



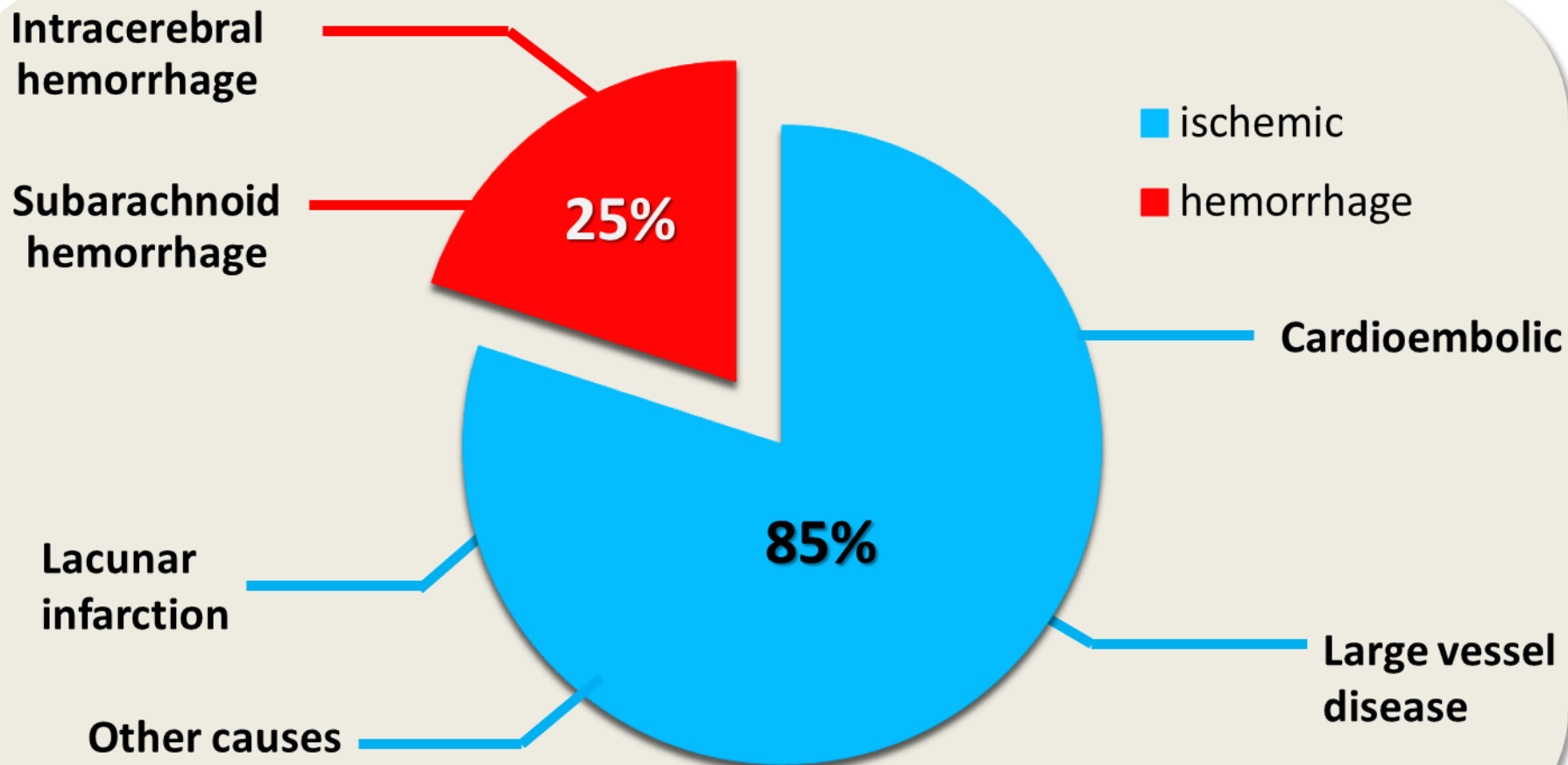
Acute Stroke management

August 21, 2019

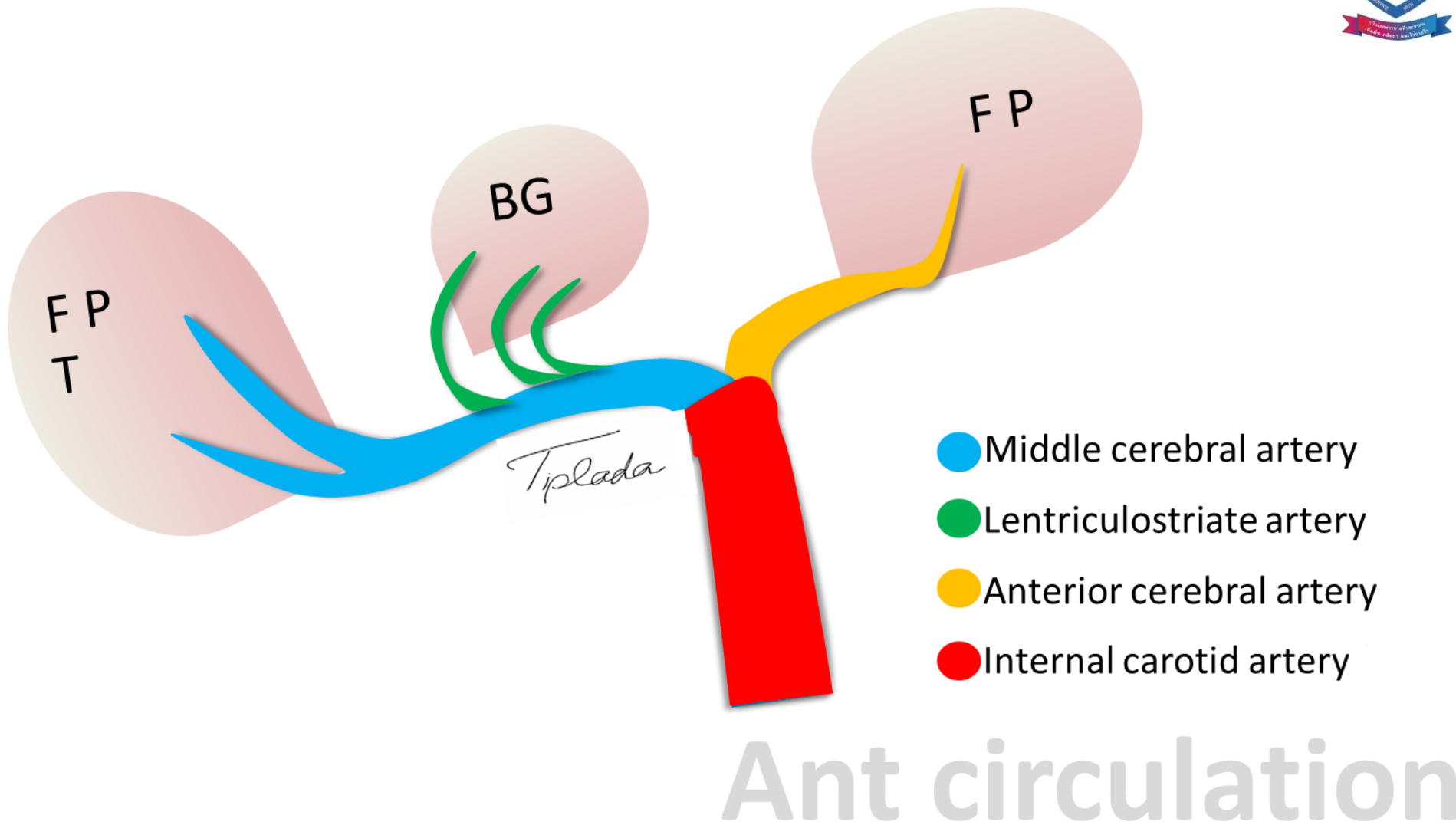
พญ.ทิพย์ลดา บุญชัย

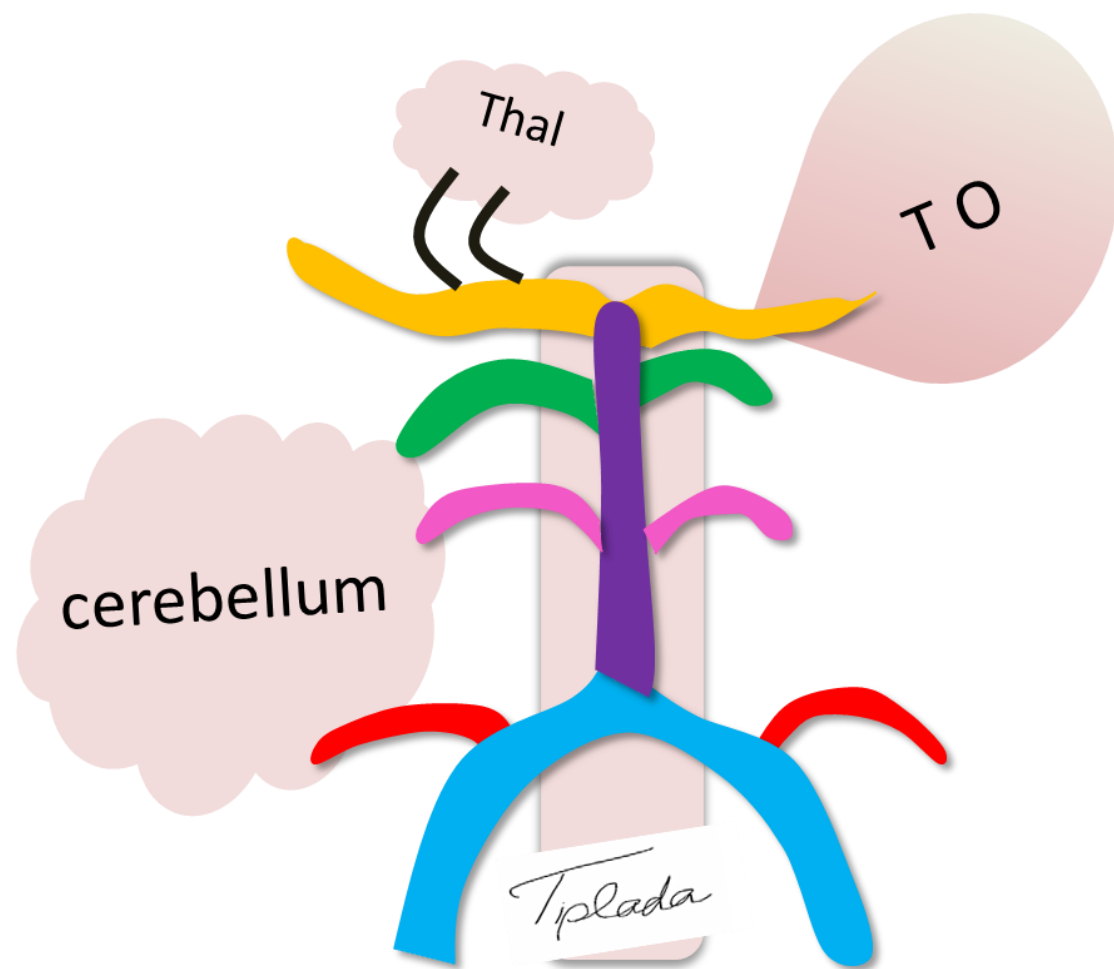
หน่วยประสาทวิทยา โรงพยาบาลตรัง

Neurology for Non-neurologist : ประชุมวิชาการสัณจร ปี 2562/2



Cause





- Posterior cerebral artery
- Superior cerebellar artery
- Basilar artery
- AICA
- PICA
- Vertebral artery

Post circulation

Outline

- **Acute management**
 - General supportive care
 - Reperfusion therapy
 - Thrombolysis
 - Mechanical thrombectomy
- Imaging in acute stroke
 - CT brain
 - CT perfusion
 - MRI

General care

ABCD	Class
■ Maintain SpO₂ > 94%	I
■ Avoid hypotension and hypovolemia, keep BP < 185/110 mmHg if iv rt-PA is indicated	I
■ Source of hyperthermia (T > 38°C) should be identified and treated *	I
■ Avoid hypoglycemia (BG < 60 mg/dl) **	I

* T < 37, > 39 in 1st 24 hr associated with increase risk of in hospital death
 ** keep BG level 140-180 mg/dl

Stroke mimicker

Neurological condition

- Seizure with Todd's paralysis
- Brain tumor
- Demyelinating disorder
- Complicated migraine
- Myasthenia gravis
- Bell's palsy

Infections

- Encephalitis
- Meningitis
- Brain abscess

CVS

- Syncope
- HT encephalopathy

Psychologic

- Conversion disorder
- Malingering

Stroke mimicker

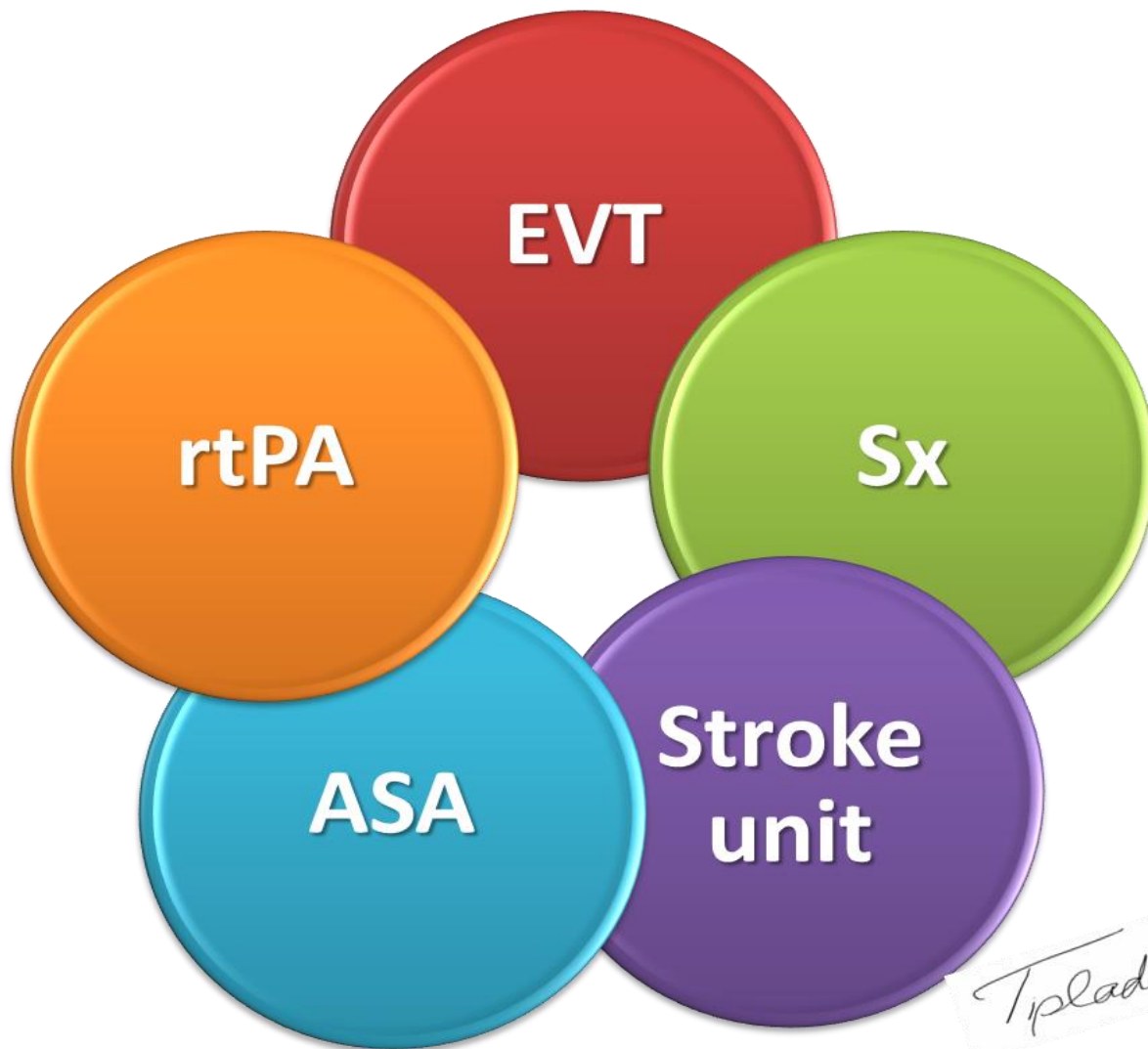
Vestibular condition

- Labyrinthitis
- Vestibular neuritis
- BPPV

Metabolic

- Hypoglycemia
- HHS
- Hyponatremia
- Hypokalemia
- Hepatic encephalopathy
- Substance intoxication

