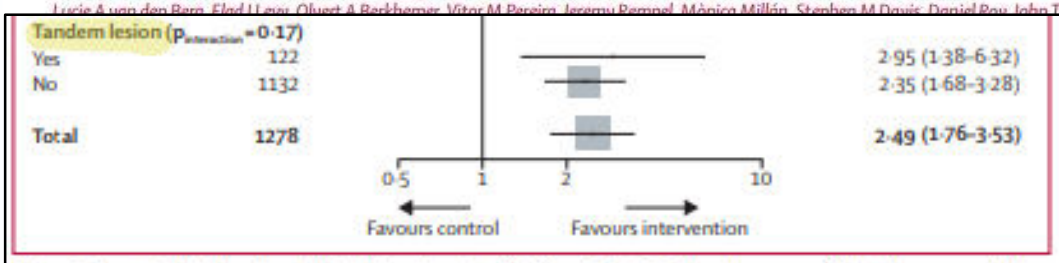

Figure 2: **Forest plot showing adjusted treatment effect for mRS at 90 days in prespecified subgroups with p values for heterogeneity across subgroups**

cOR=common odds ratio. mRS=modified Rankin Scale. ASPECTS=Alberta Stroke Program Early CT score. ICA=internal carotid artery. M1=M1 segment of middle cerebral artery. M2=M2 segment of middle cerebral artery. NIHSS=National Institutes of Health Stroke Scale.

achieve functional independence (mRS 0–2) as a result of treatment. The rates of symptomatic intracranial

Our analysis confirms benefit from endovascular thrombectomy for patients with occlusions of the intracranial arterial circulation segment, with or without concomitant (tandem) occlusions of the extracranial internal carotid artery, indicating that patients with tandem occlusions should not be excluded from treatment (figure 2, appendix p 11). However, the heterogeneity of treatment methods given with respect to the proximal extracranial carotid occlusion in this group of patients (no revascularisation of the proximal lesion *vs* angioplasty *vs* stenting) does not allow for any conclusions about the optimum treatment approach for patients with tandem occlusions. This strategy remains to be refined through future studies.

Er der evidens?

- Skal vi stente ICA efter intrakraniel MT ved tandem okklusion? Ja, men…

Stroke
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https://doi.org/10.1161/STROKEAHA.120.033032

American Heart Association.

CLINICAL AND POPULATION SCIENCES

Endovascular Therapy of Anterior Circulation Tandem Occlusions

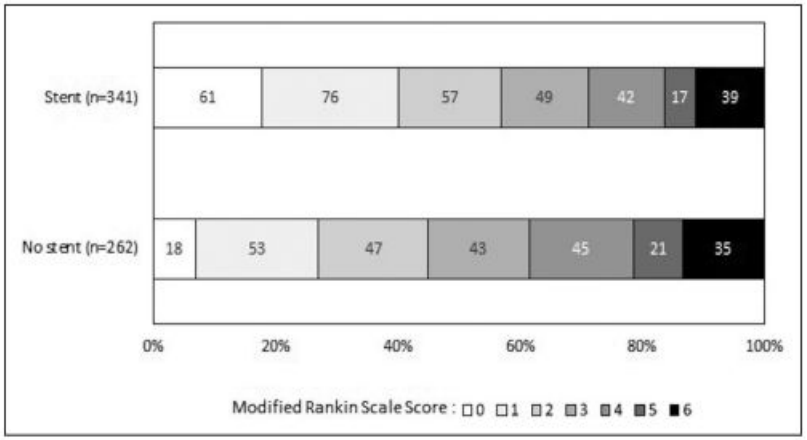

Figure 2. Distribution of the modified Rankin Scale according to the treatment of the cervical carotid lesion (stenting vs no stenting).

TITAN og ETIS:
603 ptt.
341 ICA stent
Median NIHSS 16

90-d mRS 0-2: 57% vs 45% (P 0,036)

sICH: 8,2% vs 6.4% (P 0,069)
90-d mortalitet: 11,6% vs 13,5% (P 0,63)

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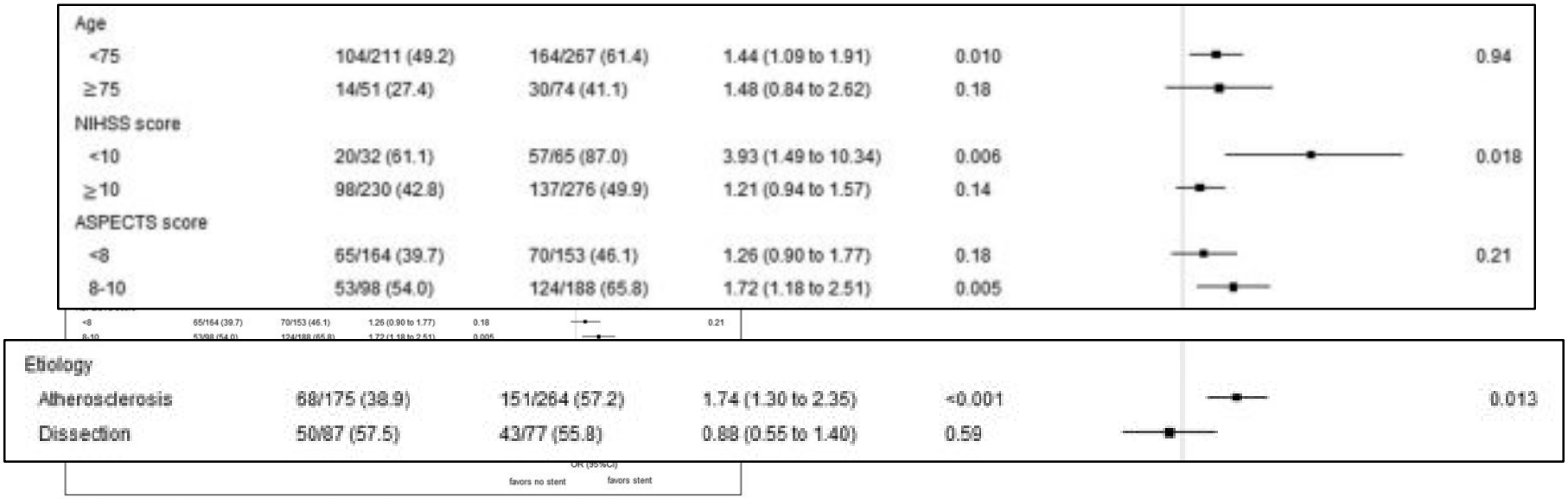
Er der evidens?

- Skal vi stente alle?

