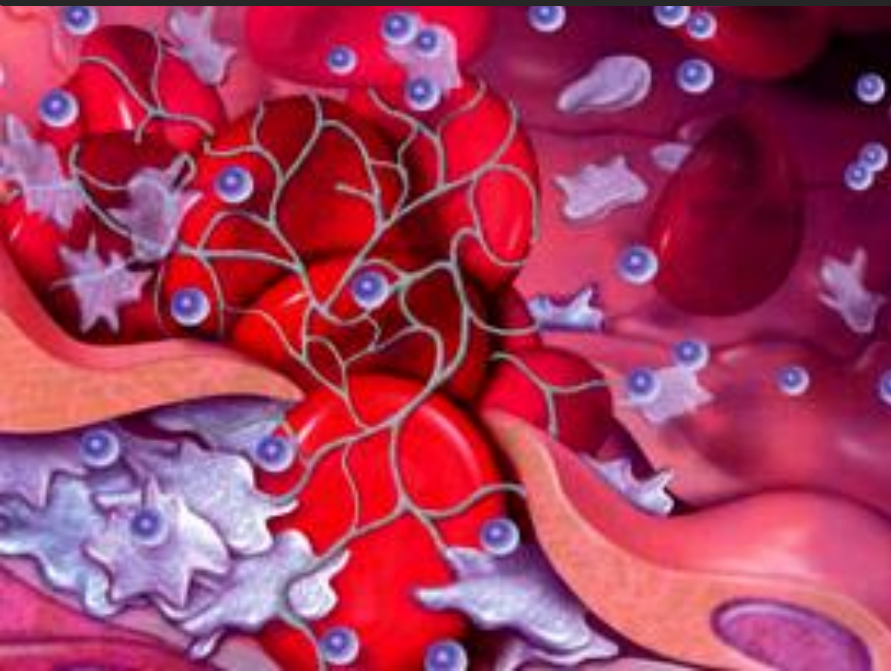


**SEMANA DEL INTERVENCIONISMO
MINIMAMENTE INVASIVO
2016**

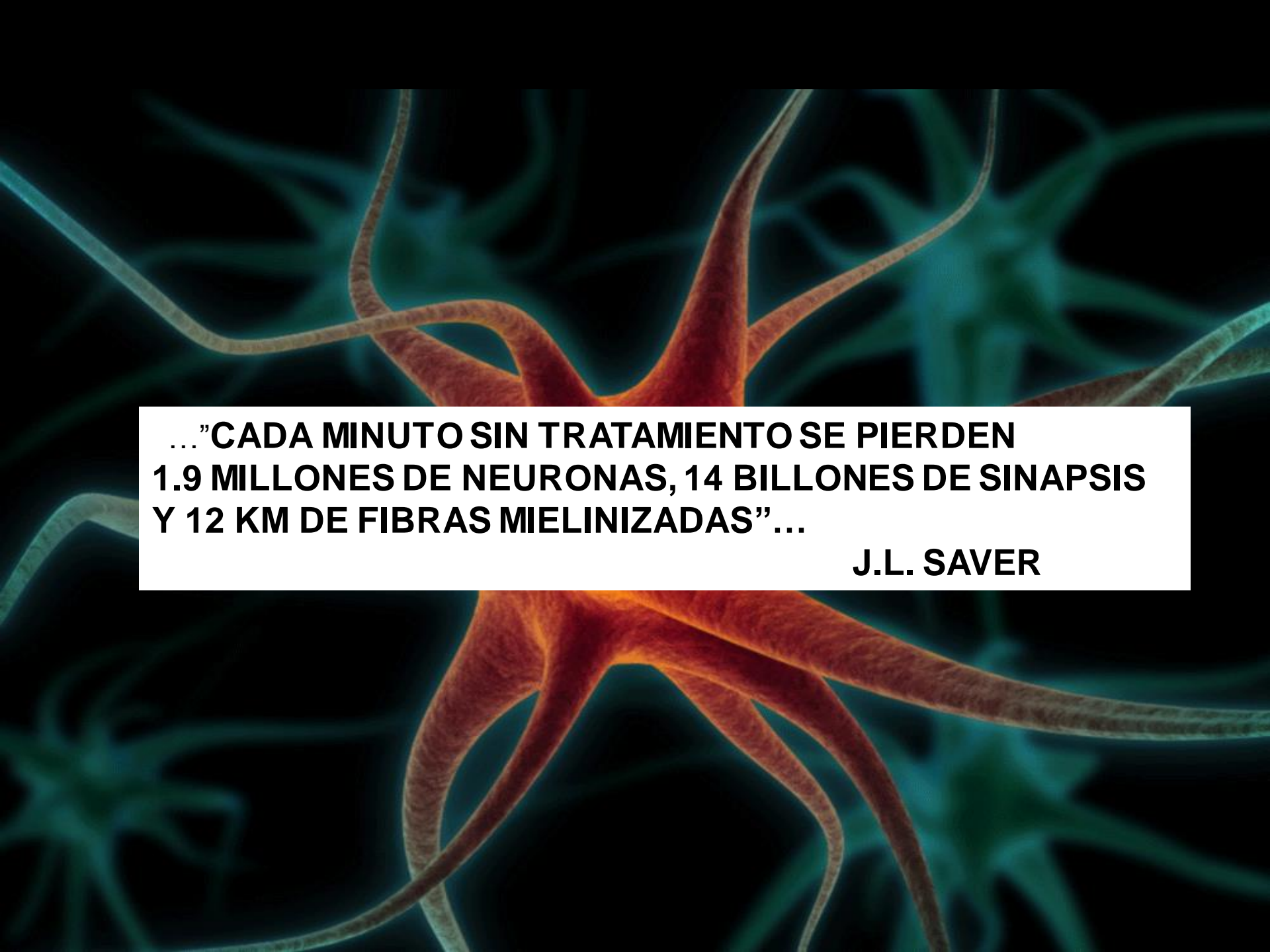
**ROL de LAS IMÁGENES
EN LA TOMA DE DECISIONES TERAPEUTICAS EN
EL ACV**



Dra. Rosana SALVATICO
Neuroradiologa ESNR

Dr. Hector LAMBRE

ENERI CLINICA LA SAGRADA FAMILIA

The background of the image is a microscopic view of neurons. A central neuron is highlighted in a warm, reddish-orange glow, showing its cell body and several long, tapering dendrites extending outwards. Other neurons are visible in the background, rendered in a cooler, teal-blue color, creating a sense of depth and complexity. The overall lighting is dramatic, with the central neuron being the brightest element.