Class IA: rt-PA



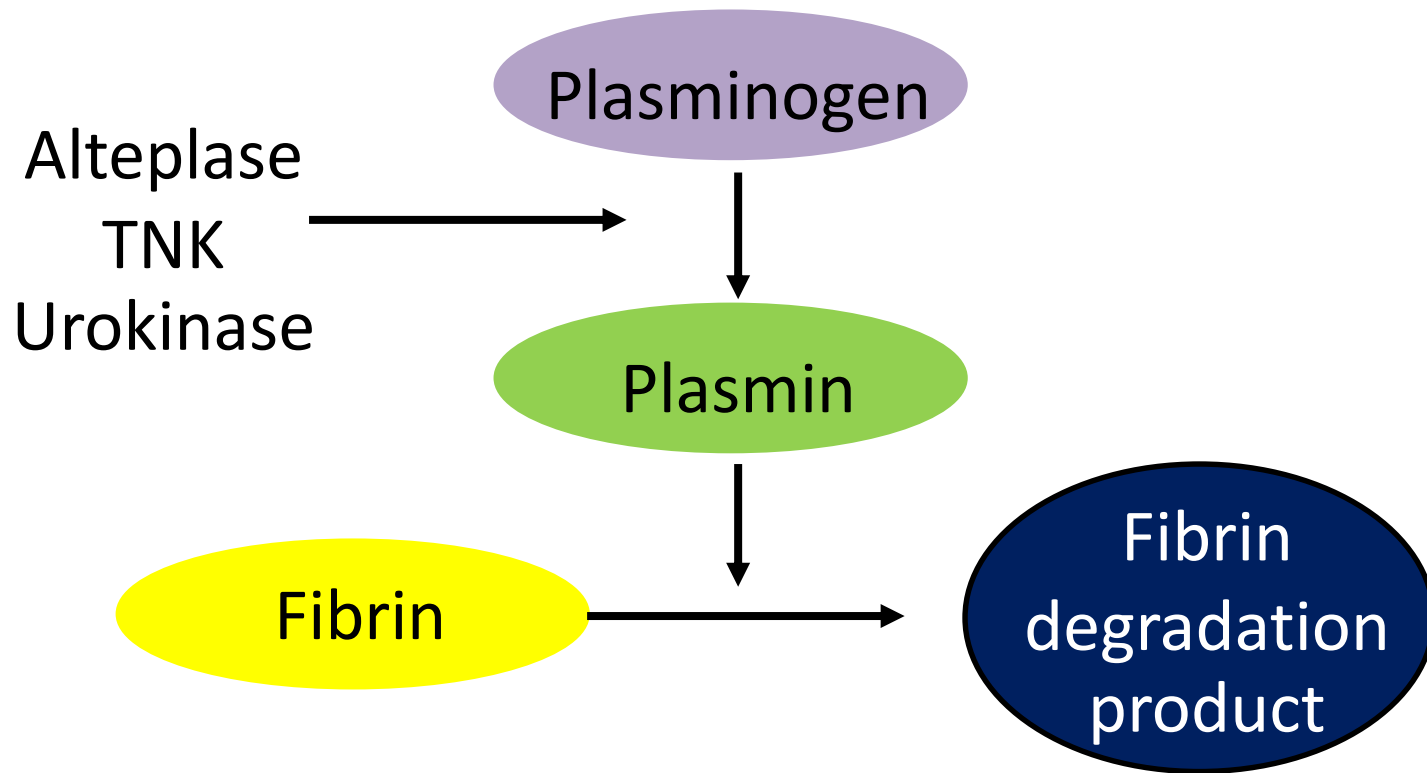
Tiplada

Treatment effect for AIS &STEMI

	Therapy	NNT	Outcome
Ischemic stroke	Thrombolysis in 0-3 hr	10	mRS ≤ 2 at 3 mo
	Thrombolysis in 3-4.5 hr	19	
	Thrombolysis in >4.5 hr	50	
STEMI	Thrombolysis in 0-6 hr	43	Death in 1 mo
	Thrombolysis in 6-12 hr	63	

Mechanism of action

- Alteplase : fibrin specific thrombolytic



Alteplase

- Tissue plasminogen activator produced by recombinant DNA technology, 527 amino acid, pH 7.3 osmolality 215 mOsm/kg
- Initial half life < 5 min,

Indication IA : 0-3 hr

- Age ≥ 18
- Severe symptom
- Mild disabling symptom
 - Complete hemianopia (≥ 2)
 - Severe aphasia (≥ 2)
 - Visual or sensory extinction (≥ 1)
 - Any weakness (≥ 2)



Alteplase 0.9 mg/kg up to 90 mg over 60 min with initial 10% of dose given as bolus over 1 min

Indication IA : 0-3 hr

- BP < 185/110 before and < 180/105 mmHg at least 24 hr after iv-rtPA
- BS > 50 mg/dl
- ESRD on HD + normal aPTT
- Early ischemic change on CT

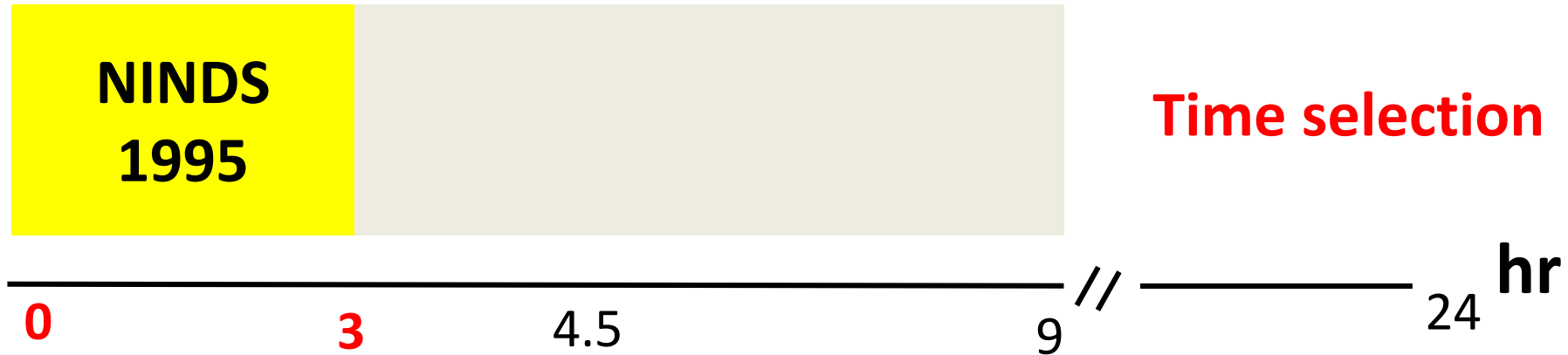
Alteplase 0.9 mg/kg up to 90 mg over 60 min with initial 10% of dose given as bolus over 1 min

Indication IB : 3-4.5 hr

- Age 18-80
- No DM + prior stroke
- NIHSS < 25
- No OAC
- No large hypodense on CT (<1/3 of MCA)

Alteplase 0.9 mg/kg up to 90 mg over 60 min with initial 10% of dose given as bolus over 1 min

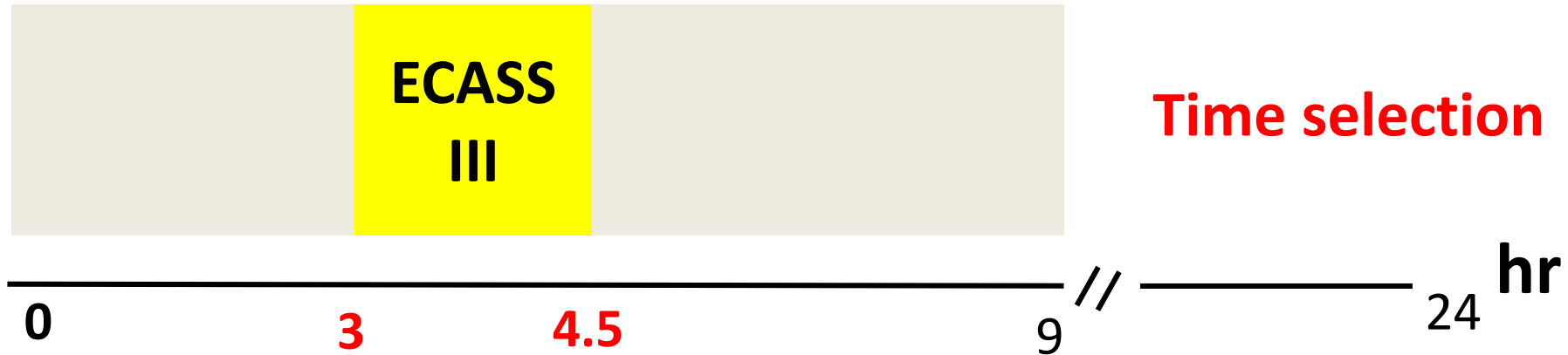
IV Alteplase



NINDS NEJM 1995

- N 624 within 3 hr, alteplase vs placebo
- Excellent outcome OR 1.7 95%CI 1.2-2.6 $p=0.008$
 - mRS 0-1 38.7% vs 26% OR 1.7 95%CI 1.1-2.6 $p=0.019$
- sICH 6.4% vs 0.6% ($p < 0.001$)
- Mortality 17% vs 21% ($p=0.30$)

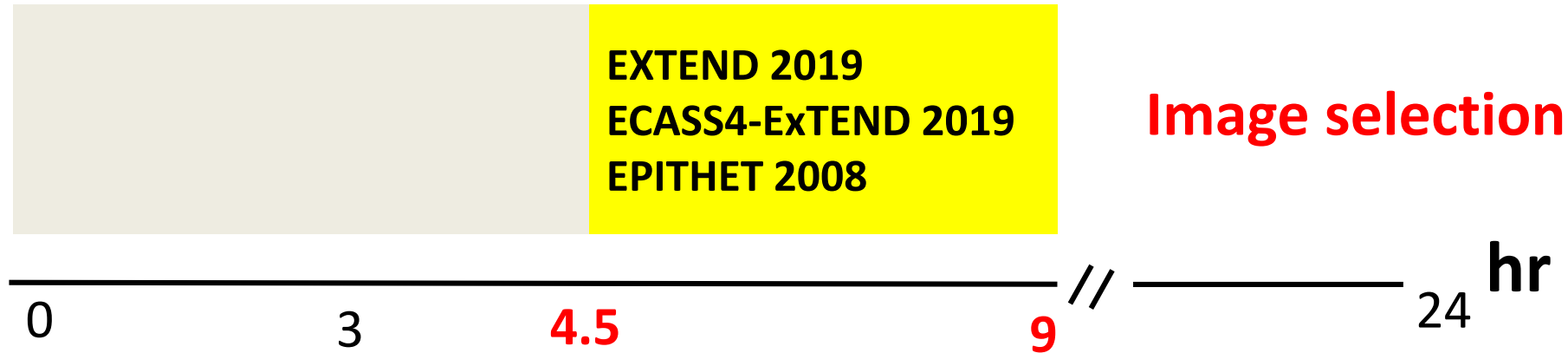
IV Alteplase



ECASS III Hacke et al NEJM 2008

- N 821 3-4.5 hr , alteplase vs placebo
- Excellent outcome OR 1.28 95%CI 1.0-1.65 $p < 0.05$
 - mRS 0-1 52.4% vs 45.2% OR 1.34 95%CI 1.02-1.76 $p = 0.04$
- sICH 2.4% vs 0.2% ($p = 0.008$)
- Mortality 7.7% vs 8.4% ($p = 0.68$)

IV Alteplase late window



Extending thrombolysis to 4.5–9 h and wake-up stroke using perfusion imaging: a systematic review and meta-analysis of individual patient data



Bruce CV Campbell*, Henry Ma*, Peter A Ringleb*, Mark W Parsons, Leonid Churilov, Martin Bendszus, Christopher R Levi, Chung Hsu, Timothy J Kleinig, Marc Fatar, Didier Leys, Carlos Molina, Tissa Wijeratne, Sami Curtze, Helen M Dewey, P Alan Barber, Kenneth S Butcher, Deidre A De Silva, Christopher F Bladin, Nawaf Yassi, Johannes A R Pfaff, Gagan Sharma, Andrew Bivard, Patricia M Desmond, Stefan Schwab, Peter D Schellinger, Bernard Yan, Peter J Mitchell, Joaquín Serena, Danilo Toni, Vincent Thijs, Werner Hacke†, Stephen M Davis†, Geoffrey A Donnan†, on behalf of the EXTEND, ECASS-4, and EPITHET Investigators‡

mRS 0-1 OR **1.86** 95%CI 1.15-2.99, **p=0.01**

	All patients		Automated perfusion mismatch	
Characteristic	Alteplase	Placebo	Alteplase	Placebo
N (%)	213 (51)	201 (49)	152 (50)	152 (50)
Age mean	73	72	73	72
NIHSS median	12	10	12	11
Onset to RCT				
4.5-6 hr (%)	58 (27)	49 (24)	33 (22)	31 (20)
6-9 hr (%)	50 (24)	48 (24)	37 (24)	37 (24)
Wake-up (%)	105 (49)	104 (52)	82 (54)	84 (55)
LVO %	60	62	71	74
Core vol (ml)	8	8.1	6.2	8.9
Tmax>6 s vol (ml)	64	64	74	75

All patients (404)

Placebo
(n=201)

Alteplase
(n=213)

Odds ratio*
(95% CI)

p value

Primary outcome

Excellent functional outcome (mRS score 0–1) at 3 months	58/199 (29%)	76/211 (36%)	1.86 (1.15–2.99)	0.01
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Secondary outcomes

Functional improvement in mRS score at 3 months†	NA	NA	1.60 (1.12–2.27)	0.009
Functional independence (mRS score 0–2) at 3 months	87/199 (44%)	103/211 (49%)	1.74 (1.08–2.81)	0.02
Early neurological improvement at 72 h‡	31/197 (16%)	58/206 (28%)	2.54 (1.51–4.27)	<0.0001

Safety outcomes

Death at 3 months	18/201 (9%)	29/213 (14%)	1.55 (0.81–2.97)	0.19
Symptomatic intracerebral haemorrhage§	1/201 (<1%)	10/213 (5%)	9.70 (1.23–76.55)	0.03

Data are n/N (%). mRS=modified Rankin Scale. NIHSS=National Institutes of Health Stroke Scale. NA=not applicable.

*Adjusted for baseline age and NIHSS. †Reduction of ≥ 1 point in mRS score (with mRS categories 5 and 6 merged), analysed using ordinal logistic regression. ‡Reduction of ≥ 8 points on NIHSS or reaching NIHSS score 0–1 at 72 h.

§Within 36h of treatment.

Patients with automate perfusion mismatch (304)	Placebo (n=152)	Alteplase (n=152)	Odds ratio (95% CI)*	p value
Primary outcome				
Excellent outcome (mRS score 0–1) at 3 months	39/151 (26%)	55/152 (36%)	2.06 (1.17–3.62)	0.012
Secondary outcomes				
Functional improvement in mRS score at 3 months†	NA	NA	1.68 (1.11–2.53)	0.014
Functional independence (mRS score 0–2) at 3 months	60/151 (40%)	77/152 (51%)	2.22 (1.25–3.94)	0.006
Early neurological improvement at 72 h‡	26/152 (17%)	44/148 (30%)	2.26 (1.26–4.03)	0.006
Safety outcomes				
Death at 3 months	16/152 (11%)	20/152 (13%)	1.28 (0.60–2.73)	0.52
Symptomatic intracerebral haemorrhage§	1/152 (1%)	7/152 (5%)	7.29 (0.88–60.18)	0.07

Data are n/N (%). mRS=modified Rankin Scale. NIHSS=National Institutes of Health Stroke Scale. NA=not applicable. One patient in the placebo group did not have available mRS data at 3 months and thus was excluded from the analysis of the primary outcome and selected secondary outcomes. *Adjusted for baseline age and NIHSS. †Reduction of ≥ 1 point in mRS score (with mRS categories 5 and 6 merged), analysed using ordinal logistic regression. ‡Reduction of ≥ 8 points on NIHSS or reaching NIHSS score 0–1 at 72 h. §Within 36 h of treatment.

