

Inserm

Institut national
de la santé et de la recherche médicale



What every vascular surgeon should know about perfusion CTA in stroke patients?

Mikael Mazighi

Service de Neuroradiologie Interventionnelle
Fondation Ophtalmologique de Rothschild
Paris

Unité de Soins Intensifs NeuroVasculaire
Hôpital Lariboisière
Paris

INSERM U 1148: Laboratory of Vascular Biology Translational Science
Paris

Speaker Disclosure

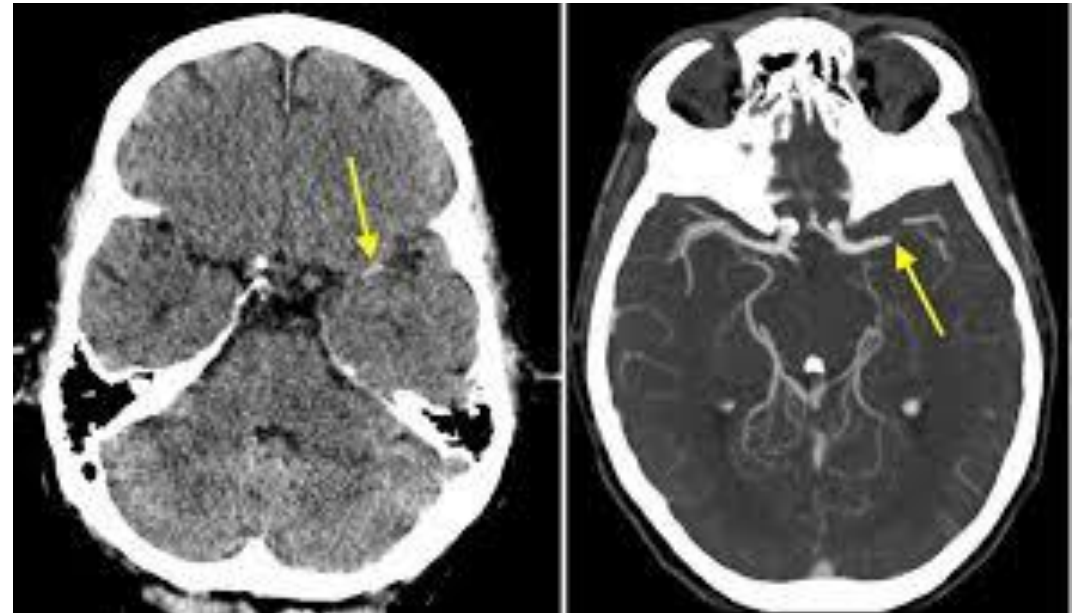
	No, nothing to disclose
	Yes, please specify:

<i>Company Name</i>	<i>Honoraria/ Expenses</i>	<i>Consulting/ Advisory Board</i>	<i>Funded Research</i>	<i>Royalties/ Patent</i>	<i>Stock Options</i>	<i>Ownership/ Equity Position</i>	<i>Employee</i>	<i>Other (please specify)</i>
Amgen	X	X						
Boehringer Ingelheim	X	X						
Bristol Mayer Squibb	X							
Acticor Biotech		X						
Medtronic	X	X						
Servier		X						

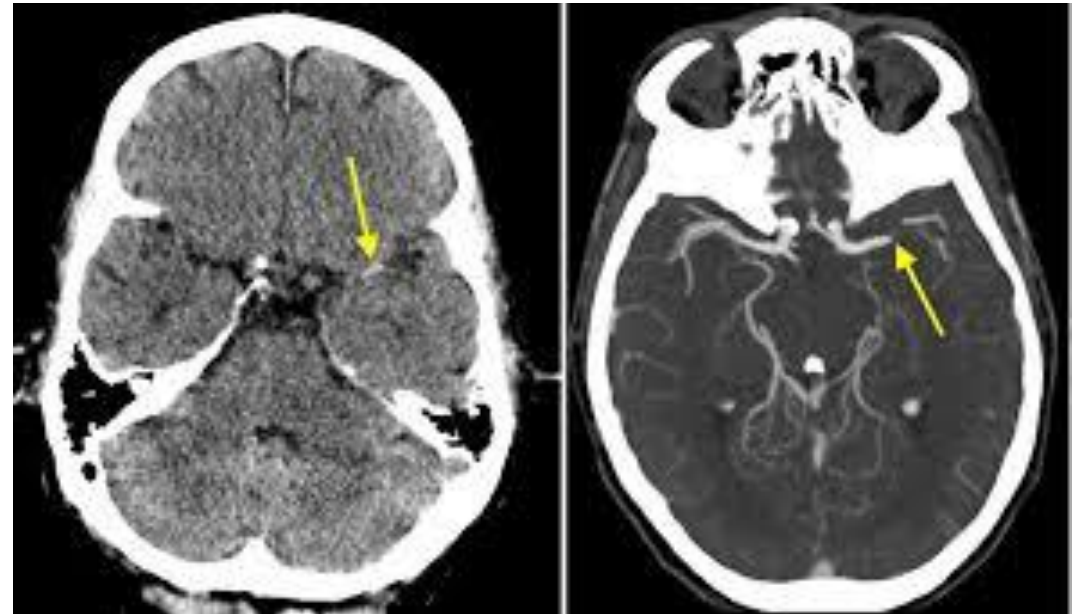


CT, ANGIO-CT: what are we looking for?

