Extending Time window for acute stroke intervention

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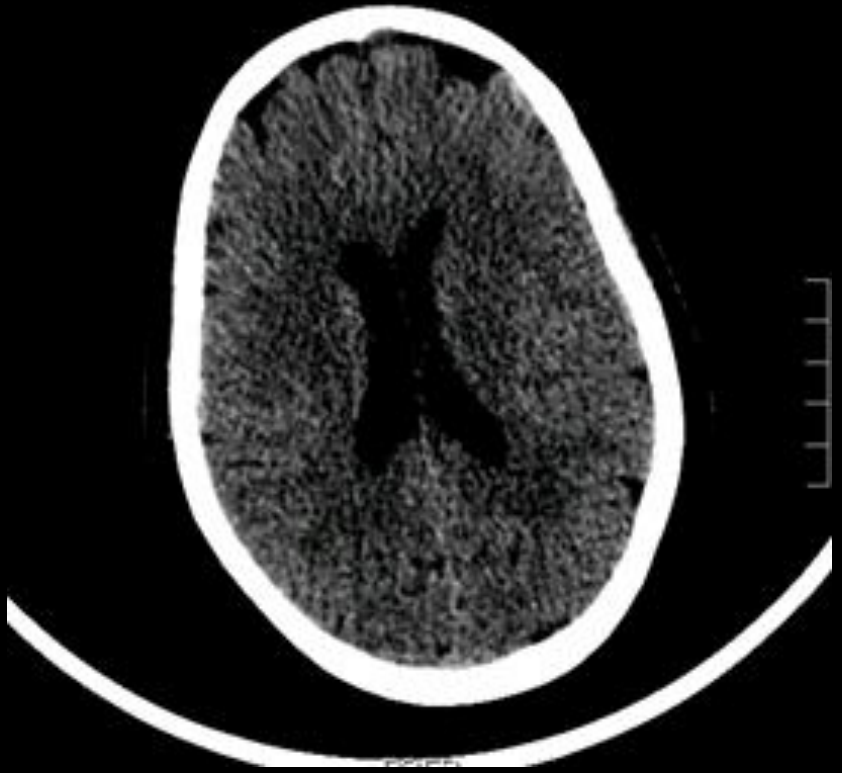
50 year old lady ,no comorbidities went to sleep at 11PM woke up at 6 am with global aphasia and right hemiplegia, reached hospital 11.30 AM
12.30 hours from last seen normal , 5.30 hours from noticing deficits