Implications

- Alteplase improve functional outcome at 3 m. when administered 4.5-9 hr or after wake-up stroke < 9 h from midpoint of sleep in patient with perfusion mismatch
- sICH increased but not offset the net benefit of thrombolysis
- Benefit to risk ratio seem to be larger in patients who meet automated perfusion mismatch criteria*
 - * Core < 70 ml, Mismatch ratio >1.2, Mismatch vol > 10 ml

Tenecteplase (TNK)

- 3 point mutated variant of alteplase bioengineer
- Biphasic $t_{1/2}$ 20 min then 90-130 mins
- 15-fold higher fibrin specificity
- 80-fold low binding toward plasminogen activator inhibitor-1
- 0.4 mg/kg single IV bolus (max 40 mg)
- Alternative for minor neurological impairment + no major intracranial occlusion

Clin Pharmacokinet.2002;41:1229-45

Tenecteplase versus alteplase for management of acute ischaemic stroke (NOR-TEST): a phase 3, randomised, open-label, blinded endpoint trial

Nicola Logallo, Vojtech Novotny, Jörg Assmus, Christopher E Kvistad, Lars Alteheld, Ole Morten Rønning, Bente Thommessen, Karl-Friedrich Amthor, Hege Ihle-Hansen, Martin Kurz, Håkon Tobro, Kamaljit Kaur, Magdalena Stankiewicz, Maria Carlsson, Åse Morsund, Titto Idicula, Anne Hege Aamodt, Christian Lund, Halvor Næss, Ulrike Waje-Andreassen, Lars Thomassen

Logallo N. et al Lancet Neurol 2017

- N **1,100** , median NIHSS = **4**
- Safety and efficacy alteplase vs TNK 0.4 mg/kg
- 4.5 hr : onset & awake up stroke (DWI-FLAIR)
- 1^{ry} : mRS 0-1 at 90 days: **64%** vs 63% (**p = 0.52**)
- 2^{ry} :sICH **3%** vs 2% (p = 0.70)
Death at 3 mo **5%** vs 4% (p = 0.49)

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Tenecteplase versus Alteplase before Thrombectomy for Ischemic Stroke

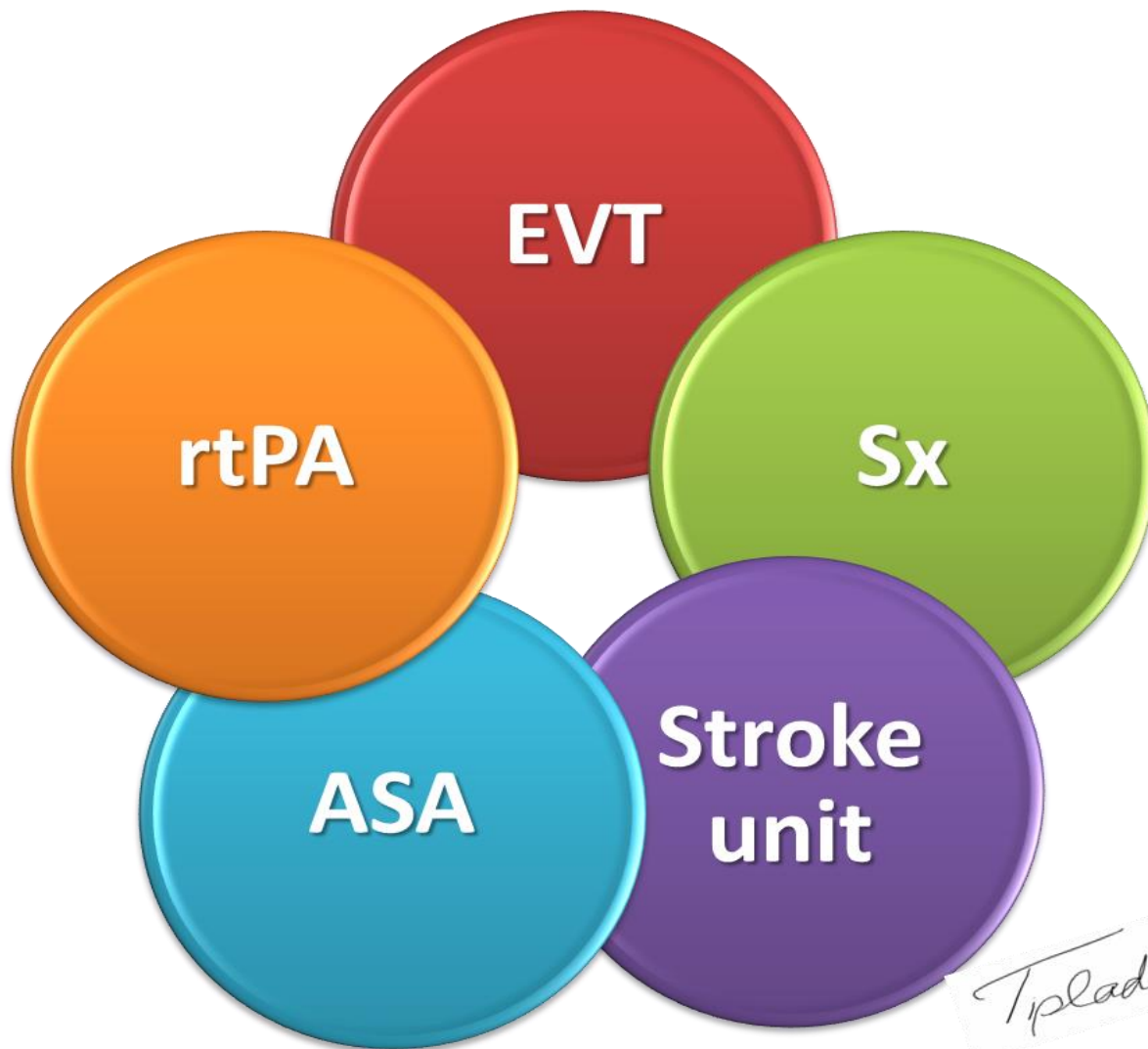
Campbell et al NEJM 2018

- 0.25 mg/kg single IV bolus (max 25 mg)
- N= 202 , NIHSS 17, cardioembolic, large VV
- **Perfusion mismatch**
- 1^{ry} : incidence of reperfusion **22%** vs 10% (p=0.03)
- 2^{ry} : mRS **64%** vs 51% (p=0.06)
 - slCH **1%** vs 1% (p=0.99)
 - Death **10%** vs 18% (p=0.08)

Reperfusion therapy

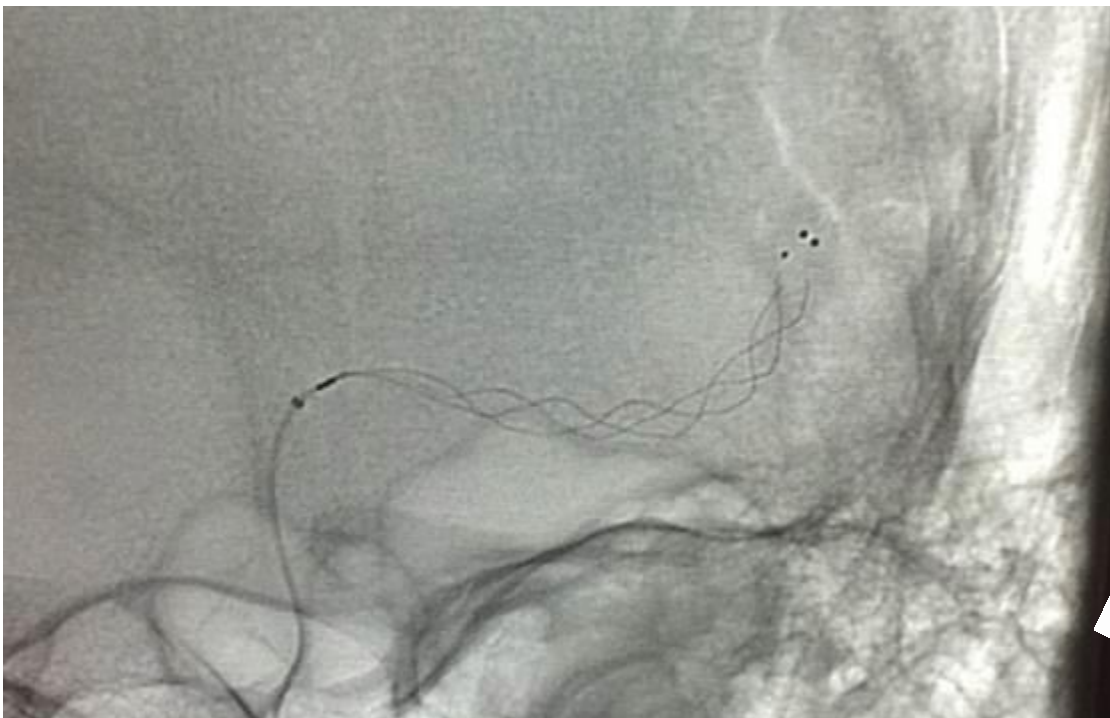
Thrombolysis	Class
❖ 0-3 hr (NINDs)	IA
❖ 3-4.5 hr (ECASS III)	IB
- Alteplase - Tenecteplase 0.4 mg/kg (new) - Other defibrinogenating agent or fibrinolytic agents - Sonothrombolysis as adjuvant therapy - Abciximab administered concurrently with alteplase	IA IIB III III III

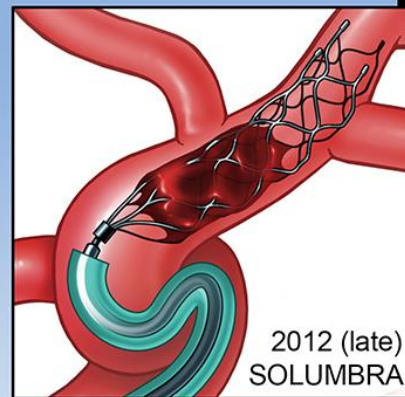
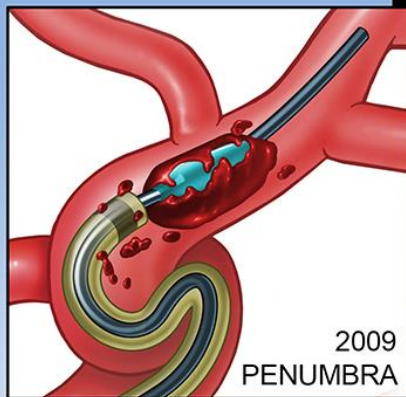
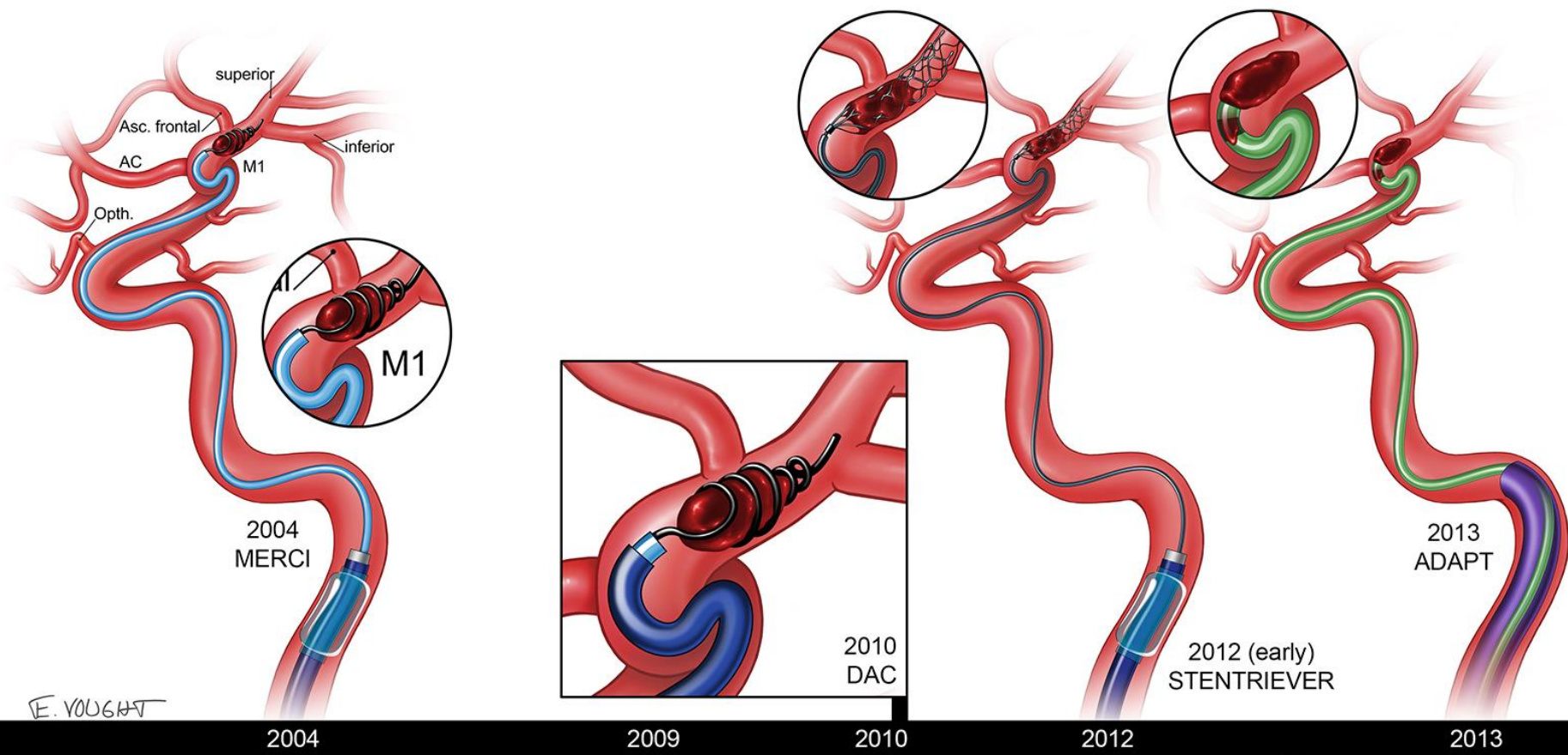
Class IA: EVT



Mechanical thrombectomy

Endovascular treatment (under fluoroscopic guidance) of removing blood clot from the vessel with thrombectomy device → stent retriever





Inclusion criteria

- Age ≥ 18
- Pre-stroke mRS 0-1
- NIHSS ≥ 6
- ICA or MCA (M1) occlusion
- ASPECTS score ≥ 6
- Onset to groin puncture within
 - 6 h (IA)
 - 6-16 h (IA)
 - 16-24 h (IIA)

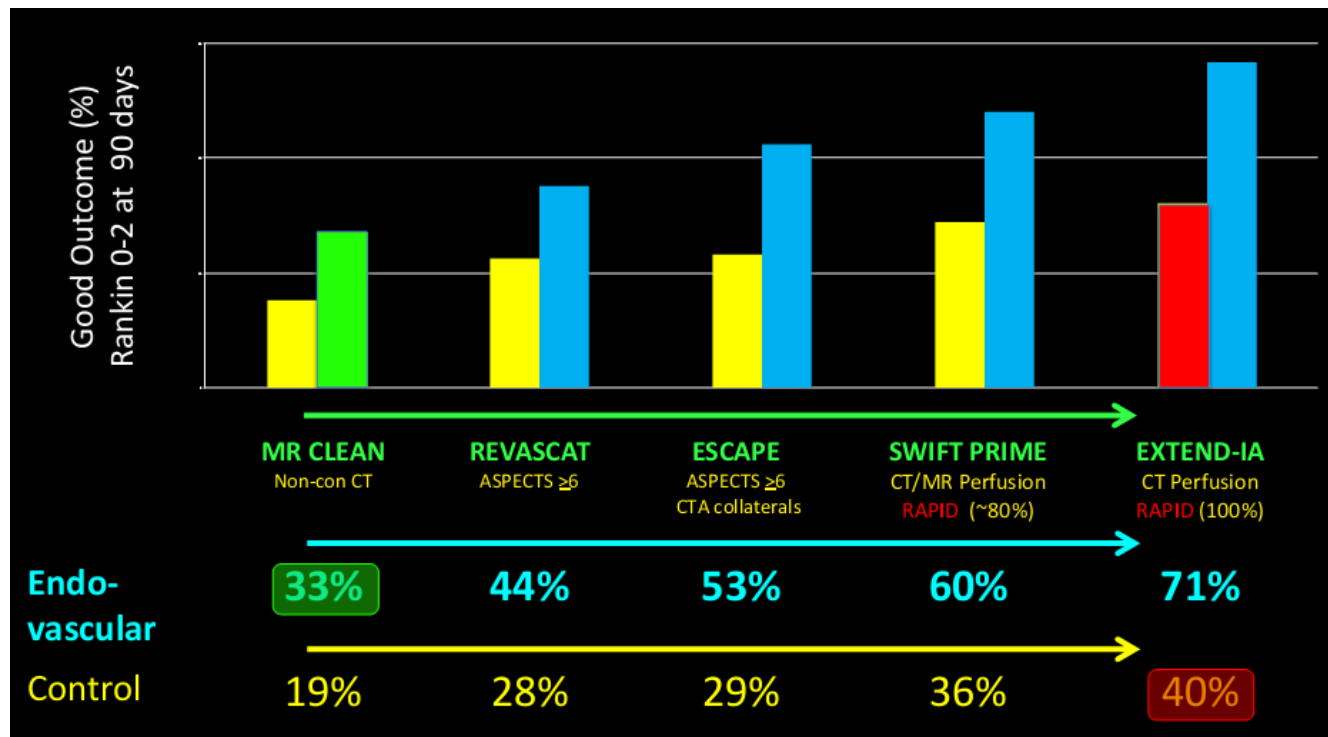
Indication IIB

- Pre-stroke mRS > 1
- NIHSS < 6
- MCA (M2,3) , ACA, VA, PCA, BA
- ASPECTS score < 6

MT

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

0 3 4.5 6 // 24 hr



MT

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

0 3 4.5 6 // 24 hr

MR CLEAN Berkhemer et al NEJM 2015

- N 500 , < 6hr NIHSS $\geq$ 2, MT vs IV alteplase
- LVO (ICA,M1,M2,A1,A2), NCCT
- Netherland, SR 81.5%
- mRS 0-2 32.6% vs 19.1%, aOR 2.16 95%CI 1.39-3.38, $p<0.001$)
- sICH 7.7% vs 6.4%
- Mortality 21% vs 22%

