



Extended time windows

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AUSL Bologna



SERVIZIO SANITARIO REGIONALE
EMILIA-ROMAGNA
Azienda Unità Sanitaria Locale di Bologna
OSPEDALE MAGGIORE

Istituto delle Scienze Neurologiche
Istituto di Ricovero e Cura a Carattere Scientifico

Conflitti di interesse

- Consulenze e Advisory Board per *Medtronic, Stryker, Boehringer-Ingelheim, Daiichi Sankio*.

ORIGINAL ARTICLE

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

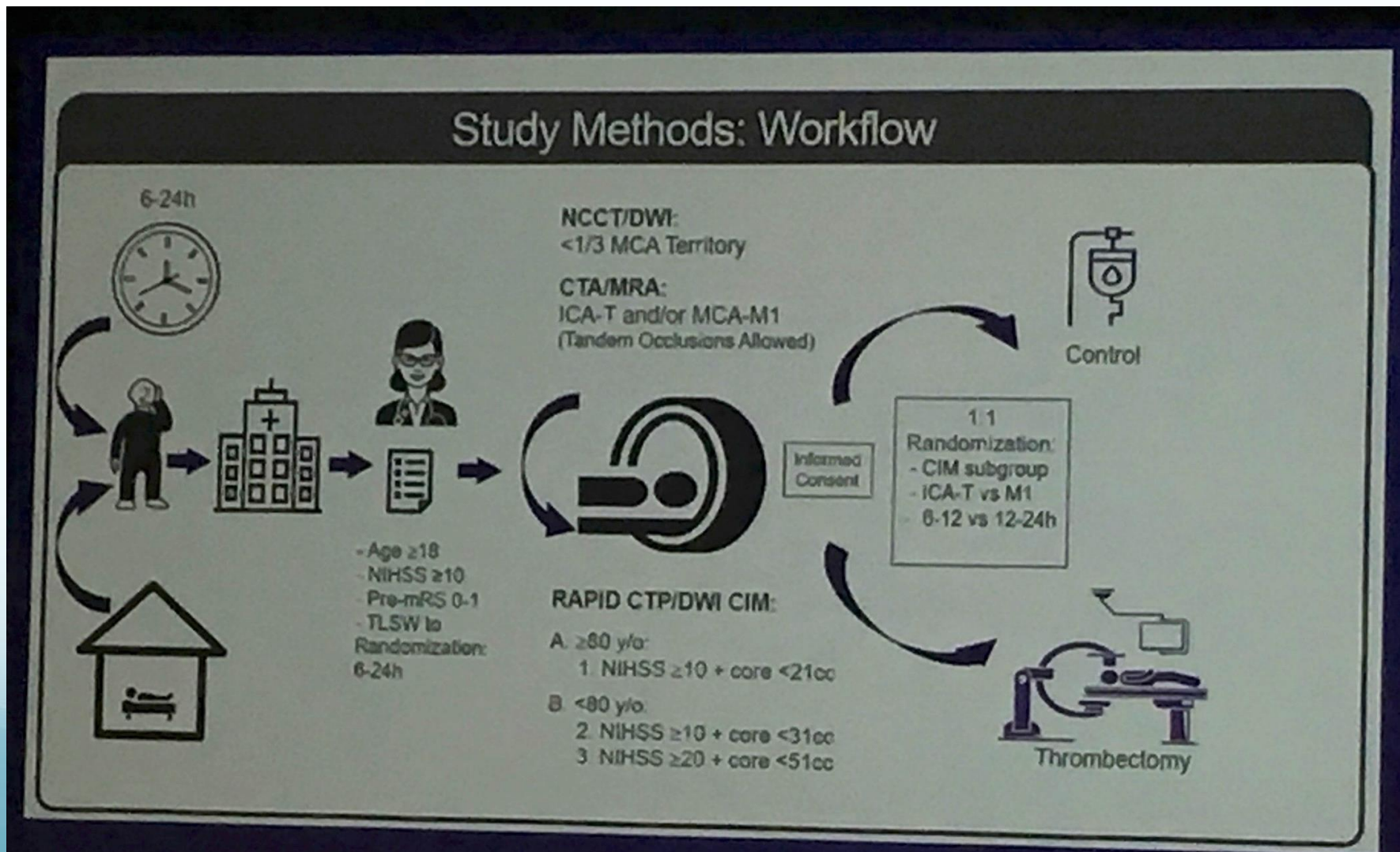
R.G. Nogueira, A.P. Jadhav, D.C. Haussen, A. Bonafe, R.F. Budzik, P. Bhuva, D.R. Yavagal, M. Ribo, C. Cognard, R.A. Hanel, C.A. Sila, A.E. Hassan, M. Millan, E.I. Levy, P. Mitchell, M. Chen, J.D. English, Q.A. Shah, F.L. Silver, V.M. Pereira, B.P. Mehta, B.W. Baxter, M.G. Abraham, P. Cardona, E. Veznedaroglu, 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*

Table 2. DAWN: Patients Achieving Functional Independence (mRS Score, 0 - 2) by Time of Presentation

Endpoint	Thrombectomy Group (%)	Control Group (%)	P Value
6 - 12 h	55.1	20.0	<.001
12 - 24 h	43.1	7.4	<.001



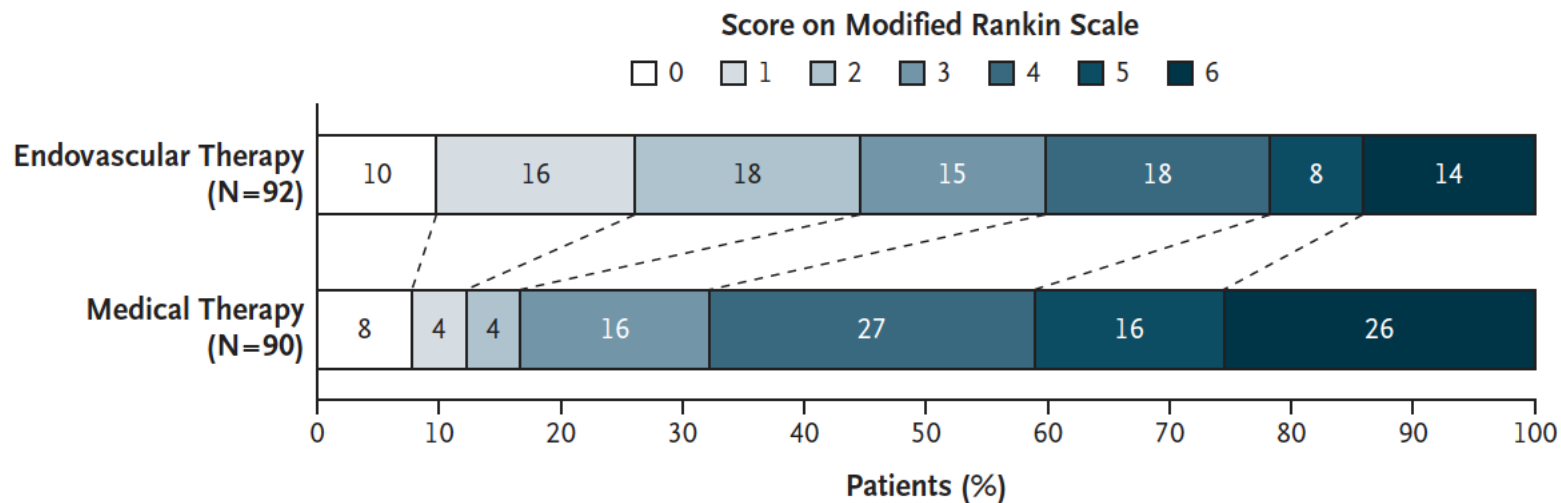
Finestra 6-24h



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*



Ora esordio nota >6h

- 10% nel trial DAWN
- 34% nel trial DEFUSE 3

QUALI COMPENZE?

- *Anamnesi* (ora esordio, autonomia pre, sintomatologia, localizzazione sede, ecc)
- *Uso della tecnologia*
- *Precisione*
- *Conoscenza della anatomia e delle Neuroimmagini*
- *Velocità decisionale*
- *Strategia*

Ricadute organizzative dopo DAWN e DEFUSE3

- Riorganizzazione reti
- Variazione criteri centralizzazione
- Variazione criteri di selezione dei pazienti (CTA/CTP) in centri Spoke e in centri Hub
- Stroke Unit Mobile – STEMO?
- Aumento volumi di attività (15-20%?)

Pre-notifica 118-Neurologo



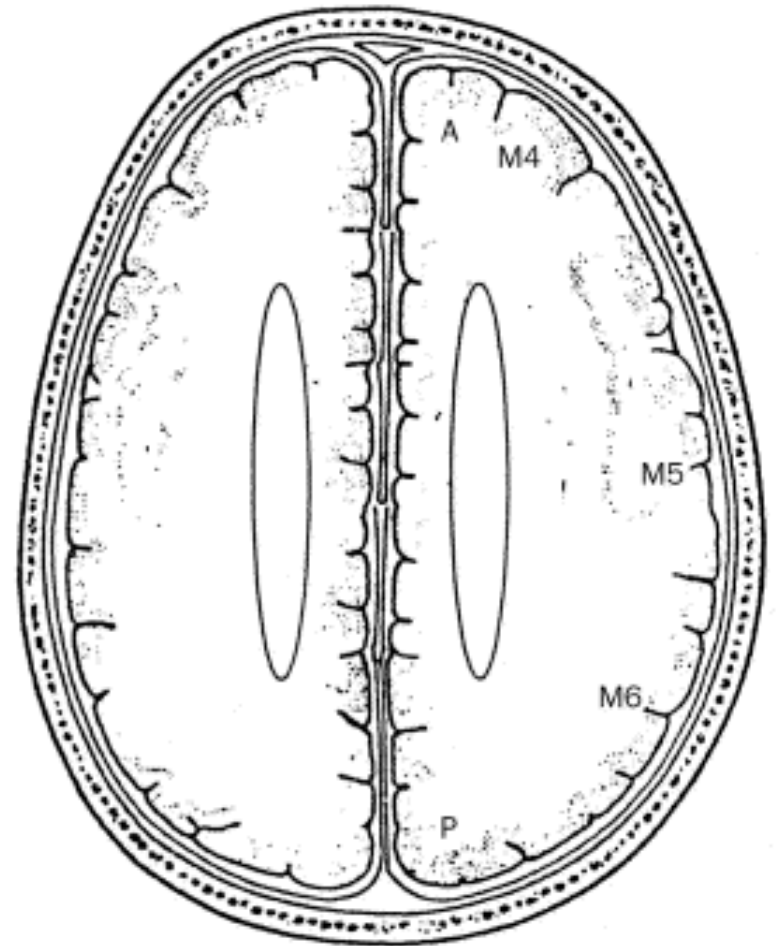
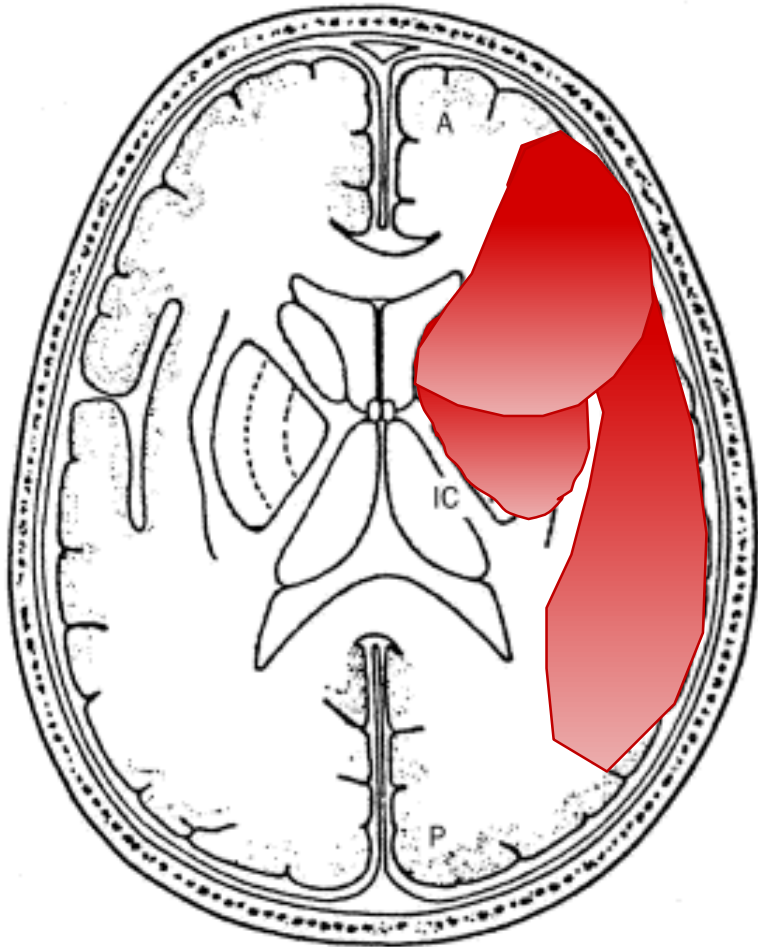
11:41