Nej – vurder case til case



Age					
<75	104/211 (49.2)	164/267 (61.4)	1.44 (1.09 to 1.91)	0.010	0.94
≥75	14/51 (27.4)	30/74 (41.1)	1.48 (0.84 to 2.62)	0.18	
NIHSS score					
<10	20/32 (61.1)	57/65 (87.0)	3.93 (1.49 to 10.34)	0.006	0.018
≥10	98/230 (42.8)	137/276 (49.9)	1.21 (0.94 to 1.57)	0.14	
ASPECTS score					
<8	65/164 (39.7)	70/153 (46.1)	1.26 (0.90 to 1.77)	0.18	0.21
8-10	53/98 (54.0)	124/188 (65.8)	1.72 (1.18 to 2.51)	0.005	
Etiology					
Atherosclerosis	68/175 (38.9)	151/264 (57.2)	1.74 (1.30 to 2.35)	<0.001	0.013
Dissection	50/87 (57.5)	43/77 (55.8)	0.88 (0.55 to 1.40)	0.59	

favors no stent favors stent

Figure 3. Comparisons in favorable outcome (90-d modified Rankin Scale score, 0–2) rate according to the use of cervical internal carotid artery stent and key subgroups before and after inverse probability treatment weighting (IPTW).
Odds ratios (ORs) were calculated after handling missing values for variables included in the propensity score using a multiple imputation procedure. ASPECTS indicates Alberta Stroke Program Early CT Score; ETIS, Endovascular Treatment in Ischemic Stroke; IVT, intravenous thrombolysis; NIHSS, National Institutes of Health Stroke Scale; p-het, *P* of heterogeneity; and TITAN, Thrombectomy in Tandem Lesions.
*Propensity score was calculated with all parameters in Table 1.

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Mens vi venter…

- TITAN
- CASES
- EASI-TOC

TITAN is an investigator-initiated, multicenter, prospective, randomized, open-label, blinded-endpoint (PROBE) study. Eligibility requires a diagnosis of acute ischemic stroke, pre-stroke modified Rankin Scale (mRS)≤2 (no upper age limit), National Institutes of Health Stroke Scale (NIHSS)≥6, Alberta Stroke Program Early Computed Tomography Score (ASPECTS)≥6, and tandem occlusion on the initial catheter angiogram. Tandem occlusion is defined as large vessel occlusion (intracranial internal carotid artery, M1 and/or M2 segment) and extracranial severe internal carotid artery stenosis ≥90% (NASCET) or complete occlusion. Patients are randomized in two balanced parallel groups (1:1) to receive either intracranial mechanical thrombectomy plus internal carotid artery stenting (and at least one antiplatelet therapy) or intracranial mechanical thrombectomy alone within 8 h of stroke onset. Up to 432 patients are randomized after tandem occlusion confirmation on angiogram.

Title	Carotid Artery Stenting during Endovascular treatment of acute ischemic Stroke versus deferred treatment of carotid artery stenosis
Participants (P)	Patients with acute ischemic stroke with a CT-angiography proven intracranial large vessel occlusion in the anterior circulation (ICA, A1, M1 or M2) as well as an ipsilateral cervical carotid artery tandem lesion of presumed atherosclerotic origin with a stenosis >50% or an ipsilateral acute proximal internal carotid artery occlusion who are treated with endovascular thrombectomy (EVT) according to the guidelines
Intervention (I)	The cervical carotid artery lesion will be treated with a stent during the EVT (just before or directly after intracranial thrombus removal)
Control (C)	The control group will be treated according to the national guidelines with carotid endarterectomy of carotid artery stenting (for patients with non-disabling stroke) or medical management alone (for patients with severe disabling stroke).
Outcome (O)	Modified Rankin Scale (mRS) score at 3 months after stroke onset
Trial Design	A randomized, controlled, open-label, multicentre trial
Sample Size	600 participants randomised

EASI-TOC is a phase III multi-centre, prospective, randomized, open-label, blinded endpoint (PROBE) controlled trial (1:1 allocation).

The trial will seek to determine if in patients undergoing acute intracranial thrombectomy for anterior circulation stroke with concurrent ipsilateral symptomatic high-grade (≥70%) atherosclerotic stenosis or occlusion of the extracranial ICA, endovascular ICA revascularization with stenting is superior to intracranial thrombectomy alone with regards to functional outcome at 90 days (measured using the Modified Rankin Scale).

EASI-TOC will be conducted at 10-12 high-volume comprehensive stroke centres in Canada.

458 male and female adult (aged ≥ 18 years) patients will be enrolled.

… hvad anbefales så?

European Stroke Organisation (ESO) - European Society for Minimally Invasive Neurological Therapy (ESMINT) Guidelines on Mechanical Thrombectomy Acute Ischemic Stroke

Guillaume Turc [1,2,3,4] Pervinder Bhogal [5] Urs Fischer,[6] Pooja Khatri,[7] Kyriakos Lobotesis,[8] Mikaël Mazighi,[3,9,10,11] Peter D. Schellinger,[12] Danilo Toni,[13] Joost de Vries,[14] Philip White,[15] Jens Fiehler[16]

PICO 15: For adults with LVO-related acute ischemic stroke and high-grade ipsilateral extracranial carotid stenosis, does cervical stenting in addition to MT compared with MT alone improve functional outcome?

- No recommendation can be provided regarding which treatment modality should be favored in patients with LVO-related acute ischemic stroke and associated extracranial carotid artery stenosis or occlusion. We recommend the inclusion of such patients in dedicated RCTs.

Quality of evidence: **Very low** ⊕ Strength of recommendation: —

9/11 experts suggest that if inclusion in a dedicated RCT is not possible, patients with high-grade stenosis or occlusion may be treated with intraprocedural stenting if unavoidably needed.

Stroke
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https://doi.org/10.1161/STR.0000000000000457

AHA SCIENTIFIC STATEMENTS

Treatment and Outcomes of Cervical Artery Dissection in Adults: A Scientific Statement From the American Heart Association

Shadi Yaghi, MD, Chair; Stefan Engelter, MD, Vice Chair; Victor J. Del Brutto, MD, MS; Thalia S. Field, MD, MHSc; Ashutosh P. Jadhav, MD, PhD; Kimberly Kicielinski, MD; Tracy E. Madsen, MD, PhD; Eva A. Mistry, MBBS, MSCI; Setareh Salehi Omran, MD; Aditya Pandey, MD; and Eytan Raz, MD, PhD on behalf of the American Heart Association Stroke Council; Council on Cardiovascular and Stroke Nursing; Council on Clinical Cardiology; and Council on Peripheral Vascular Disease

Mechanical Thrombectomy

The need for emergent mechanical thrombectomy in patients with cervical artery dissection is based on existing criteria for thrombectomy in patients with acute large-vessel occlusion. A meta-analysis comparing patients with cervical artery dissection and concurrent acute ischemic stroke found that mechanical thrombectomy increased favorable functional outcomes (modified Rankin Scale score, 0–2 at 90 days) compared with medical management (62.9% versus 41.5%; *P*=0.006), with no difference in symptomatic ICH or mortality.[82]

In patients with cervical artery dissection and acute ischemic stroke presenting with tandem occlusion, debate exists about the optimal approach. Approaches include opening the extracranial dissection first and then addressing the intracranial large-vessel occlusion (antegrade) or opening the intracranial large-vessel occlusion and then securing the extracranial dissection (retrograde). The majority of multicenter analyses show similar rates of recanalization and symptomatic ICH between the 2 approaches.[83,84] Most studies also report similar 90-day functional outcomes, but 1 retrospective study found better functional outcome with the retrograde approach.[85] Aspiration, angioplasty, and stenting have proved to be successful with equivalent outcomes in retrospective series.[83]