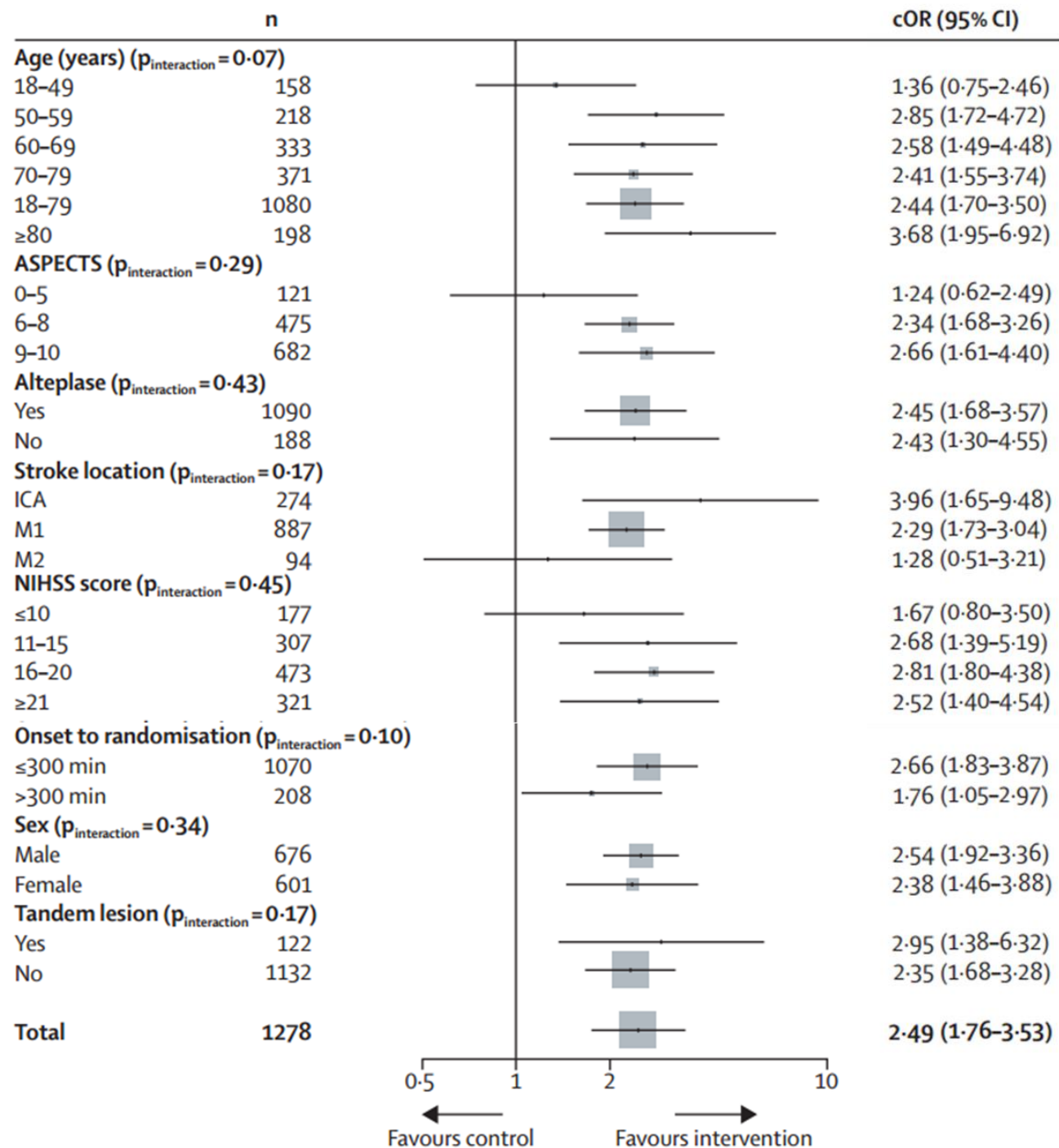
Endovascular thrombectomy after large-vessel ischaemic stroke: a meta-analysis of individual patient data from five randomised trials



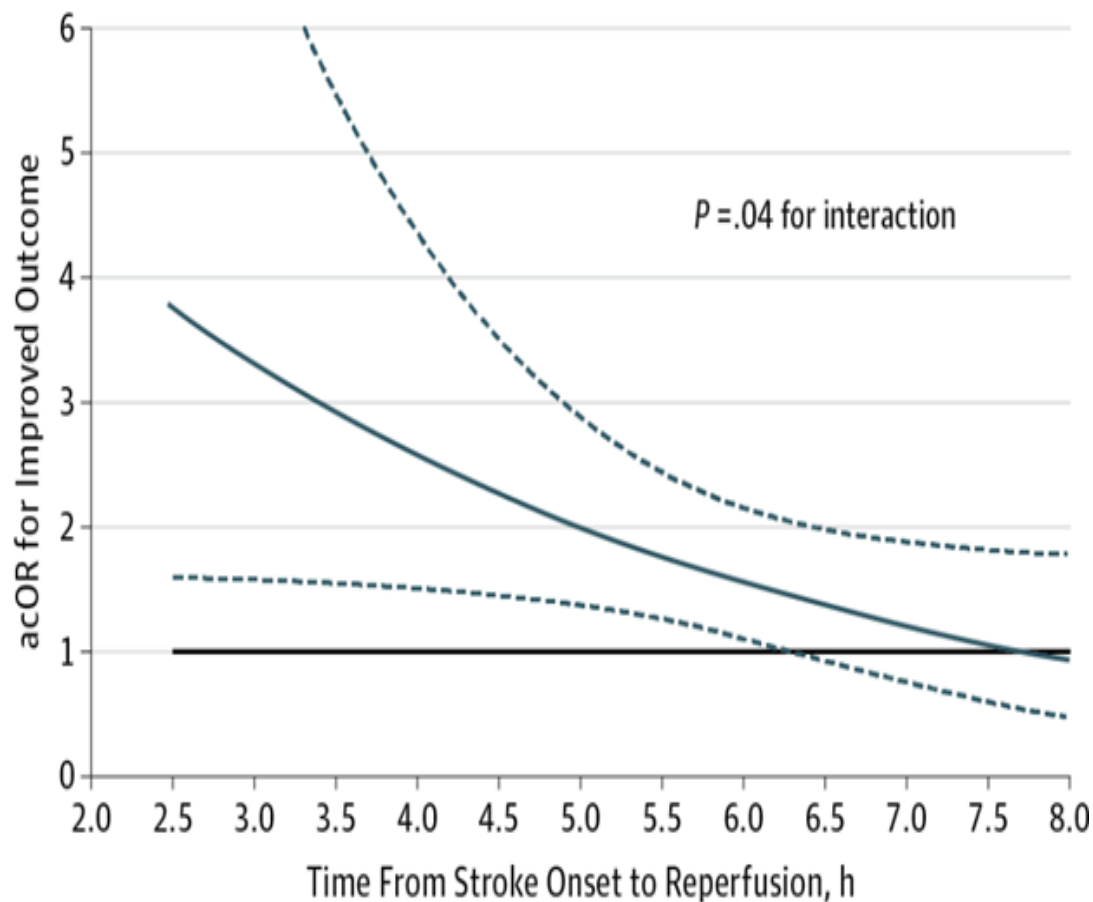
Mayank Goyal, Bijoy K Menon, Wim H van Zwam, Diederik W J Dippel, Peter J Mitchell, Andrew M Demchuk, Antoni Dávalos, Charles B L M Majoie, Aad van der Lugt, Maria A de Miquel, Geoffrey A Donnan, Yvo B W E M Roos, Alain Bonafe, Reza Jahan, Hans-Christoph Diener, Lucie A van den Berg, Elad I Levy, Olvert A Berkhemer, Vitor M Pereira, Jeremy Rempel, Mònica Millán, Stephen M Davis, Daniel Roy, John Thornton, Luis San Román, Marc Ribó, Debbie Beumer, Bruce Stouch, Scott Brown, Bruce C V Campbell, Robert J van Oostenbrugge, Jeffrey L Saver,

HERMES Goyal et al Lancet Neurol 2016

- N 1287 EVT vs medical treatment
- mRS 0-1 26.9% vs 12.9%, cOR 2.71 95%CI 1.84-3.35 , $p<0.0001$)
- mRS 0-2 46% vs 26.5%, cOR 2.35 95%CI 1.81-2.98 , $p<0.0001$)
- sICH 4.4% vs 4.3 % ($p=0.8$)
- Mortality 15.3% vs 18.9% ($p=0.15$)



A Effect of time on achieving an mTICI score of 2b-3



Treatment effect was significant until **6 hours 18 minutes** (acOR 1.42; 95% CI, 1.00-2.03); at **7 hours 43 minutes**, the point estimate crossed the line that indicated unity

Fransen PS et al. JAMA 2016

Implications

- Benefit from thrombectomy is generalisable to a broad range of patients with LVO
- Endovascular therapy should not be withheld on the basis of advanced age, moderately extensive early ischemic change on baseline CT, moderate or severe clinical deficit

MT

DEFUSE-3

Image selection



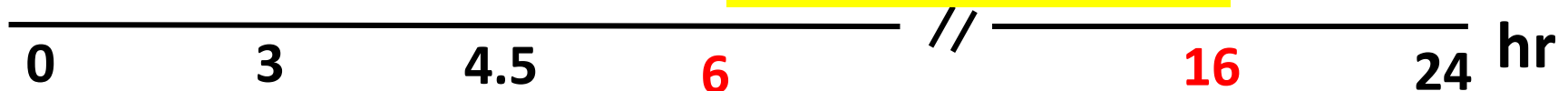
Albers GW. et al. NEJM 2018

- Thrombectomy vs medical treatment
- N= **182** , NIHSS 16, MCA (65%), ASPECT 8, target mismatch
- Awakening 53%, witnessed 34%
- 1^{ry} : mRS score 3 vs 4 (p<0.001)
- 2^{ry} : mRS 0-2 **45%** vs 17% OR **2.67** 95%CI 1.6-4.48 (p<0.001)
 - sICH **7%** vs 4% (p=0.75)
 - Death **14%** vs 26% (p=0.05)

MT

DEFUSE-3

Image selection

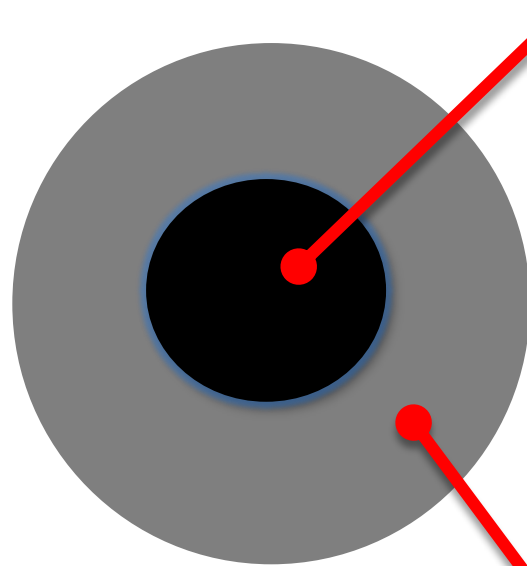


target mismatch **DWI+MRP/CTP**

Ischemic core ≤ 70 ml

Mismatch volume > 15 ml

Mismatch ratio > 1.8



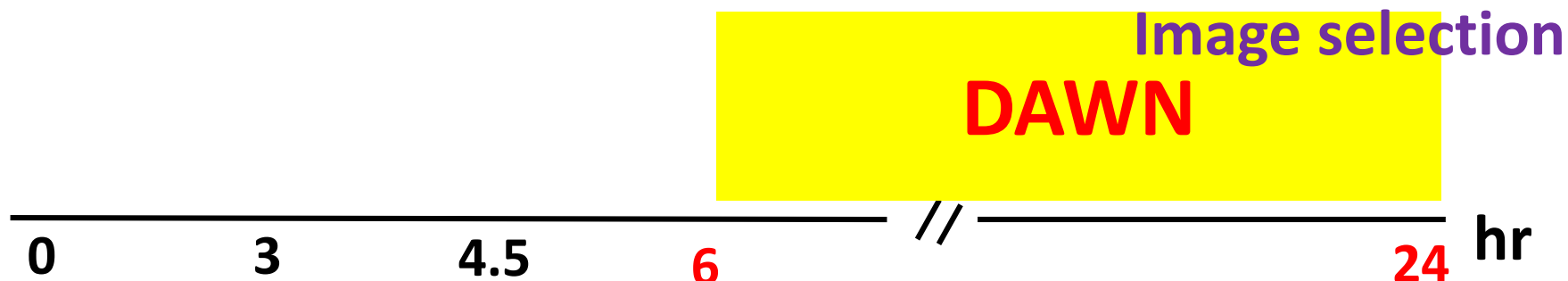
Ischemic core
Core
(CBF <30%)

Hypoperfusion
(delay time > 6 sec)

Mismatch volume > 15 ml
Penumbra

Mismatch ratio > 1.8
Hypoperfusion/core

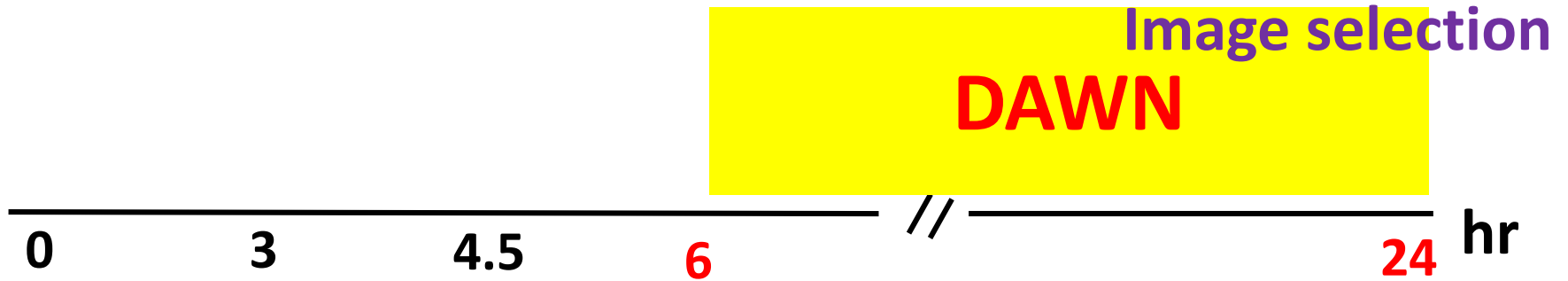
MT



Nogueira RG. et al. NEJM 2018

- Thrombectomy vs medical treatment
- N= 206 , NIHSS 17, MCA 80%, clinical imaging mismatch
- Awakening 63 %, witnessed 10 %
- 1^{ry} : mRS 0-2 49% vs 13% (posterior probability of superiority >0.999)
- 2^{ry} : sICH 6% vs 3% (p=0.5)
Death 19% vs 18% (p=1.0)

MT



DWI or CTP

Clinical

Imaging

Age NIHSS

Core

≤ 80 ≥ 10

≤ 31 ml

≥ 20

≤ 51 ml

≥ 80 ≥ 10

≤ 21 ml

Reperfusion therapy

Mechanical thrombectomy	Class
❖ 0-6 hr (5 landmark trials)	IA
❖ 6-16 hr (DEFUSE-3) new	IA
❖ 16-24 hr (DAWN) new	IIA
▪ Stent retriever	IA
▪ Other devices	IIB
▪ Intra-arterial thrombolysis	IIB