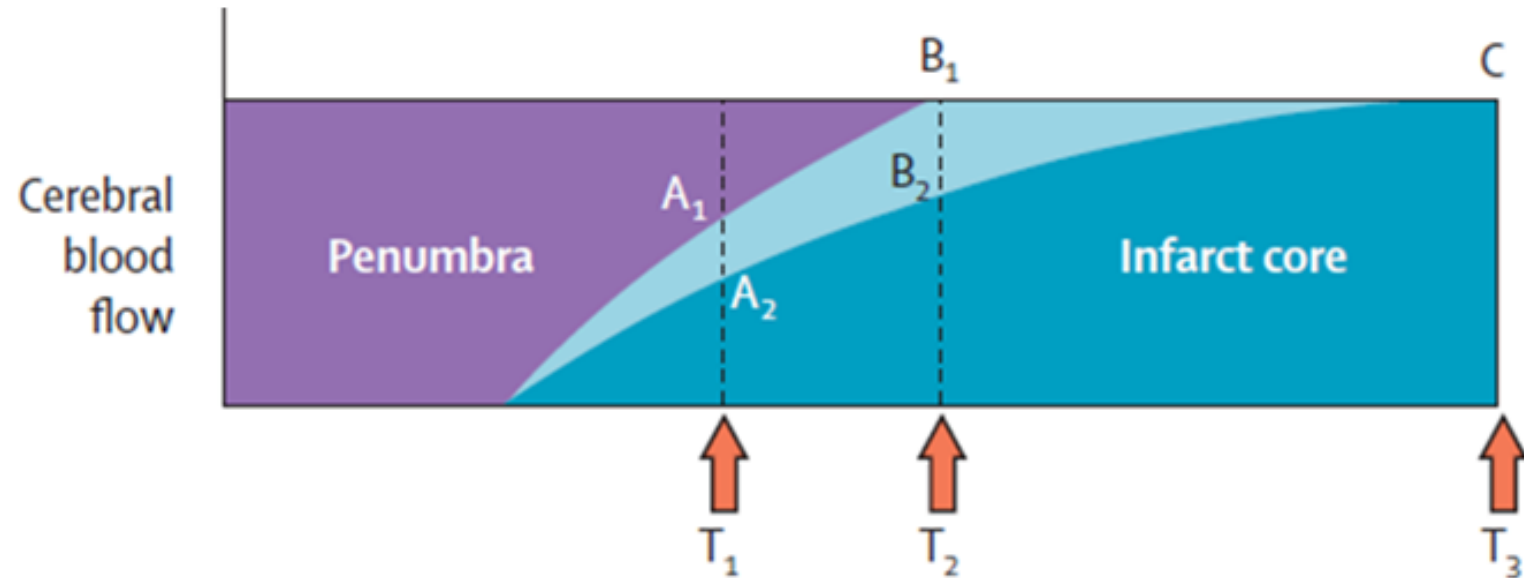
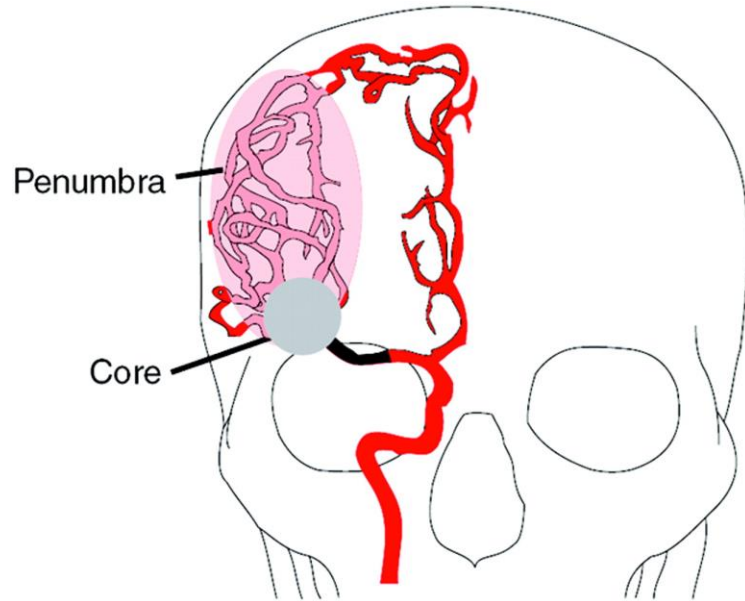
- RULE OUT INTRACRANIAL BLEEDING
- IDENTIFY INTRACRANIAL OCCLUSION



Perfusion-CT: what are we looking for?



CT PERFUSION: Penumbra Imaging



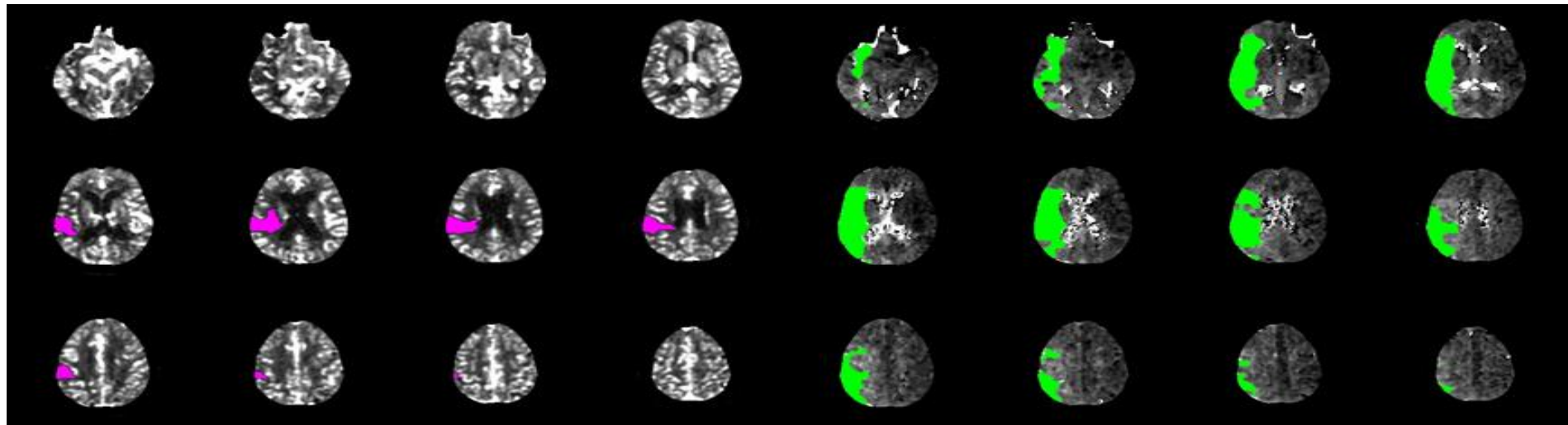


Perfusion CT

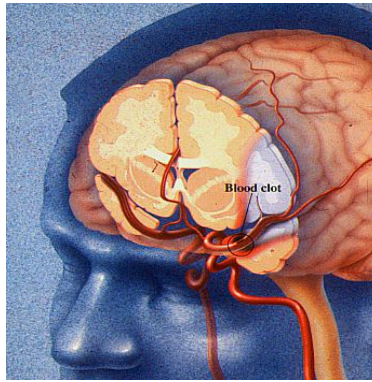
ISCHEMAVIEW : RAPID™
SOFTWARE



Mismatch Volume : 66 ml
Mismatch ratio : 7,6





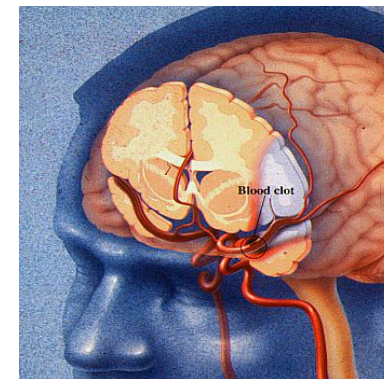


Acute ischemic Stroke+
Large Vessel Occlusion

What is the standard of care?