Acute Stenting

Cervical artery dissections may cause stenosis or occlusion of the lumen but more often do not lead to hypoperfusion of the distal territory,[86] and stenting of cervical artery dissection as an acute treatment modality remains controversial. Although many studies report safety with stenting and even higher rates of vessel patency the day after mechanical thrombectomy, an improvement in functional outcome has not been found.[83–85,87,88] In randomized, multicenter studies of extracranial stenting, subgroup analysis of patients with cervical artery dissection failed to show a functional benefit after stent placement.[87,88] However, stenting of a stenotic or occluded dissected segment of the vessel can be considered to improve distal perfusion in patients with neurological deficits due to hypoperfusion.[89,90] During a 9-year period, a study of 73 patients undergoing acute stenting for carotid dissection and associated hypoperfusion or intracranial thrombosis found a clinically relevant thrombosis and thromboembolism rate of 8% and a symptomatic hemorrhage rate of 5% with no recurrence of ischemic symptoms. In this study, however, 38% of patients (25/66) had abnormalities of the stented artery, leading to additional follow-up and retreatment in 17% (11/66).[91] Therefore, given the observational and retrospective nature of these studies and their small sample size and limited generalizability, acute stenting of the dissected artery in the absence of hypoperfusion remains controversial. The ongoing TITAN trial (Thrombectomy in Tandem Occlusion) will shed more light on further safety and efficacy of emergency stenting in tandem occlusion.

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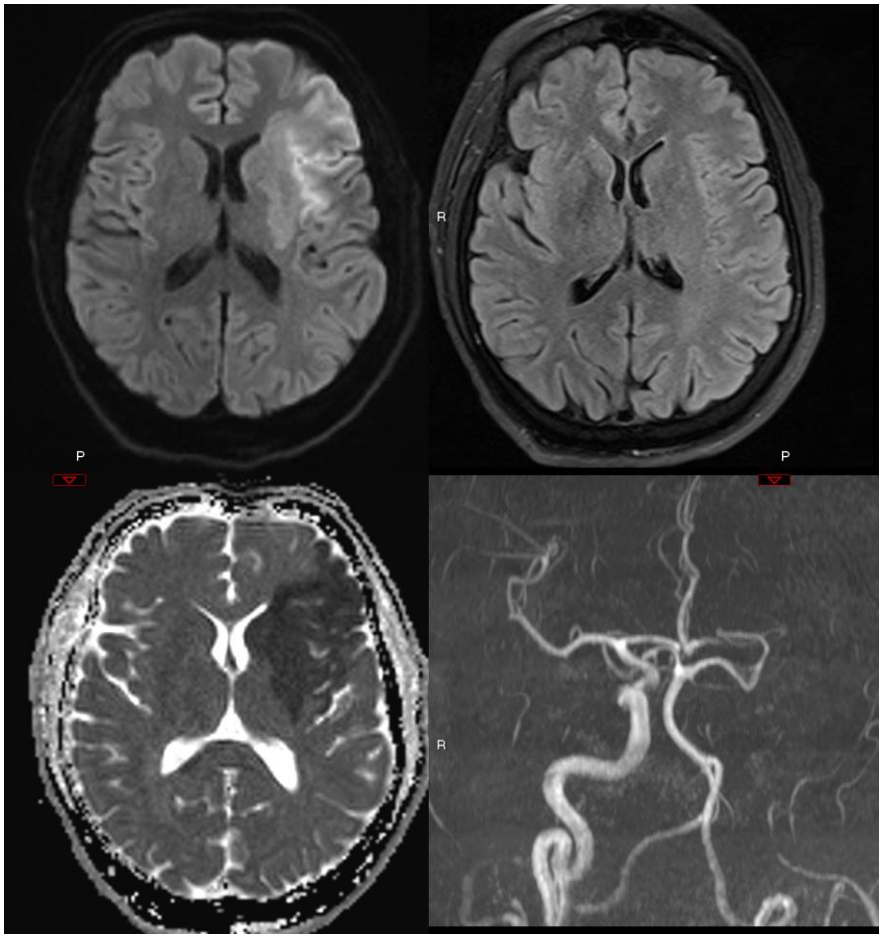
Case 1 – 57-årig mand

Fundet på gulv med afasi og parese. NIHSS 20.



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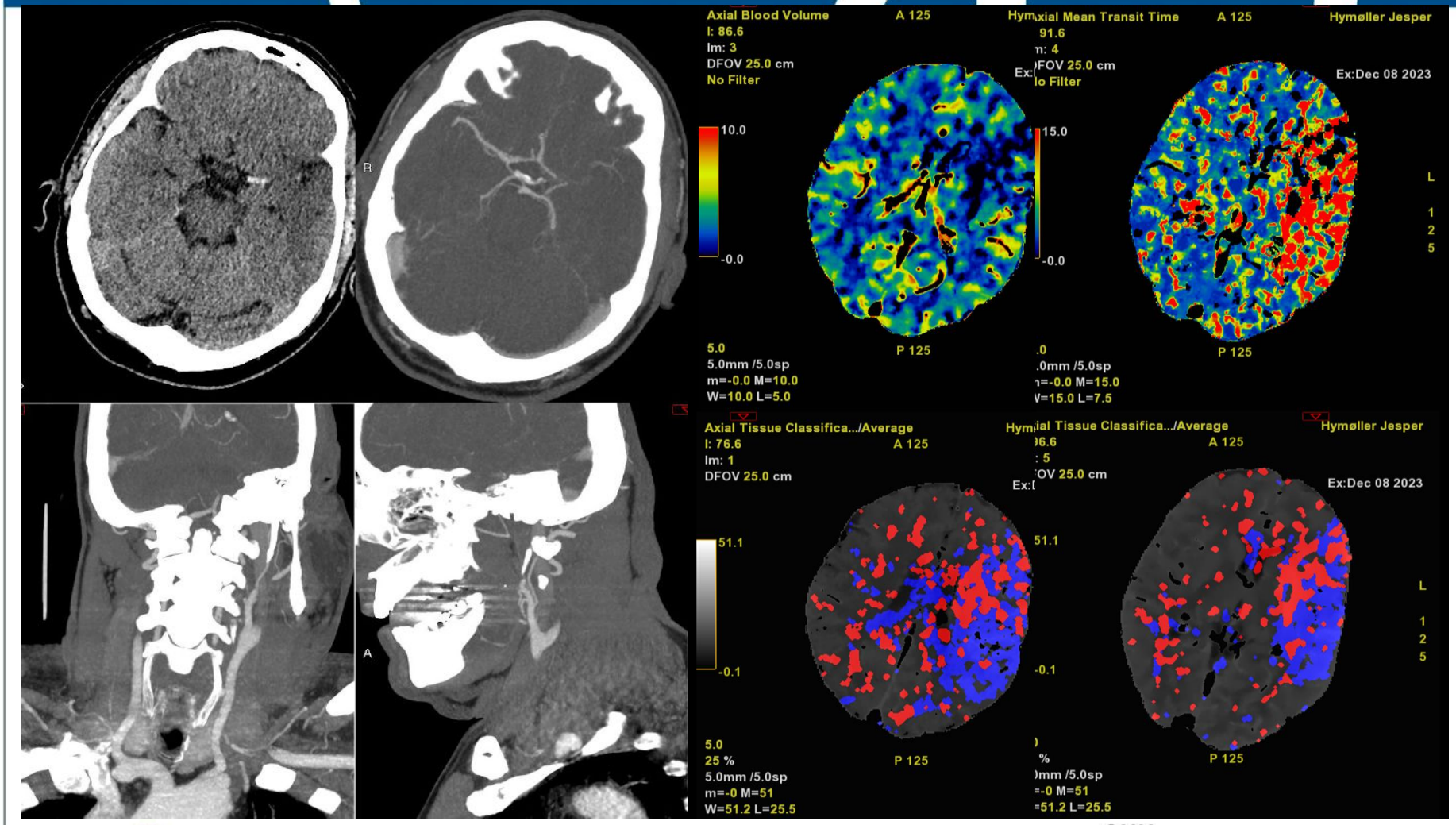