Imaging for rt-PA

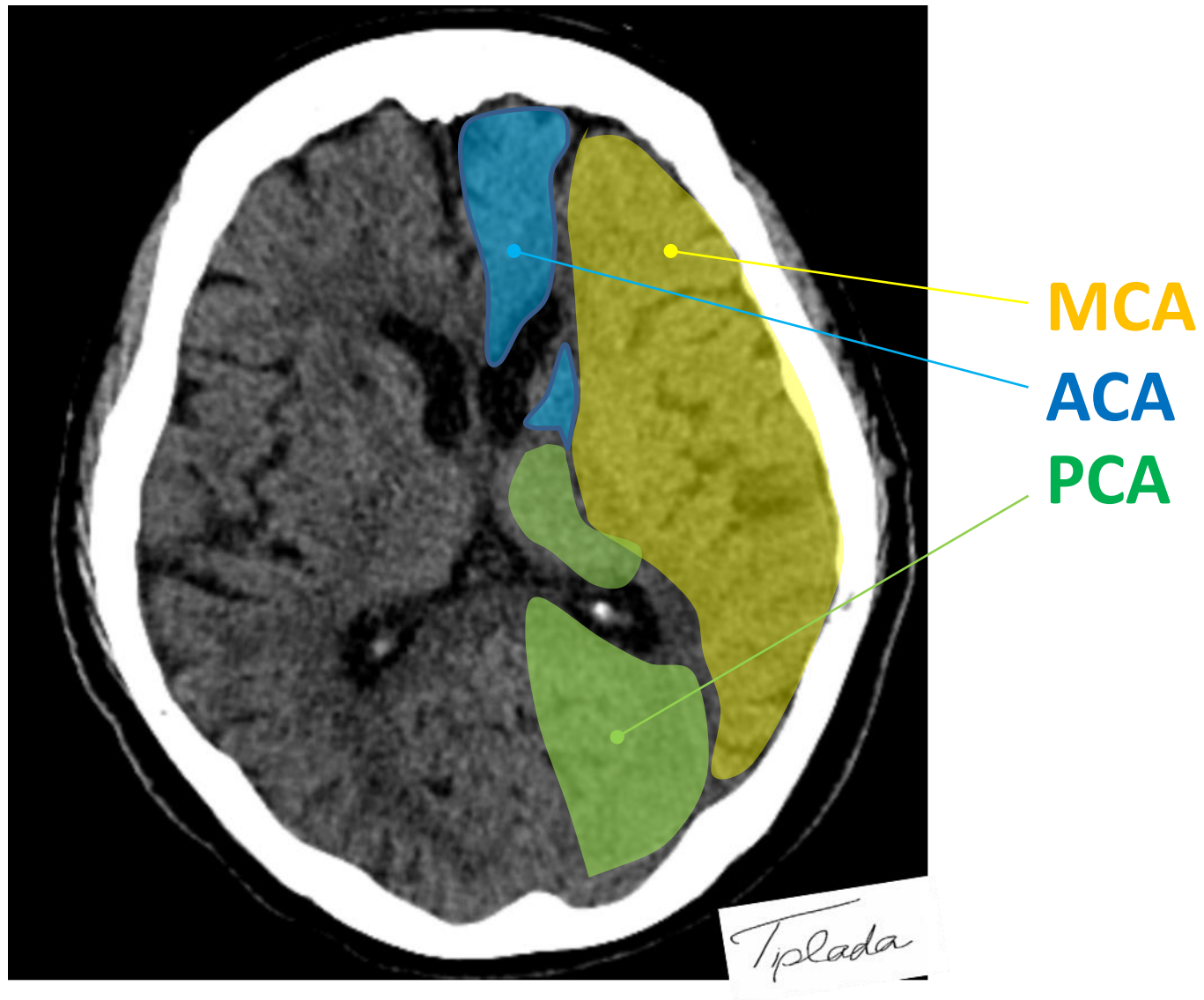
Simple and fast



Exclude ICH



Large infarct

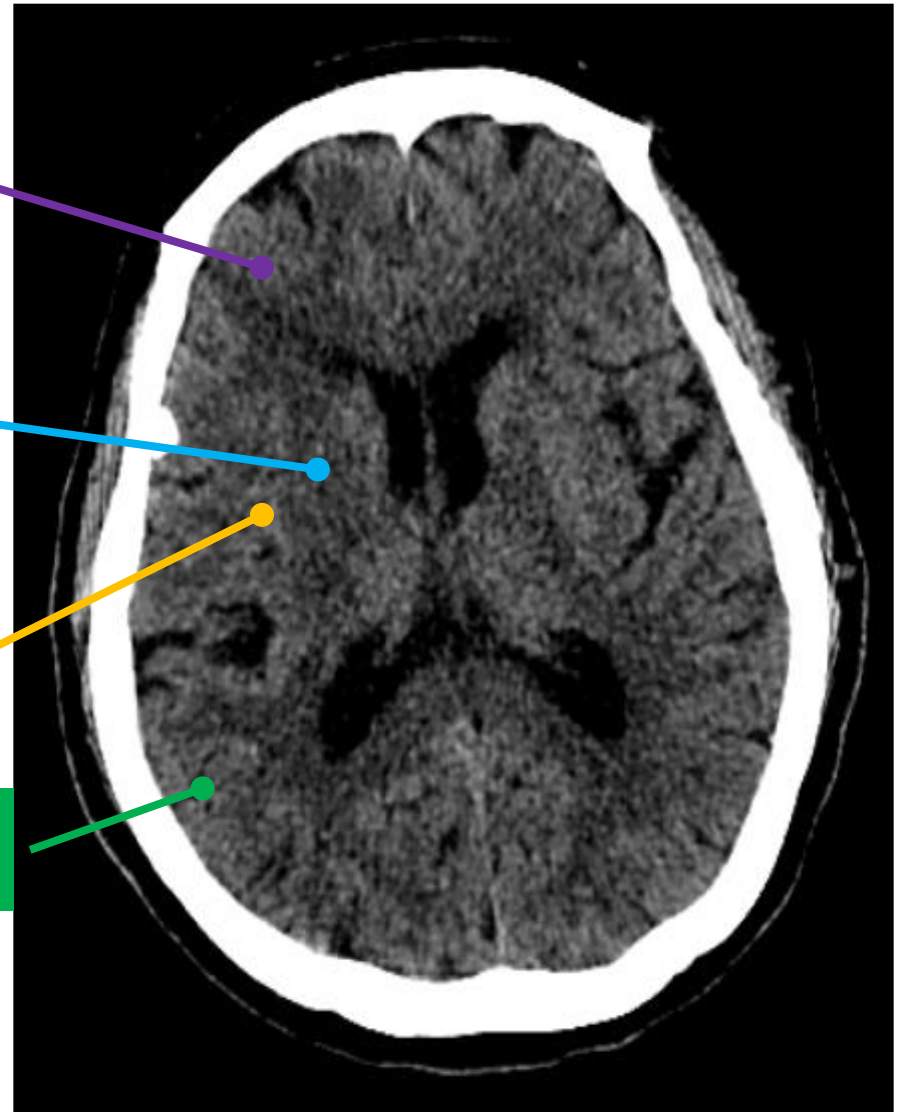


Loss of gray-white differentiation

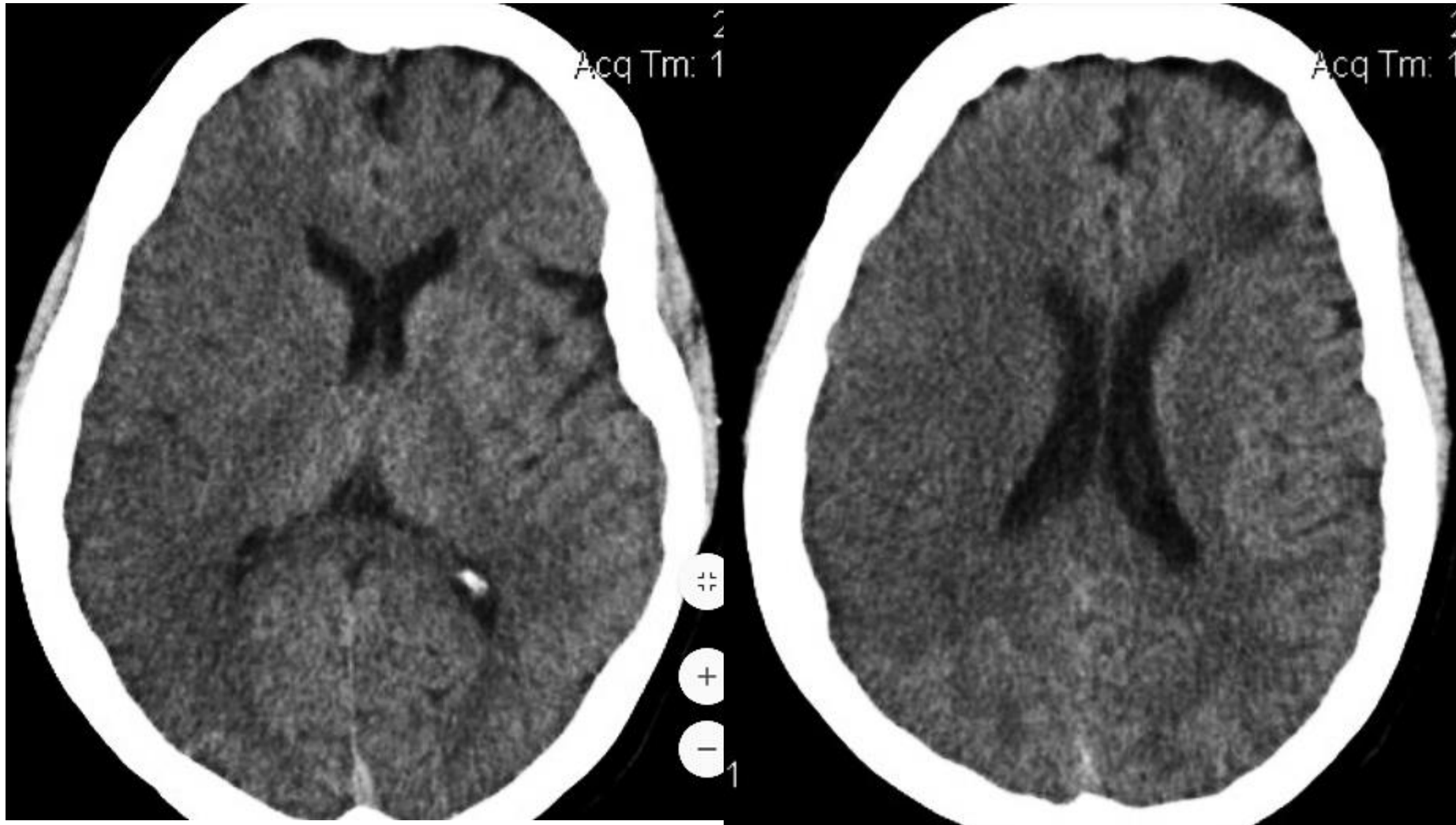
Basal ganglion obscuration

Loss of insular ribbon

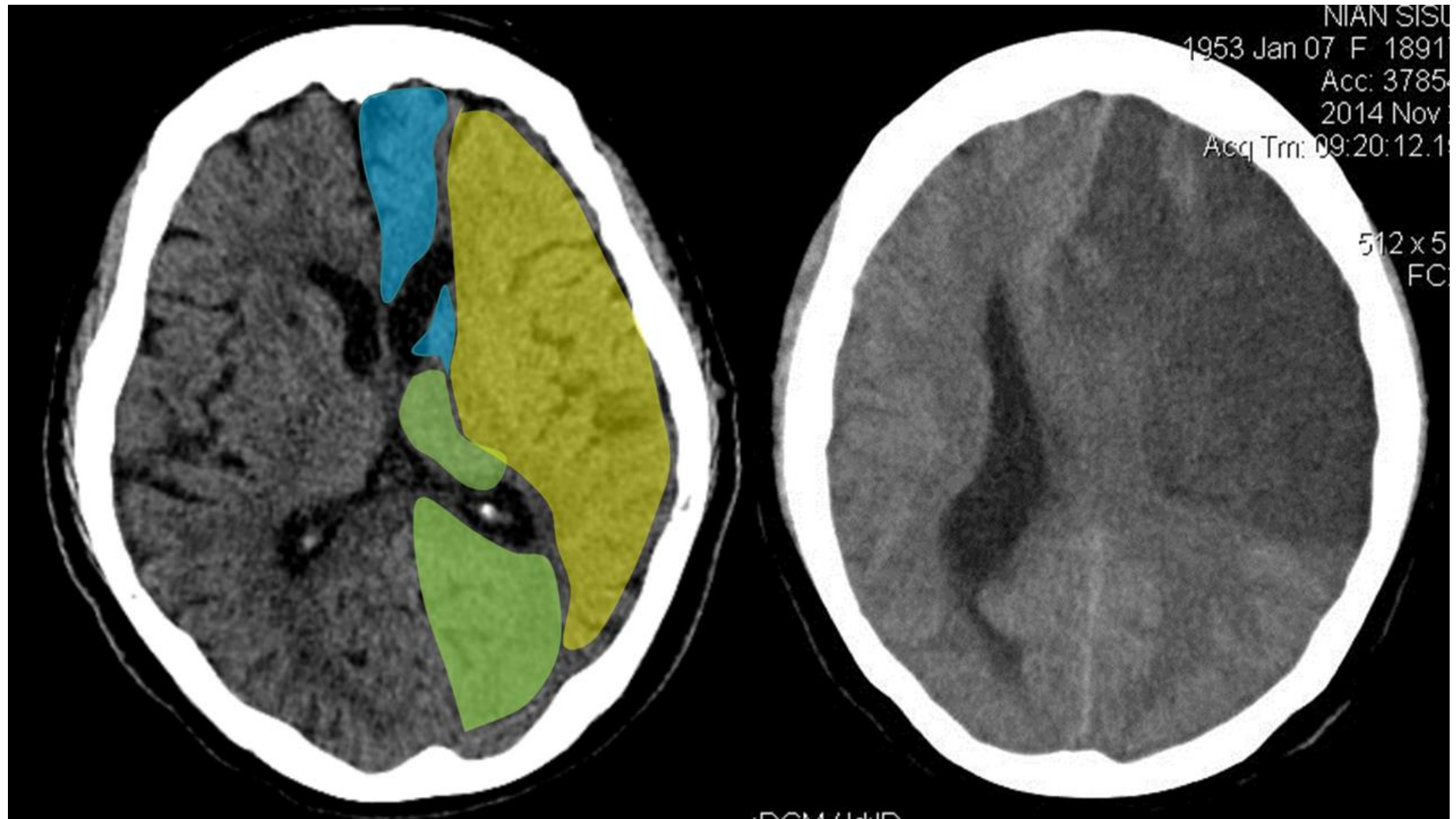
Sulcal gyral effacement



Large hypodense on CT ($>1/3$ of MCA)