**...”CADA MINUTO SIN TRATAMIENTO SE PIERDEN
1.9 MILLONES DE NEURONAS, 14 BILLONES DE SINAPSIS
Y 12 KM DE FIBRAS MIELINIZADAS”...**

J.L. SAVER



**LA PROMESA DE TERAPIAS PARA EL ACV SE
BASÓ EN LA PREMISA DE LA **PENUMBRA**....**

**LA REPERFUSION TEMPRANA SE TRANSFORMÓ EN
EL EVENTO CLAVE EN EL PRONÓSTICO DEL ACV**

EL TIEMPO ES CEREBRO

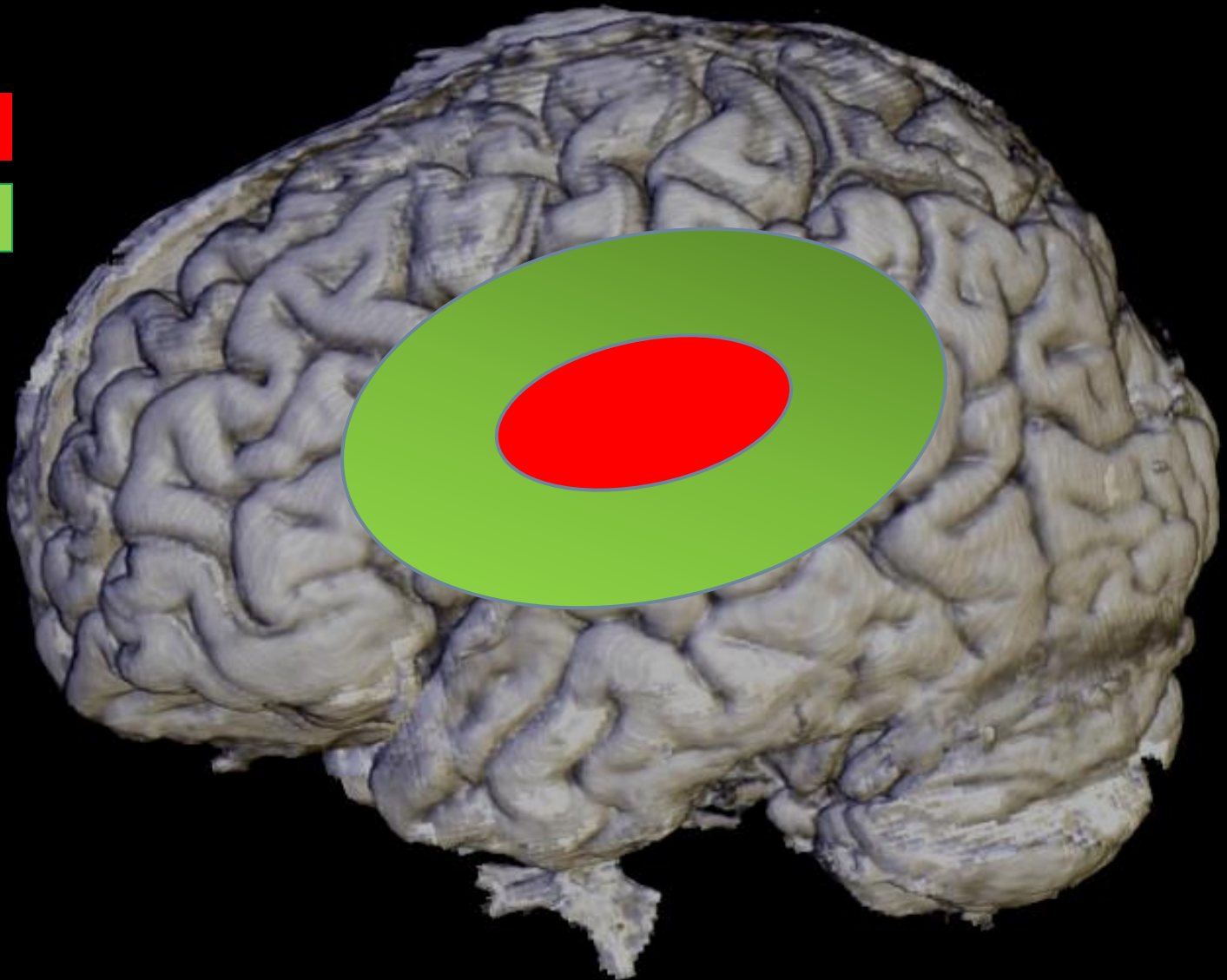


SELECCIÓN ADECUADA DE PACIENTES PARA LA REPERFUSIÓN EN VENTANA DE 3HS !!!

HIPOTESIS DEL MISMATCH DWI-PWI

CORE

PENUMBRA





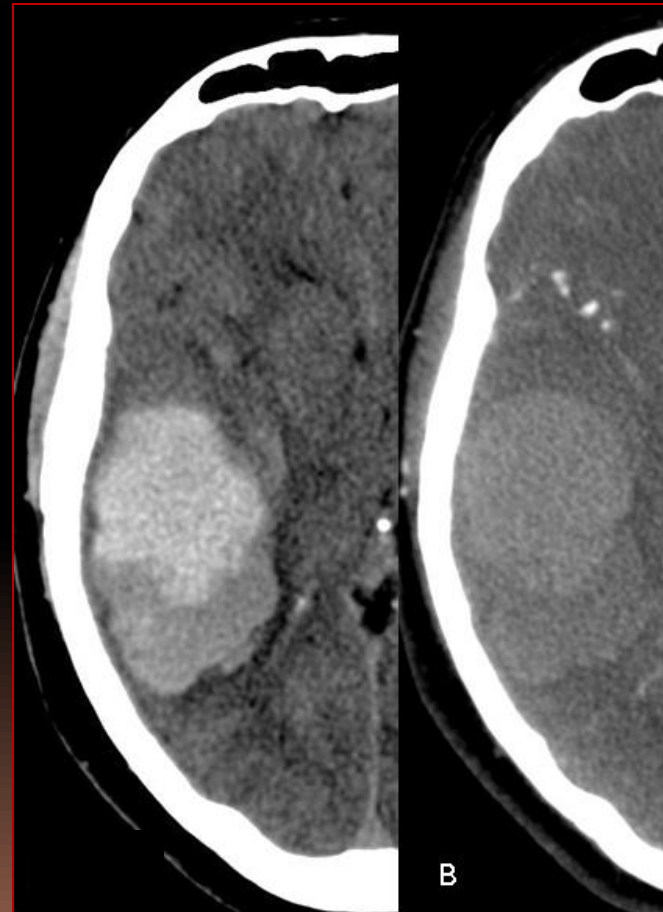
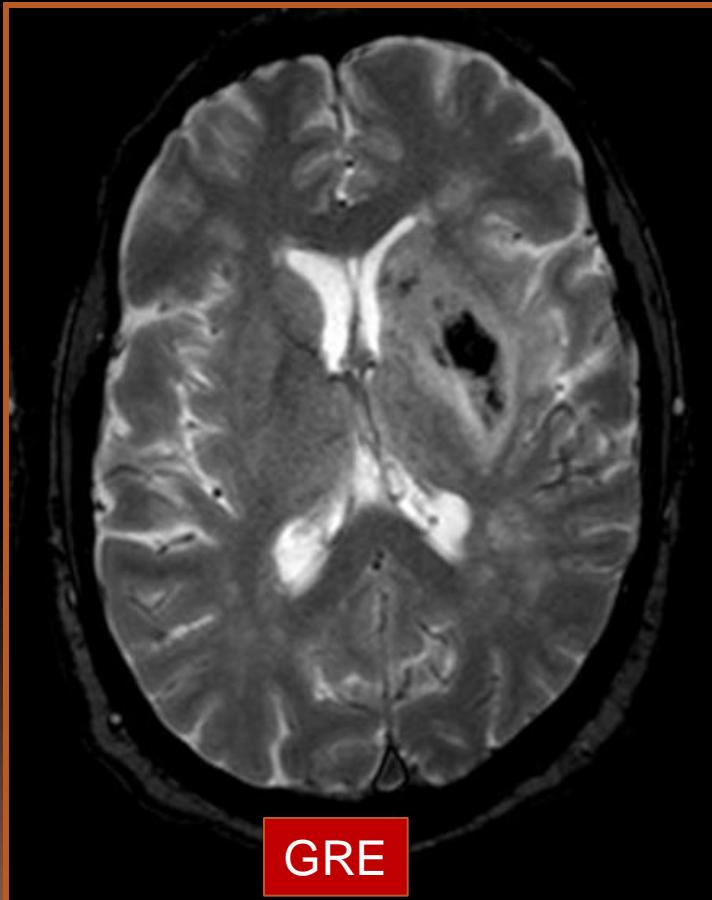
1) EXISTE HEMORRAGIA?