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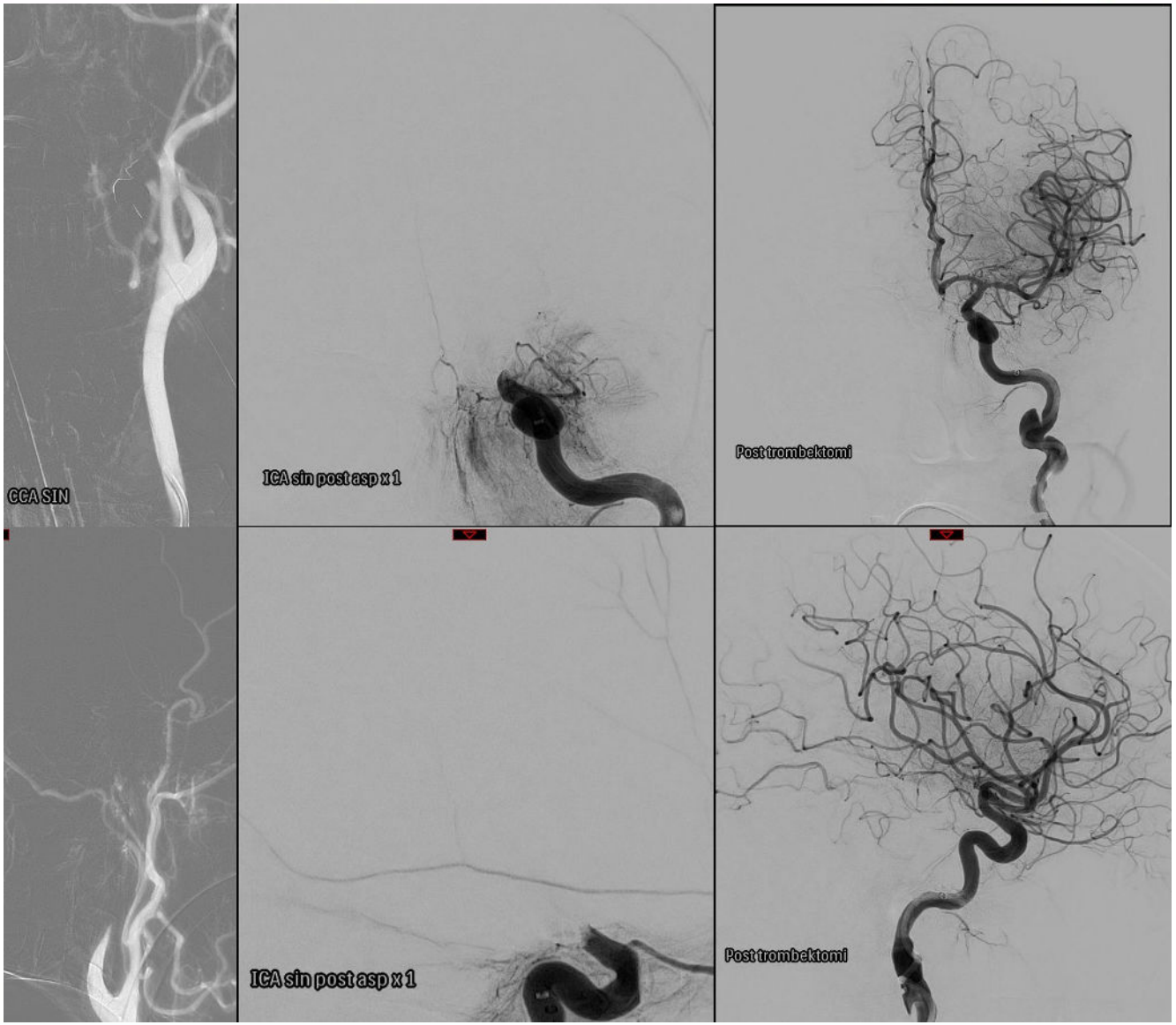