< Indietro Nuovo caso

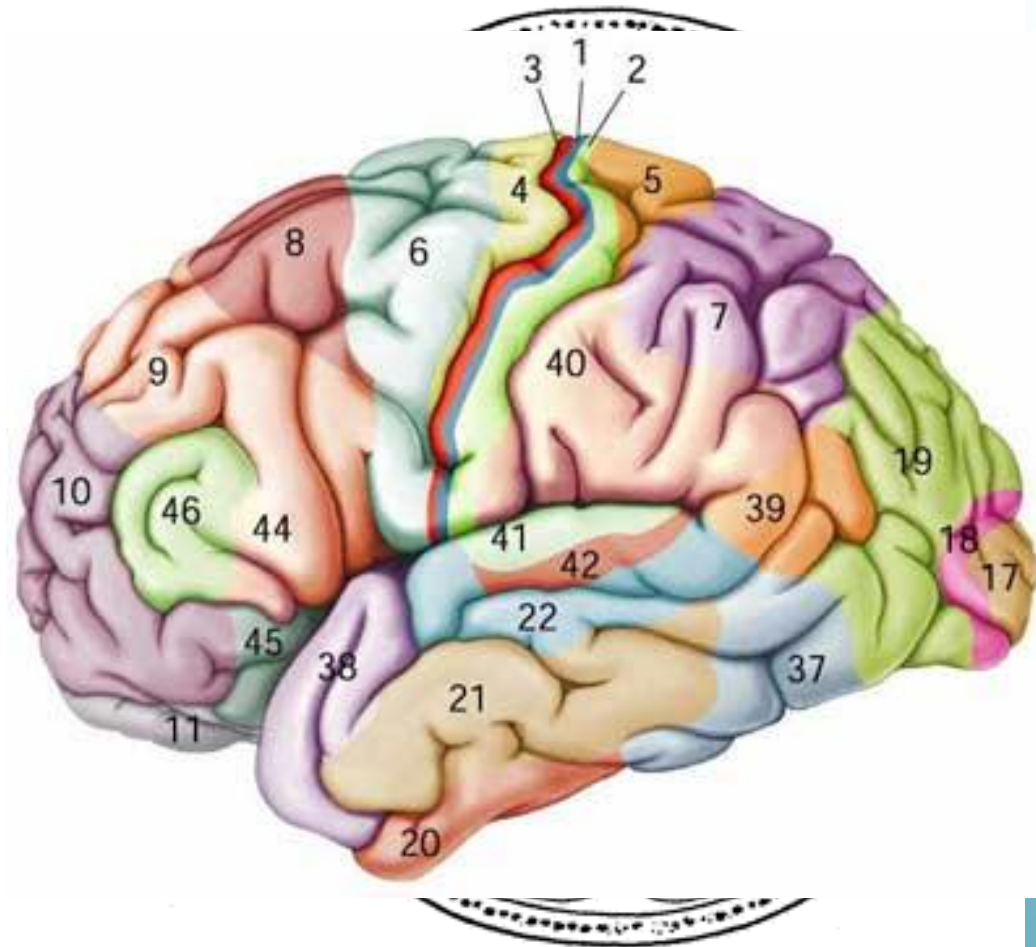
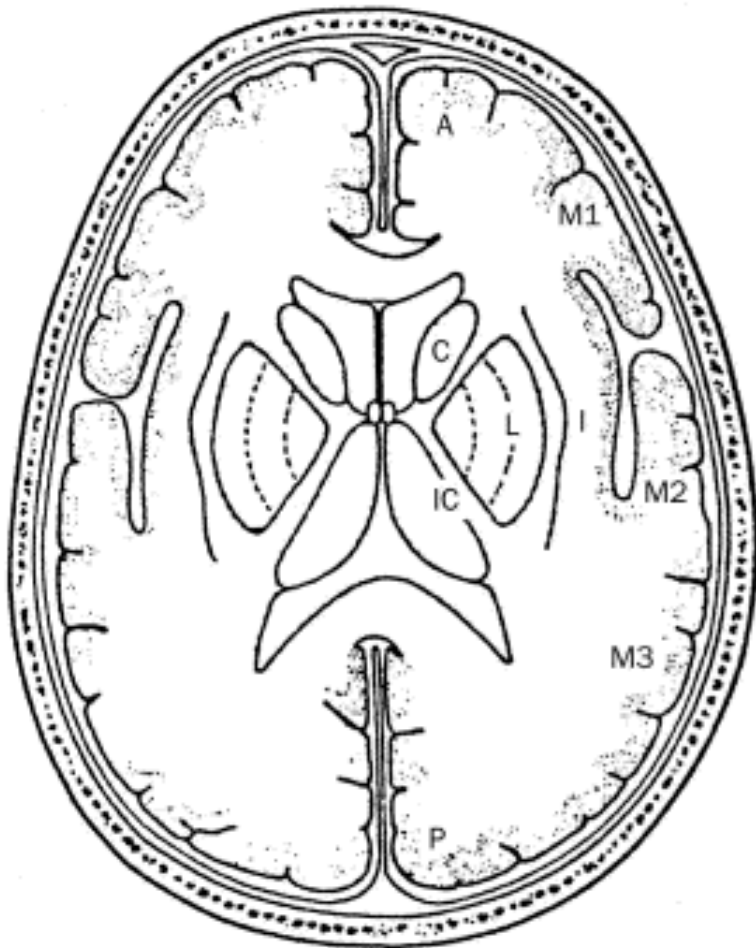
Tempi	Paziente	NIHSS	mRe pre-ictus
Ictus		11:37, 14/01/19	☐ Al risveglio
Arrivo		11:37, 14/01/19	
TAC		00:00:14	
Laboratorio		00:00:21	
Trombolisi		00:00:31	
Angio. inizio		00:03:44	
Angio. fine		00:03:47	
<button>Trasmetti</button>			



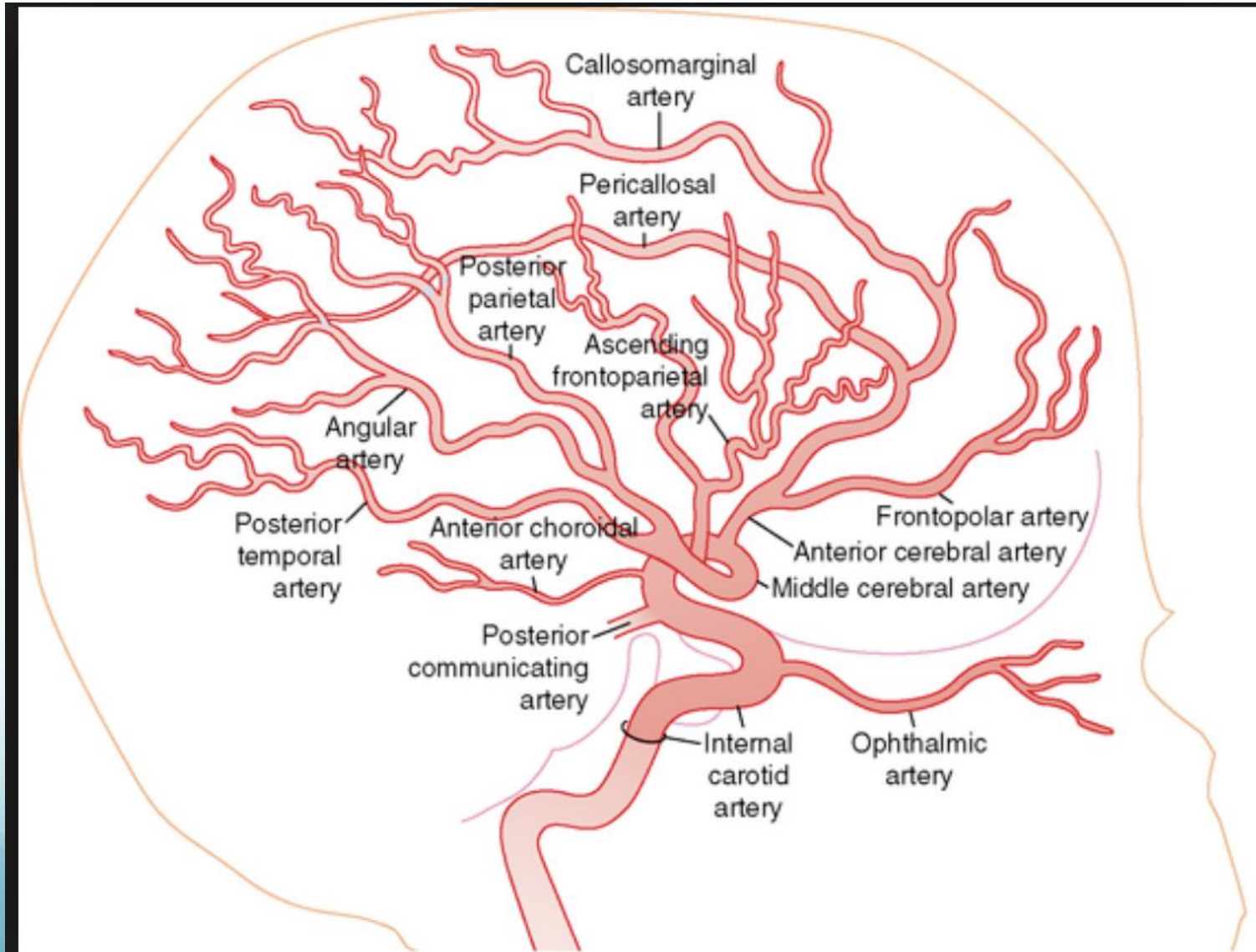
ASPECTS = 7



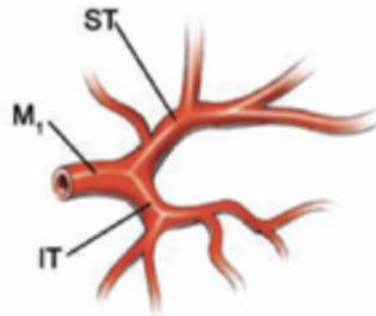
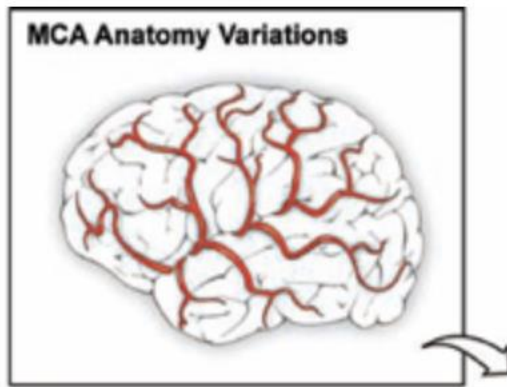
ASPECTS = 7



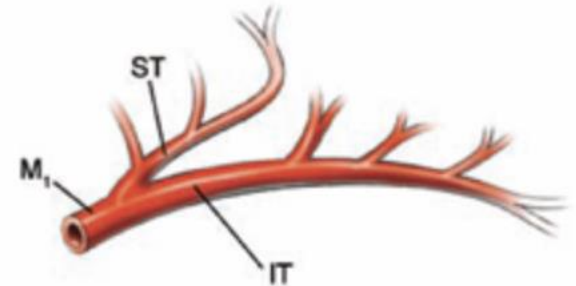
Anatomia



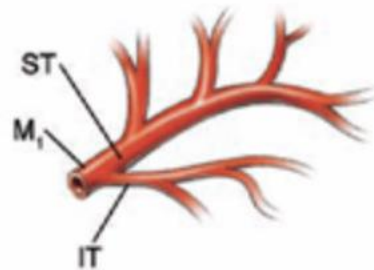
M2: quale?