2) HAY OBSTRUCCIÓN DE LOS GRANDES VASOS?

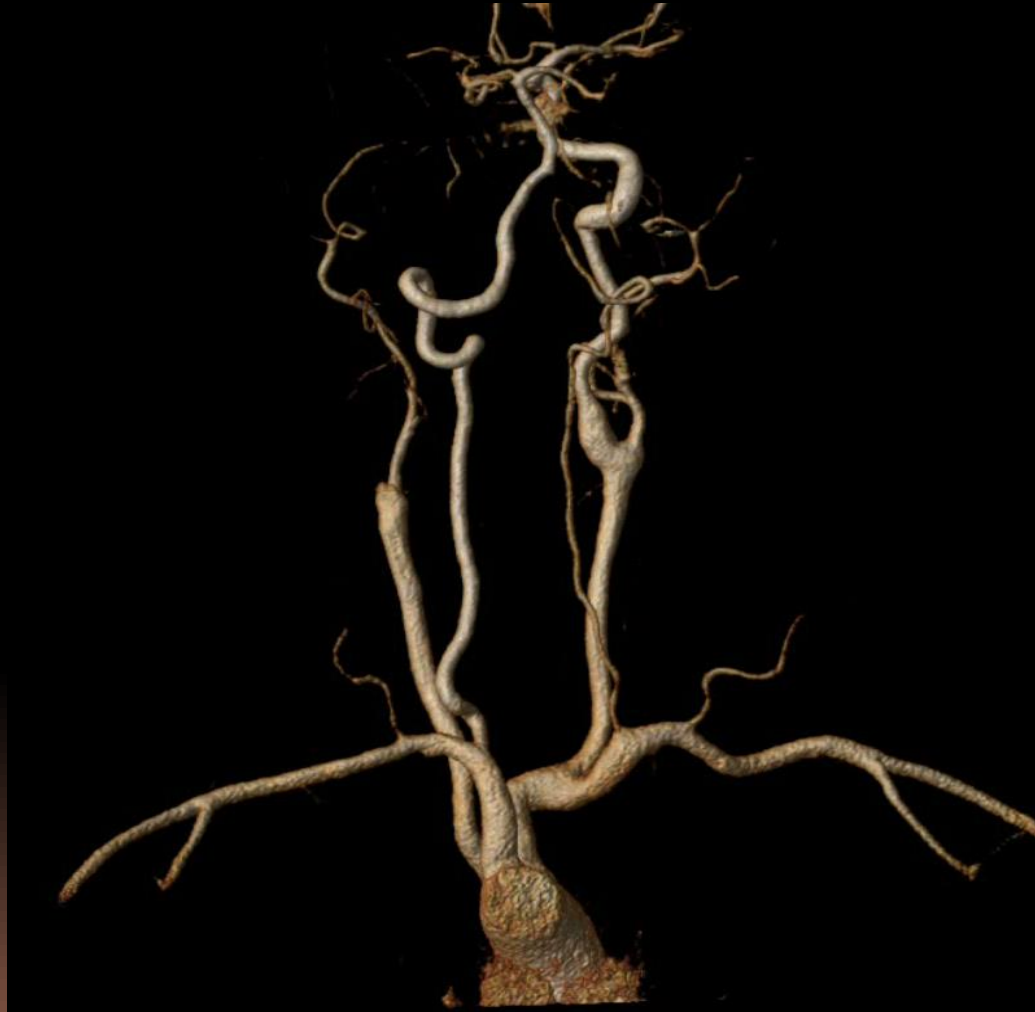
3) QUÉ TEJIDO ESTÁ INFARTADO?

4) QUÉ TEJIDO ES POTENCIALMENTE SALVABLE?

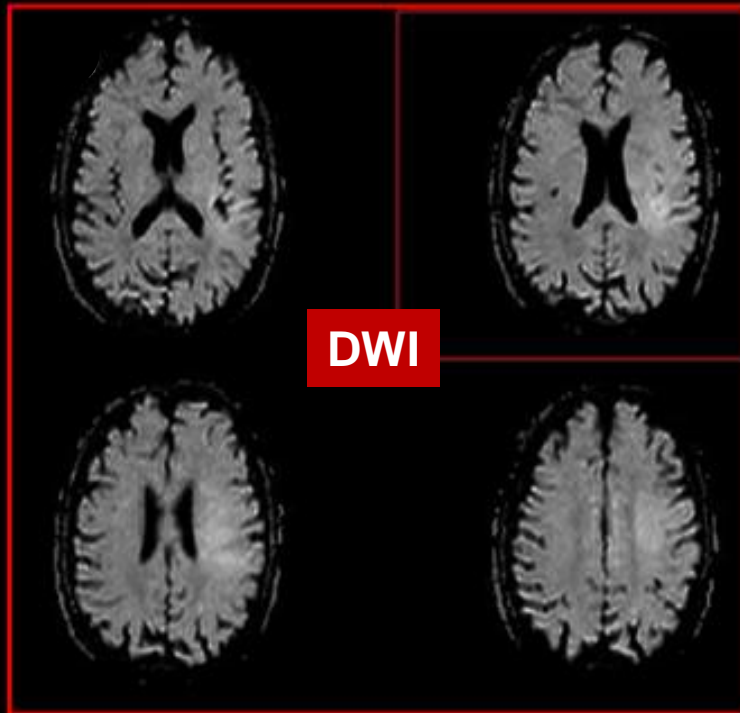
1) EXISTE HEMORRAGIA?