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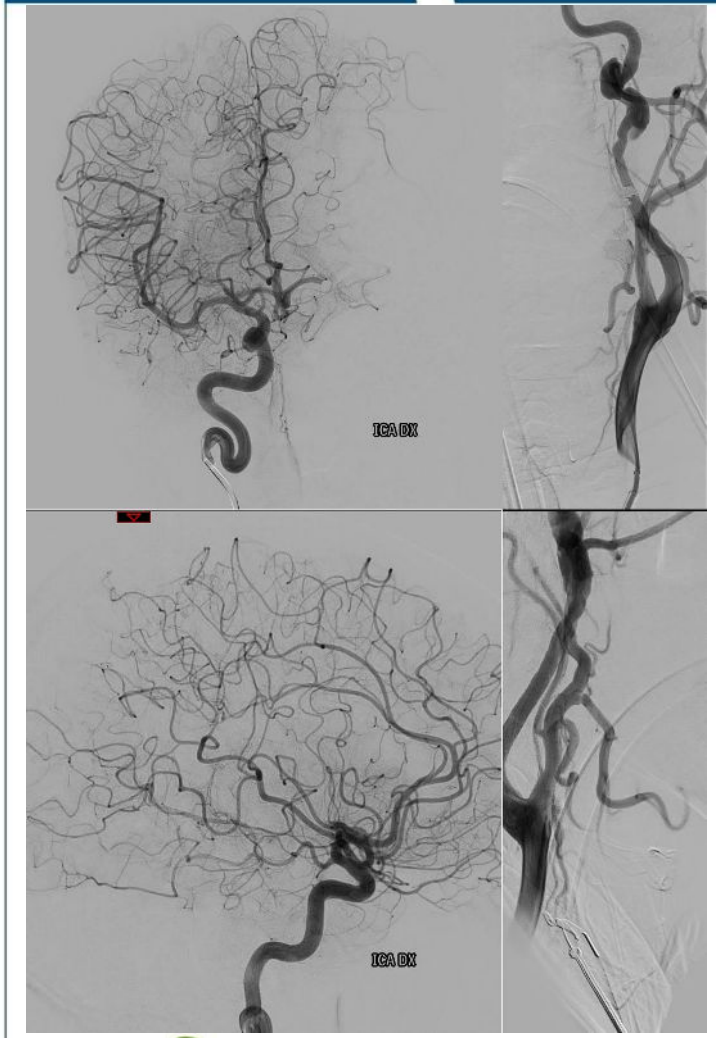
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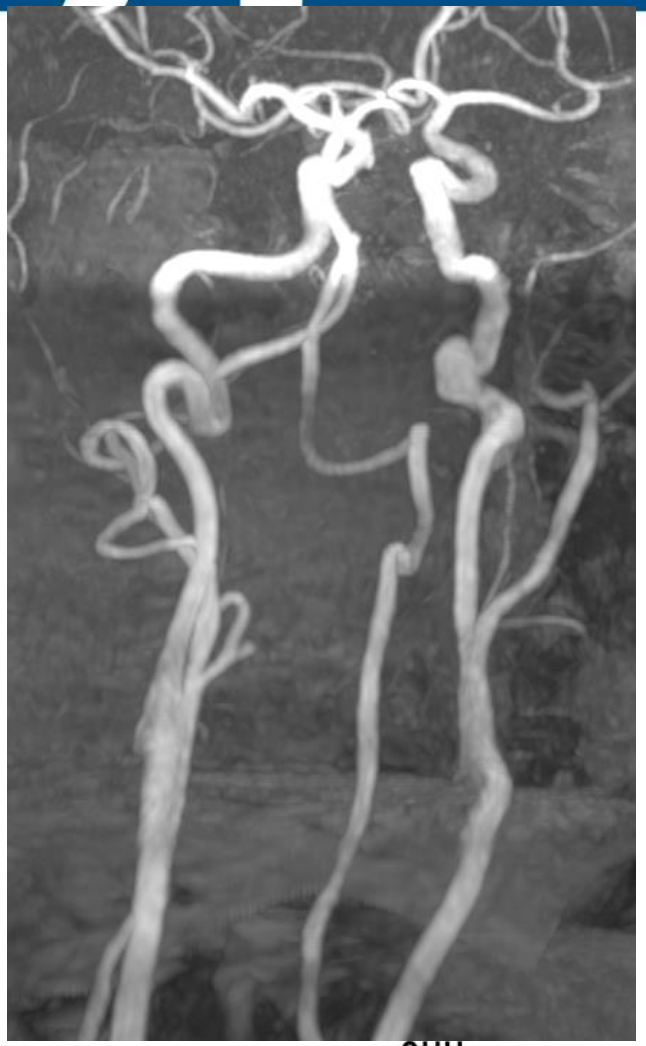
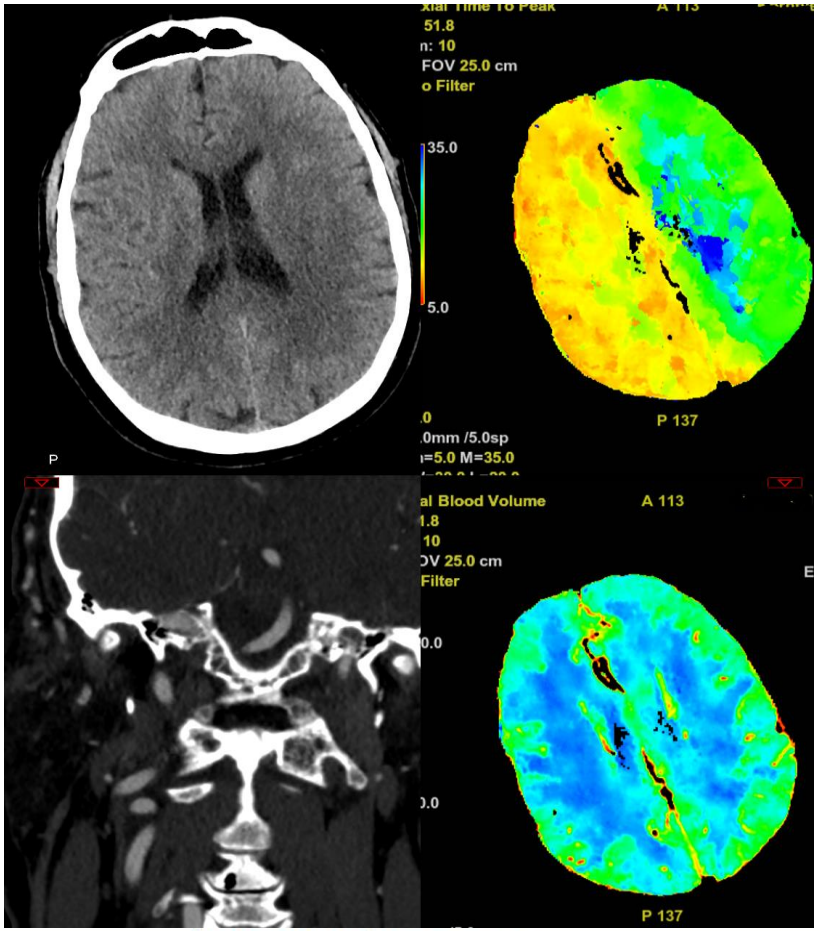


Case 2 – 58 årig mand

Akut debut af afasi og højresidig paralyse. NIHSS 16.