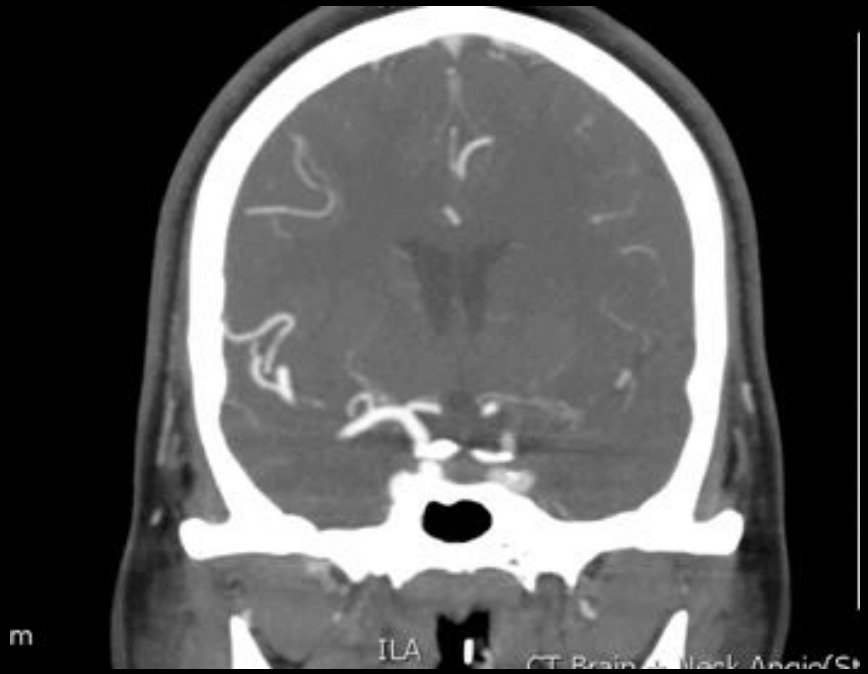
NIHSS -19

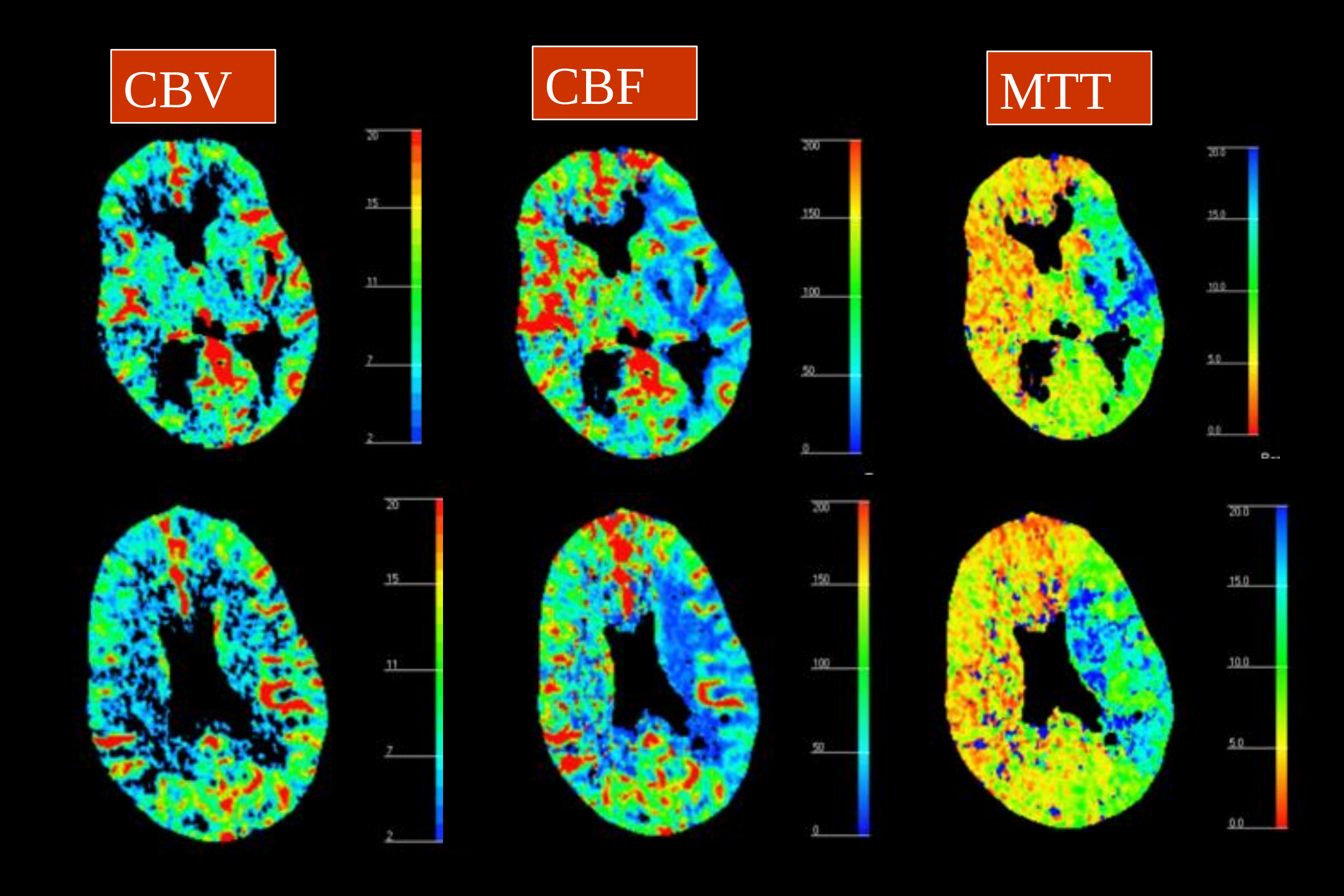
ASPECTS -8



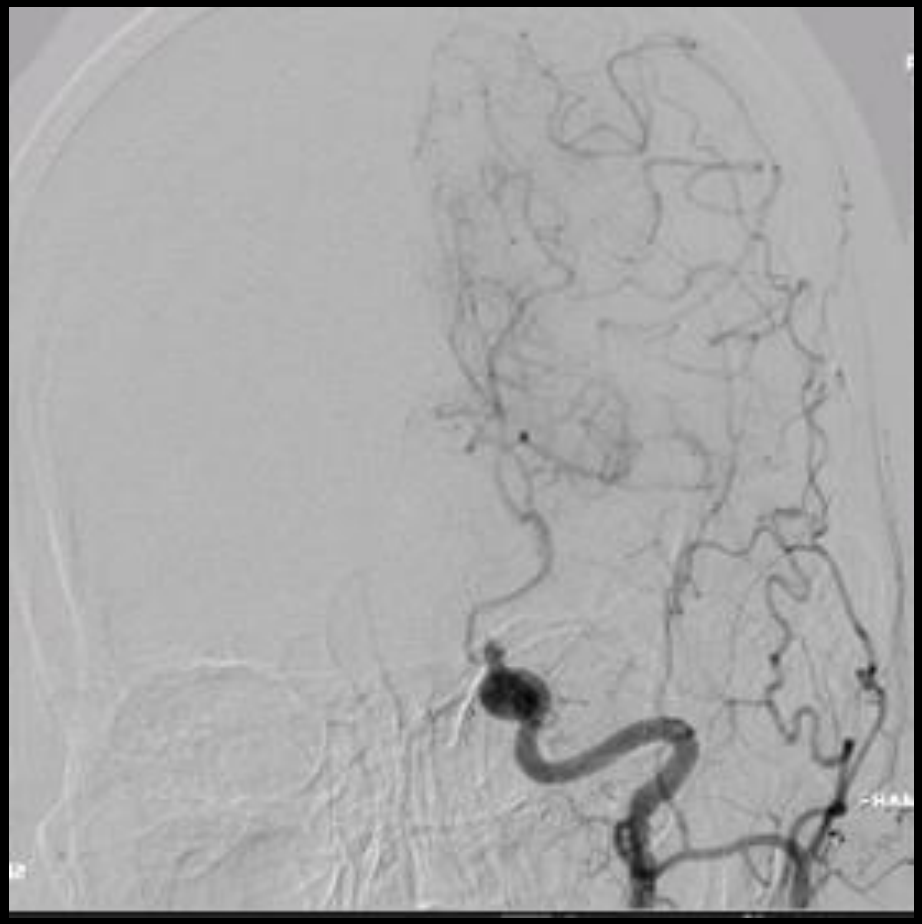
CT angiography

Occlusion of the left distal ICA and M1 –Intermediate collaterals



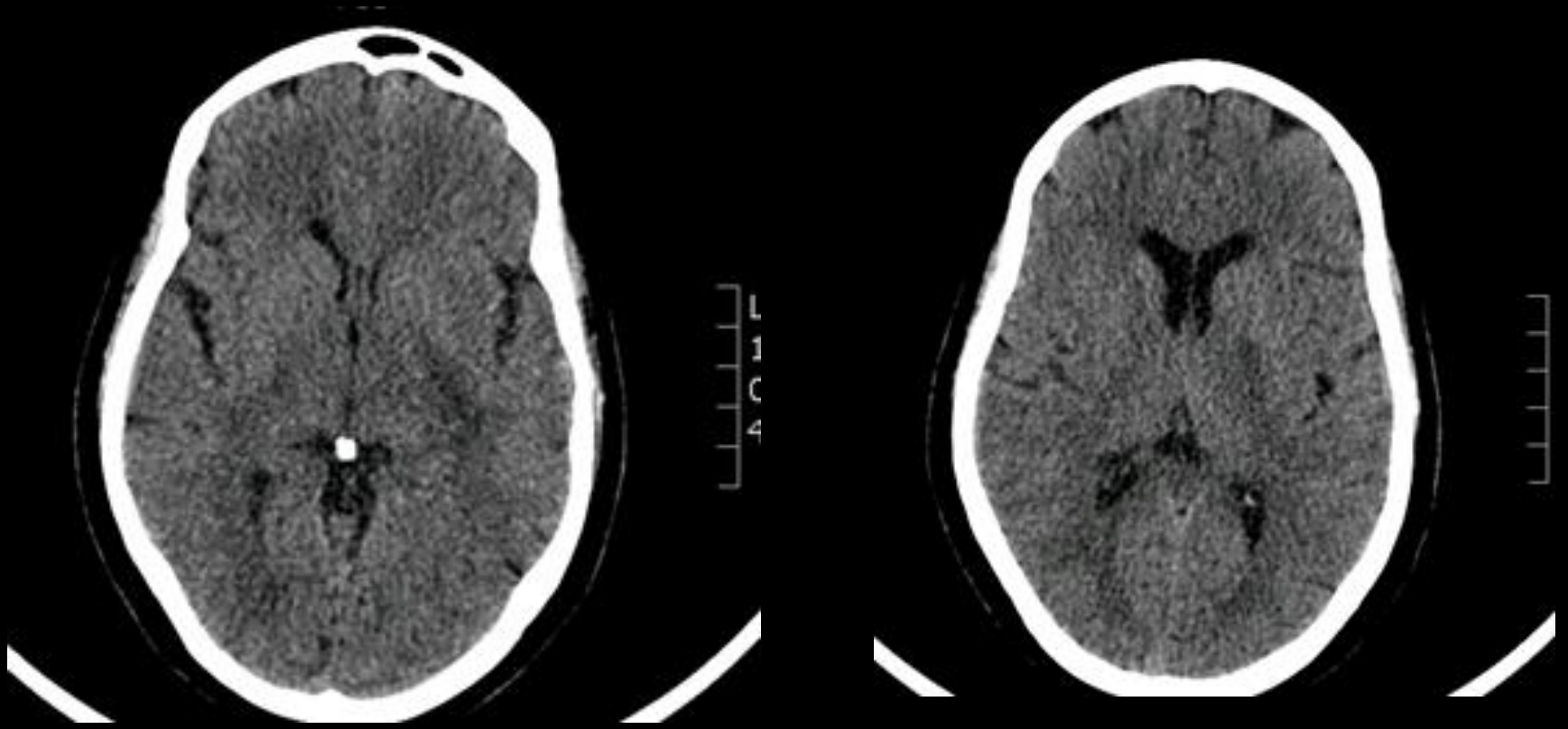

CBV
CBF
MTT
20
15
11
7
2
200
150
100
50
0
20.0
15.0
10.0
5.0
0.0

Recanalization attained with 2 passes –TICI 2 b
Door to groin puncture – 40 minutes
Groin to recanalization- 1 hour