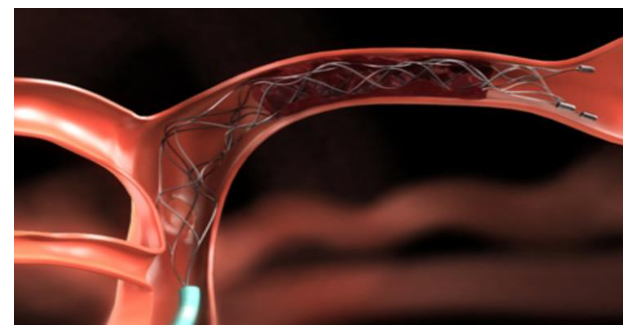
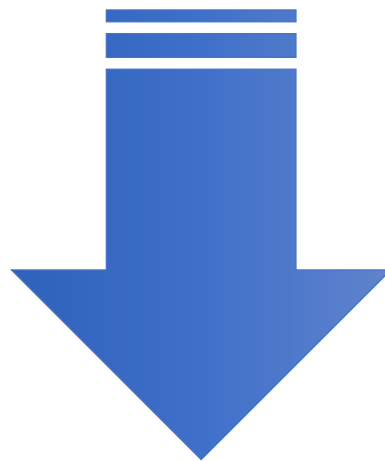
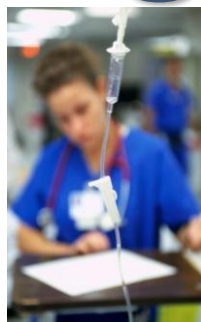
European Stroke Organisation
(ESO) – European Society for
Minimally Invasive Neurological Therapy
(ESMINT) guidelines on mechanical
thrombectomy in acute ischaemic stroke

European Stroke Journal
0(0) 1–47
© European Stroke Organisation
2019
Article reuse guidelines:
sagepub.com/journals-permissions
journals.sagepub.com/home/eso
SAGE

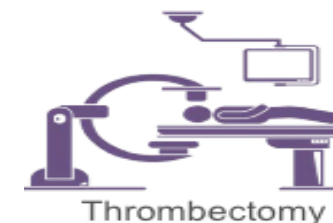


Endorsed by Stroke Alliance for Europe (SAFE)

Acute ischemic Stroke+ Large Vessel Occlusion



tPA + THROMBECTOMY

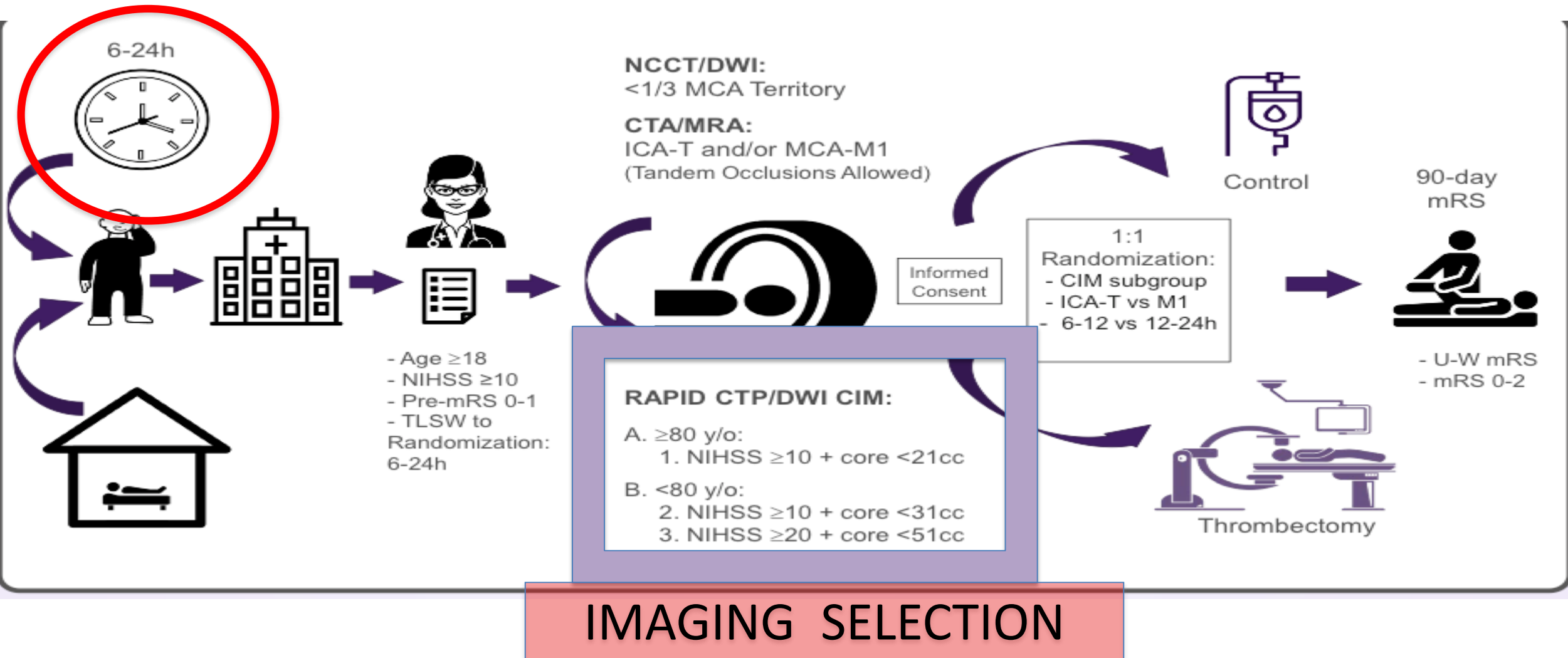


Thrombectomy 6 to 24 Hours after Stroke with a Mismatch between Deficit and Infarct

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. Teckle, 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*

This article was published on November 11, 2017, at NEJM.org.