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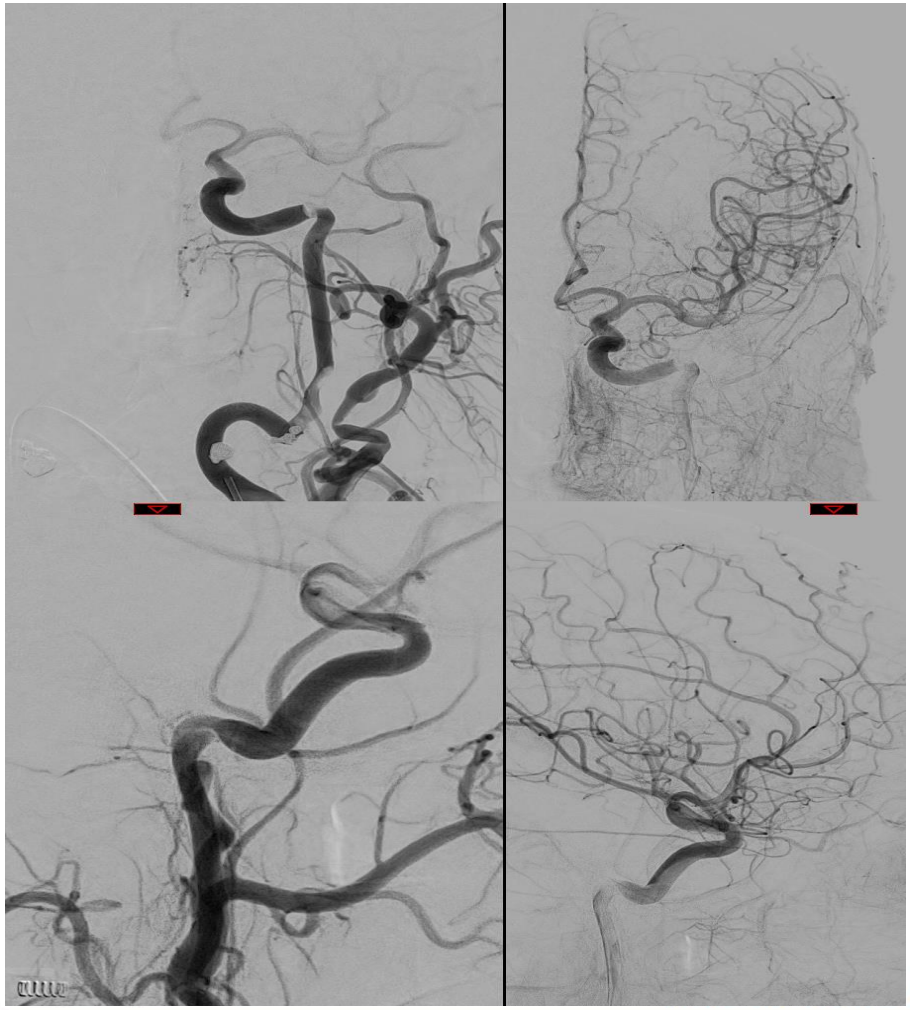
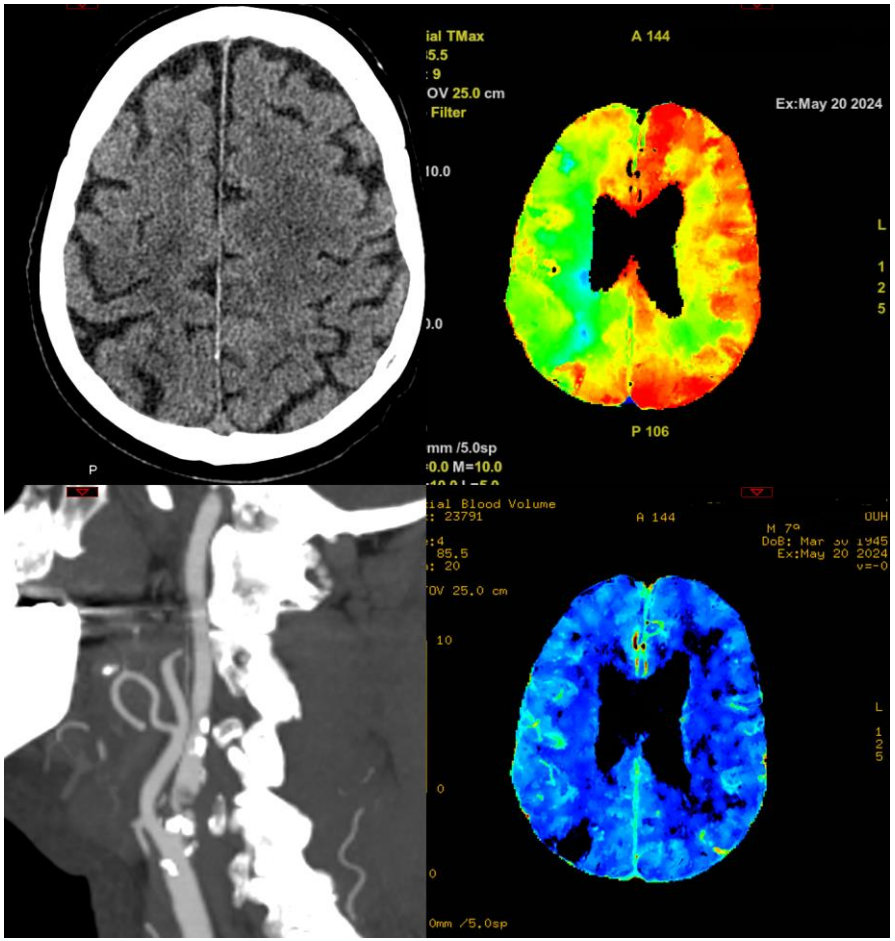
Case 2 – 58 årig mand



Case 3 – 79 årig mand

4 dage P.O. pauseret AK for AFLA. Nu venstresidig paralyse, øjendrejning og inattention.



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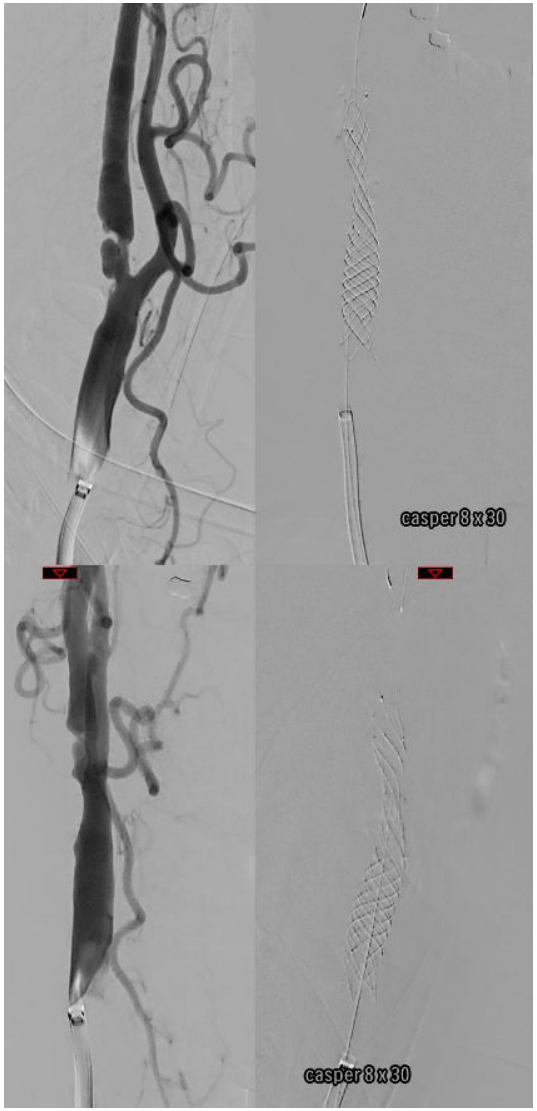
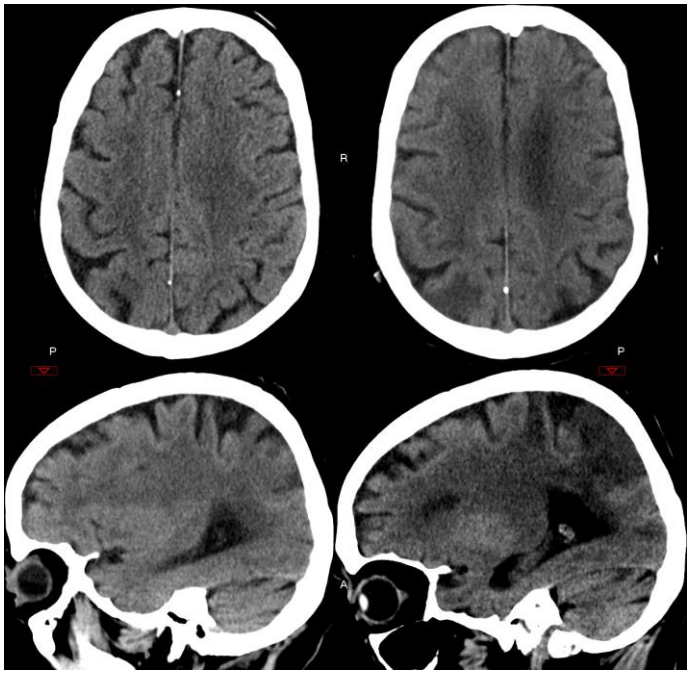
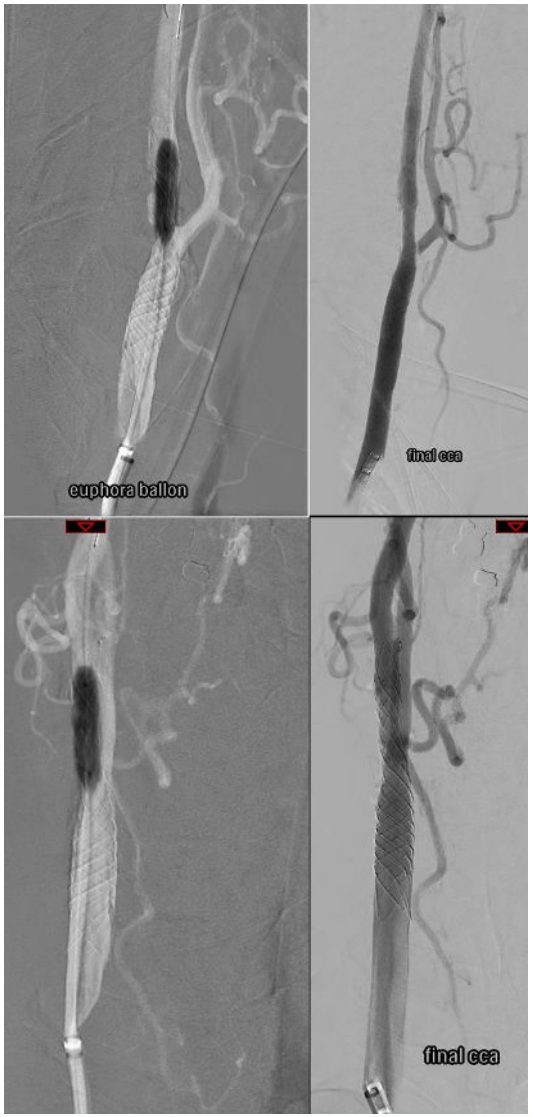
Case 3 – 79 årig mand