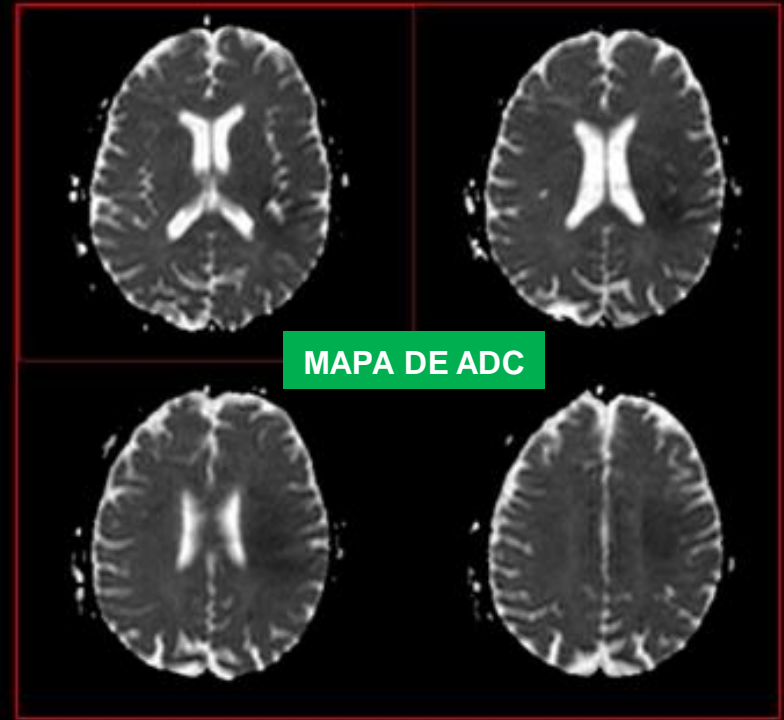
2) HAY OBSTRUCCIÓN DE LOS GRANDES VASOS?



3) QUÉ TEJIDO ESTÁ INFARTADO?



DWI



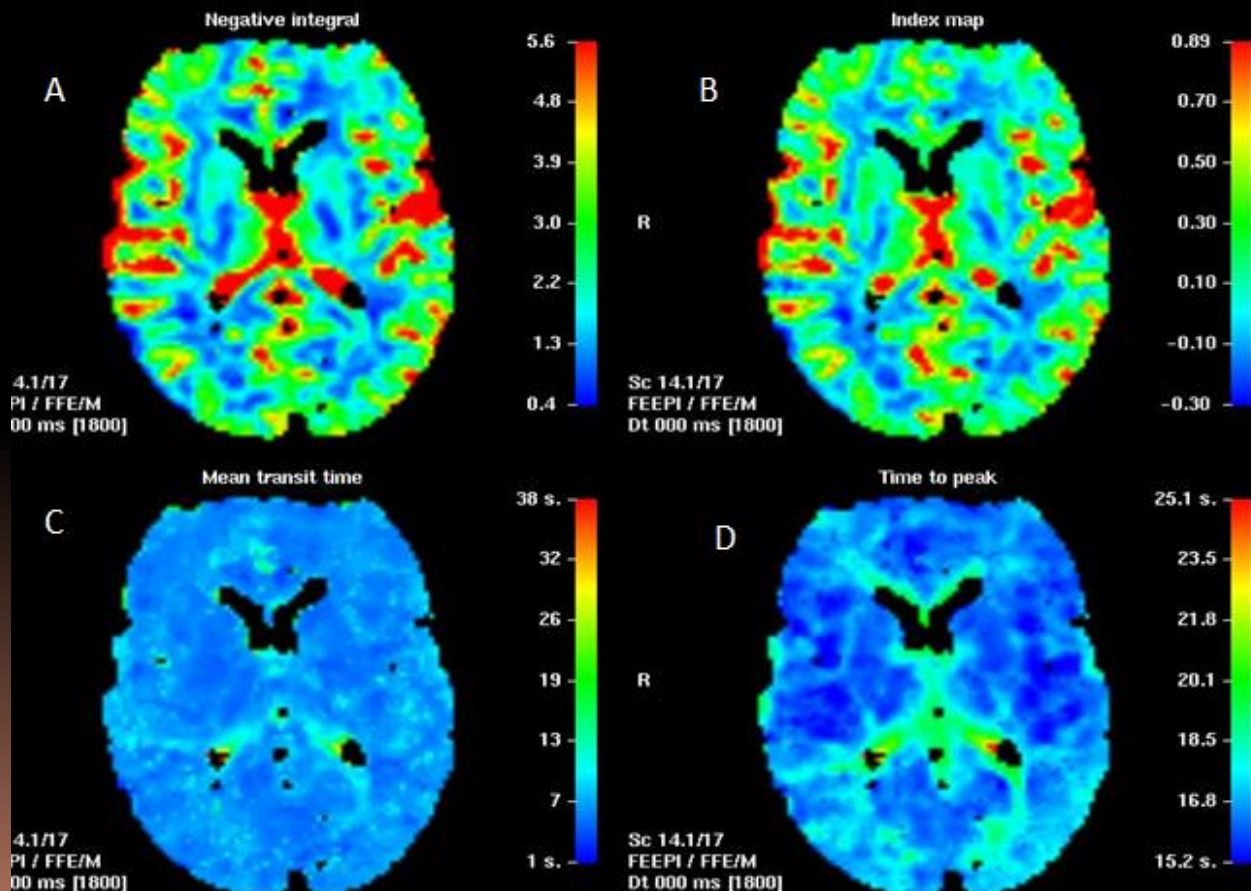
MAPA DE ADC

CORE

TEJIDO IRREVERSIBLEMENTE DAÑADO A PESAR DE LA REPERFUSIÓN

4) QUÉ TEJIDO ES POTENCIALMENTE SALVABLE?

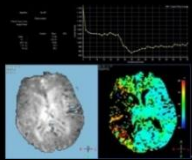
PENUMBRA: TEJIDO ISQUÉMICO, NO FUNCIONANTE PERO TODAVÍA VIVO QUE MORIRÁ A MENOS QUE SE REPERFUNDA