NIHSS at 24 hours- 6

NIHSS at discharge – 0, mRS- 0

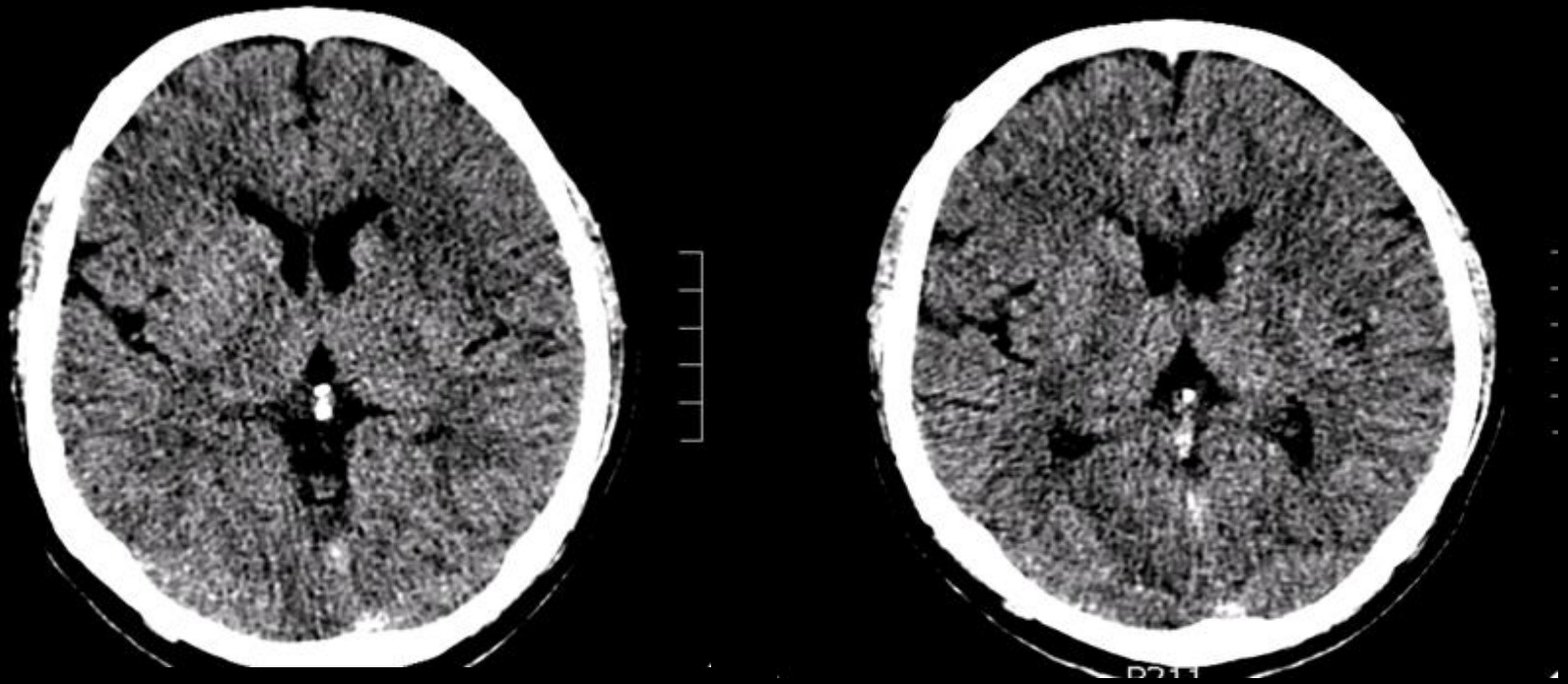


Etiology – RHD , MS Not on anticoagulation earlier

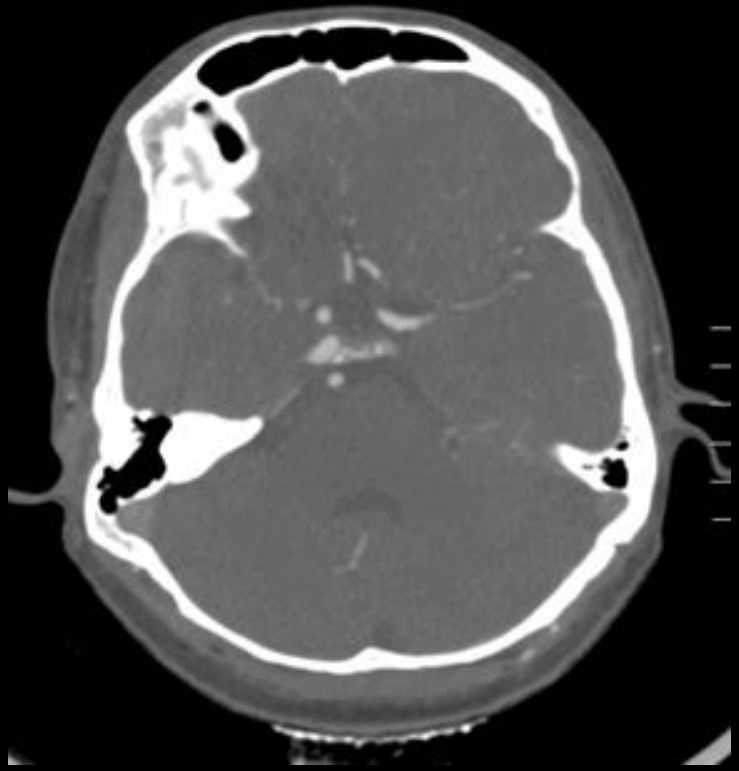
40 year old man chronic smoker and hypertensive
Last seen normal at 8 am, on waking up from sleep at 3.30 PM wife noted right hemiplegia and motor aphasia, reached hospital at 7.30 PM
4 hours from noticing deficit and 11.30 hours from last seen normal