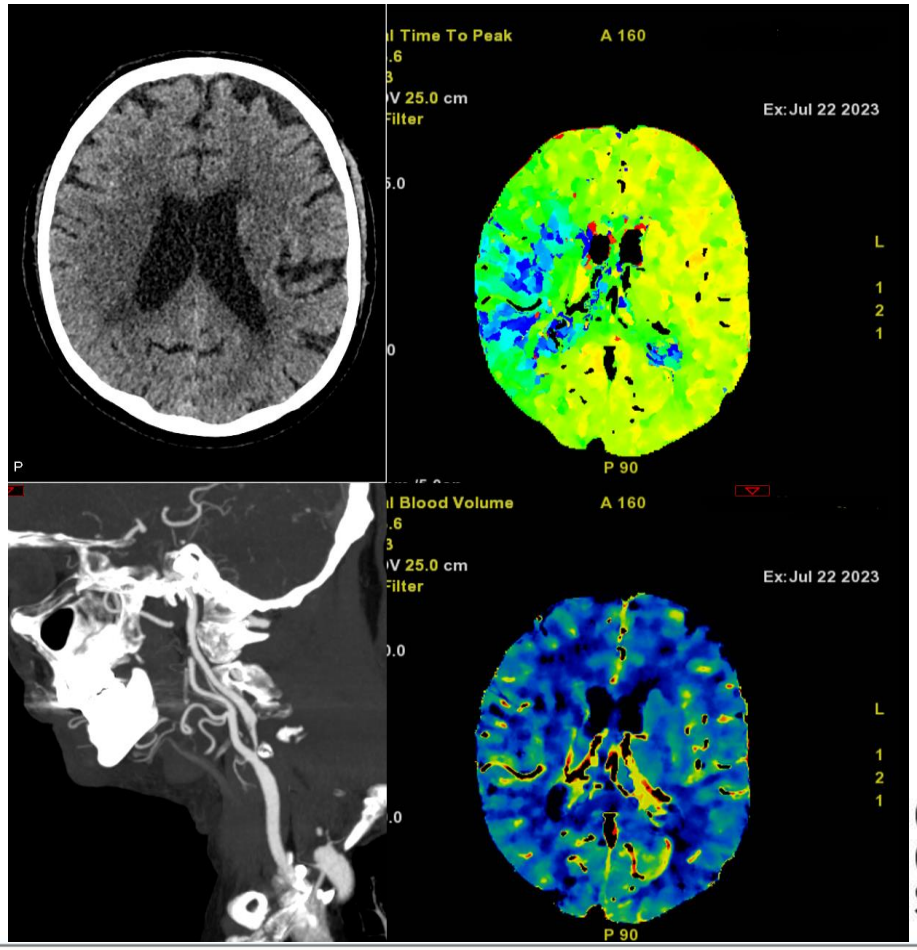






Case 4 – 72 årig mand

Global afasi og venstresidig hemiparese. NIHSS>6.