PERFUSIÓN

RM T₂

- GADOLINIO
- CBV, CBF, TTP, Tmax
- COBERTURA TOTAL

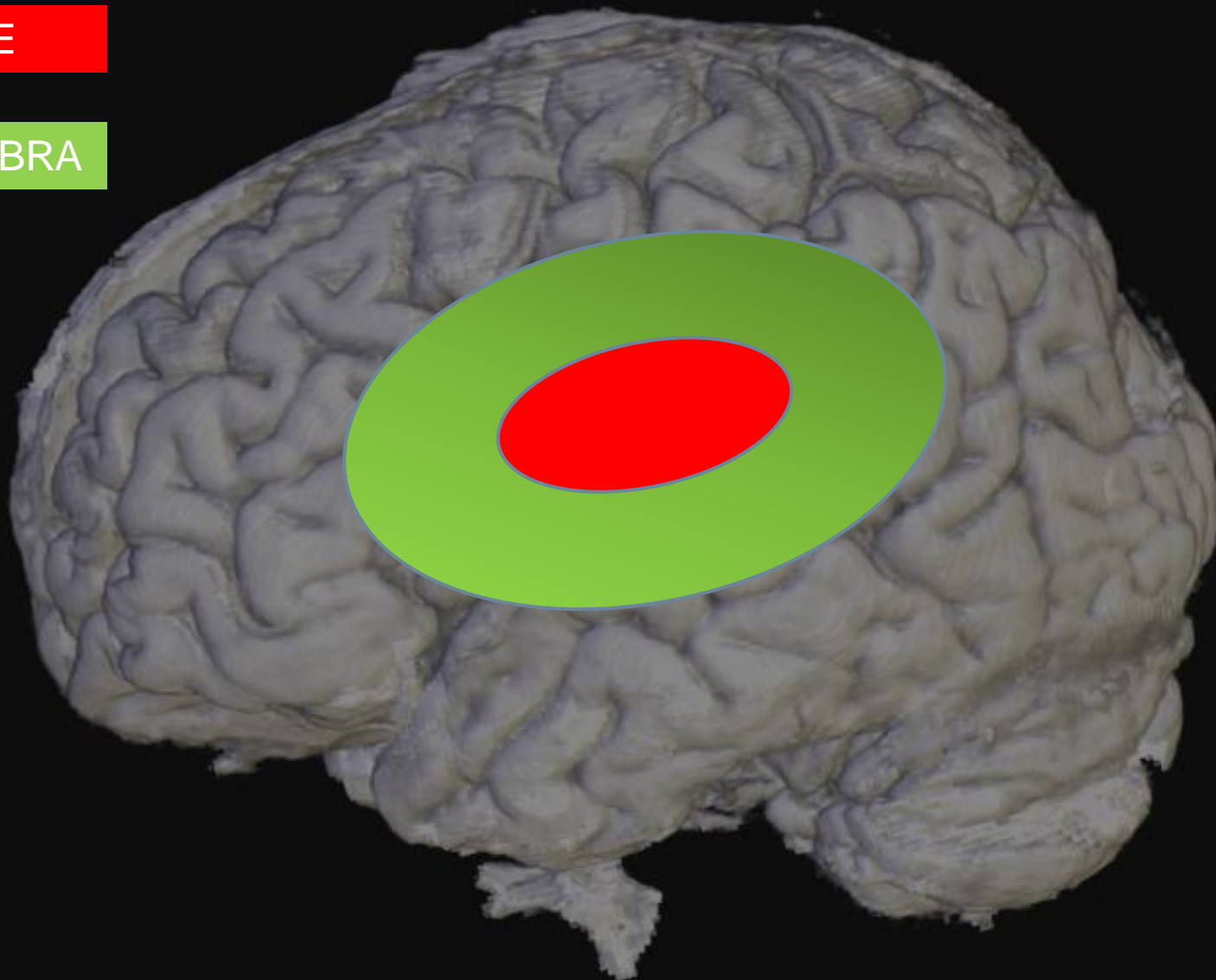


TC (pTC)

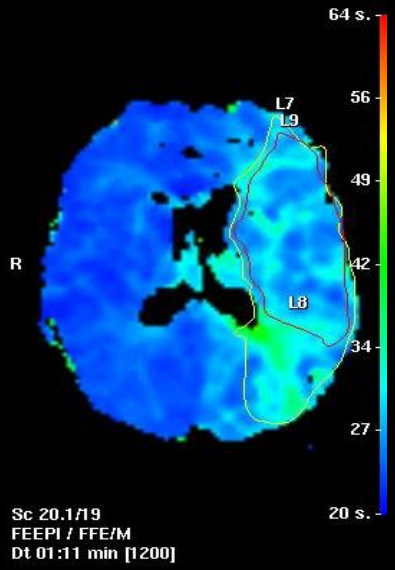
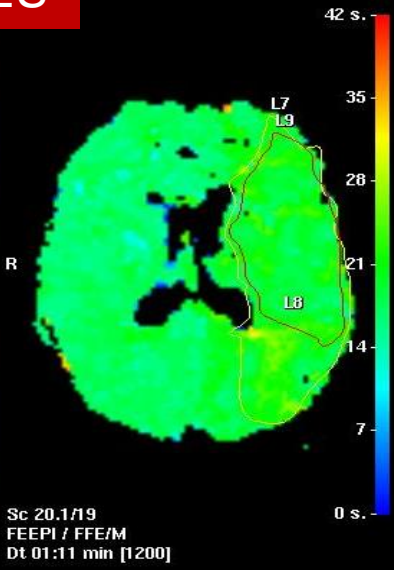
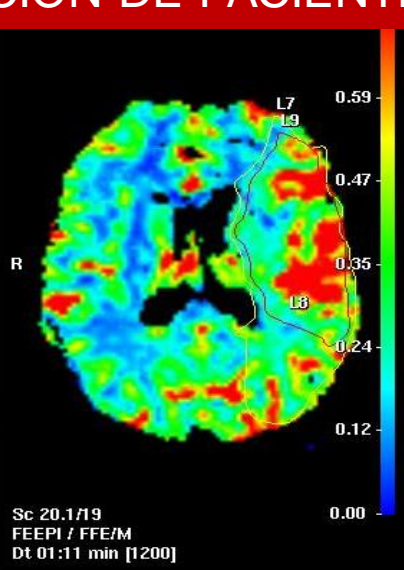
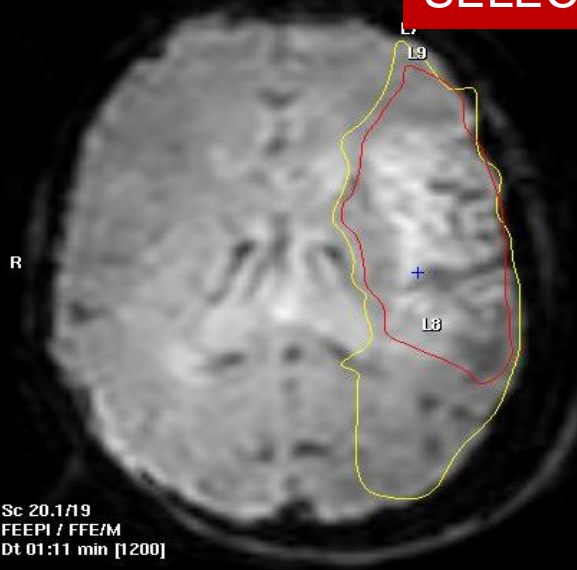
- YODO
- VSC, TTM, Y FSC
- COBERTURA PARCIAL

CORE

PENUMBRA



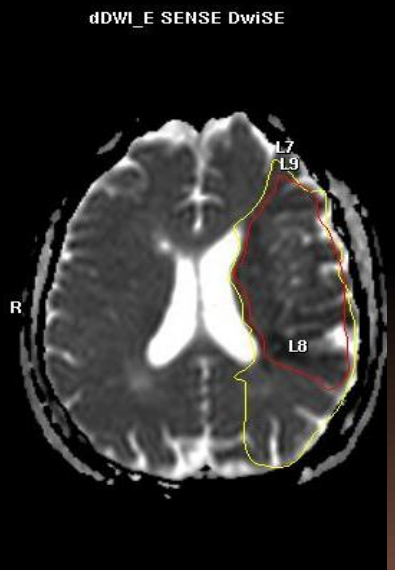
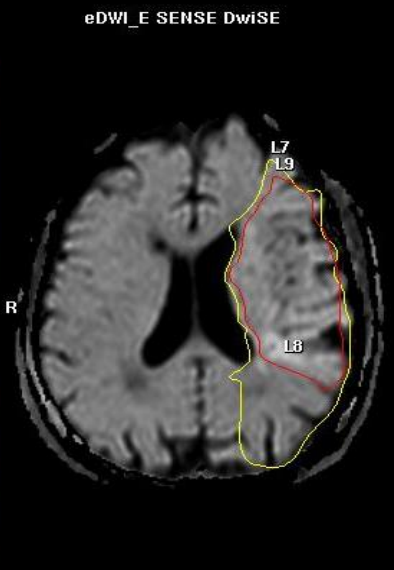
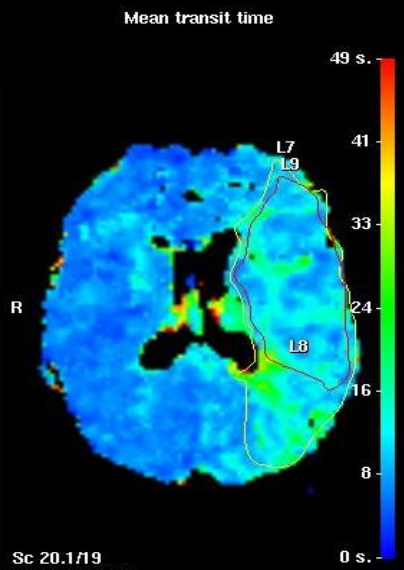
MISMATCH DWI/PWI SELECCIÓN DE PACIENTES



Slice	19	-	+	<input type="radio"/> Dynamics <input checked="" type="radio"/> Dynamics
Dynamic	38	-	+	
Reference	2	-	+	

FIEGE ANIBAL
MR perfusion
Slice number: 19.