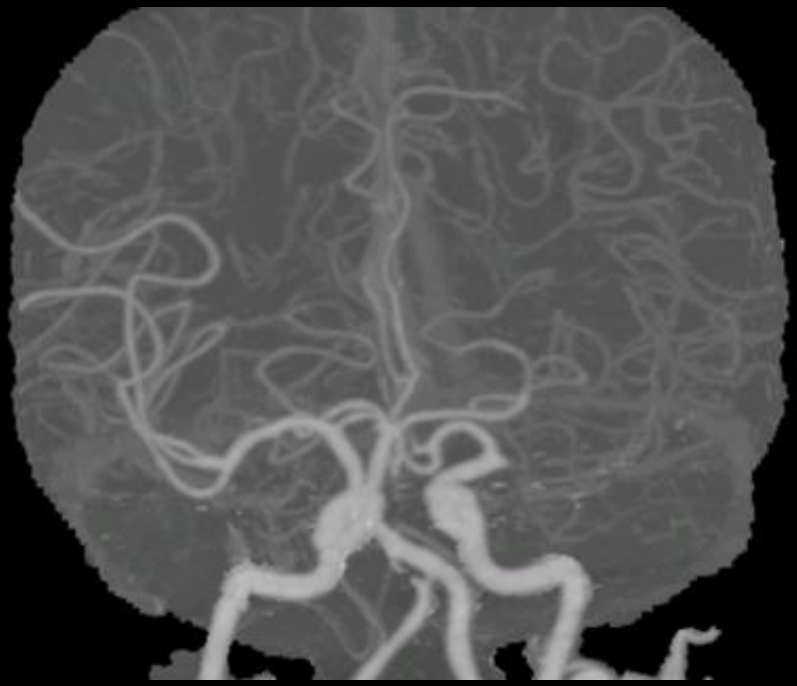
NIHSS 13

ASPECTS 6



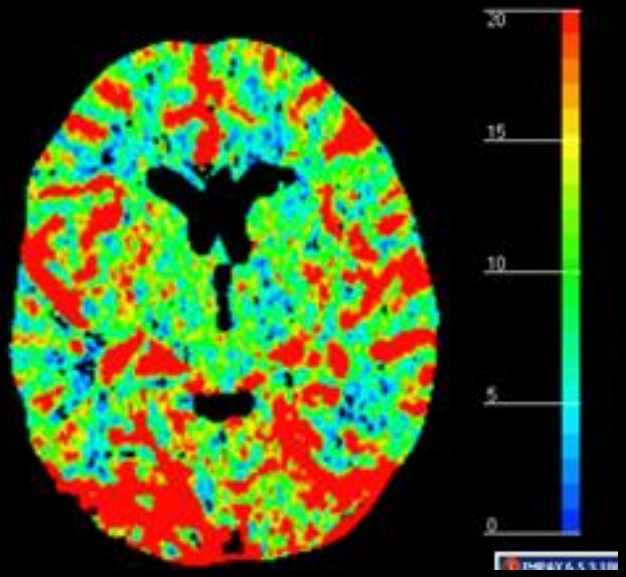
Left M1 occlusion with intermediate collaterals



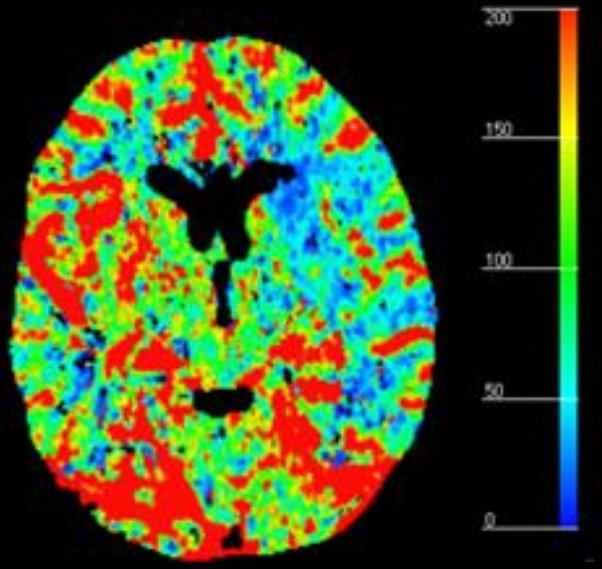


CT Perfusion

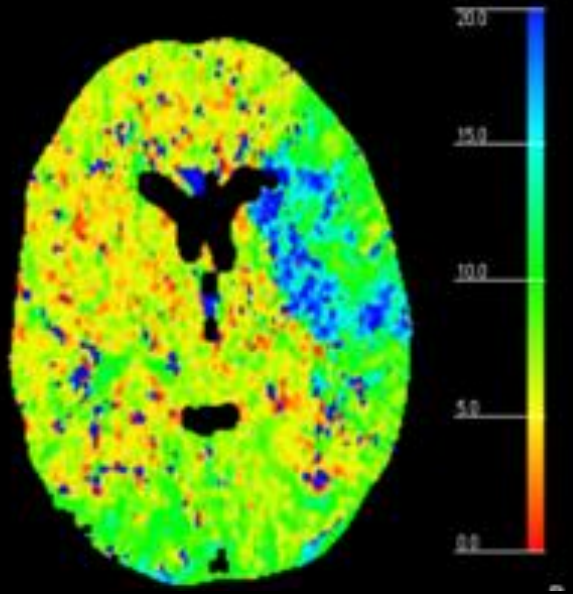
CBV



CBF



MTT



Left M1 occlusion
Recanalized after 3 passes - TICI 2a
Residual stenosis - ICAD

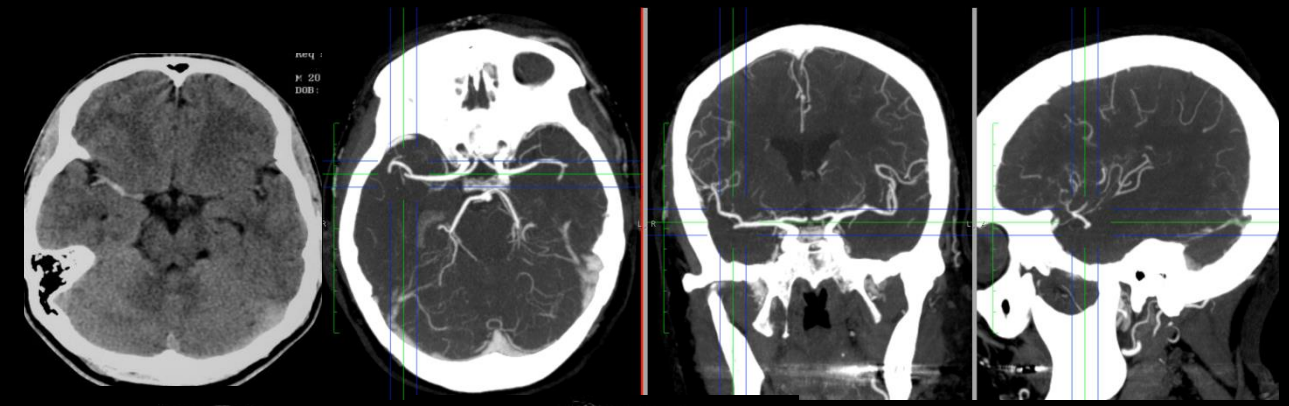
Door to groin puncture – 40 minutes
Groin to recanalization- 1 hr 15 minutes