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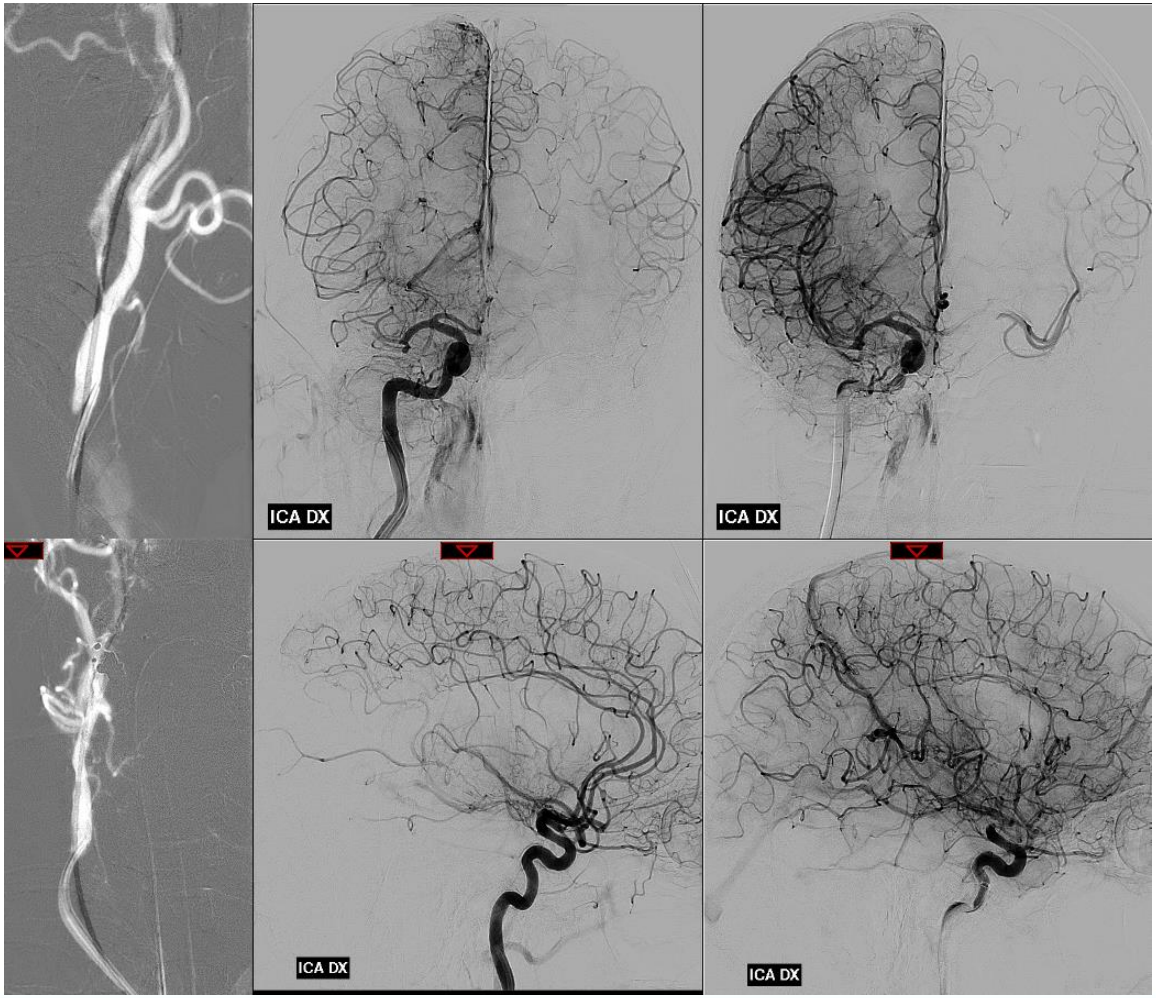
Case 4 – 72 årig mand



Intrakraniel MT.
At stente eller ej?

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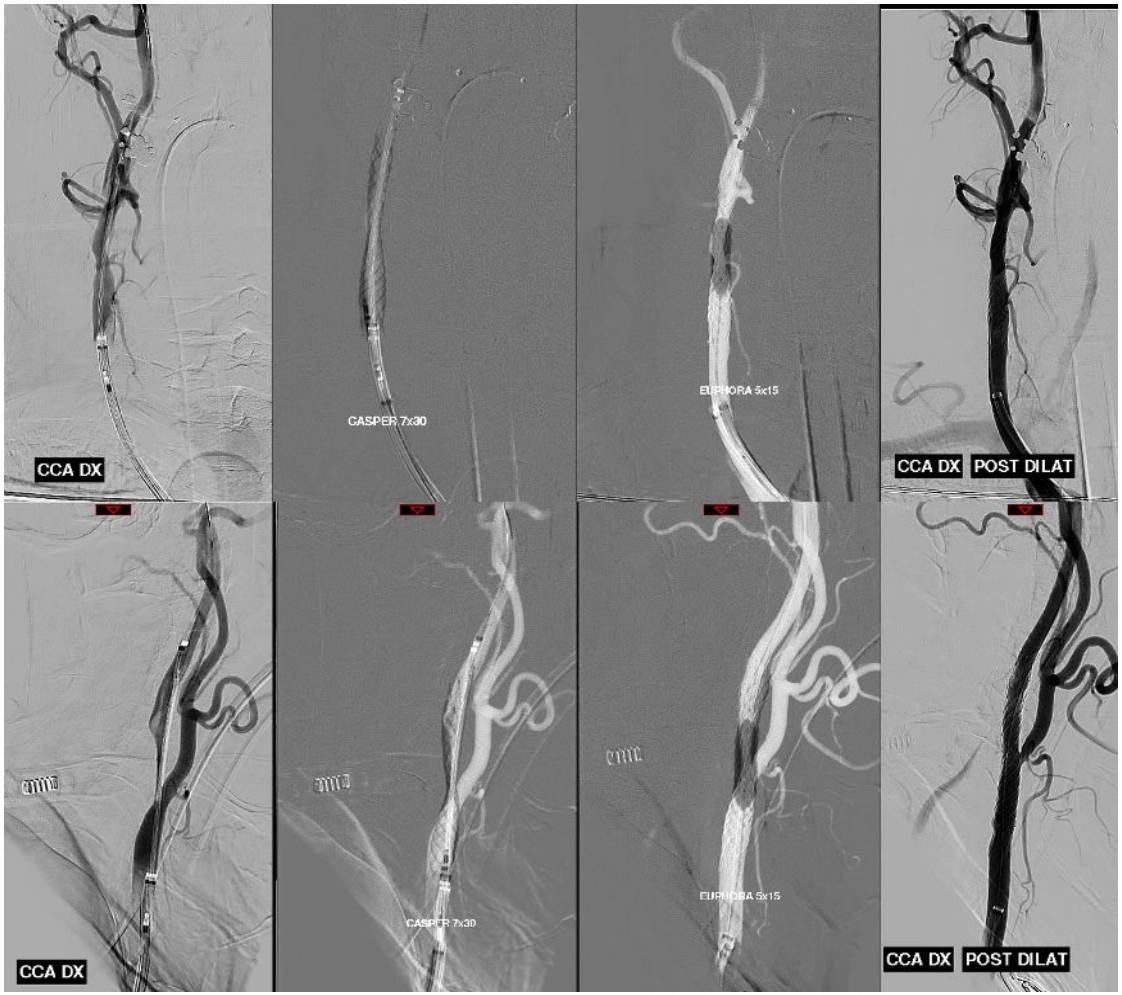
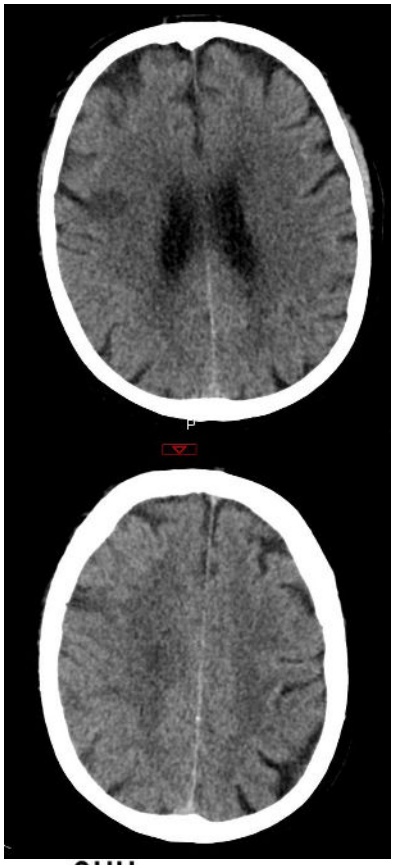
Case 4 – 72 årig mand





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