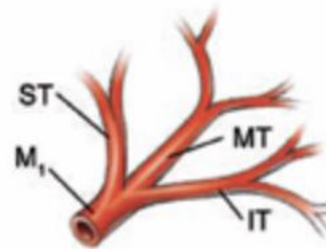
A. Bifurcation, Equal Trunks



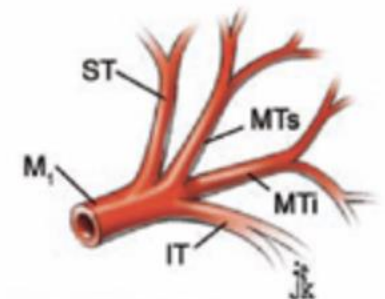
B. Bifurcation, Inferior Trunk Dominant



C. Bifurcation, Superior Trunk Dominant



D. Trifurcation

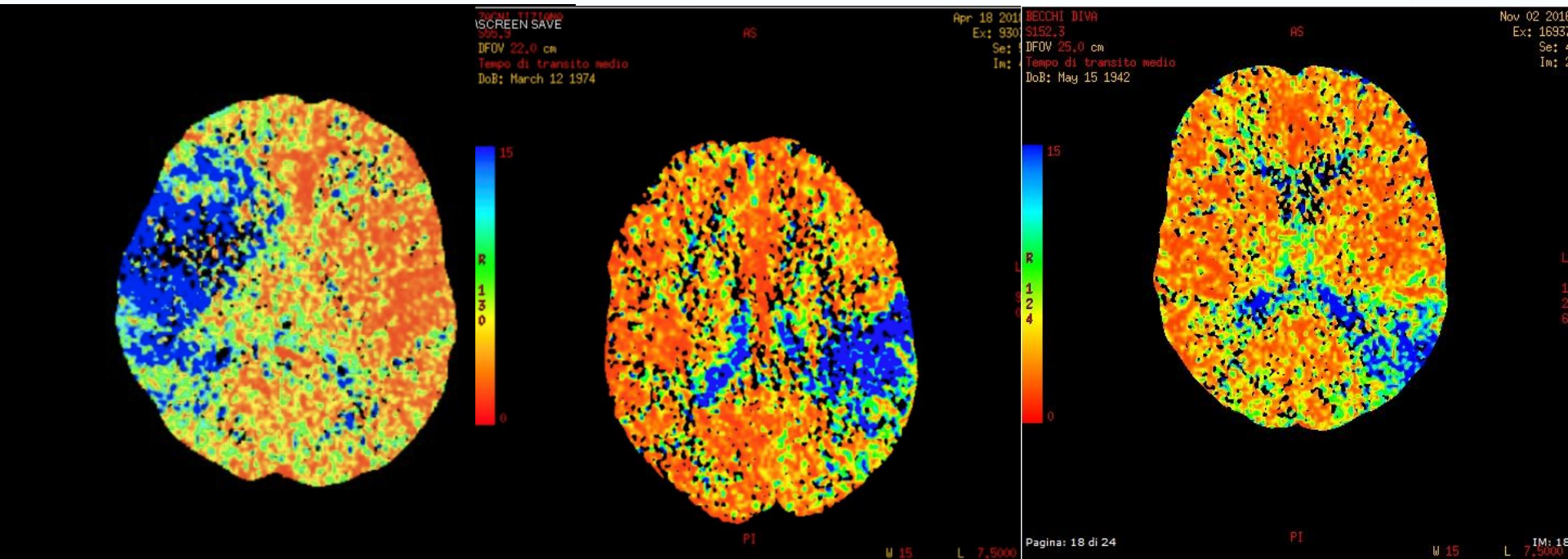


E. Quadrifurcation

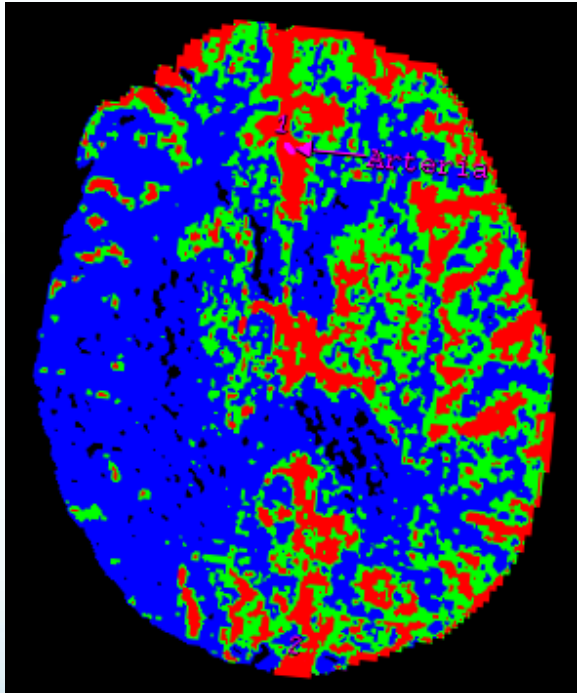
M2: quale?



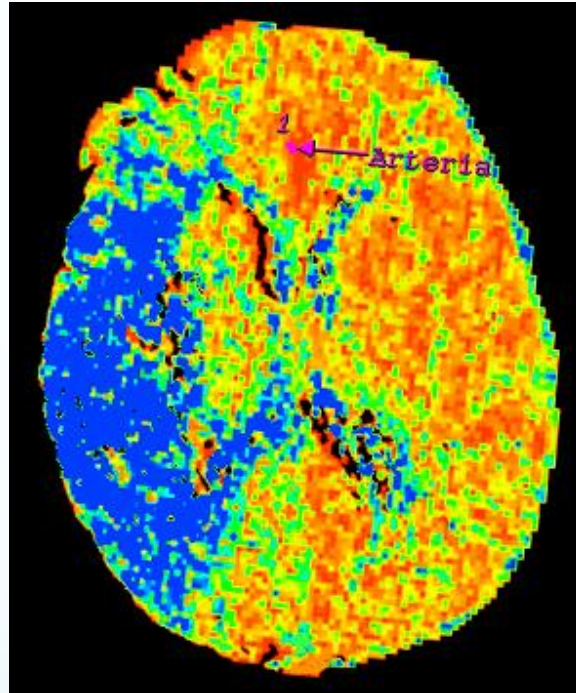
M2 e correlazione con area cerebrale ipoperfusa