NIHSS at discharge - 10
mRS- 4

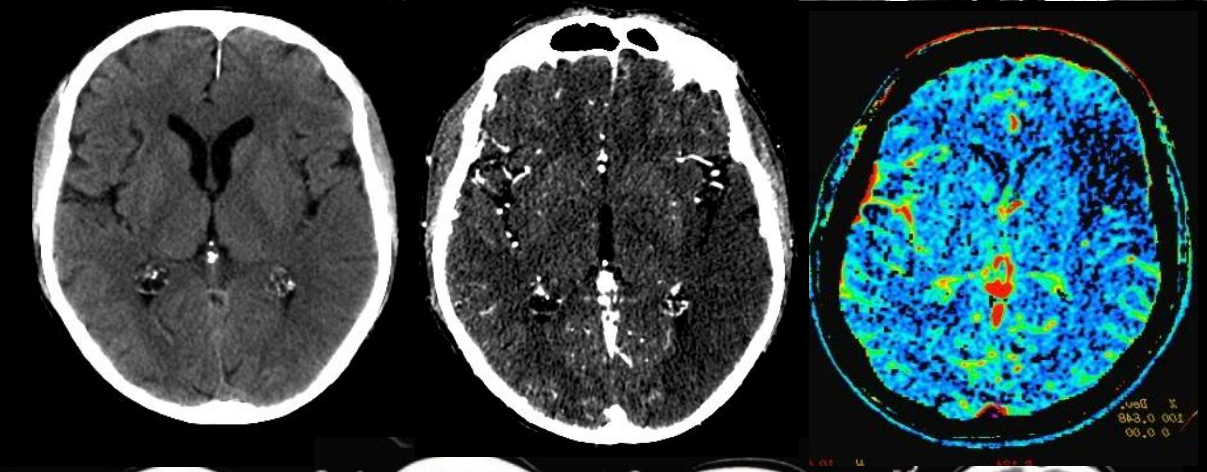
ASPECTS -5

3 month mRS - 3

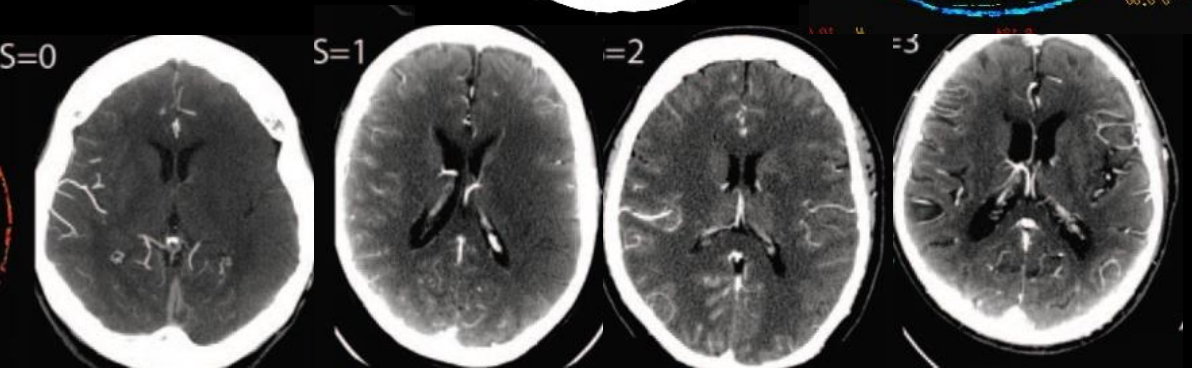
The Three 3 C's for Imaging Selection



Clot (size/location)

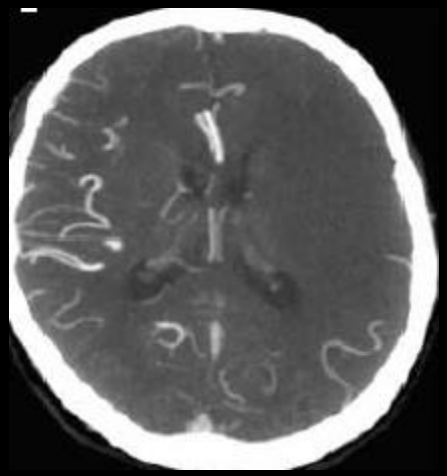


Core (size/severity)

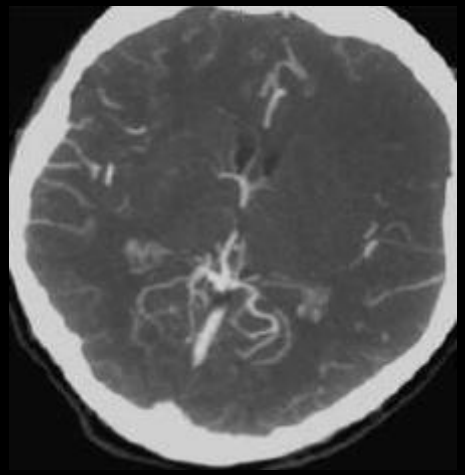


Collaterals

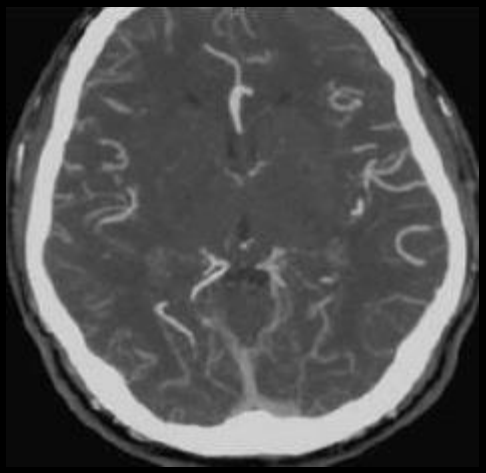
Collateral status- Mass et al grading system



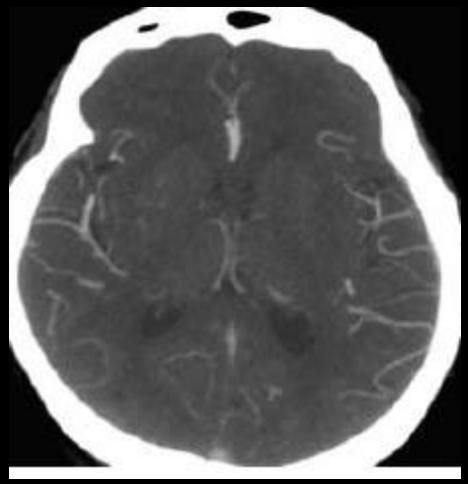
Absent



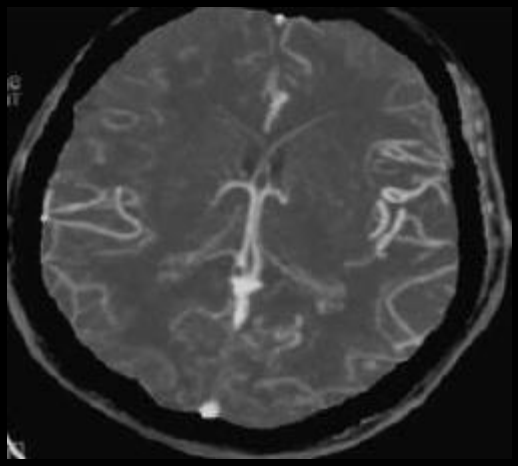
Less than contralateral side



Equal to contralateral side



Greater than contralateral side



Exuberant

DEFUSE 2 Mismatch patients benefit from reperfusion Non mismatch patients do not benefit