Obvious hypodense lesion



Window 100



Window 40



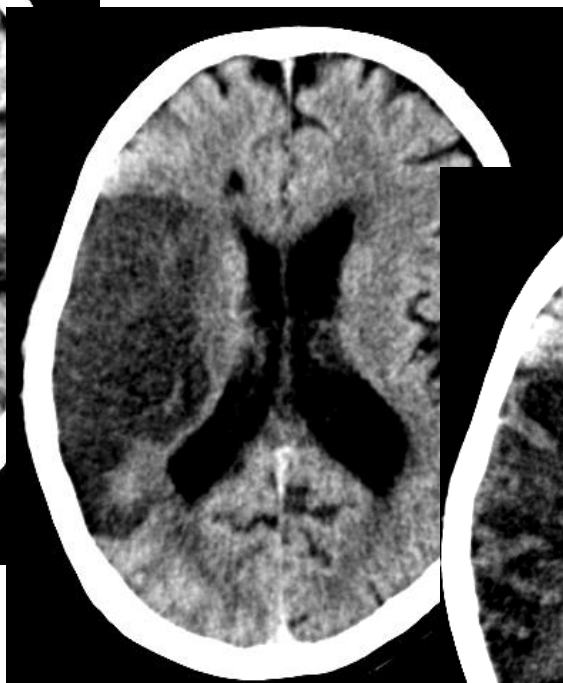
D0



D1



D2



D30



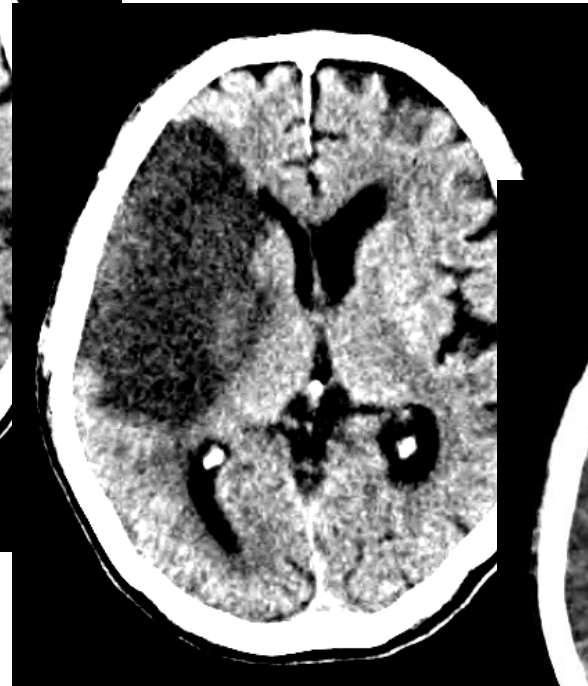
D0



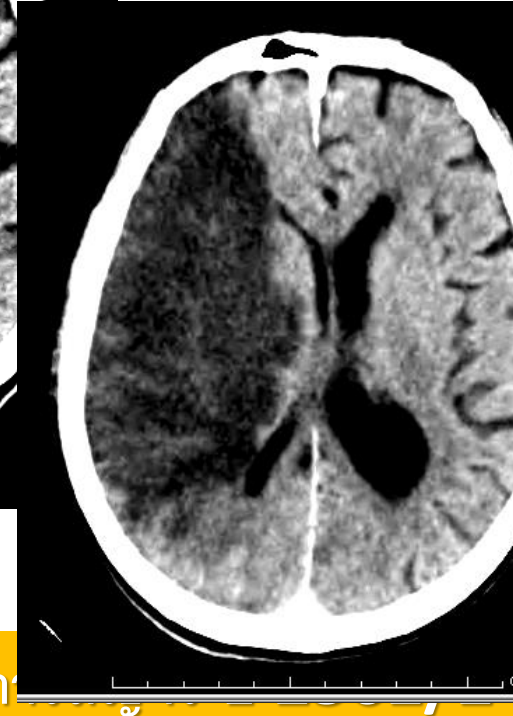
D1



D2



D5



Imaging for EVT

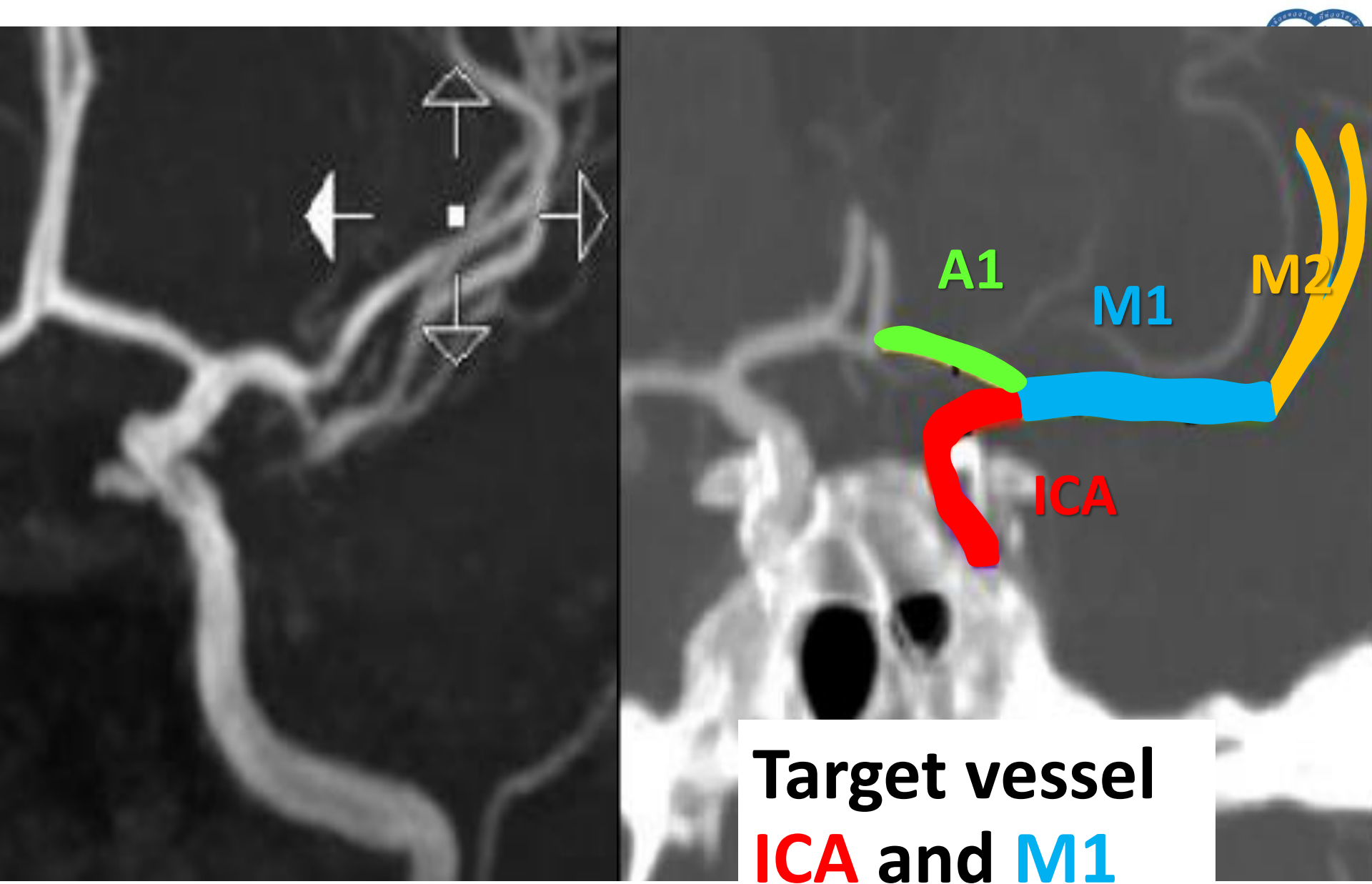
Target & core



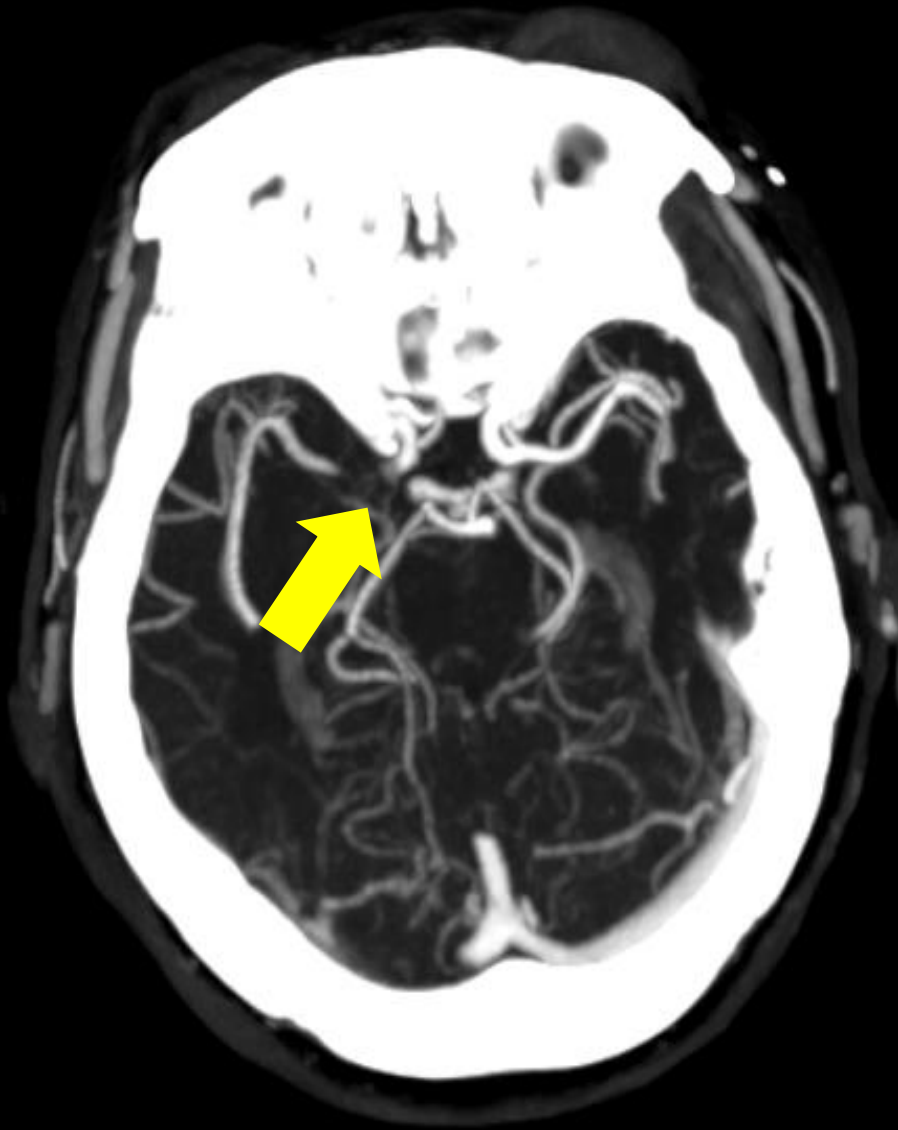
**Large vessel
occlusion**



**Small core
large penumbra**



CTA



MRA



Infarct core estimation

- NCCT ASPECT
- CTA-SI ASPECT
- CTA collateral
- Multiphase CTA collateral
- CT perfusion core
- DWI core

Accuracy



Speed



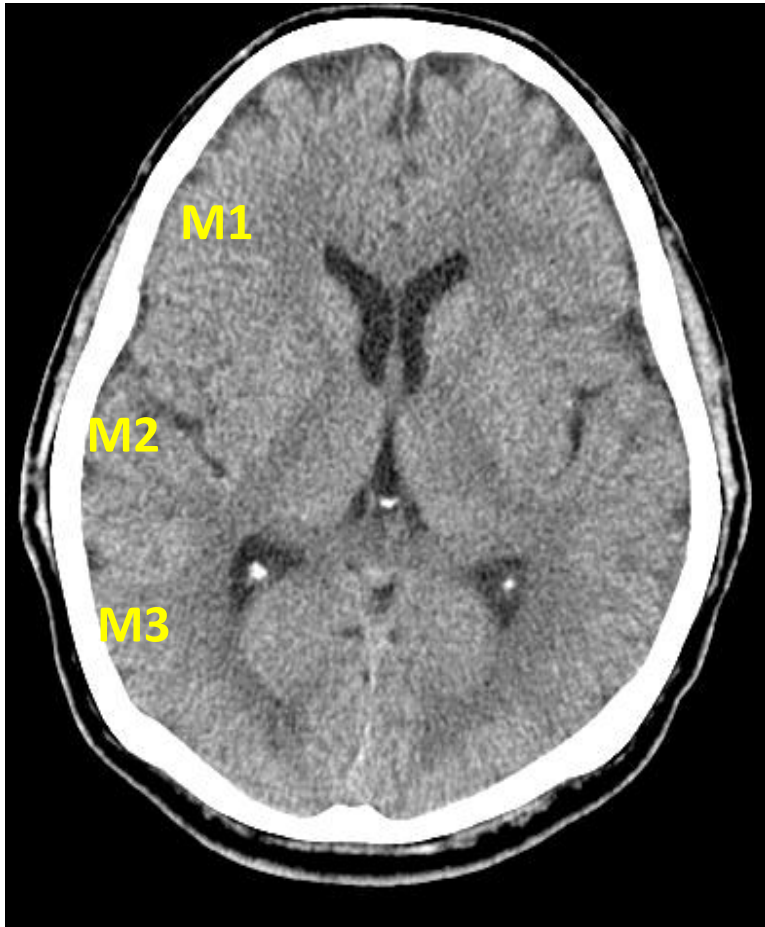
Infarct core estimation

Imaging	Indicators
NCCT ASPECT	Hypodense
CTA-SI ASPECT CTA collateral Multiphase CTA collateral	Non-enhance parenchyma
CT perfusion core	↓↓CBF, ↓↓CBV, ↑MTT
DWI core	Restrict diffusion

NCCT ASPECT

- Alberta stroke program early CT score is a 10-point quantitative scores used to assess early ischemic changes on NCCT head
- Represent occlusion of middle cerebral artery
- Maximum 10 point – no area of hypodense
- ASPECT < 7 : core volume > 70 ml