DAWN STUDY



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. Olivrot, 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*

DAWN STUDY

	Thrombectomy	Control	Treatment benefit (95% CI)	Bayesian probability of superiority
Day 90 weighted mRS	5.5 ± 3.8	3.4 ± 3.1	2.1 (1.20, 3.12)	>0.9999*
Day 90 mRS (0-2)	48.6%	13.1%	35.5% (23.9%, 47.0%)	>0.9999*

Favorable outcome

Selected patients
+++

73% relative risk reduction of dependency in ADL's
NNT for any lower disability 2.0



DEFUSE 3 STUDY

The NEW ENGLAND JOURNAL of MEDICINE

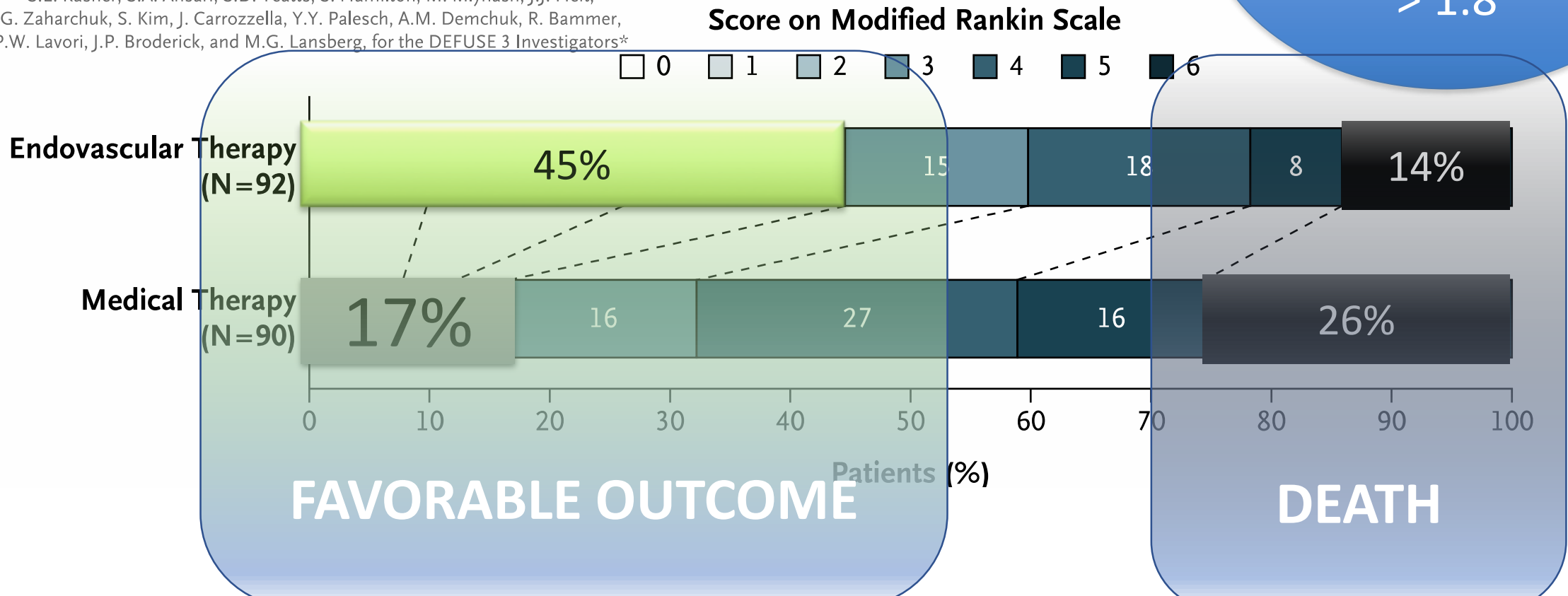
This article was published on January 24
2018, at NEJM.org.

ORIGINAL ARTICLE

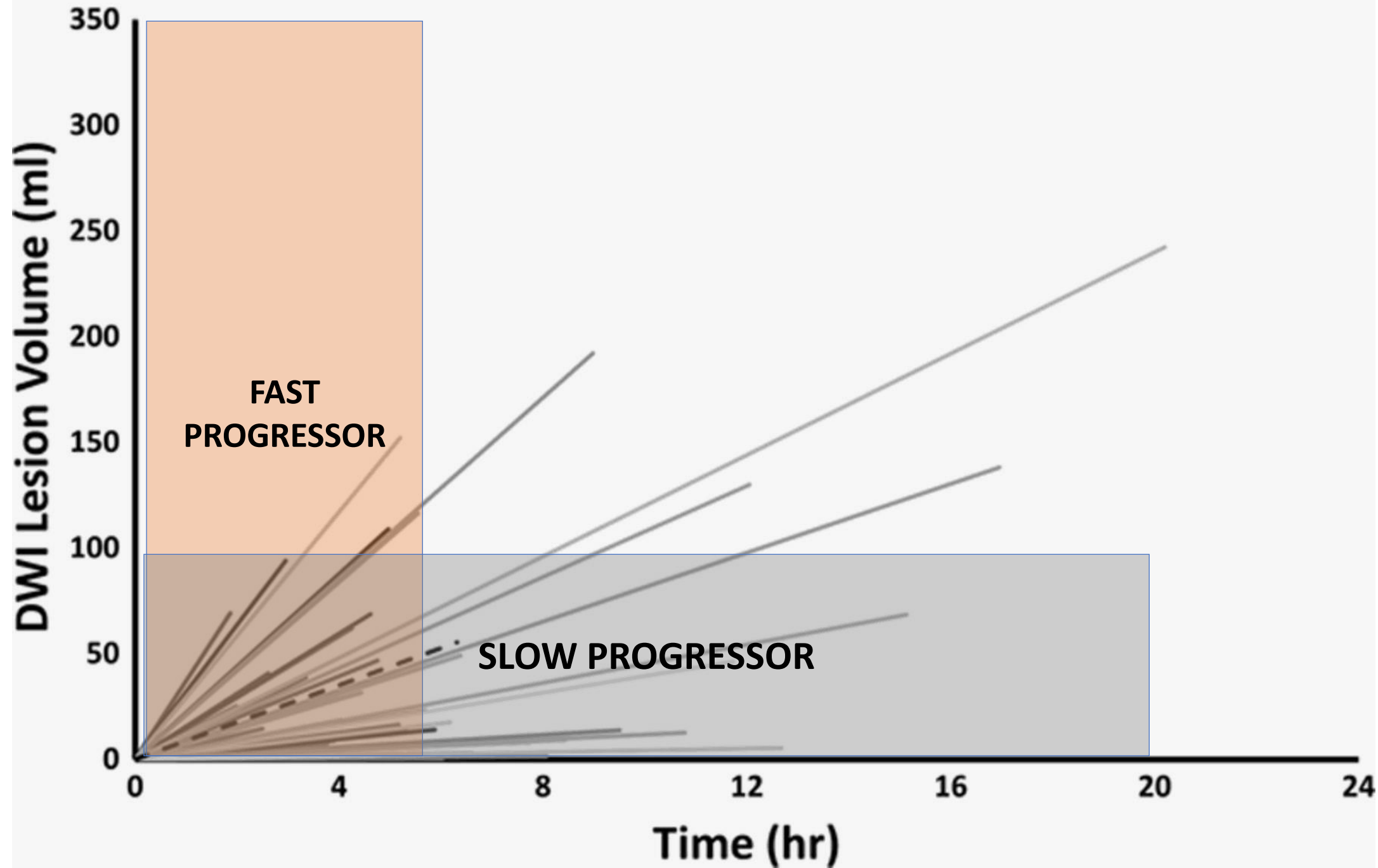
Thrombectomy for Stroke at 6 to 16 Hours with Selection by Perfusion Imaging