Region	Negative integral	Mean transit time	Index map	T0	Time to peak	Region area	Number of pixels
L7	6.1	15.7 s.	0.39	17.5 s.	28.4 s.	5218.5 mm ²	1616.0
L8	3.2	15.0 s.	0.22	19.6 s.	29.4 s.	-1.5 mm ²	0.0
L9	6.7	14.8 s.	0.45	17.5 s.	27.7 s.	3170.5 mm ²	982.0



- MENOS DE UN TERCIO DEL TERRITORIO ARTERIAL AFECTADO
- VENTANA DE 3 HORAS DESDE EL COMIENZO DE SÍNTOMAS!!

SELECCIÓN POR IMÁGENES PARA TERAPIA IV

TEORIA DE MISMATCH

Clark WM, Wissman S, Albers GW, Jhamandas JH, Madden KP, Hamilton S. Recombinant tissue-type plasminogen activator (Alteplase) for ischemic stroke 3 to 5 hours after symptom onset. The ATLANTIS study: a randomized controlled trial. Alteplase Thrombolysis for Acute Noninterventional Therapy in Ischemic Stroke. *JAMA*. 1999;282(21):2019–2026

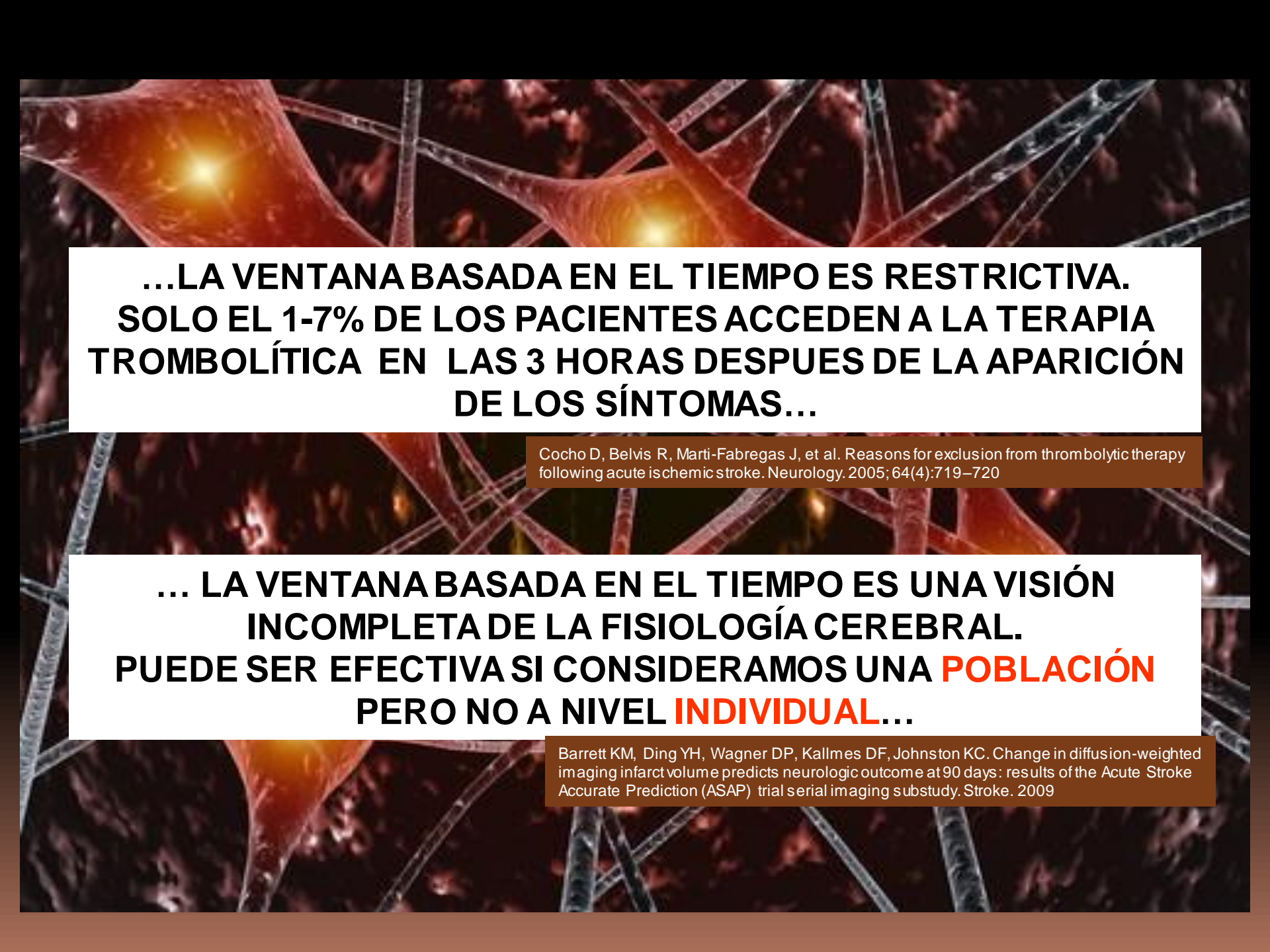
Hacke W, Kaste M, Fieschi C, et al. Intravenous thrombolysis with recombinant tissue plasminogen activator for acute hemispheric stroke. The European Cooperative Acute Stroke Study (ECASS). *JAMA*. 1995;274(13):1017–1025.

Hacke W, Kaste M, Fieschi C, et al. Randomised double-blind placebo-controlled trial of thrombolytic therapy with intravenous alteplase in acute ischaemic stroke (ECASS II). *Lancet* 1998

**NO DEMOSTRARON BENEFICIO EN EXTENDER LA VENTANA
MAS ALLÁ DE LAS 3 HORAS!!!**

A microscopic view of neurons, showing their cell bodies and branching axons. Several axons are highlighted with a bright yellow glow, suggesting electrical activity or a specific focus of study. The background is dark and slightly blurred, emphasizing the intricate structure of the neural network.