NCCT ASPECT



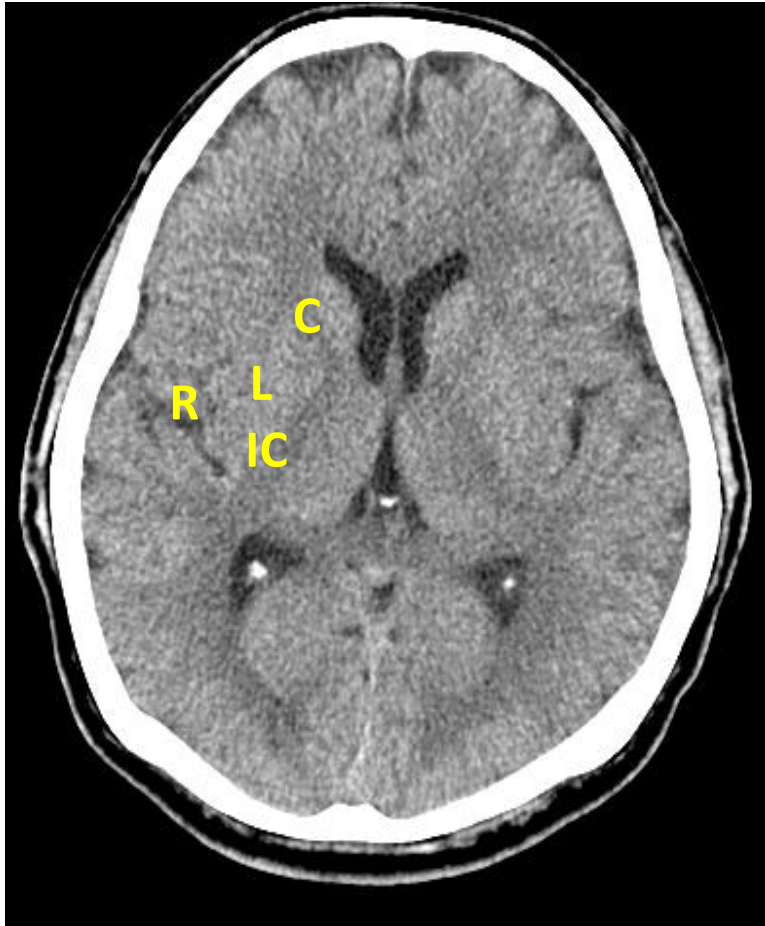
Ganglionic nuclei

M1 frontal operculum

M2 anterior temporal lobe

M3 posterior temporal lobe

NCCT ASPECT



Basal ganglia

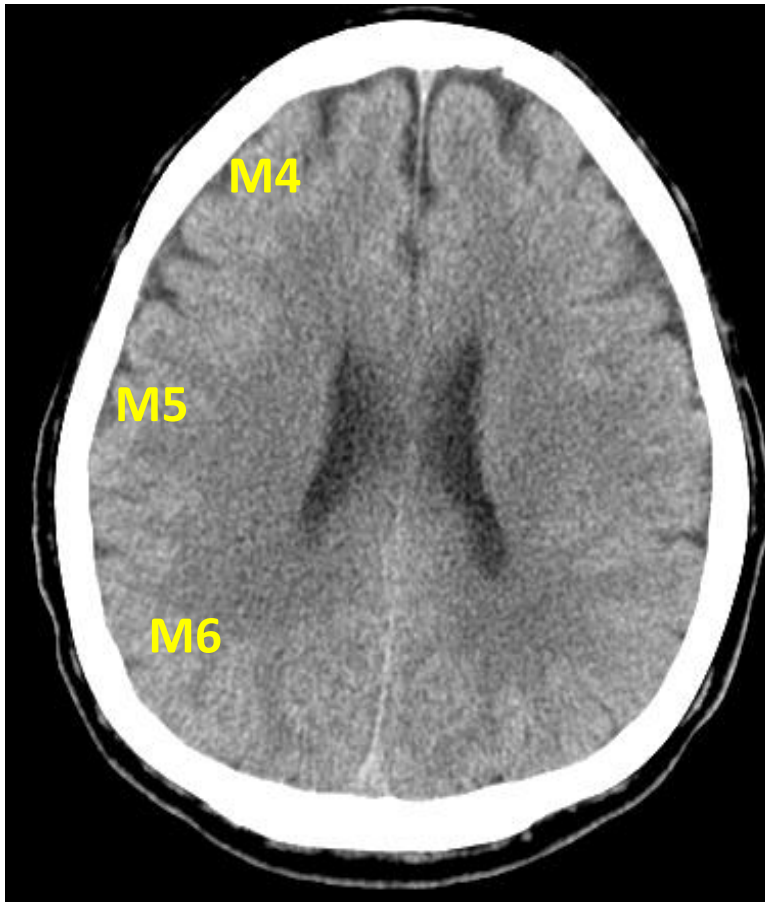
Caudate

Lentiform nucleus

Insular

Internal Capsule

NCCT ASPECT



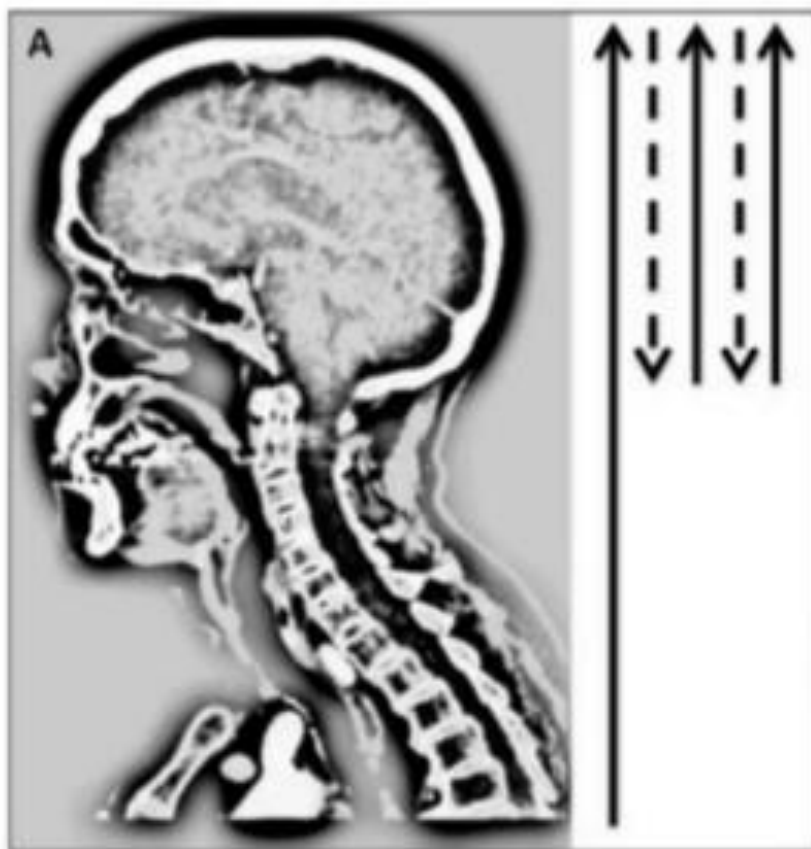
Supraganglionic nuclei

M4 anterior MCA

M5 lateral MCA

M6 posterior MCA

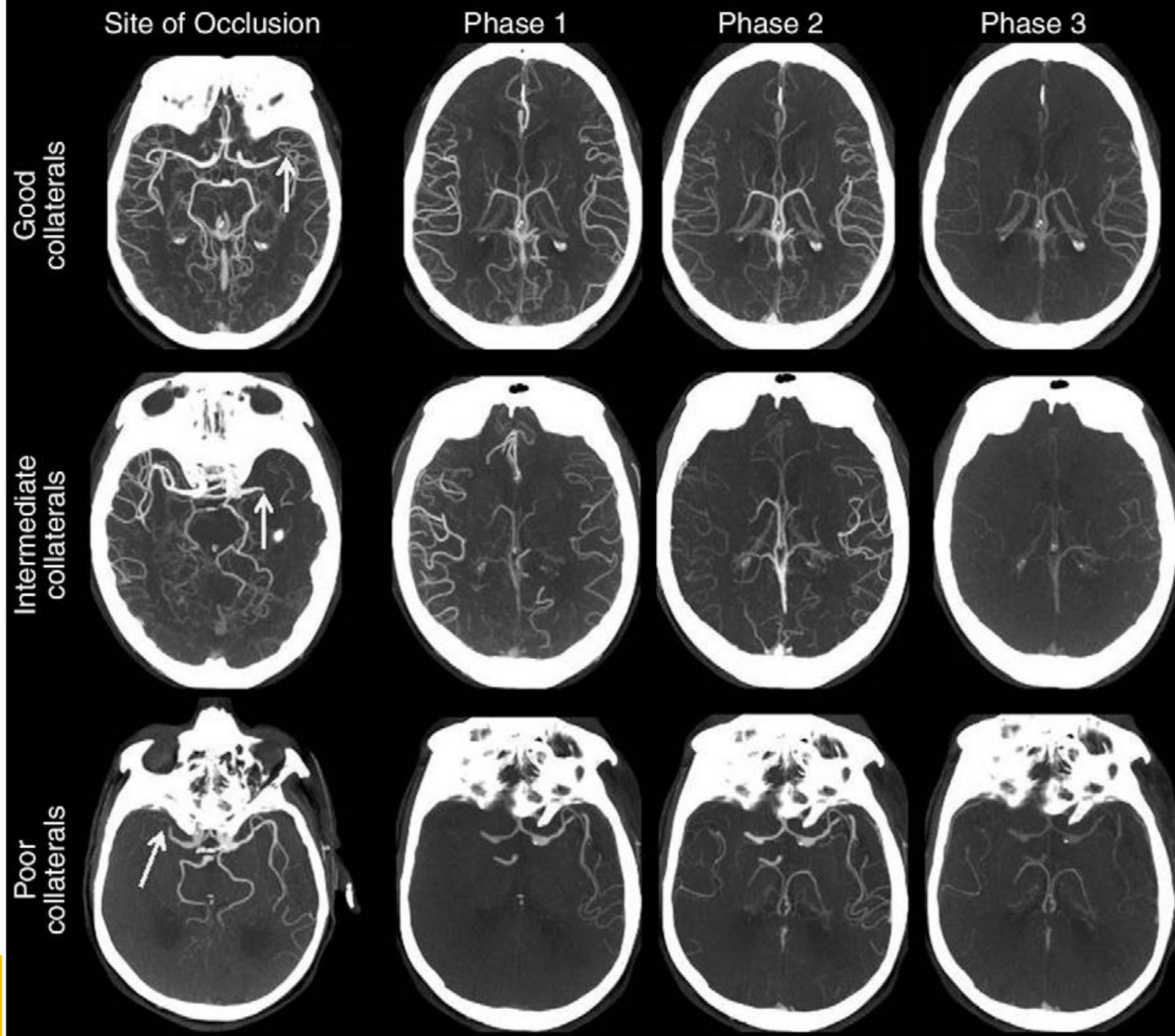
Multiphase CTA collateral



1st phase : arch to vertex
(arterial)

2nd phase : skull to vertex
(midvenous)

3rd phase : skull to vertex
(latevenous)

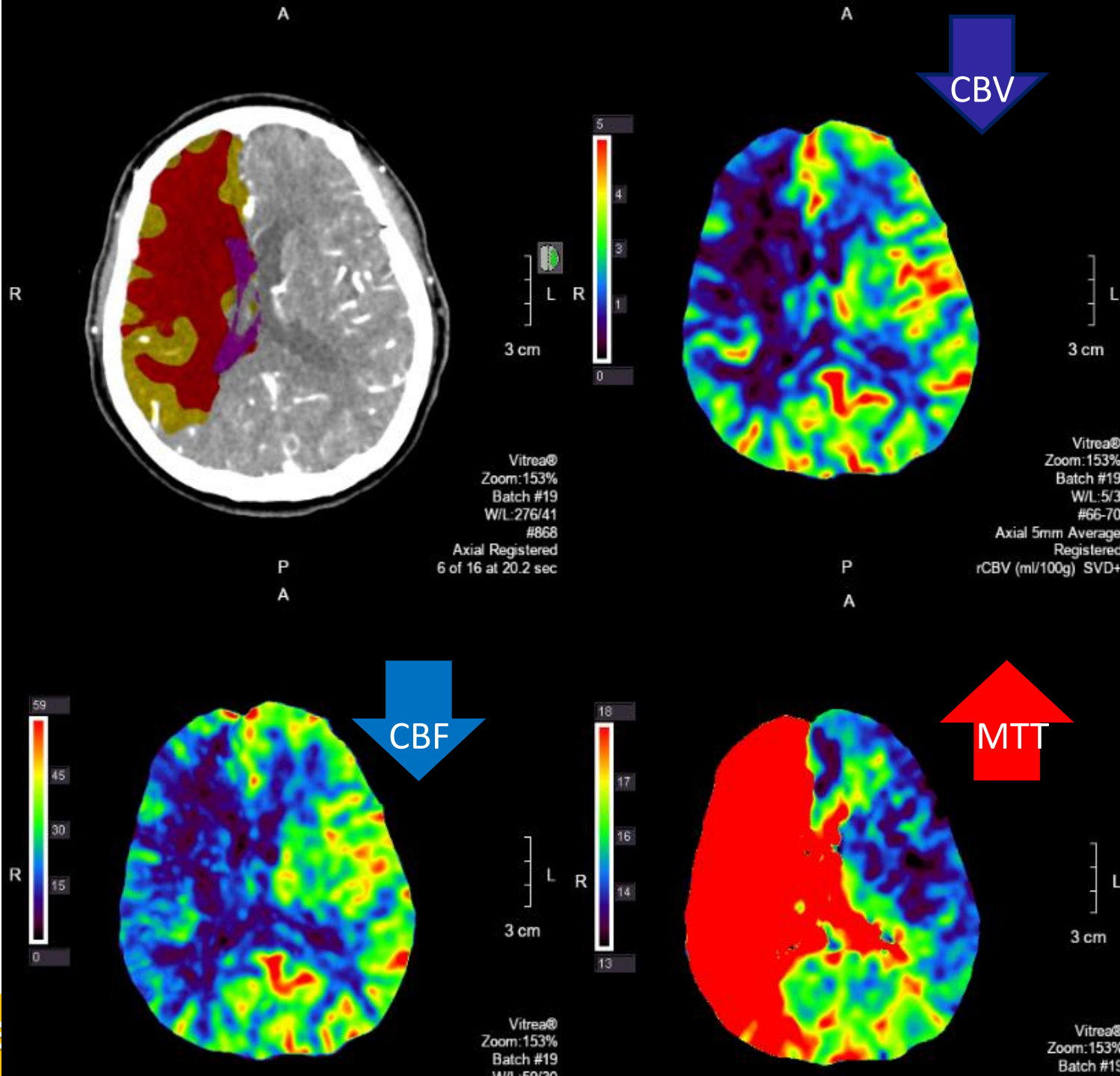


Multiphase CTA

Score	Description
5	Compared to asymptomatic contralateral hemisphere, there is no delay and normal/increased prominence of peripheral vessels/normal extent within the occluded arteries territory within the symptomatic hemisphere
4	Compared to asymptomatic contralateral hemisphere there is a delay of one phase in filling in of peripheral vessels, but prominence and extent is the same
3	Compared to asymptomatic contralateral hemisphere there is a delay of two phases in filling in of peripheral vessels but prominence and extent is the same <u>or</u> there is a one phase delay and decreased prominence (thinner vessels)/reduced number of vessels in some part of the territory occluded
2	Compared to asymptomatic contralateral hemisphere there is a delay of two phases in filling in of peripheral vessels and decreased prominence and extent or a one-phase delay and some regions with no vessels in some part of the territory occluded
1	Compared to asymptomatic contralateral hemisphere there are just a few vessels visible in any phase within the occluded vascular territory
0	Compared to asymptomatic contralateral hemisphere there are no vessels in any phase within the occluded vascular territory

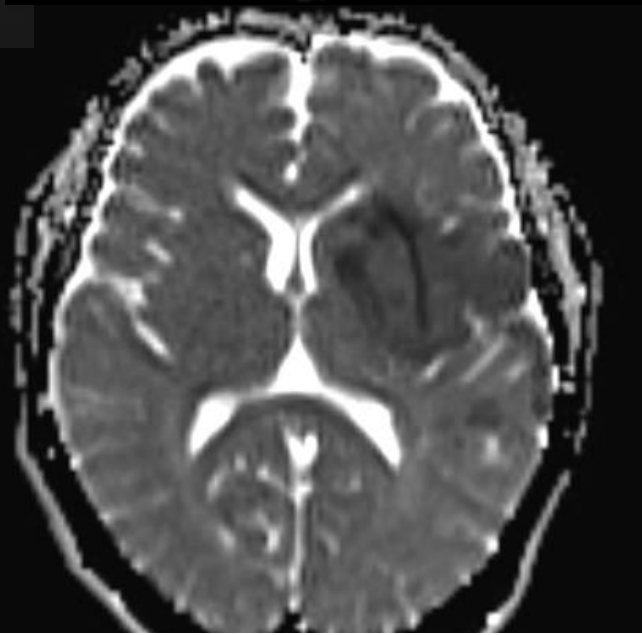
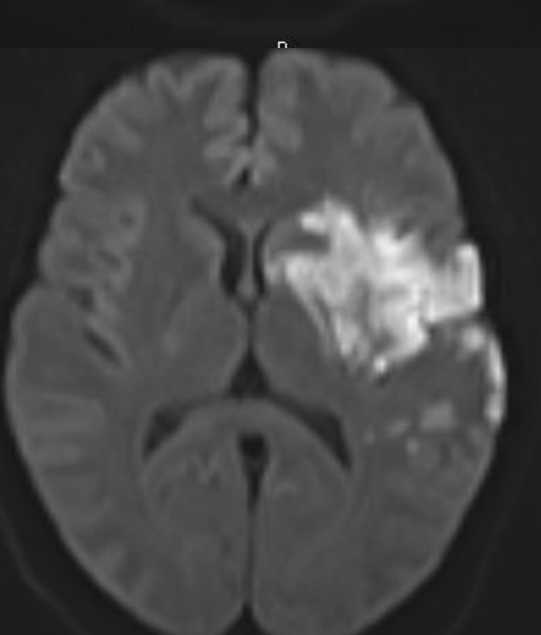
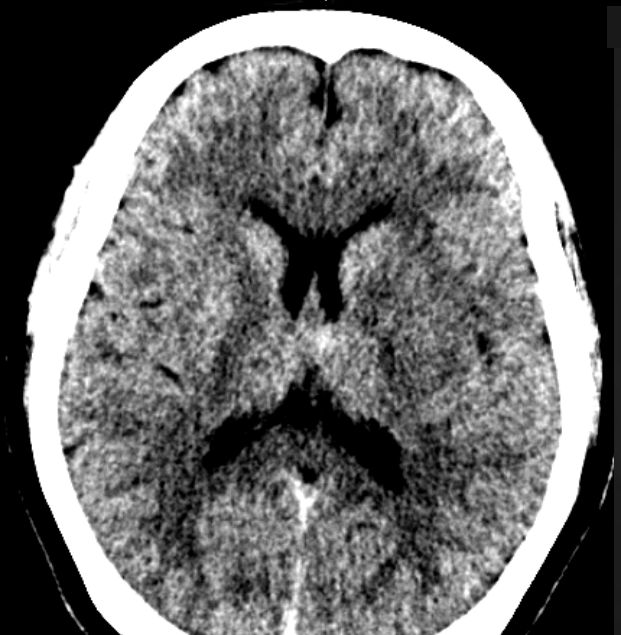
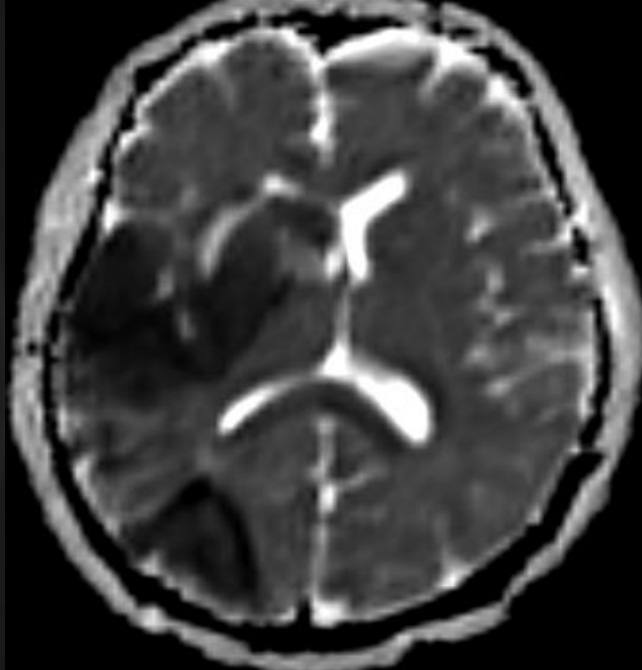
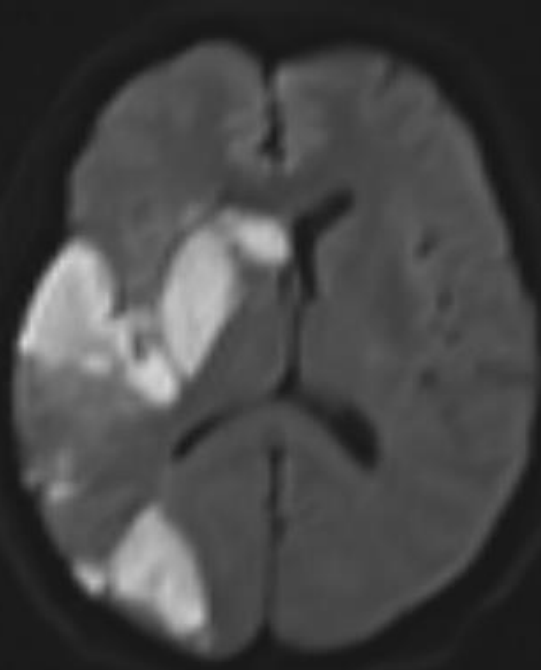
Interpretation CTP

Tissue type	MTT	CBV (ml/100 g)	CBF (ml/100g/min)	Tissue stage
Normal	Normal	4-5	50-60	Normal
Viable oligemia	↑	↑↑	N	Penumbra
Viable ischemia	>145%	↑/N	<40%	Penumbra
Infarct	↑↑↑	<2 ml/100g	<30% <10 ml/100g/min	Core



MRI

Sequence	Utility
DWI	Core infarct
SWI	Occlusion Hemorrhage
FLAIR	Tissue clock- no hypodense = 4.5 hr Collateral
MRA/TOF	Occlusion Neck vessel
PWI	Mismatch