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*

Stroke vol < 70
cc, vol
penumbra/AVC
> 1.8



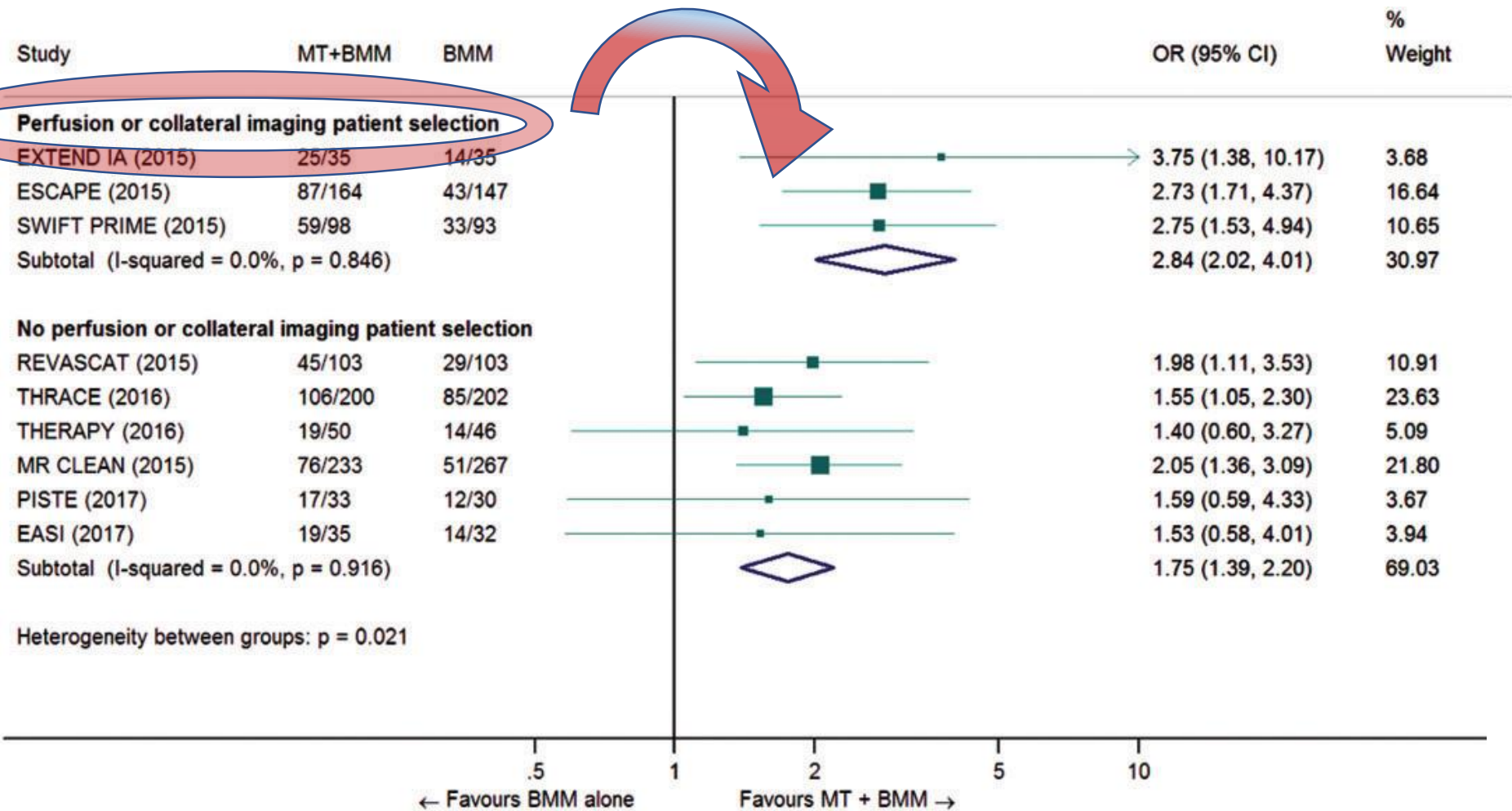
Linear Model of Infarct Growth



European Stroke Organisation
(ESO) – European Society for
Minimally Invasive Neurological Therapy
(ESMINT) guidelines on mechanical
thrombectomy in acute ischaemic stroke

Endorsed by Stroke Alliance for Europe (SAFE)

IMPACT OF IMAGING MODALITY for the 0-6h window?





2018 Guidelines for the Early Management of Patients With Acute Ischemic Stroke

A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association

Reviewed for evidence-based integrity and endorsed by the American Association of Neurological Surgeons and Congress of Neurological Surgeons

In selected patients with AIS within **6 to 16 hours** of last known normal who have LVO in the anterior circulation and meet other **DAWN** or **DEFUSE 3** eligibility criteria, mechanical thrombectomy is recommended.

In selected patients with AIS within **6 to 24 hours** of last known normal who have LVO in the anterior circulation and meet other **DAWN** eligibility criteria, mechanical thrombectomy is reasonable.

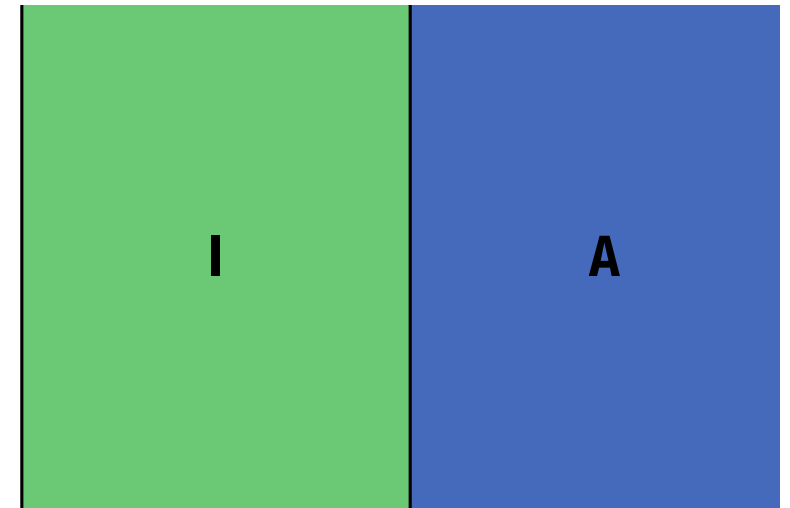
I	A
IIa	B-R

2018 Guidelines for the Early Management of Patients With Acute Ischemic Stroke

A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association

Reviewed for evidence-based integrity and endorsed by the American Association of Neurological Surgeons and Congress of Neurological Surgeons