Lancet 2012;11:860-7

138 patients

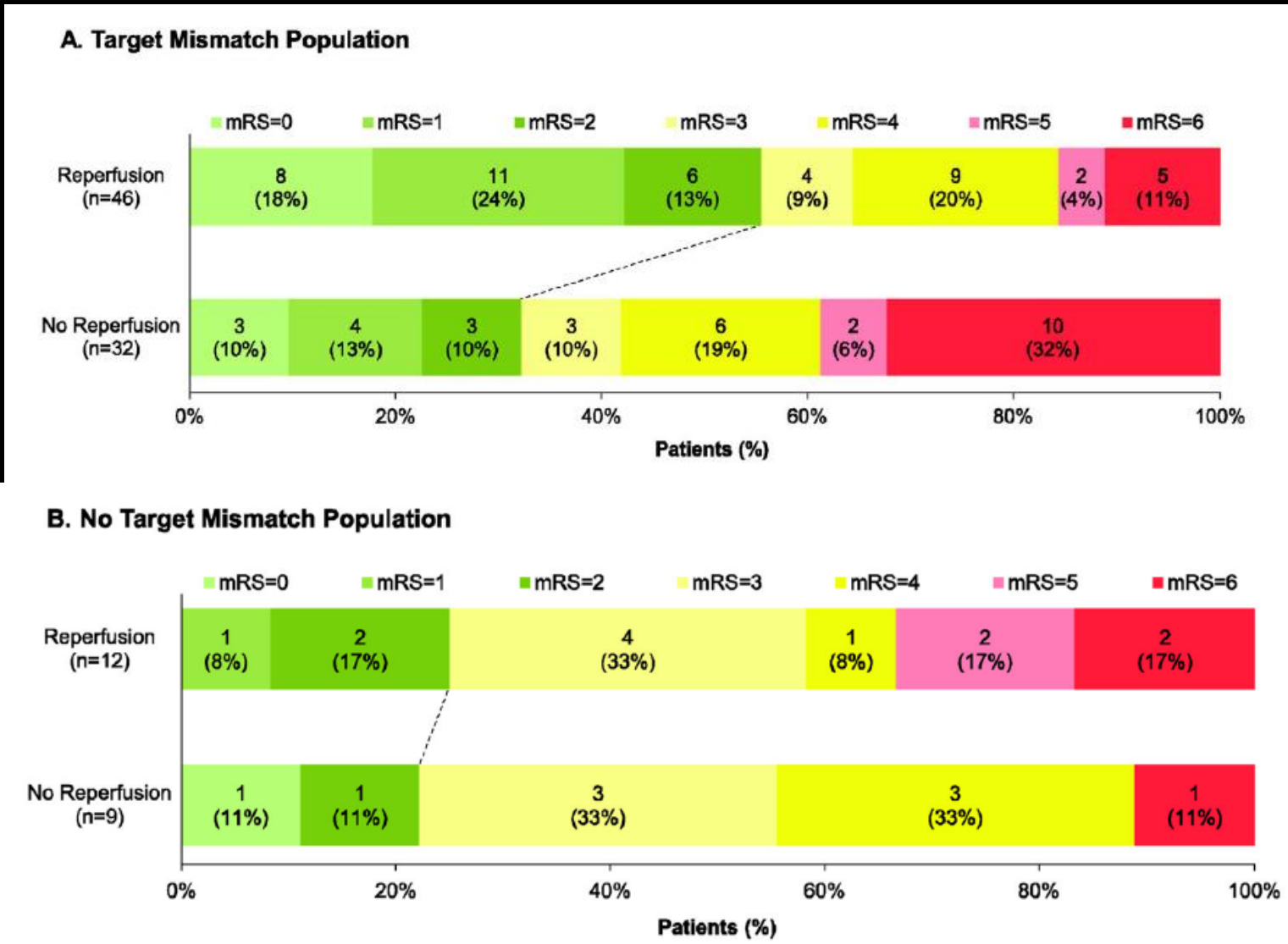
Target Mismatch

OR 4.0 95%CI 1.3-12.2

EVT within 12 hours

No Target mismatch

OR 1.9 95% CI 0.2- 18.7



CT Perfusion in ESCAPE

Computed Tomographic Perfusion Predicts Poor Outcomes in a Randomized Trial of Endovascular Therapy.

Stroke 2018;49:1426-33

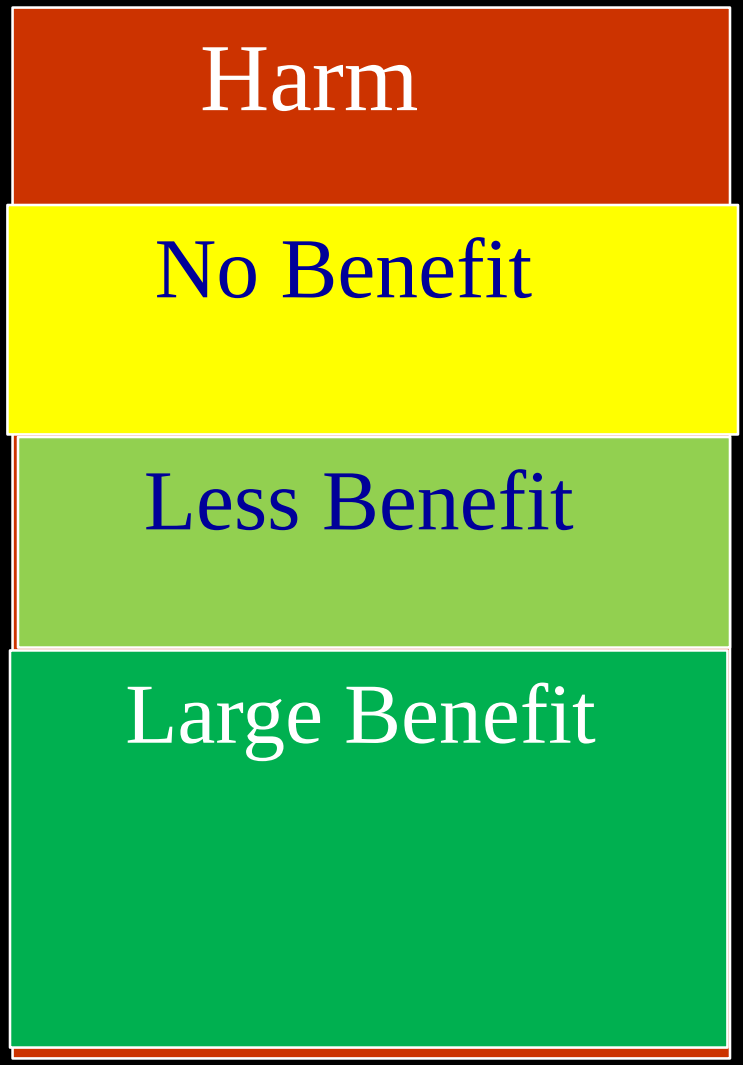
Penumbral pattern – Infarct core <70 ml
Penumbral volume >15 ml
Ratio of hypoperfused vs core volume - >1.8

CT Perfusion was obtained in 44% of the ESCAPE patient

Good functional outcome in the penumbral pattern 46% vs 17% ,P= 0.04

EVT was associated with good functional outcome 57% vs 33% ,p= 0.01

Ischemic penumbra and treatment benefit



Massive core and no penumbra

No Penumbra

Small Penumbra

Large Penumbra

AHA 2018 guideline for imaging selection

Early Window < 6 hours

	COR	LOE
Additional imaging beyond CT and CTA or MRI and magnetic resonance angiography (MRA) such as perfusion studies for selecting patients for mechanical thrombectomy in <6 hours is not recommended.	III: No Benefit	B-R

Late window 6-24 hours

In selected patients with AIS within 6 to 24 hours of last known normal who have LVO in the anterior circulation, obtaining CTP, DW-MRI, or MRI perfusion is recommended to aid in patient selection for mechanical thrombectomy, but only when imaging and other eligibility criteria from RCTs showing benefit are being strictly applied in selecting patients for mechanical thrombectomy.	I	A