CT

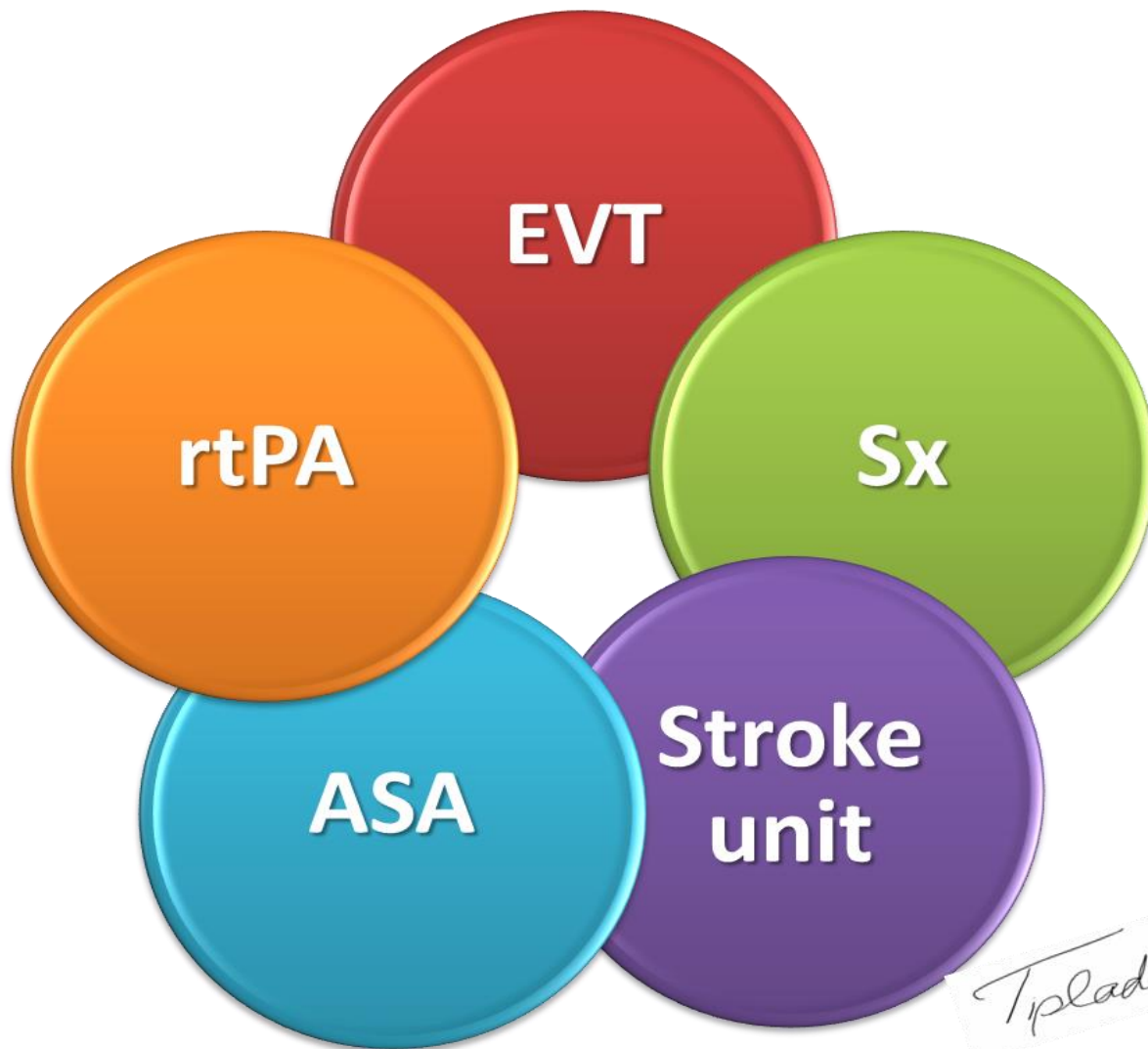
DWI

ADC

Brain imaging

Brain imaging	Class
- NCCT for thrombolysis (door-CT<20 min) - NCCT + CTA/MRA for MT (0-6 hr) - Intracranial artery - Extracranial carotid and vertebral - Collateral flow status (multiphase CTA) - CTP/MRP for MT (6-24 hr)	- IB - IA - IIA - IIB - IA

Class IA: Apirin



Antiplatelet treatment

Antiplatelet	Class
▪ Aspirin 160-300 mg within 24-48 hr after onset	IA
▪ IV Tirofiban and eptifibatide	IIB
▪ Other glycoprotein IIb/IIIa receptor antagonist	III
▪ Ticagrelor (new)	III
▪ Dual antiplatelet in minor stroke (new)	IIA

Anticoagulants

Anticoagulants	Class
▪ For preventing early recurrent stroke	III
▪ Severe stenosis of internal carotid artery ipsilateral to ischemic stroke	IIB
▪ Nonocclusive, extracranial intraluminal thrombus (new)	IIB
▪ Thrombin inhibitors and factor Xa inhibitor (new)	IIB

Hemodynamic

Volume expander	Class
▪ Hemodilution	III
▪ High-dose albumin	III
▪ Vasodilatory agent ie. pentoxifylline	III
▪ Device to augment cerebral blood flow	IIB
▪ Neuroprotective agents	III
▪ Emergency CEA/CAS	IIB

แนวปฏิบัติผู้ป่วยโรคหลอดเลือดสมองที่โรงพยาบาลชุมชน

อาการของโรคหลอดเลือดสมอง (อย่างน้อย 1 อาการ)

แม้อาการนั้นจะหายเป็นปกติ

1. แขนขาชาหรือ**อ่อนแรง** ข้างใดข้างหนึ่งทันที
2. พูดไม่ชัด พูดไม่ได้ พูด**ลิ้นคับปาก**
3. เดินเซ **เวียนศีรษะ**ทันทีทันใด
4. ตามองเห็น**ภาพซ้อน** หรือมี**มัว**ข้างใดข้างหนึ่งทันที
5. **ปวดศีรษะ**อย่างรุนแรงชนิดไม่เคยเป็นมาก่อน

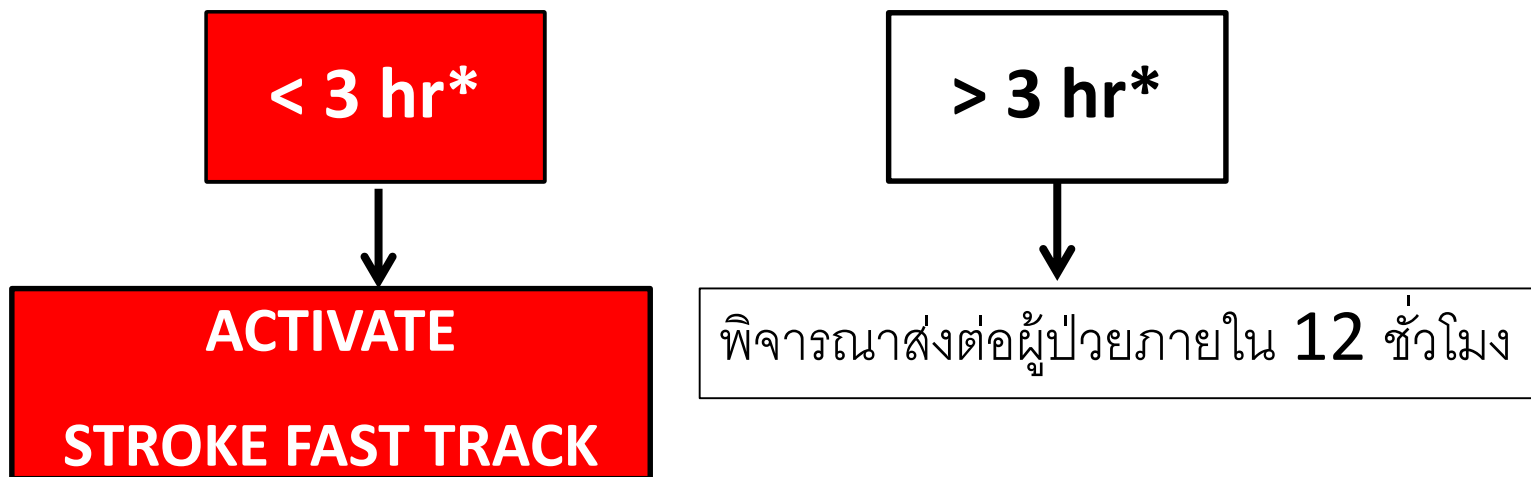


Basic life support (ABC), เจาะ DTX ระวังภาวะน้ำตาลต่ำ



Emergency Lab (**CBC**, BUN, Cr, Electrolyte,
Coagulogram, EKG)

แนวปฏิบัติผู้ป่วยโรคหลอดเลือดสมองที่โรงพยาบาลชุมชน (ต่อ)



ผู้ป่วยควรอยู่ที่โรงพยาบาลชุมชน ไม่เกิน **20 นาที** และควรรีบส่งต่อให้เร็วที่สุด โดยระยะเวลาส่งต่อควรน้อยกว่า **60 นาที**

ในกรณีที่โรงพยาบาลชุมชนส่ง **LAB** ได้ ให้ส่งตรวจทันที และส่งผลตามมาทันทีเมื่อได้ผล **LAB**

แบบฟอร์มการส่งต่อผู้ป่วย stroke

แบบฟอร์มการส่งต่อผู้ป่วยโรคหลอดเลือดสมอง โรงพยาบาลตรัง

เลขที่...../..... HN..... จากโรงพยาบาล.....
 วันที่.....เดือน.....พ.ศ.....
 ผู้ป่วยชื่อ..... เพศ ☐ ชาย ☐ หญิง อายุ.....ปี
 สัญญาณชีพ BP.....mmHg PR.....ครั้ง/นาที RR.....ครั้ง/นาที BT.....°C GCS.....DTX.....mg/dl EKG.....
 CC.....
 PI.....
 การตรวจร่างกาย ☐ มุมปากด้าน.....ตก ☐ ชาซีก..... ☐ อ่อนแรงซีก..... ☐ เดินเซ ☐ การพูดผิดปกติ

Motor power

Pupil	Size	React
Rt.		
Lt.		

เวลาที่เริ่มเกิดอาการ วันที่.....เดือน.....พ.ศ..... เวลา.....น.
 วันที่ผู้ป่วยถึงรพ.ชุมชน วันที่.....เดือน.....พ.ศ..... เวลา.....น. เวลาออกจากรพ.....น.
 (ถ้าผู้ป่วยไม่สามารถบอกเวลาที่เริ่มเกิดอาการได้ ให้บันทึกเวลาล่าสุดที่มีผู้พบเห็นผู้ป่วยยังเป็นปกติเป็นเวลาที่เริ่มเกิดอาการ ตัวอย่างเช่น
 เกิดอาการตั้งแต่ตื่นนอน ให้ใช้เวลาล่าสุดที่ตื่นขึ้นมาแล้วยังปกติ หรือถ้าไม่ตื่นตั้งแต่เช้านอนให้บันทึกเวลาที่เช้านอน เป็นเวลาที่เริ่มเกิดอาการ
 เป็นต้น และควรนำพยานผู้เห็นเหตุการณ์มากับผู้ป่วยด้วย)

แบบฟอร์มการส่งต่อผู้ป่วย stroke

ประวัติเดิม ☐ ไม่มี ☐ HT ☐ DM ☐ DLP ☐ สูบบุหรี่ ☐ หลอดเลือดหัวใจ ☐ Atrial fibrillation
☐ I'd CVA ☐ อื่นๆ.....

ยาประจำ ☐ Aspirin ☐ Warfarin ☐ Antiplatelet ☐ (ยาด้านเกล็ดเลือดอื่นๆ).....
☐ ยาอื่นๆ.....

* Exclusion criteria for IV rtPA (ถ้ามีข้อใดข้อหนึ่ง ไม่ถือว่าเข้าเกณฑ์ Fast Track) *

มี	ไม่มี	
☐	☐	ผู้หญิงที่ตั้งครรภ์หรือกำลังให้นมบุตร
☐	☐	มีประวัติเลือดออกในสมองมาก่อน
☐	☐	มีประวัติเนื้องอกในสมอง หรือเส้นเลือดสมองผิดปกติ (AVM or cerebral aneurysm)
☐	☐	มีประวัติ ischemic stroke or MI ภายใน 3 เดือน
☐	☐	การบาดเจ็บต่อสมองที่รุนแรง หรือได้รับการผ่าตัดสมองหรือไขสันหลัง ภายใน 3 เดือน
☐	☐	ภาวะเลือดออกรุนแรง หรือเลือดออกทางเดินปัสสาวะ/ทางเดินอาหาร ภายใน 3 สัปดาห์
☐	☐	มีประวัติผ่าตัดใหญ่ หรืออุบัติเหตุรุนแรงภายใน 2 สัปดาห์

การรักษาที่ได้รับ ☐ NPO ☐ O2 ☐ IV.....
 อื่นๆ.....

เข้าเกณฑ์ Stroke Fast Track ☐ ใช่ ☐ ไม่ใช่

แบบฟอร์มการส่งต่อผู้ป่วย stroke

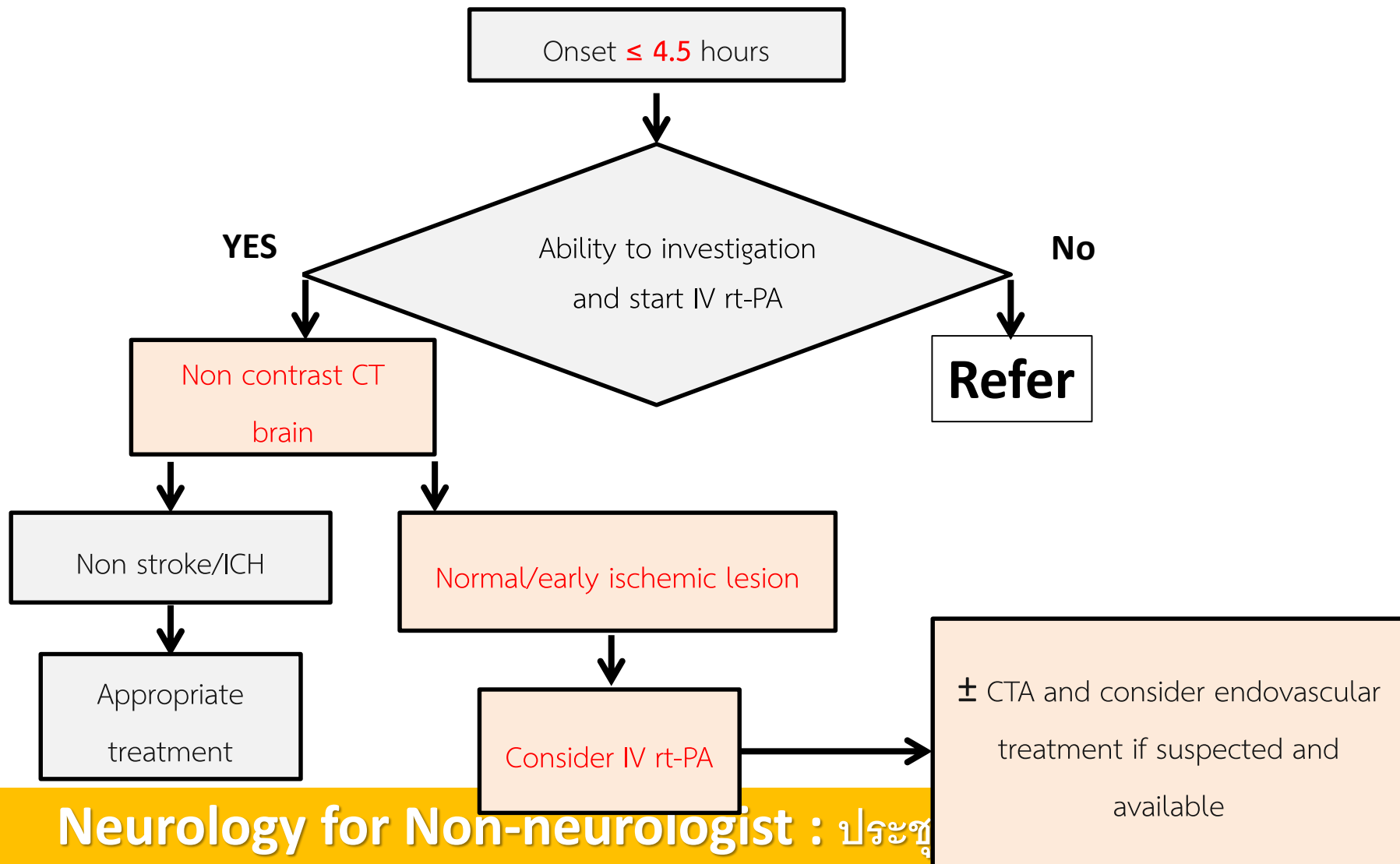
(.....)

เวลา	BP(mmHg)	PR (min)	RR (min)	O ₂ Sat (%)	GCS (E V M)
ก่อนส่งต่อ เวลา.....น.					
ขณะส่งต่อ เวลา.....น.					
เวลา.....น.					
เวลา.....น.					
ก่อนถึงรพ.ตรัง เวลา.....น.					

ลงชื่อ.....ผู้ดูแลระหว่างส่งต่อ

(.....)

แนวปฏิบัติทางด่วนโรคหลอดเลือดสมอง (Stroke Fast Track)





Take home messages

- Stroke is **sudden** non-traumatic focal **neurological deficit**, ischemic vs hemorrhage
- Treatment of choice is **iv rt-PA** in acute phase
- Limit time window **4.5 hr** : Time is brain
- Mechanical thrombectomy between **0-24 hr** in **LVO** stroke with **target mismatch** improve outcome

Take home messages

- **Non-contrast CT** is useful because of fast and widespread availability, allows differentiation between ischemic and hemorrhage
- **CT angiography** is use to identify proximal vessel occlusion as target lesion of MT
- **CT/MR perfusion** assess target mismatch for MT in late window



**THANK YOU FOR YOUR
ATTENTION**