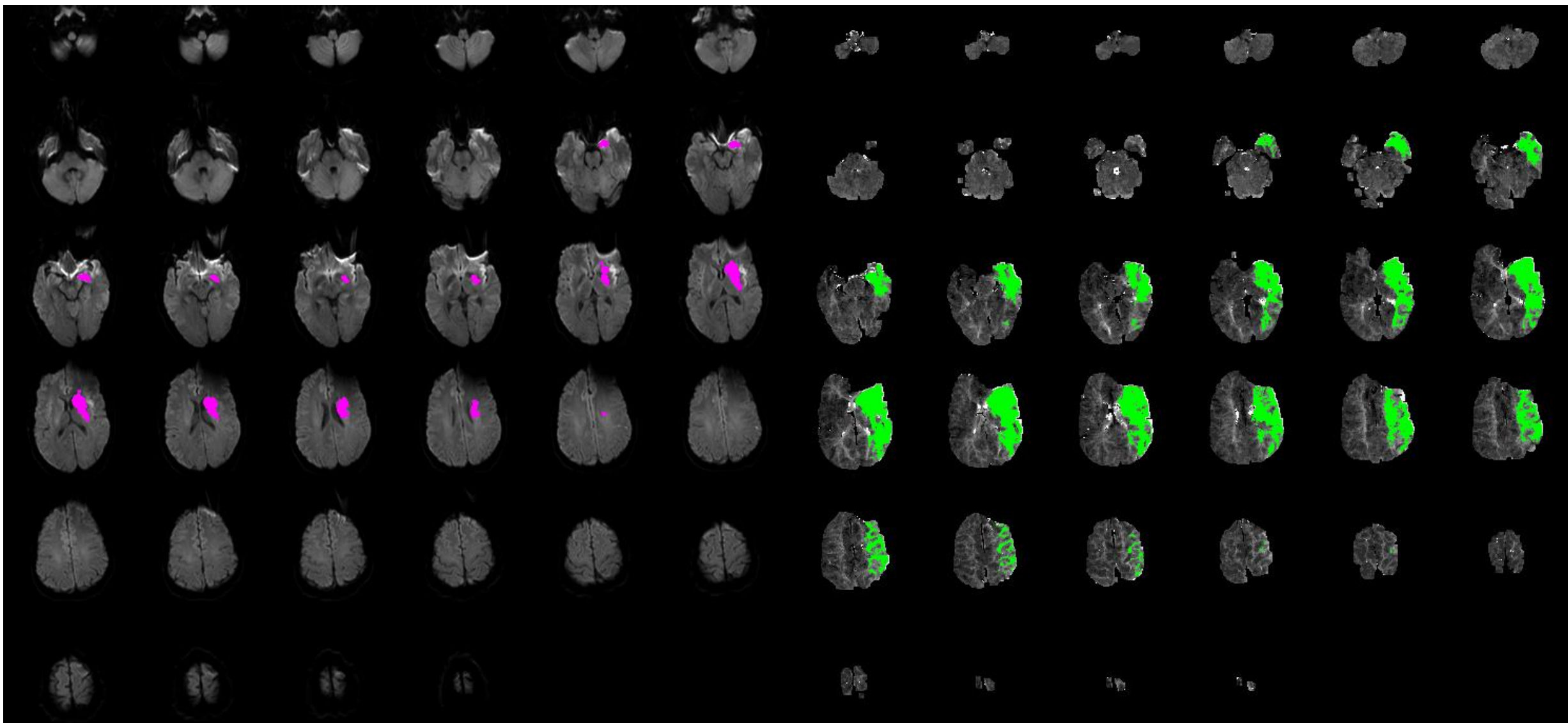
In selected patients with AIS within **6 to 24 hours** of last known normal who have LVO in the anterior circulation, obtaining **CTP, DW-MRI, or MRI perfusion is recommended** to aid in patient selection for mechanical thrombectomy, but only when imaging and other eligibility criteria from RCTs showing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



CLINICAL CASE

- 30 years old
- No medical history
- 7:00 pm, right hemiparesia and aphasia
- Goes to bed
- Next day 9:00 am, persistent neurological deficit
- 11:00 am, NIHSS 15