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2018;378:708-716

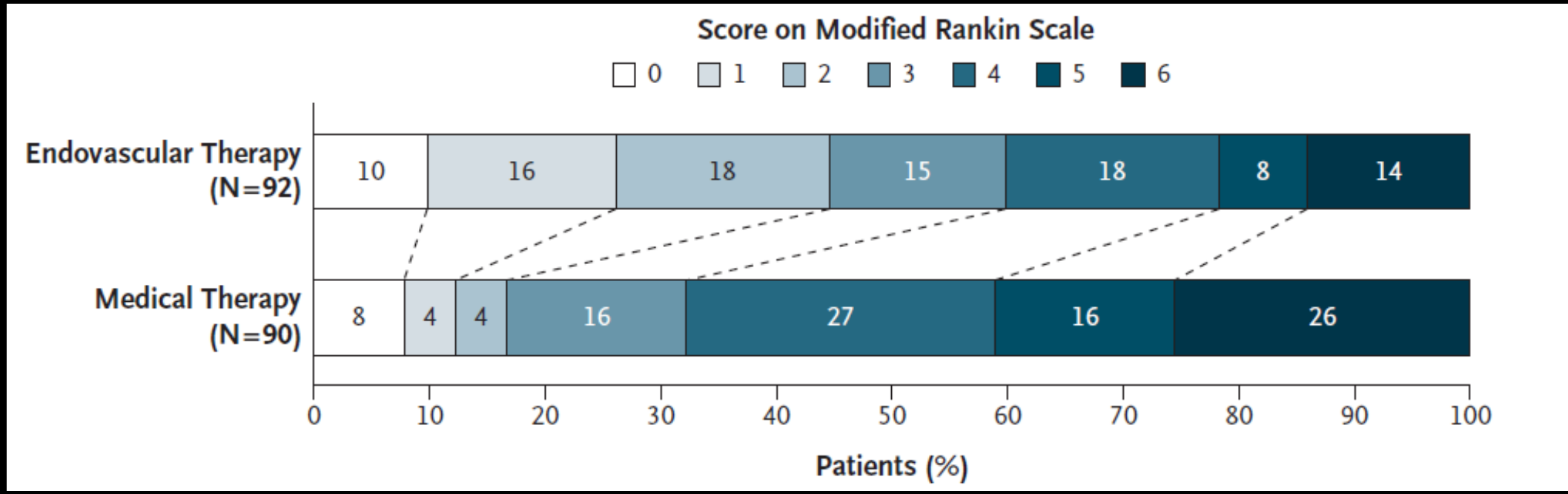
ORIGINAL ARTICLE

Thrombectomy for Stroke at 6 to 16 Hours with Selection by Perfusion Imaging

G.W. Albers, M.P. Marks, S. Kemp, S. Christensen, J.P. Tsai, S. Ortega-Gutierrez, R.A. McTaggart, M.T. Torbey, M. Kim-Tenser, T. Leslie-Mazwi, A. Sarraj, S.E. Kasner, S.A. Ansari, S.D. Yeatts, S. Hamilton, M. Mlynash, J.J. Heit, G. Zaharchuk, S. Kim, J. Carrozzella, Y.Y. Palesch, A.M. Demchuk, R. Bammer, P.W. Lavori, J.P. Broderick, and M.G. Lansberg, for the DEFUSE 3 Investigators*

DEFUSE 3

Modified Rankin Scale scores at 90 days



mRS 0-2 -45% vs 17%,P <0.001

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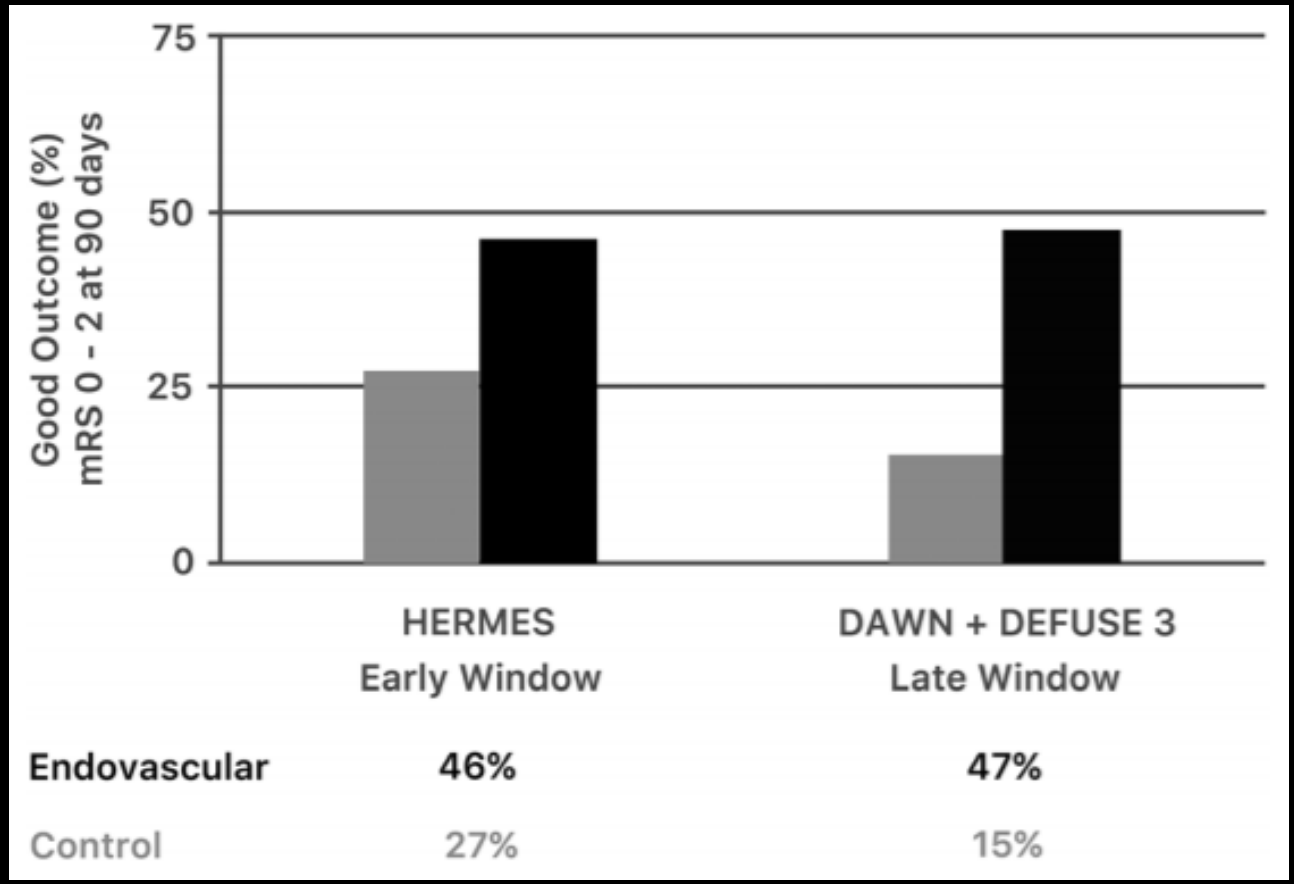
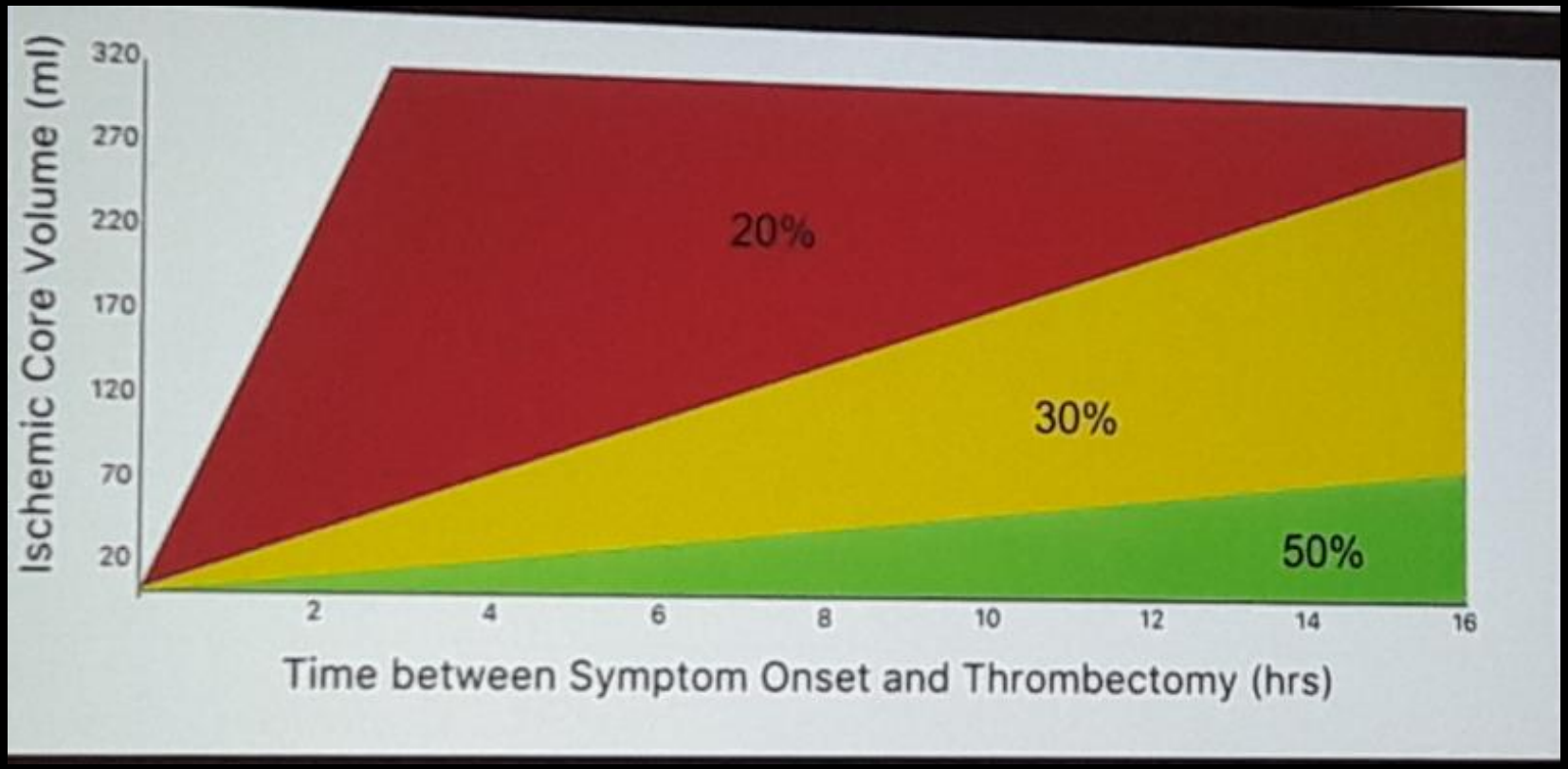
Thrombectomy 6 to 24 Hours after Stroke with a Mismatch between Deficit and Infarct