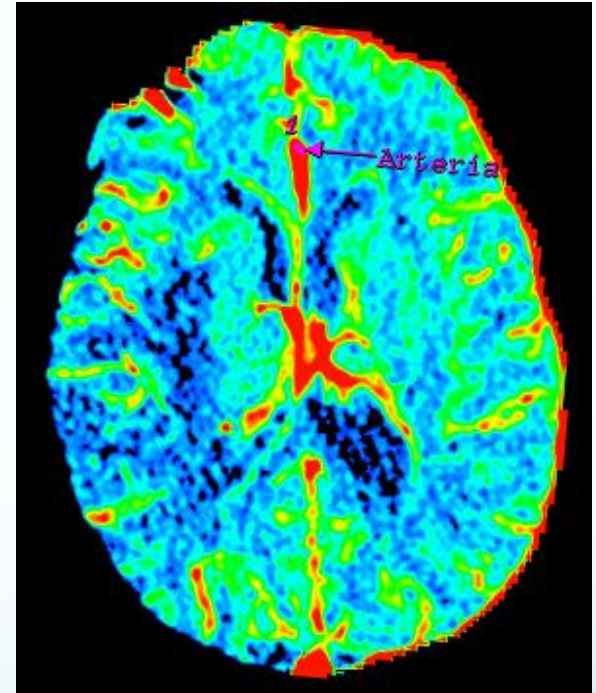
Neuroimaging



CBF

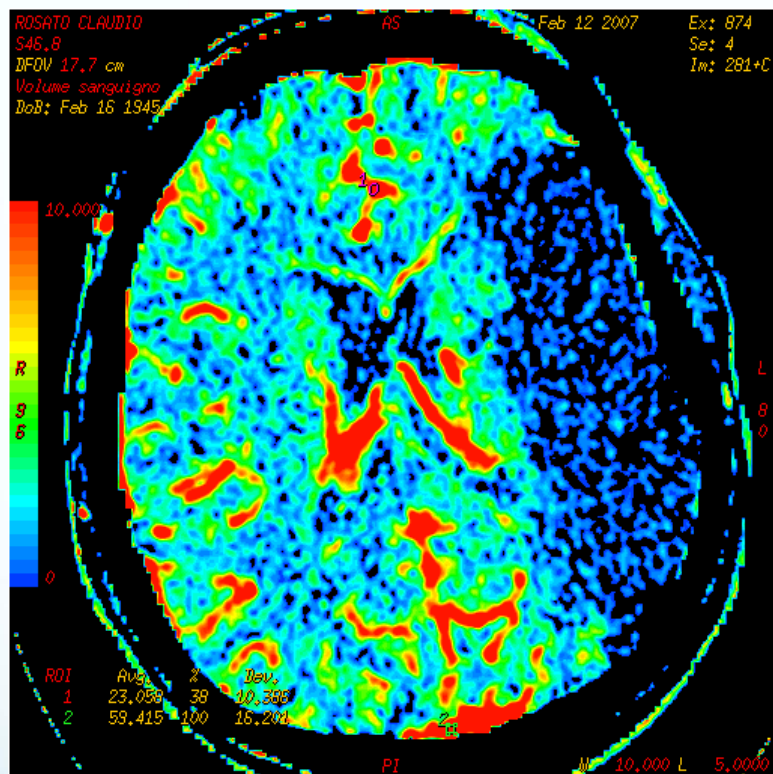


MTT

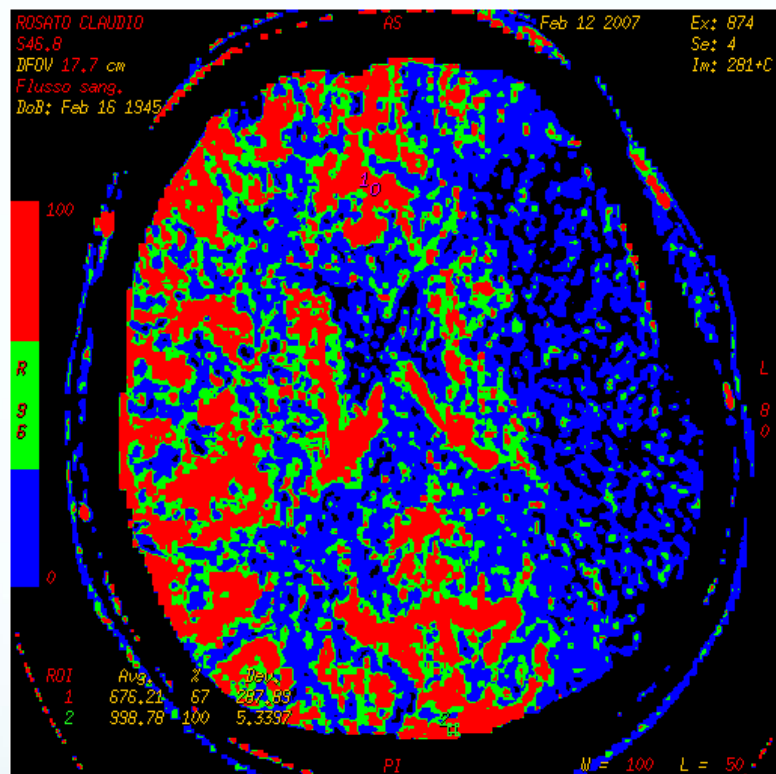


CBV

13 ore

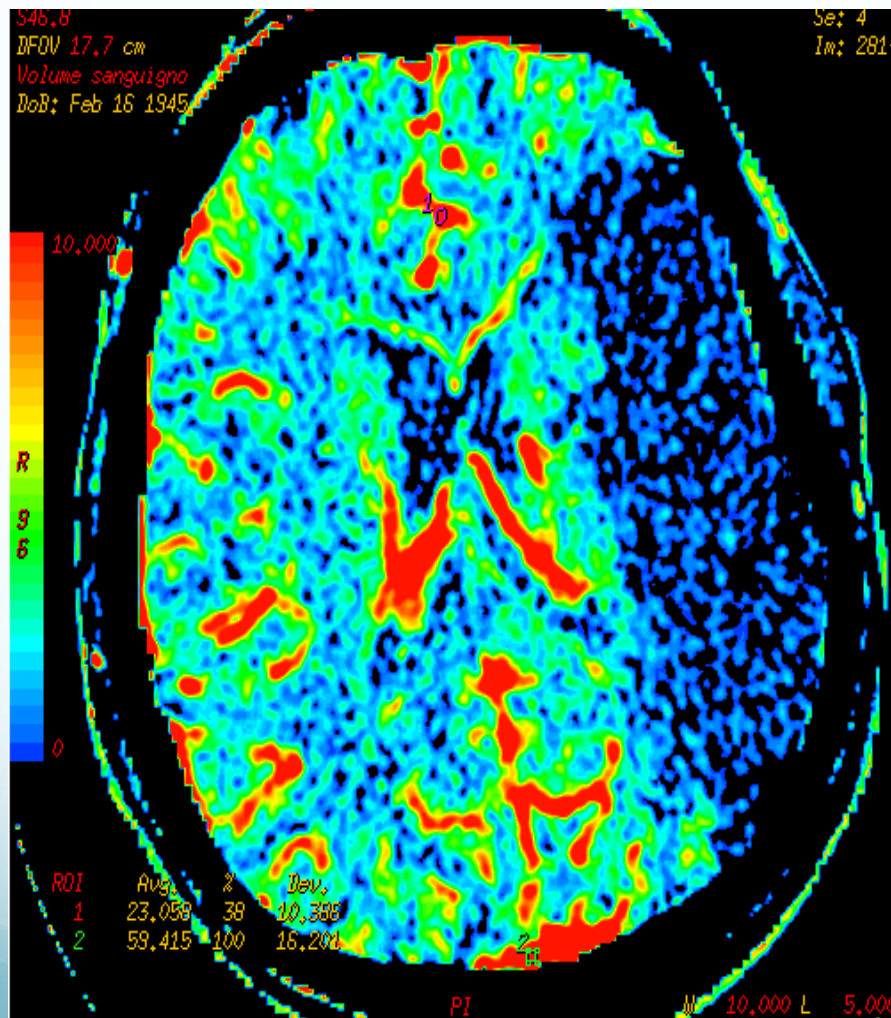


CBV

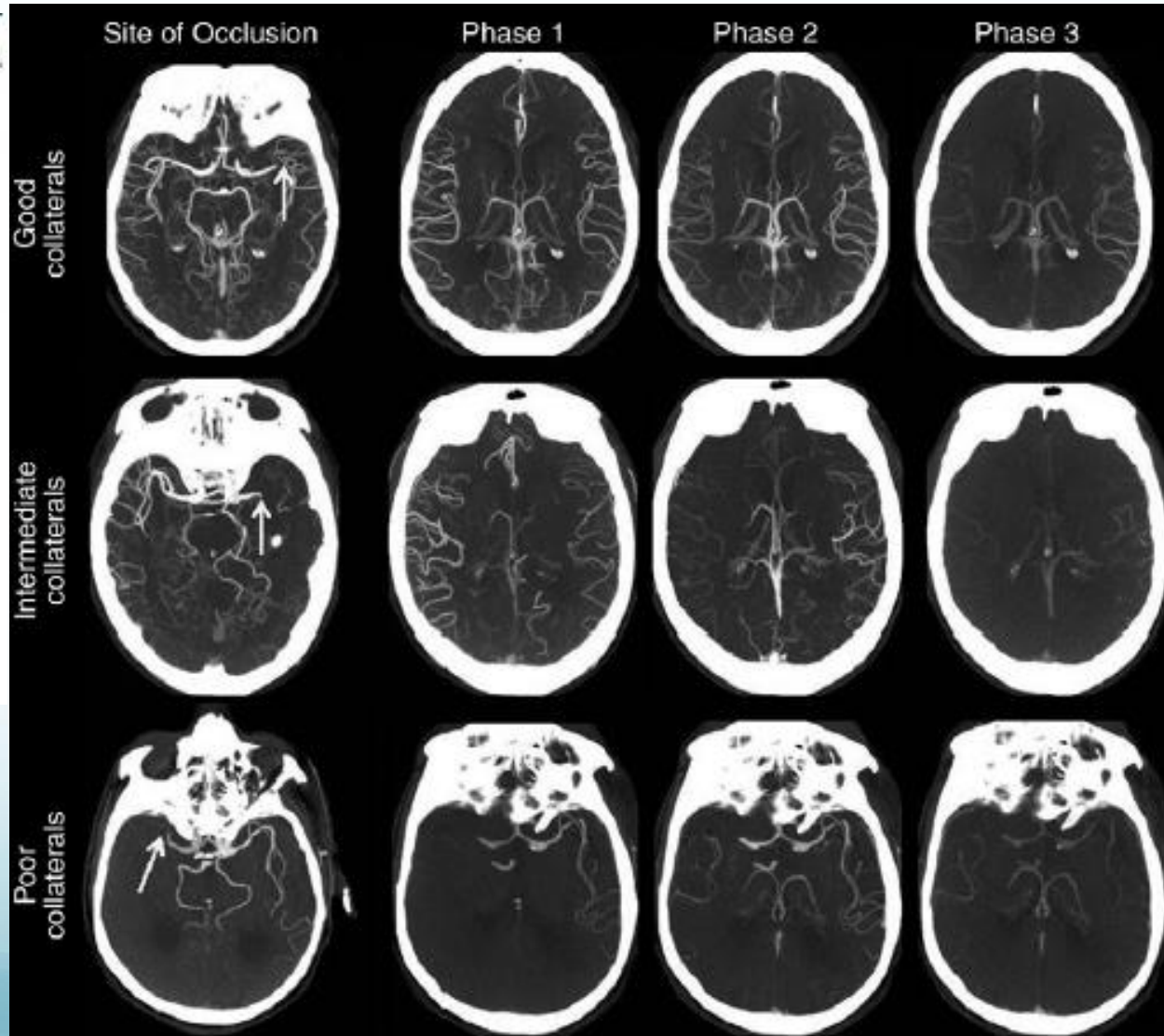
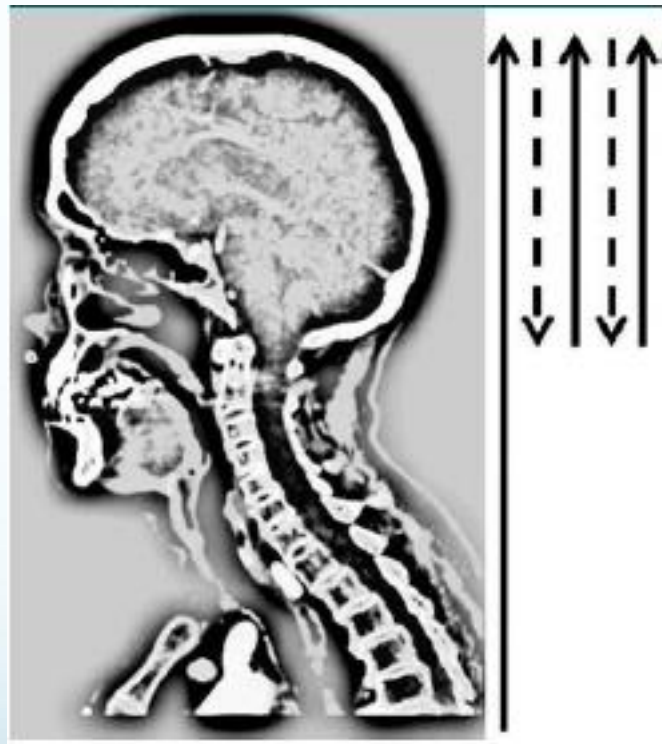


CBF

2h 30'



CT angiography



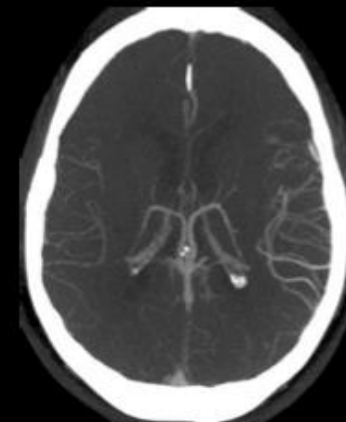
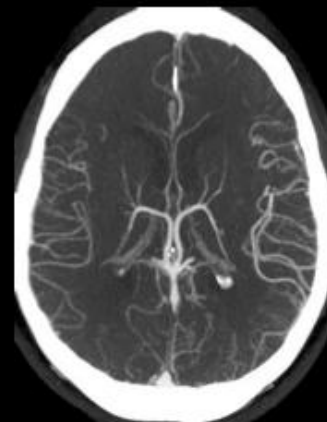
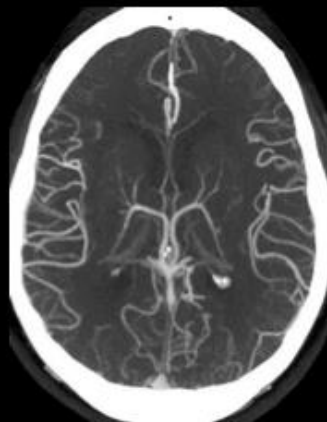
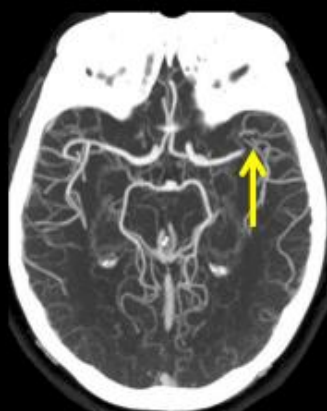
Site of Occlusion

Phase 1

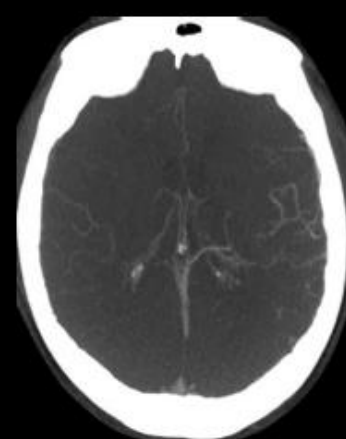
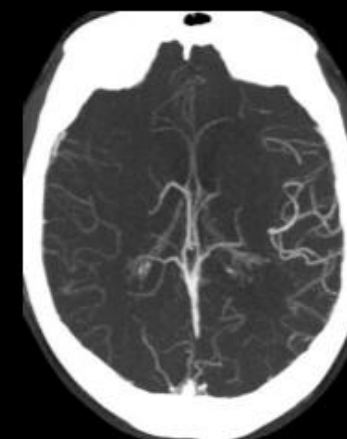
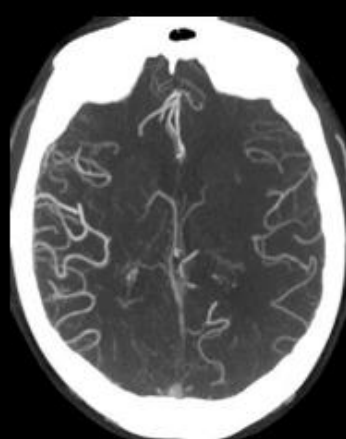
Phase 2

Phase 3

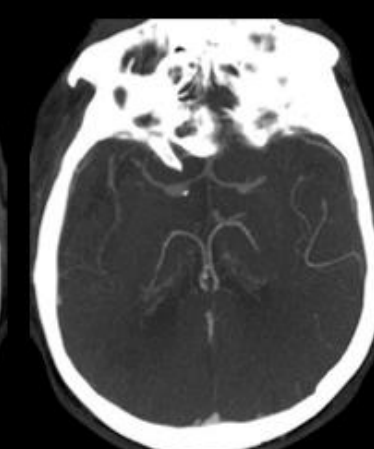
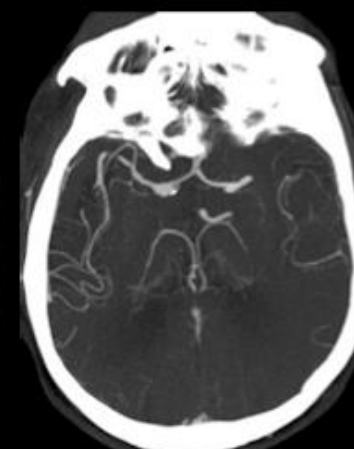
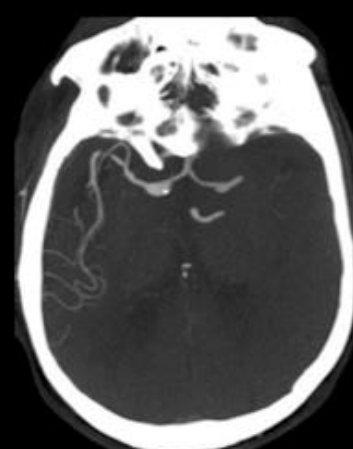
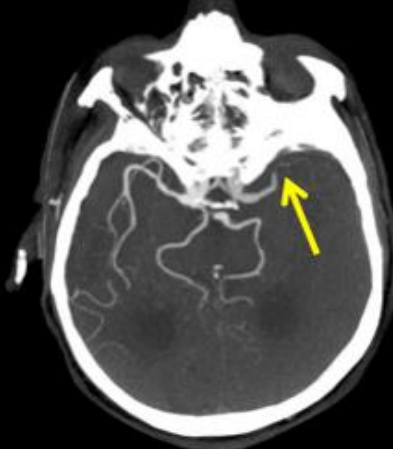
Good
collaterals



Intermediate
collaterals



Poor
collaterals



Why recanalise a M1 occlusion?

acute

F/U
Infarct

Differentiate between predicting
Good outcome and therapy effect!

good
outcome

bad
Outcome?

bad
outcome

Full success!