**LA PROMESA DE TERAPIAS PARA EL STROKE
ESTÁ BASADA EN LA PREMISA DE LA
PENUMBRA....**



**...LA VENTANA BASADA EN EL TIEMPO ES RESTRICTIVA.
SOLO EL 1-7% DE LOS PACIENTES ACCEDEN A LA TERAPIA
TROMBOLÍTICA EN LAS 3 HORAS DESPUES DE LA APARICIÓN
DE LOS SÍNTOMAS...**

Cocho D, Belvis R, Marti-Fabregas J, et al. Reasons for exclusion from thrombolytic therapy following acute ischemic stroke. *Neurology*. 2005;64(4):719–720

**... LA VENTANA BASADA EN EL TIEMPO ES UNA VISIÓN
INCOMPLETA DE LA FISIOLÓGÍA CEREBRAL.
PUEDE SER EFECTIVA SI CONSIDERAMOS UNA POBLACIÓN
PERO NO A NIVEL INDIVIDUAL...**

Barrett KM, Ding YH, Wagner DP, Kallmes DF, Johnston KC. Change in diffusion-weighted imaging infarct volume predicts neurologic outcome at 90 days: results of the Acute Stroke Accurate Prediction (ASAP) trial serial imaging substudy. *Stroke*. 2009

TIEMPO ES CEREBRO...





**TANTO LA DURACIÓN COMO EL GRADO DE ISQUEMIA
SON RESPONSABLES DE LA TASA DE MUERTE
NEURONAL**

**POR DEBAJO DE DETERMINADO NIVEL DE FLUJO SE
PRODUCE LA APARICIÓN DE SÍNTOMAS **PERO EL
TEJIDO PERMANECE VIABLE POR HORAS****

Jones TH, Morawetz RB, Crowell RM, et al. Thresholds of focal cerebral ischemia in awake monkeys. *J Neurosurg.* 1981; 54(6):773–782.

1)EXISTE HEMORRAGIA?

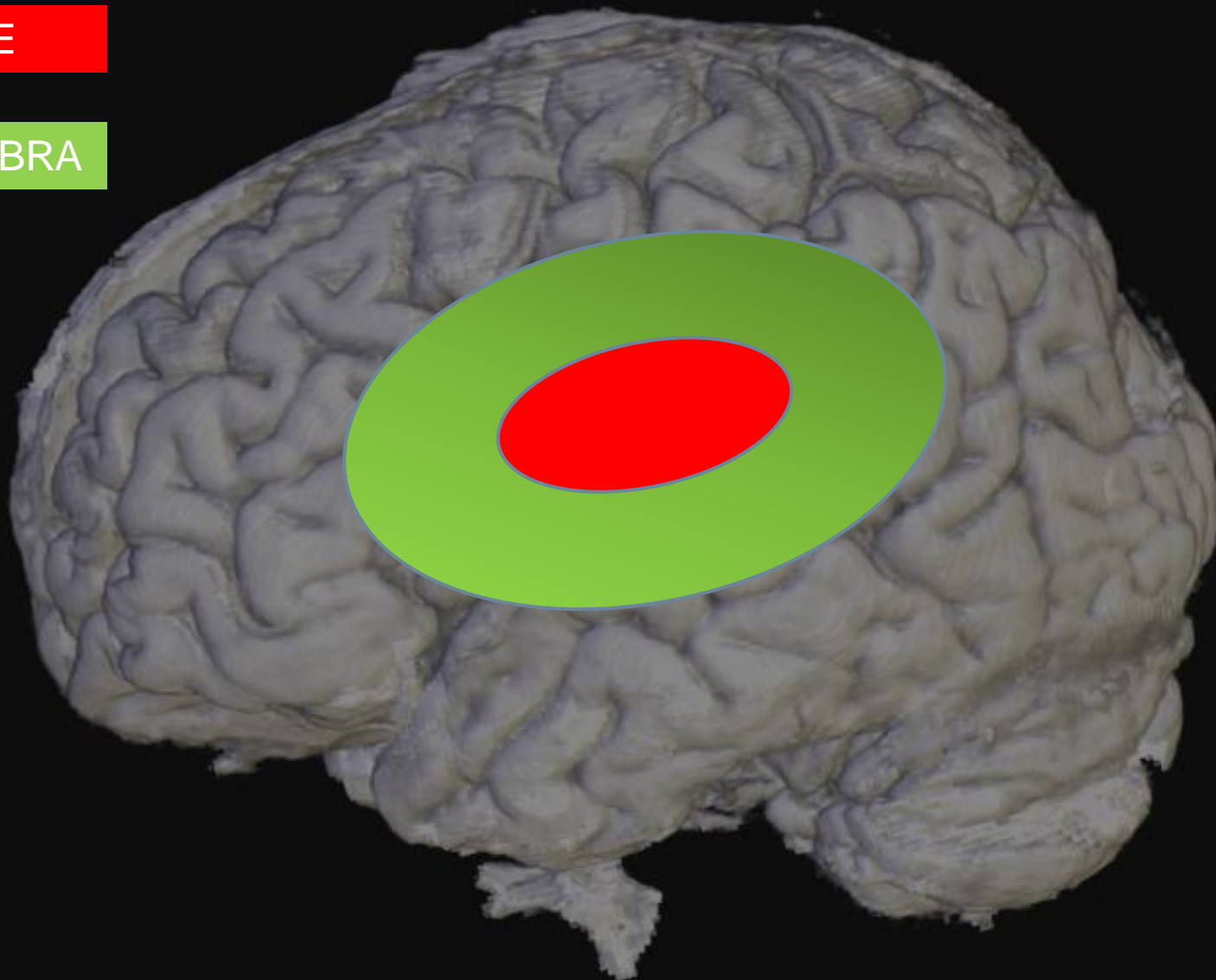
2)HAY OBSTRUCCIÓN DE LOS GRANDES VASOS?

3)QUÉ TEJIDO ESTÁ INFARTADO?

4)QUÉ TEJIDO ES POTENCIALMENTE SALVABLE?