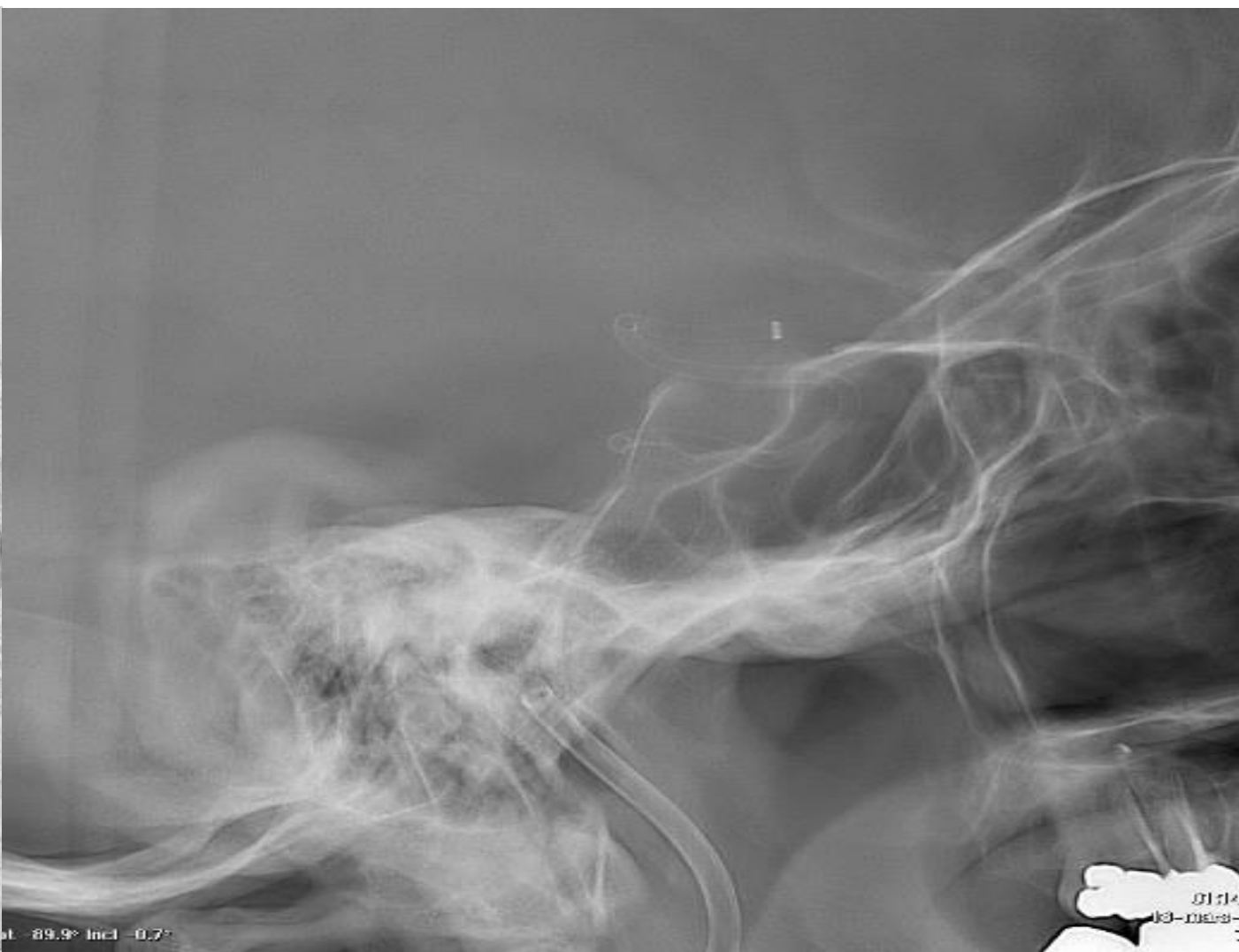


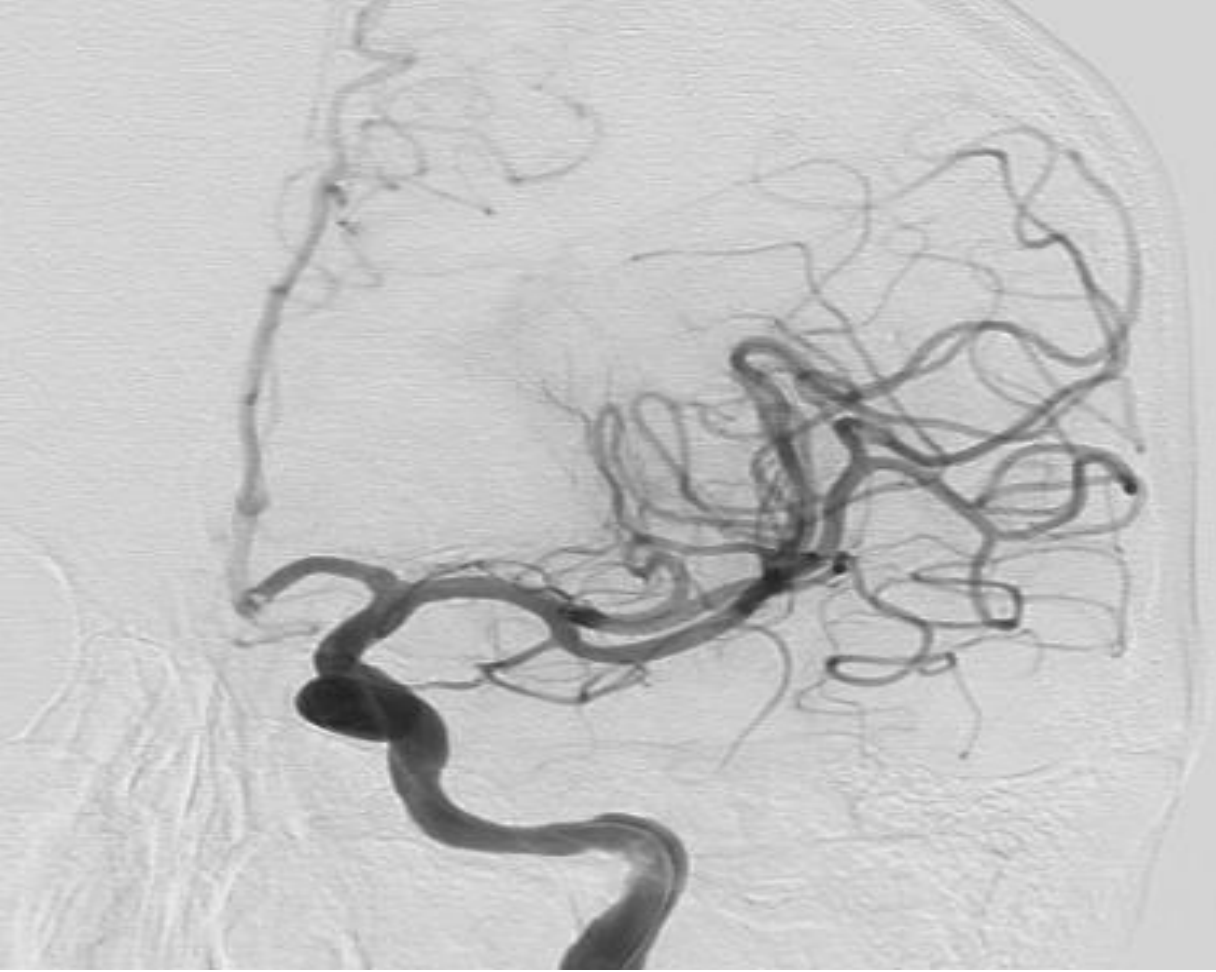
ADC<620 volume: 18 ml

Tmax>6.0s volume: 134 ml

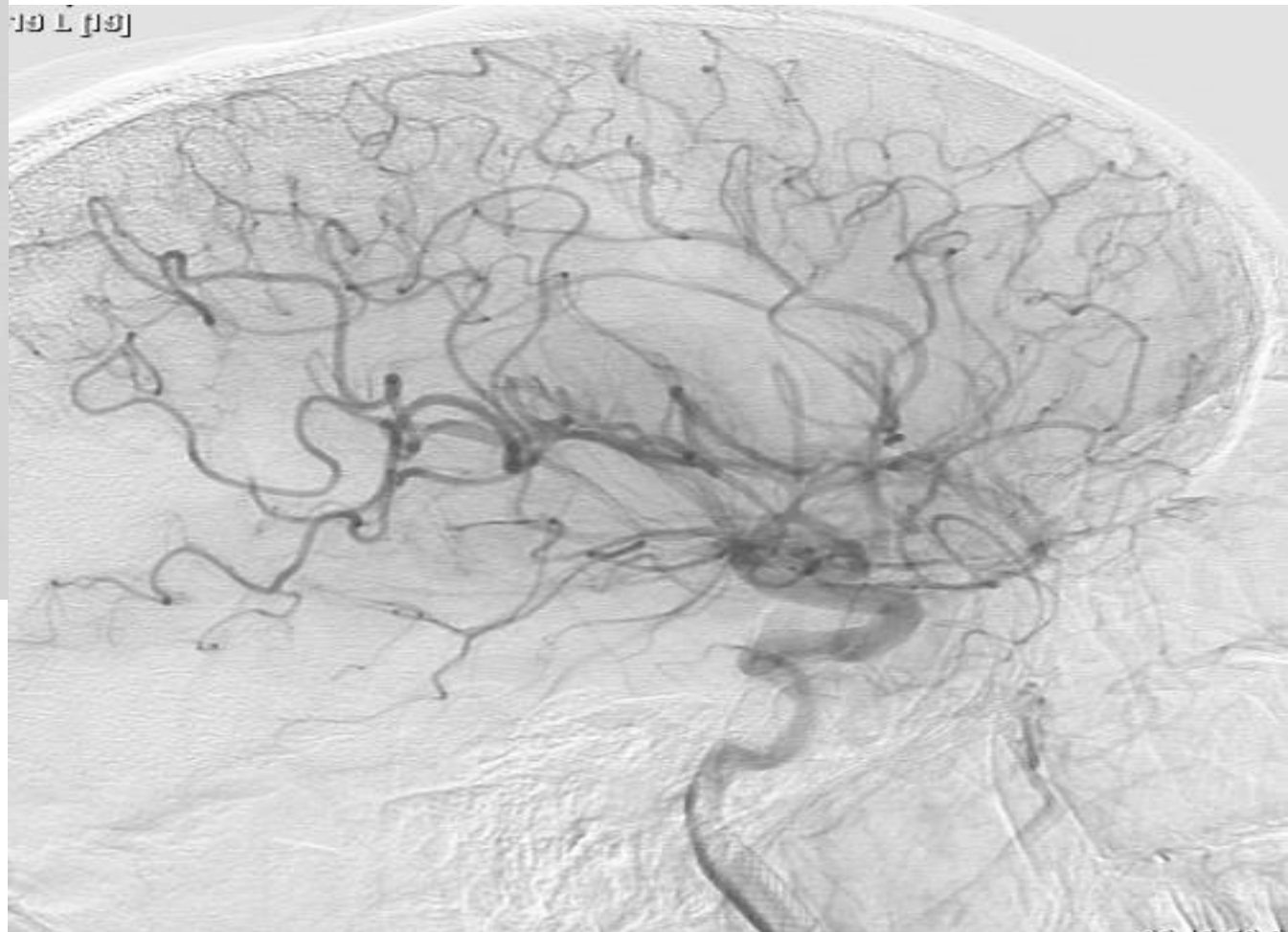
Mismatch volume: 116 ml

Mismatch ratio: 7.4

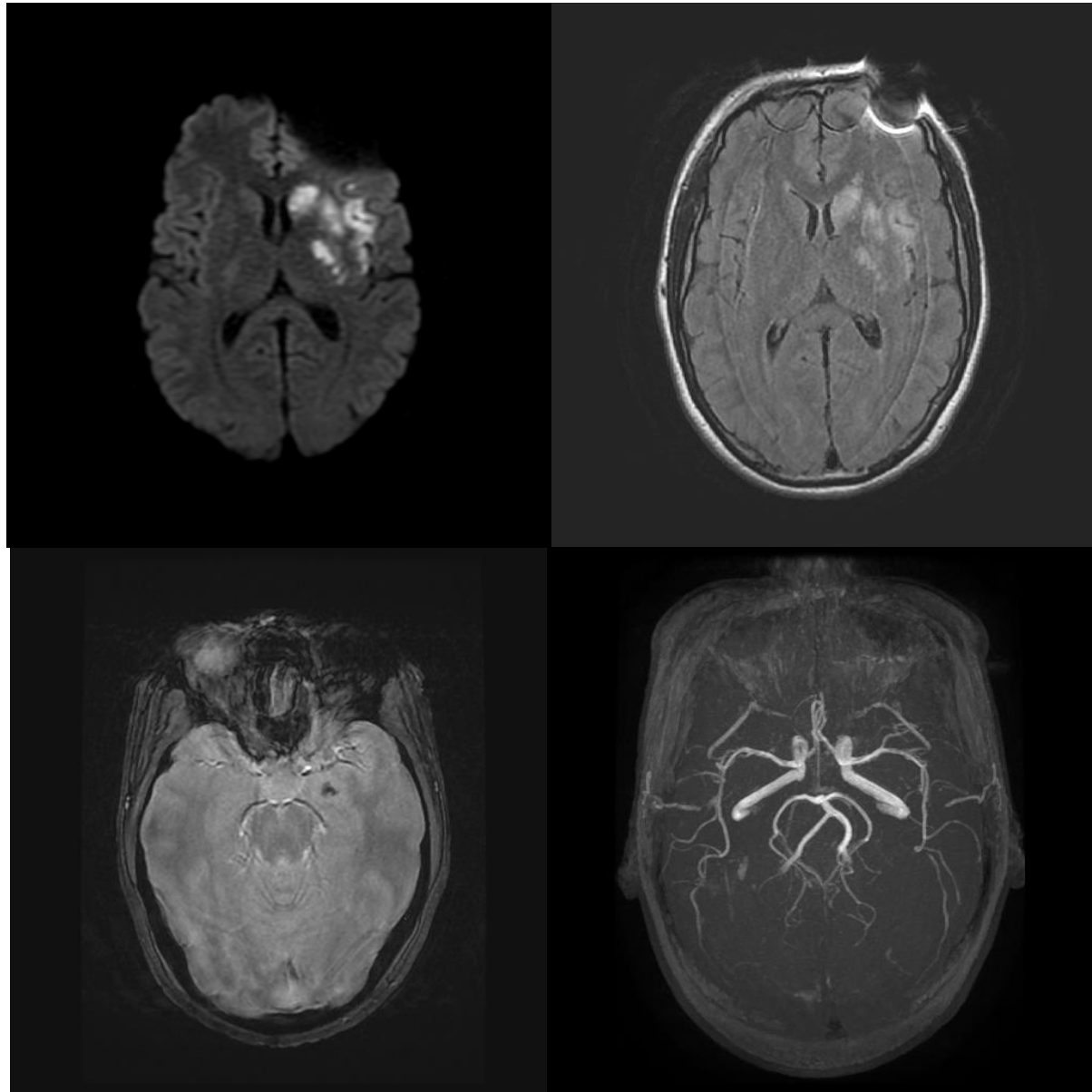




[9] L 109



MRI @ 24 hrs



TAKE HOME MESSAGES

- Beyond 6 hours after stroke onset perfusion imaging is required
- Automated process for imaging analysis
- Moving towards salvageable brain imaging approach irrespective of the timing

ESC Heart & Stroke 2020

International conference of the ESC Council on Stroke



24-25 January 2020
Barcelona, Spain

- Join this unique meeting in Europe and meet **experts from various specialties involved in stroke care:**
cardiologists, neurologists,
vascular surgeons, interventional neuroradiologists...
- **Program** is focused on **interdisciplinary exchange:**
 - ✓ Case presentations
 - ✓ Debates on controversial topics
 - ✓ Panel discussions
 - ✓ Discussion of latest clinical trials
 - ✓ Interactive workshops

24 – 25 January
Barcelona