Infarct volume 18 cm³

mRS (90) 5→0

“Sub radar success”

Infarct volume 124 cm³

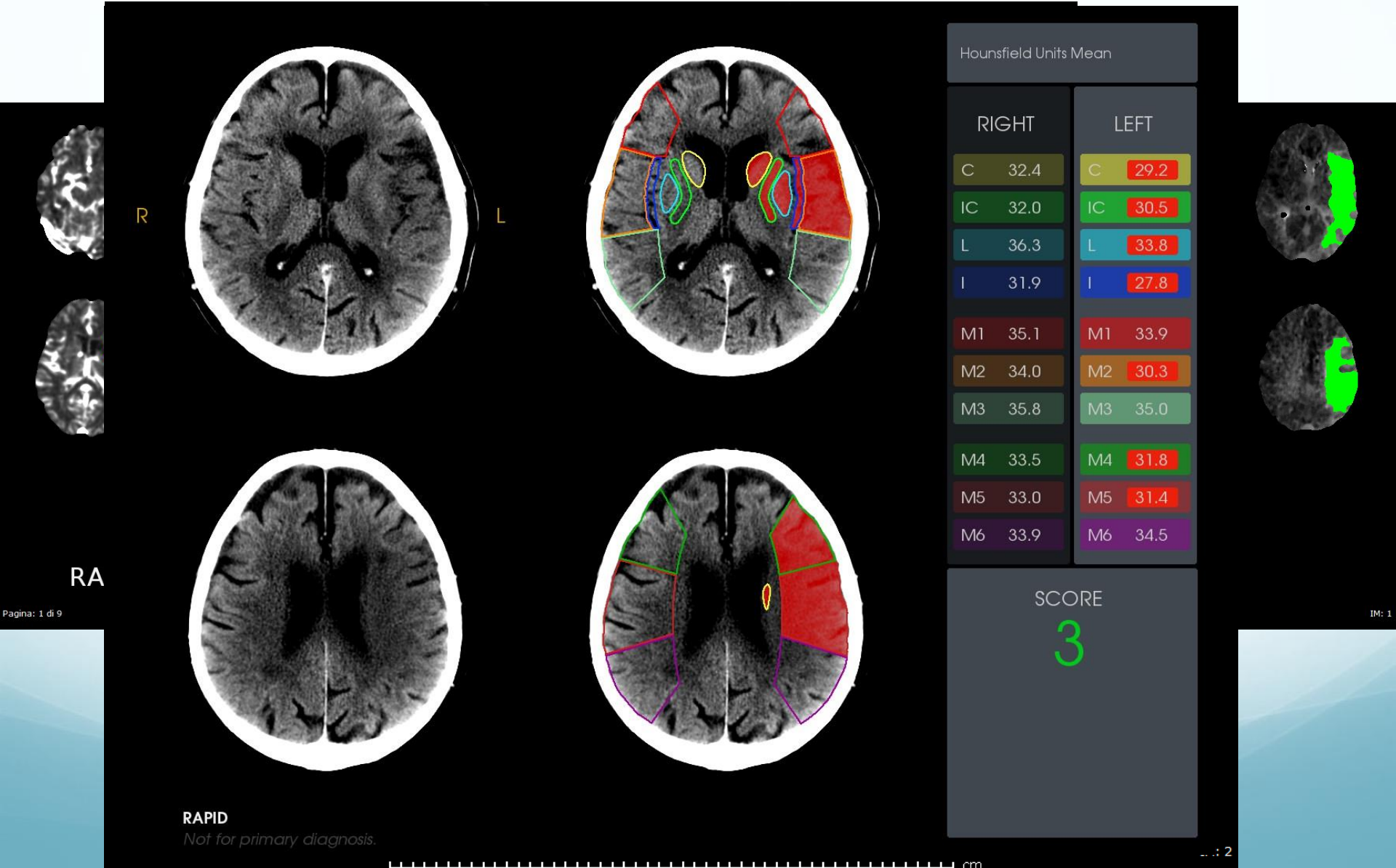
mRS (90) 5→3

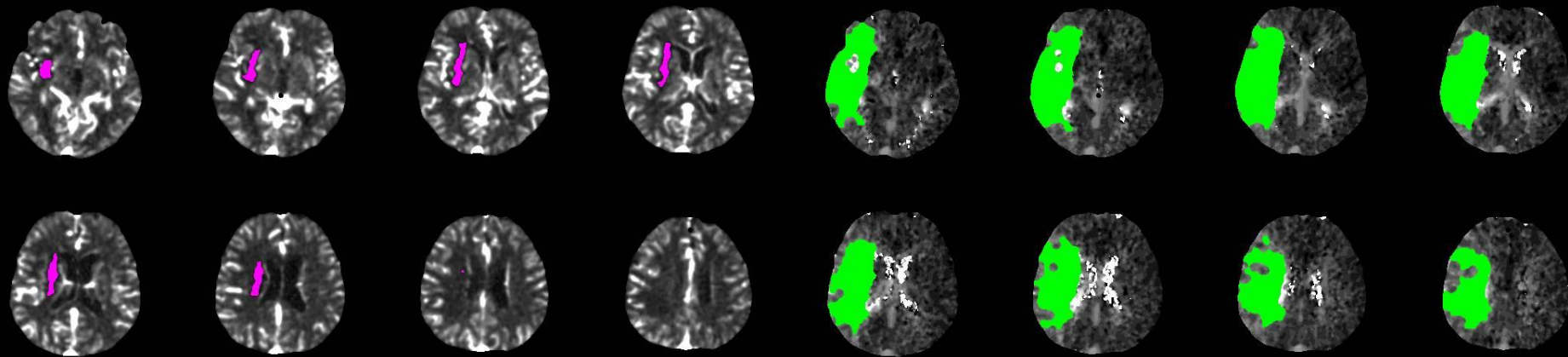
Futile recanalisation

Infarct volume 402 cm³

mRS (90) 5→5-6

RAPID Software



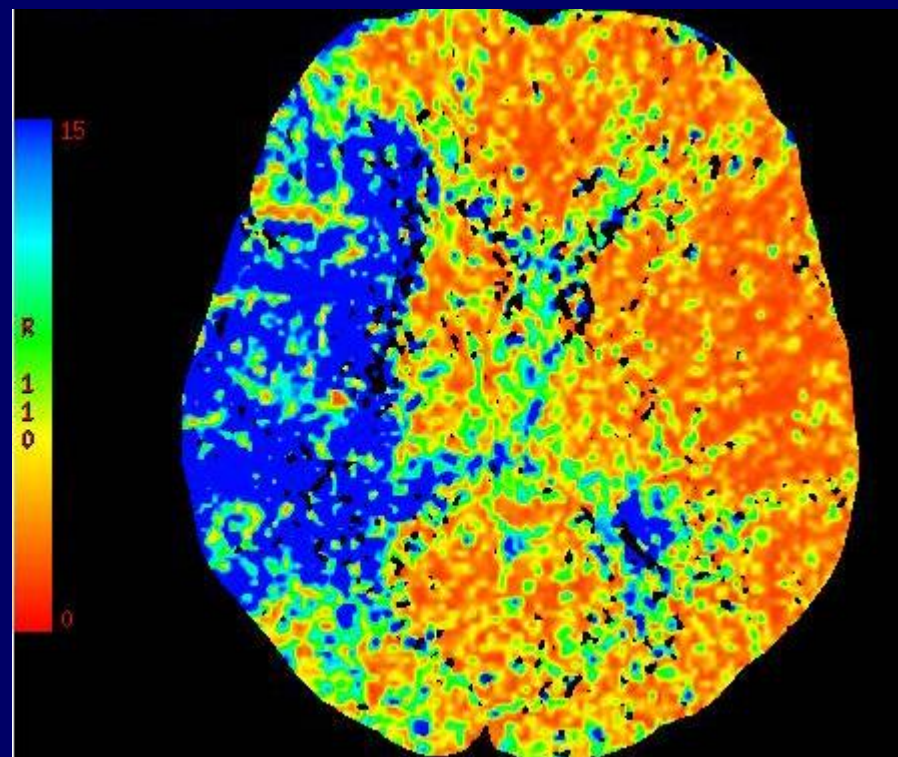
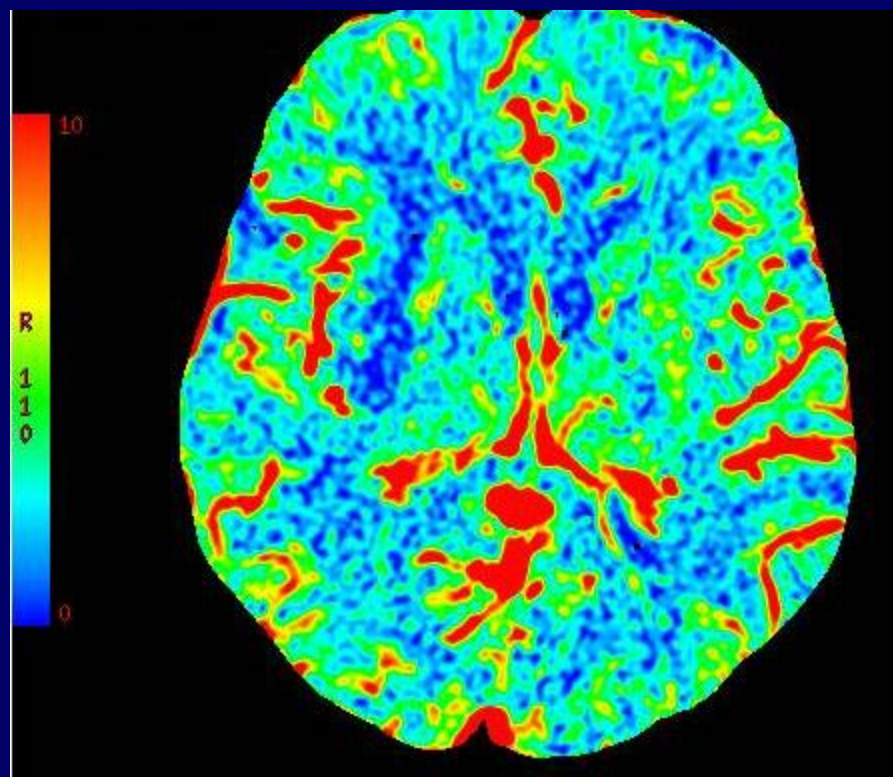