R.G. Nogueira, A.P. Jadhav, D.C. Haussen, A. Bonafe, R.F. Budzik, P. Bhuva, D.R. Yavagal, M. Ribo, C. Cognard, R.A. Hanel, C.A. Sila, A.E. Hassan, M. Millan, E.I. Levy, P. Mitchell, M. Chen, J.D. English, Q.A. Shah, F.L. Silver, V.M. Pereira, B.P. Mehta, B.W. Baxter, M.G. Abraham, P. Cardona, E. Veznedaroglu, F.R. Hellinger, L. Feng, J.F. Kirmani, D.K. Lopes, B.T. Jankowitz, M.R. Frankel, V. Costalat, N.A. Vora, A.J. Yoo, A.M. Malik, A.J. Furlan, M. Rubiera, A. Aghaebrahim, J.-M. Olivot, W.G. Tekle, R. Shields, T. Graves, R.J. Lewis, W.S. Smith, D.S. Liebeskind, J.L. Saver, and T.G. Jovin, for the DAWN Trial Investigators*

Larger benefit with later treatment

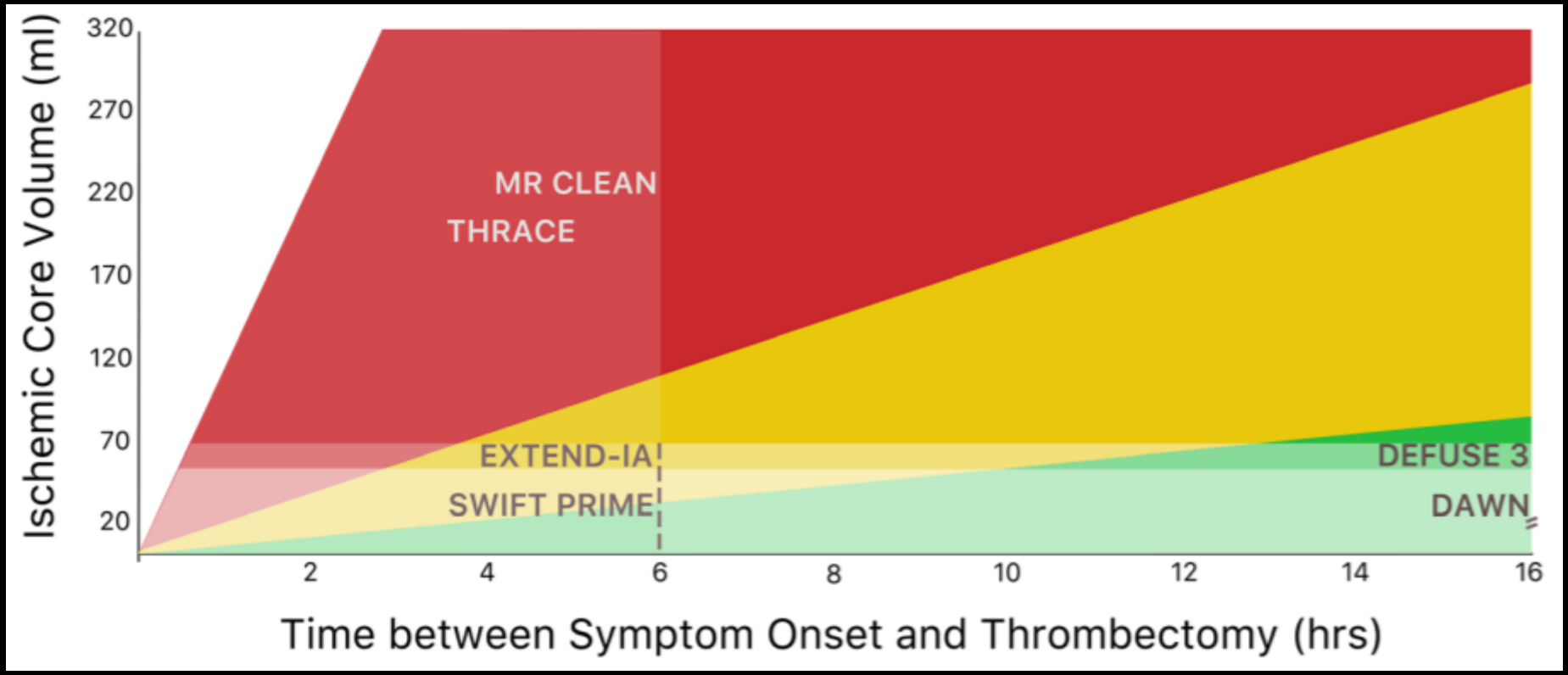


Infarct Growth Rate is Highly Variable



Rapid growth – 15 to 100 ml/hr
Intermediate growth- 3 to 10 ml /hr
Slow growth – 10 to 15 ml at 10 hours

Infarct growth rates in trials



Late Window Paradox

- Slow Infarct Growers
- Favourable collateral circulation
- Influence of tPA

Selecting stroke patients for late thrombectomy in real world

Good outcomes in DAWN and DEFUSE 3

- Careful patient selection
- Sophisticated imaging and computer soft ware program
- Effective for only a small subgroup

- EVT upto 6 hours – 10% of patients benefit
- EVT upto 24 hours – 15 % of patients benefit

Conclusions

- In mismatch patients , endovascular treatment initiated >6 - 24 hours from TLSW is no less effective than treatment 0-6 hours

- Safety profile no different than 0- 6 hours

- Effectiveness is maintained across all subgroups including those defined by age,time,mode of presentation and ASPECTS scores


Thankyou for your attention