CBF<30% volume: 8 ml

Tmax>6.0s volume: 135 ml

Mismatch volume: 127 ml

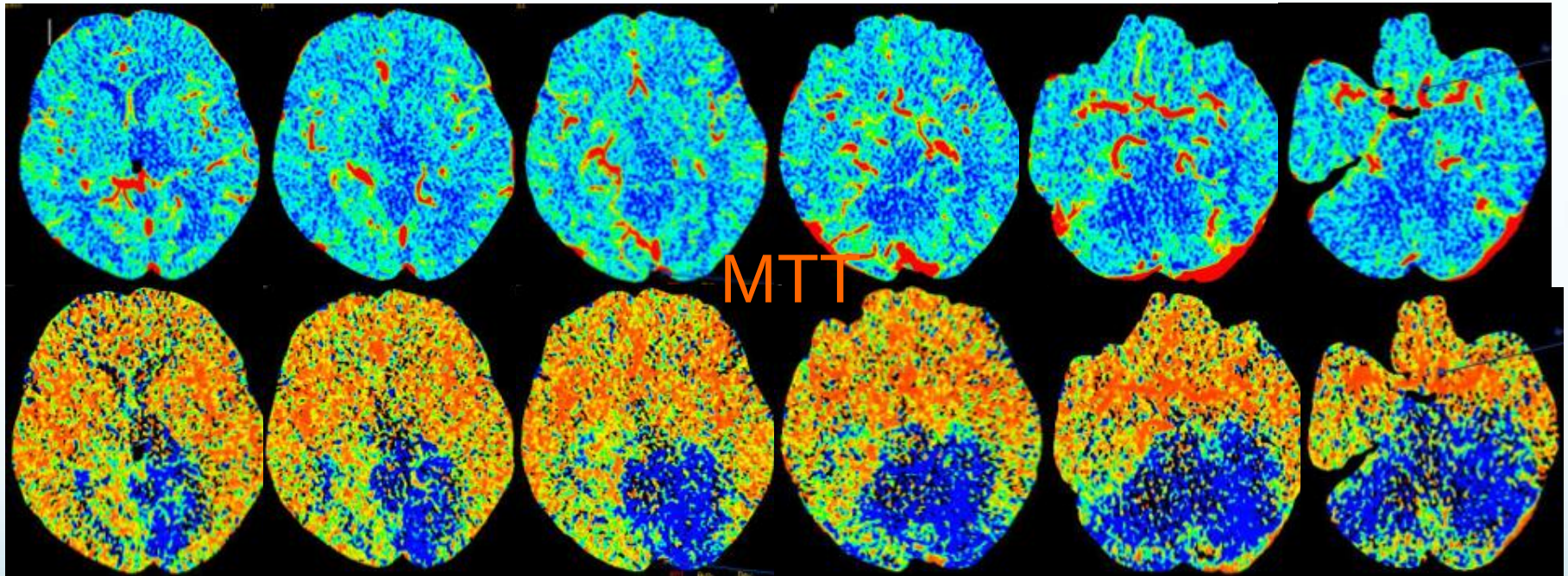
Mismatch ratio: 16.9



Basilar occlusion

CTP in vertebro-basilar stroke

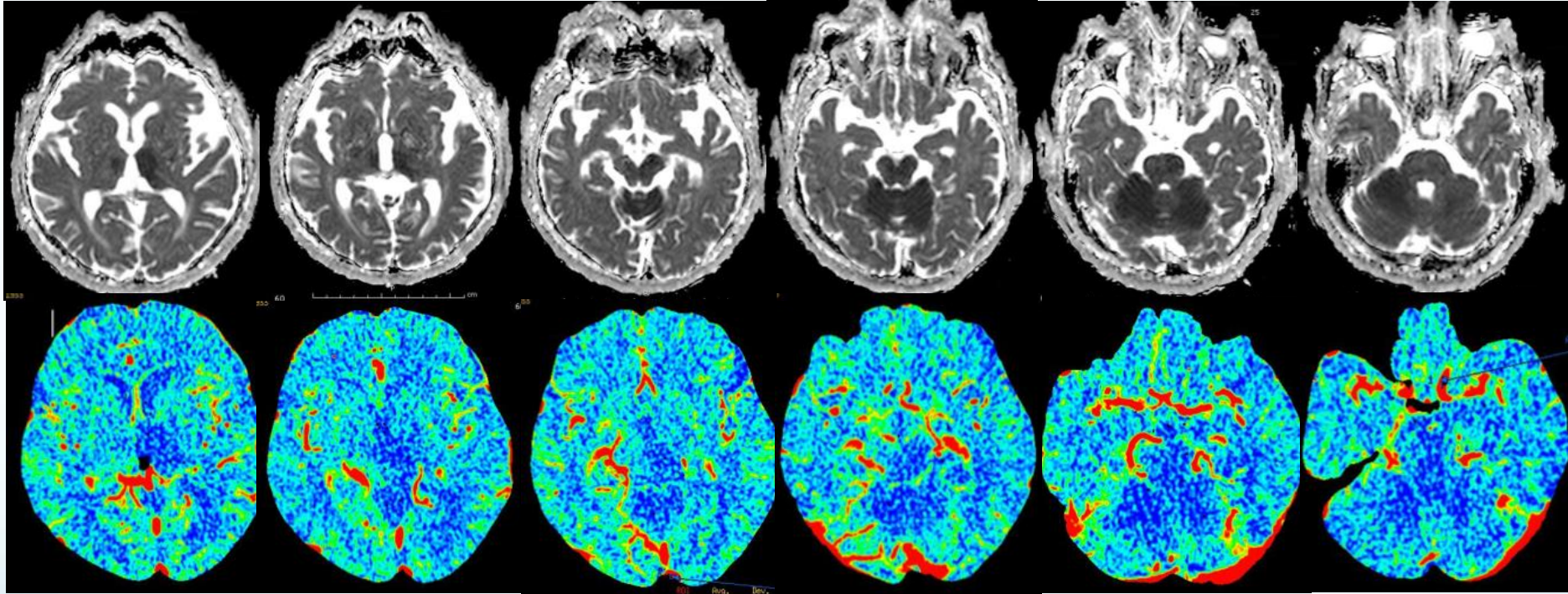
CBV



Female, 75 yy, GCS 4/15, onset to imaging 14 h

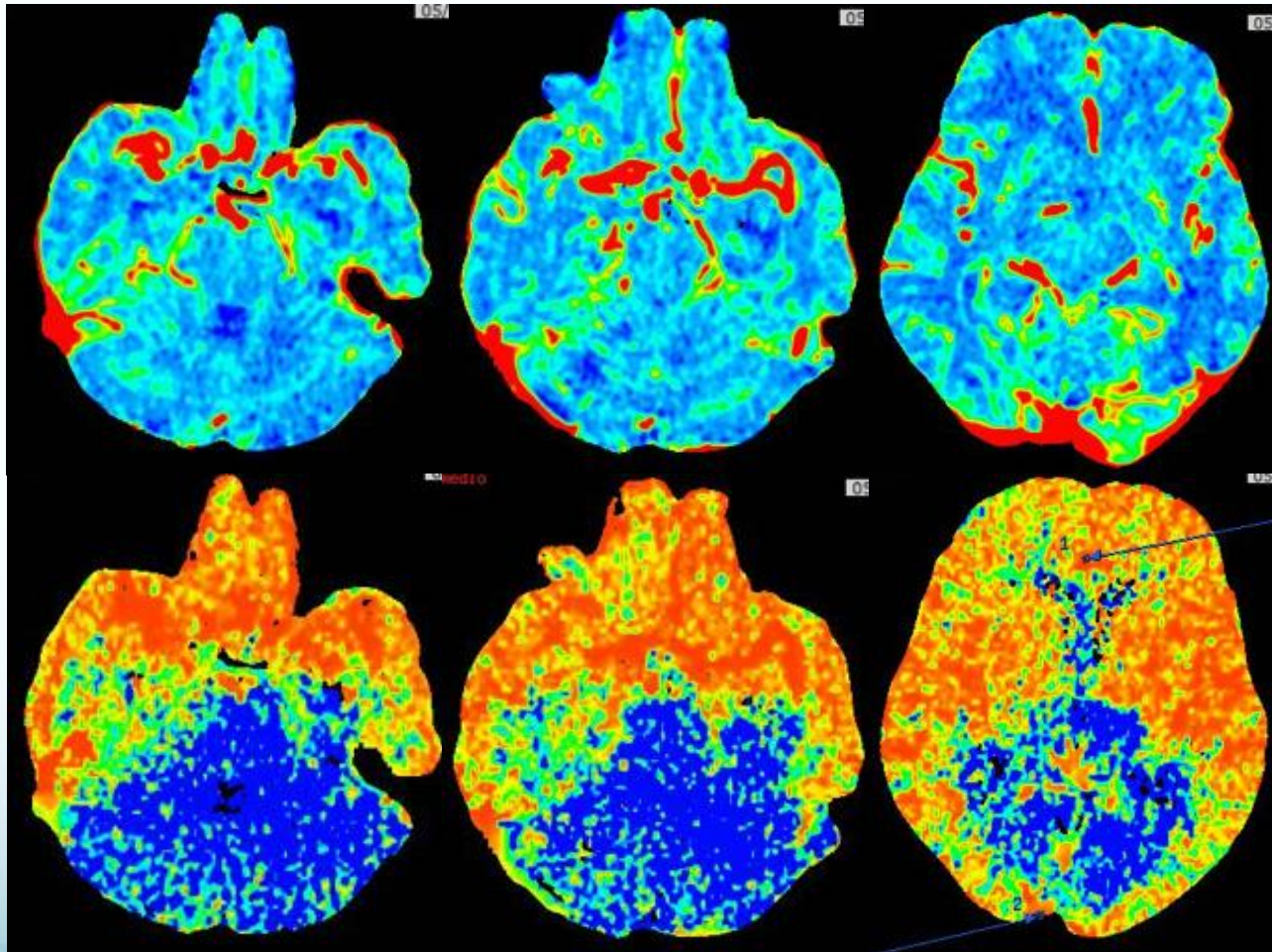
CTP Basilar occlusion stroke

MRI-ADC



Basilar occlusion

CTP in vertebro-basilar stroke

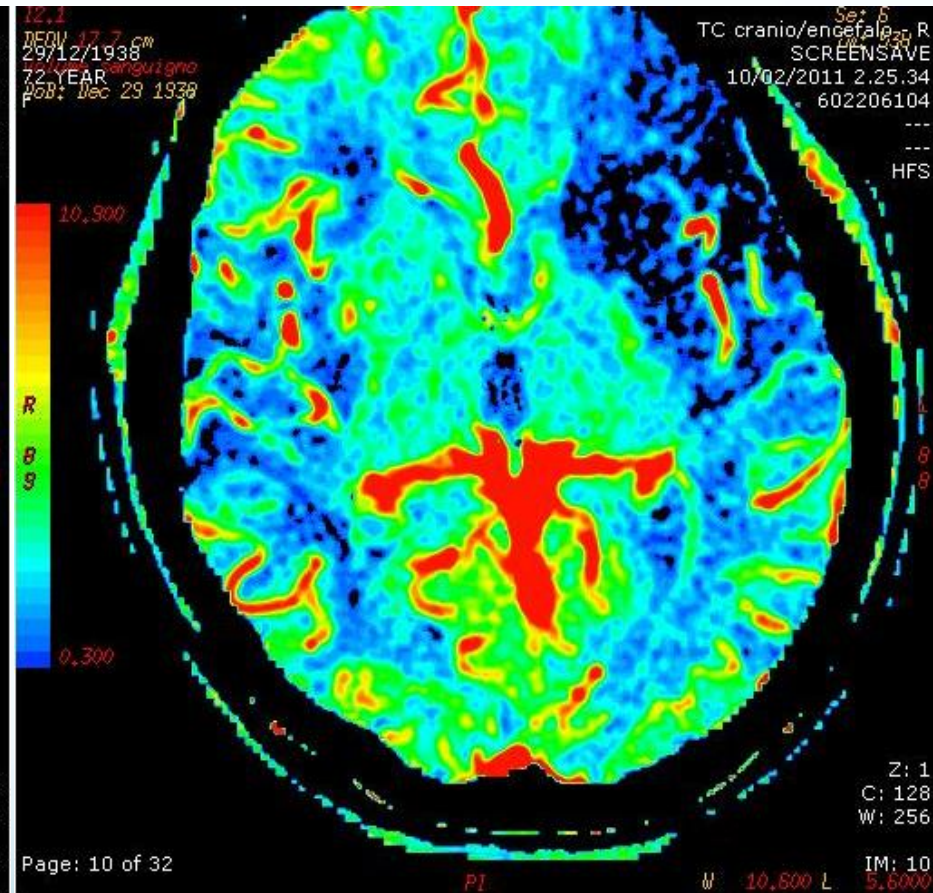
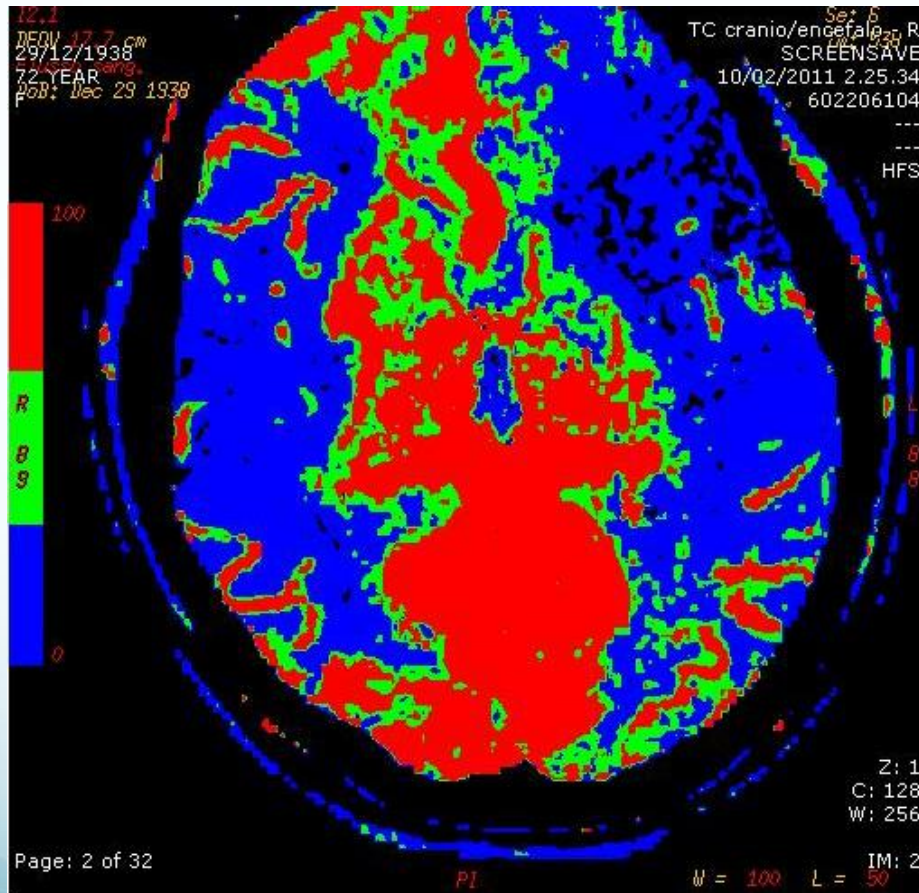


Male, 81 yy, GCS 4/15, onset to imaging 16 h

«in coma è...ma basilare non è...»

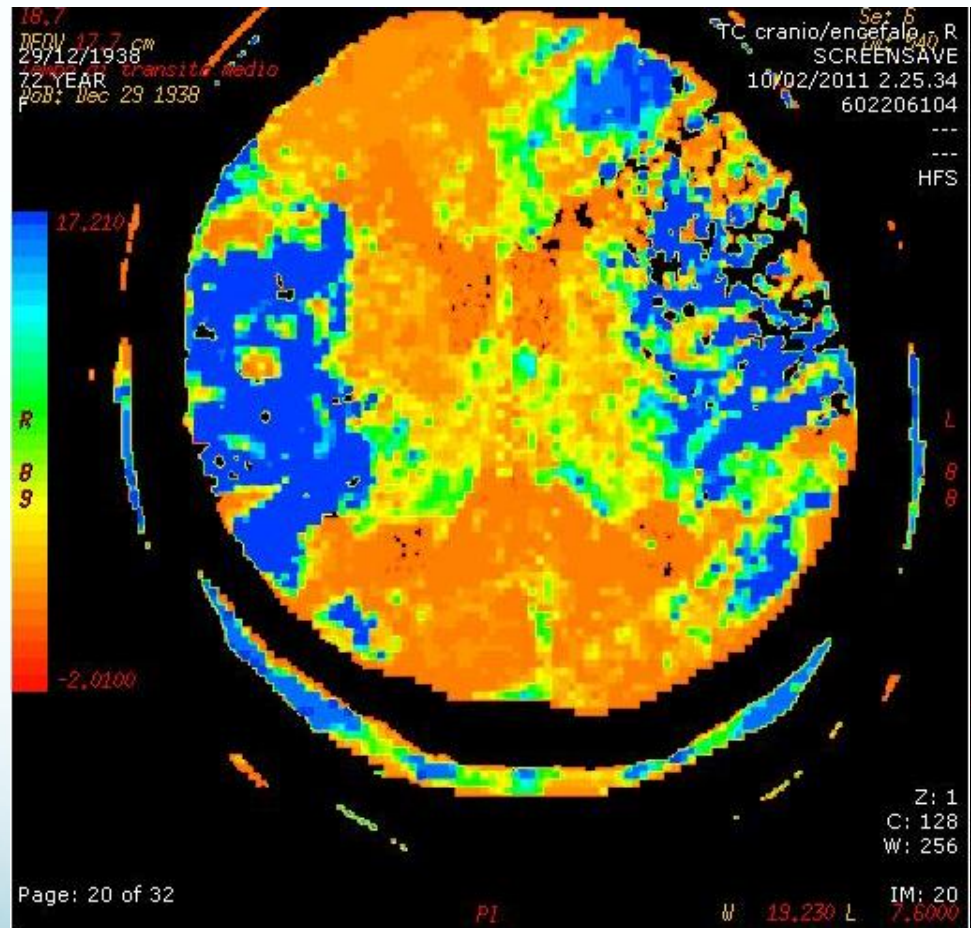
CBF

CBV



CT perfusion

MTT



Ezio

ento

01/02/1953

M

8

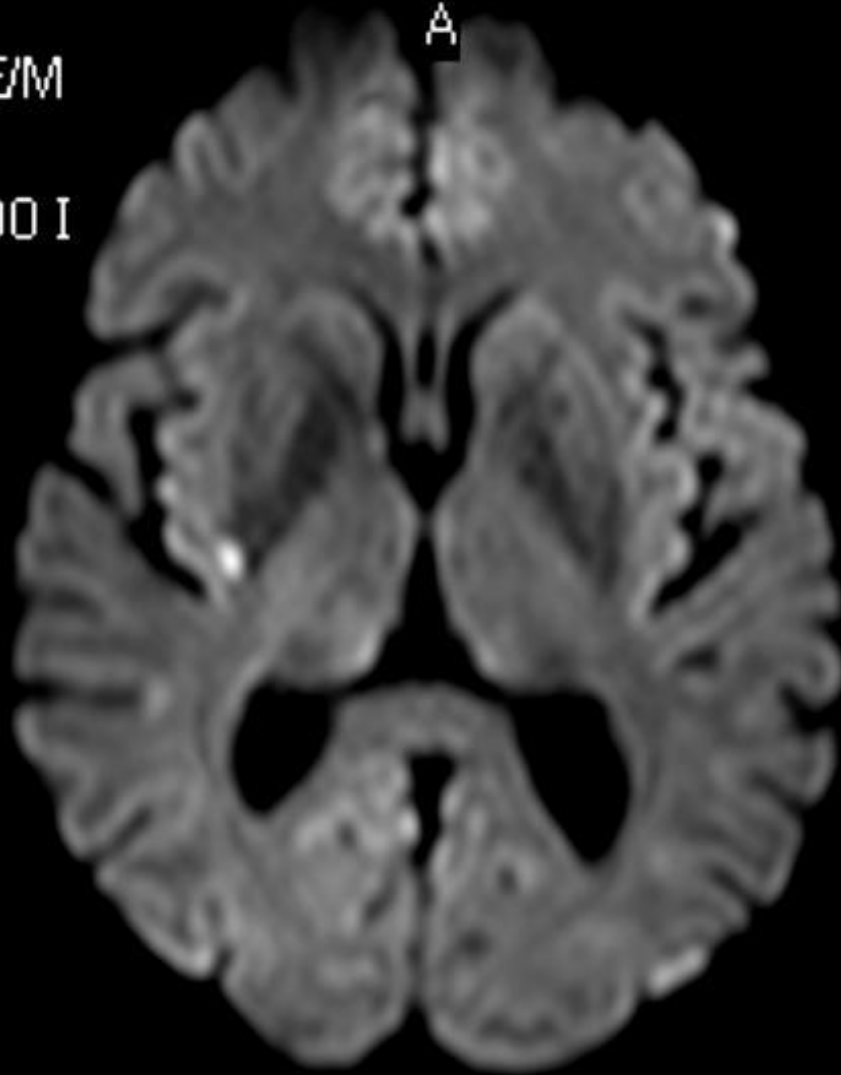
SE/M

5

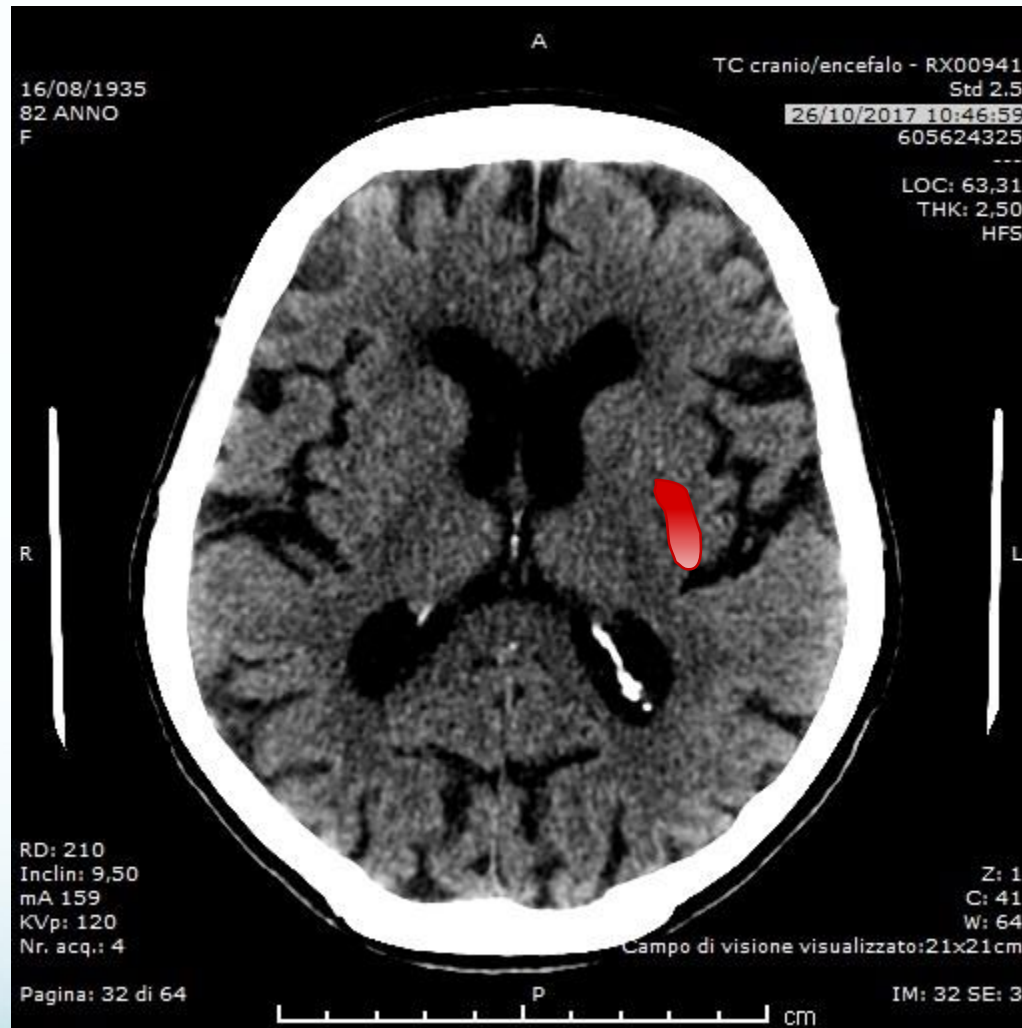
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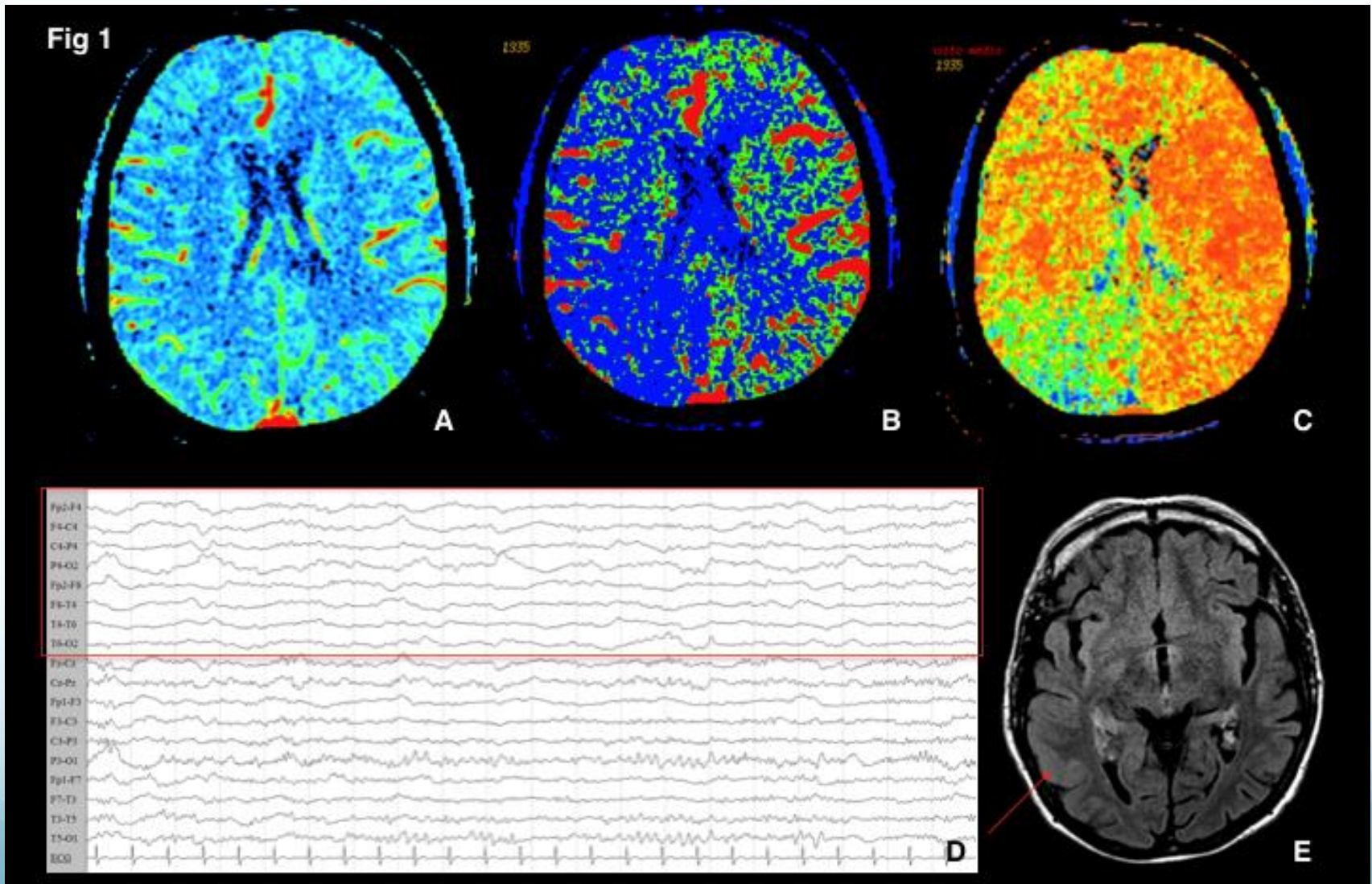
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Eziologia pre-trattamento



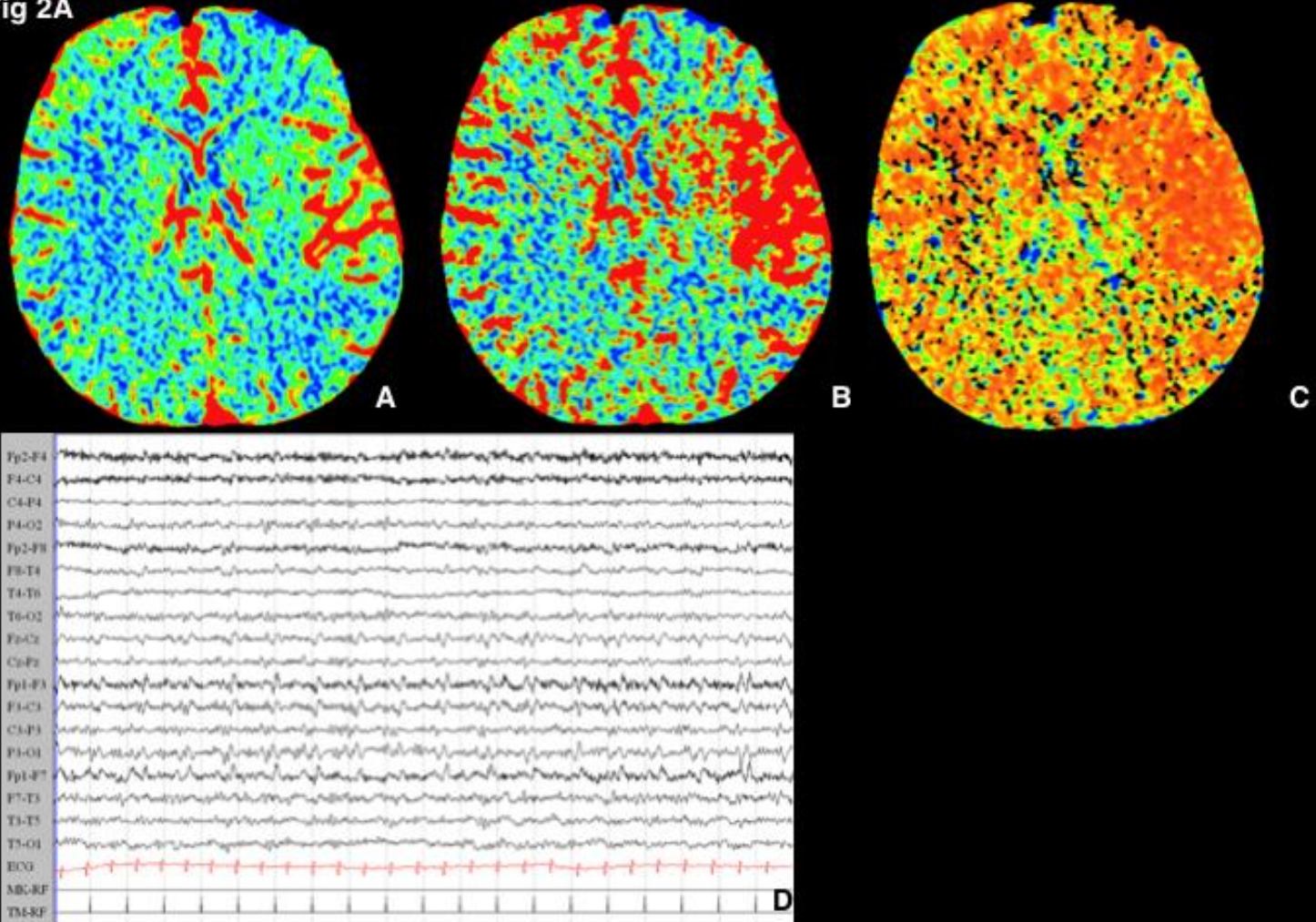
D.D.

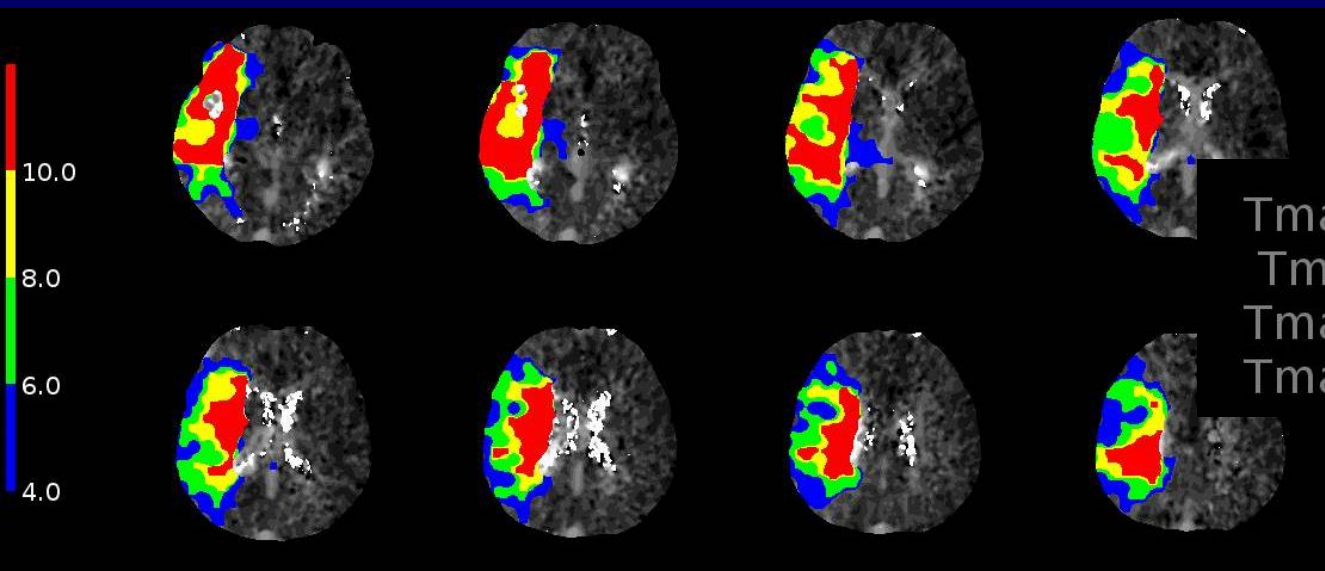


Meletti S, Giovannini G, et al. 2018

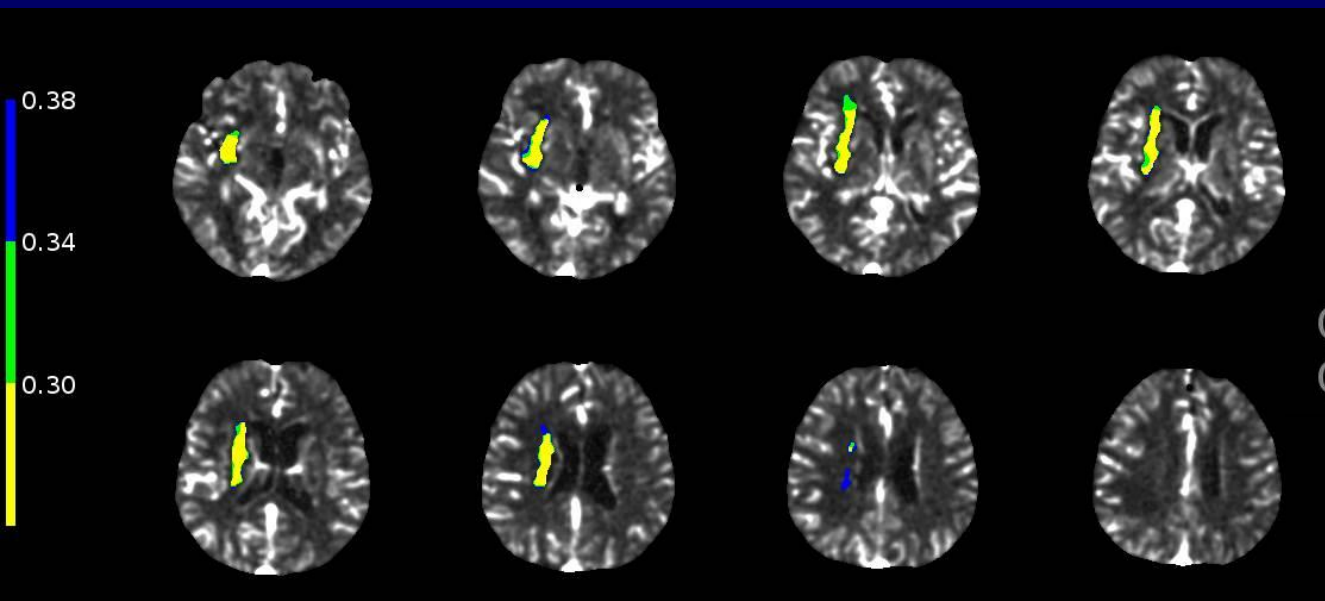
D.D.

Fig 2A





Tmax>10.0s volume: 60 ml
Tmax>8.0s volume: 93 ml
Tmax>6.0s volume: 135 ml
Tmax>4.0s volume: 181 ml



CBF<30% volume: 8 ml
CBF<34% volume: 10 ml
CBF<38% volume: 12 ml

Neurologo Interventista: può fare?

Decreto Legislativo 26 maggio 2000, n. 187

Attuazione della direttiva 97/43/ EURATOM in materia di protezione sanitaria delle persone contro i pericoli delle radiazioni ionizzanti connesse ad esposizioni mediche.

Modificato dall'art. 39, Legge 1 marzo 2002, n. 39

Articolo 7

4. Le attività radiodiagnostiche complementari all'esercizio clinico possono essere svolte dal medico chirurgo in possesso della specializzazione nella disciplina in cui rientra l'intervento stesso o dall'odontoiatra nell'ambito della propria attività professionale specifica.



OPEN ACCESS

Training Guidelines for Endovascular Ischemic Stroke Intervention: An International multi-society consensus document

Baseline training and qualifications

1. Residency training (in radiology, neurology or neurosurgery) which should include documented training in the diagnosis and management of acute stroke, the interpretation of cerebral arteriography and neuroimaging under the supervision of a board-certified neuroradiologist, neurologist or neurosurgeon with subsequent board eligibility or certification. The residency program and supervising physicians should be accredited according to national standards as they pertain to the countries involved. Those physicians who did not have adequate such training during their residencies must spend an additional period (at least one year) by training in clinical neurosciences and neuroimaging, focusing on the diagnosis and management of acute stroke, the interpretation of cerebral arteriography and neuroimaging prior to their fellowship in neuroendovascular interventions.

2. Dedicated training in Interventional Neuroradiology (also termed Endovascular Neurosurgery or Interventional Neurology) under the direction of a Neurointerventionalist (with neuroradiology, neurology or neurosurgical training background), at a high-volume center. It is preferred that this is a dedicated time (minimum of one year), which occurs after

Neurointerventisti Modena

Verganti



Sacchetti



Zelent



Commodaro



Neuroradiologi

Zini



Bigliardi



Picchetto



Borzi



Neurologi

Vallone



VIST-LAB WITH VIST G5

CATHLAB TRAINING SETUP



European Recommendations on Organisation of Interventional Care in Acute Stroke (EROICAS)

Jens Fiehler¹, Christophe Cognard², Mauro Gallitelli³, Olav Jansen⁴, Adam Kobayashi⁵, Heinrich P Mattle⁶, Keith W Muir⁷, Mikael Mazighi⁸, Karl Schaller⁹ and Peter D Schellinger¹⁰

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DOI: 10.1177/1747493016647735
wso.sagepub.com


- Operators and services should conform to minimum requirements for training, certification, caseload, and ongoing education for acute neurovascular procedures by national/European neurointerventional/radiological organizations and national statutory bodies. (Quality of evidence: **moderate**, Strength of recommendation: **strong**).

Part A. Center and operator requirements for thrombectomy

1. What service organization is associated with favorable outcome after thrombectomy?

Minimum characteristics of centers appropriate to conduct EVT common to all five studies were¹⁻⁵:

- An established organization to support rapidly instituted IV recombinant tissue plasminogen activator (rt-PA) use.
- Team organization of a level sufficient to support clinical trial participation.
- Experience with acute computed tomography (CT) interpretation including ASPECT scoring.
- Experience with CTA in acute stroke patients as a minimum additional imaging modality.
- A process for monitoring door-to-needle/groin puncture/reperfusion, and procedural duration times, and a governance process to ensure that these are reviewed.
- Implementation of door-to-needle time minimization strategies as for IVT.
- Minimum institutional and individual experience of cerebrovascular procedures generally, of thrombectomy for acute stroke, and of the specific device.

The generalizability of the trial findings to centers or interventional teams that do not fulfil these criteria is not established by the literature.

2. What operator characteristics are associated with favorable outcome after thrombectomy?

neurovascular procedures.⁴¹⁻⁴³ Training requires a minimum defined number of neurovascular cases, and maintenance of skills requires an ongoing minimum caseload.

Well-trained neurointerventionalists are a critical component of an organized and efficient team needed to deliver safe and effective EVT for acute ischemic stroke patients. The great majority of thrombectomies in five stroke thrombectomy studies showing favorable outcome after EVT were performed by trained, experienced neurointerventionalists, including interventional neuroradiologists or formally trained endovascular neurosurgeons, and interventional neurologists working routinely on neuroradiological interventional procedures.

- REVASCAT specified “certified vascular neurologists and interventional neuroradiologists or neurologists in comprehensive stroke centers that treat more than 500 acute stroke patients and perform more than 60 acute mechanical thrombectomy procedures every year will manage patients.
- ...certified interventionalists [should] have at least two years training in diagnostic angiography and endovascular treatment at a comprehensive stroke center. As first or co-interventionalists, they require to have participated in more than 200 angiographies and 150 endovascular procedures. For the purpose of the REVASCAT trial, only neurointerventionalists who have performed at least 20 thrombectomies with Solitaire device in acute ischemic stroke patients can treat subjects.”
- EXTEND-IA specified “Neurointerventionalists will be credentialed to participate in the study if they have >2 years neurointerventional experience and have performed >10 intra-cranial clot retrieval procedures.”

Conclusioni

STUDIARE

COMPRENDERE

TRATTARE

Conclusioni

Pensate

che si può sempre fare meglio

di chi vi ha preceduto

e di chi vi ha insegnato



Grazie per l'attenzione