CORE

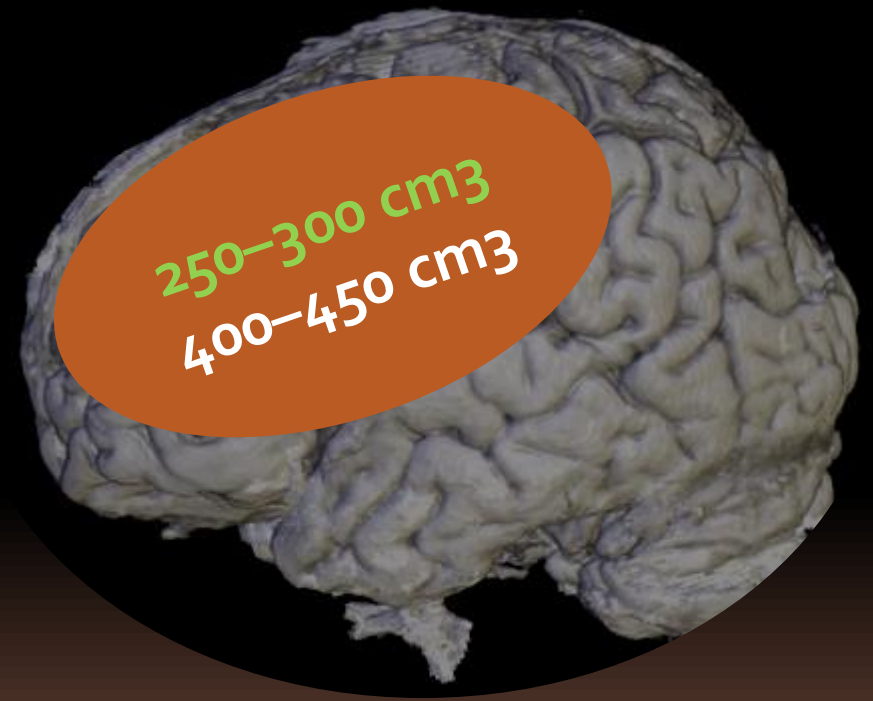
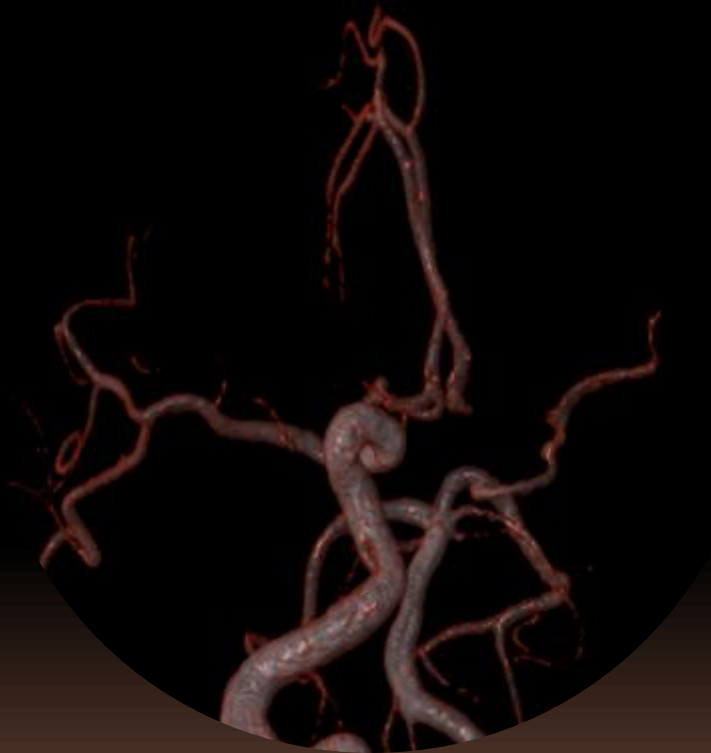
PENUMBRA



PODEMOS IDENTIFICAR A LOS PACIENTES CON ALTO RIESGO DE HEMORRAGIA QUE SE PERJUDICARÍAN CON EL TRATAMIENTO?

PODEMOS IDENTIFICAR A LOS PACIENTES CON TEJIDO POTENCIALMENTE SALVABLE QUE SE BENEFICIARÍAN CON EL TRATAMIENTO?

ARTERIA CEREBRAL ANTERIOR
ARTERIA CEREBRAL MEDIA



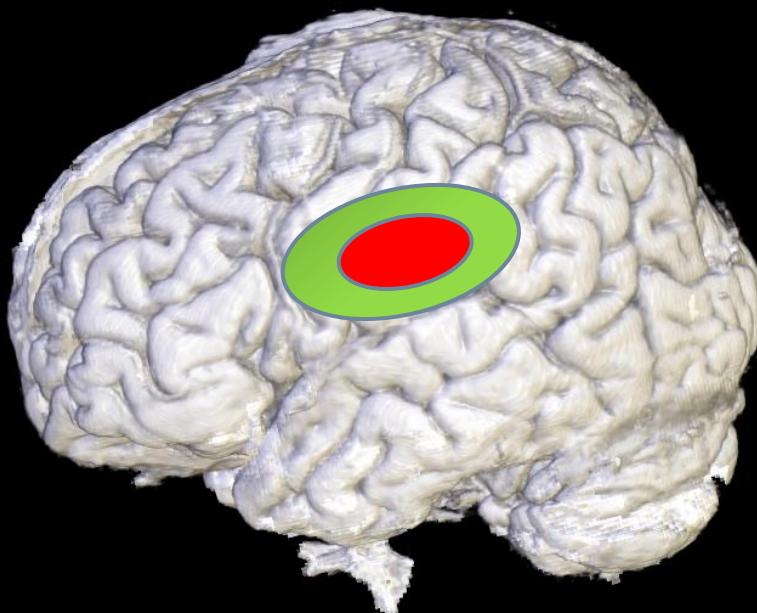
IMPORTANTE !!

VOLUMEN DEL INFARTO ANTES DEL TRATAMIENTO MÁS QUE LA EXTENSIÓN DE LA PENUMBRA ES PREDICTOR DE LA EVOLUCIÓN

CORE

EVENTO CLAVE EN LA EVOLUCIÓN CLÍNICA Y PREDICTOR DEL RIESGO DE SANGRADO!!

VOLUMEN FINAL > 70-100ml MARCADOR DE MALA EVOLUCIÓN CLÍNICA



Mullins ME, Schaefer PW, Sorensen AG, et al. CT and conventional and diffusion-weighted MR imaging in acute stroke: study in 691 patients at presentation to the emergency department. *Radiology*. 2002; 224(2):353–360

Arsava, E.; Ay, H.; Singhal, AB.; Ona, Wu; Furie, KL.; Sorenson, AG. An Infarct Volume Threshold on Early DWI to Predict Unfavorable Clinical Outcome. Presented at: International Stroke Conference; New Orleans, LA, USA. 20–22 February 2008; 173. Sanak D, Nosal V, Horak D, et al. Impact of diffusion-weighted MRI-measured initial cerebral infarction volume on clinical outcome in acute stroke patients with middle cerebral artery occlusion treated by thrombolysis. *Neuroradiology*. 2006; 48(9):632–639.

DEFINICIÓN

EVALUACIÓN

CORE

TEJIDO IRREVERSIBLEMENTE DAÑADO A PESAR DE LA REPERFUSIÓN

CORE

TEJIDO ISQUÉMICO FACTIBLE DE DAÑO IRREVERSIBLE AUN EN LOS ESTADIOS PRECOCES DEL ACV CONSIDERANDO LA BASE FISIOPATOLÓGICA DE LA MODALIDAD UTILIZADA PARA SU DETECCIÓN

Lev, M et al Radiology-2013

CORE

CONCEPTO DINÁMICO DEPENDIENTE DE LA LÍNEA DE TIEMPO Y DE LA REPERFUSIÓN

Goyal et al
Radiology-2013

Kranz PG, Eastwood JD. Does diffusion-weighted imaging represent the ischemic core? An evidence-based systematic review. AJNR Am J Neuroradiol. 2009; 30(6):1206–1212

ES REVERSIBLE LA DIFUSION?

Schaefer PW, Hassankhani A, Putman C, et al. Characterization and evolution of diffusion MR imaging abnormalities in stroke patients undergoing intra-arterial thrombolysis. AJNR Am J Neuroradiol. 2004; 25(6):951–957

Kidwell CS, Saver JL, Mattiello J, et al. Thrombolytic reversal of acute human cerebral ischemic injury shown by diffusion/perfusion magnetic resonance imaging. Ann Neurol. 2000; 47(4):462–469.

PROCESO FISIOPATOLÓGICO NO HOMOGÉNEO EN LA LESIÓN

- VARIABILIDAD EN EL METABOLISMO DEL OXÍGENO, SU TASA DE EXTRACCIÓN Y PERFUSIÓN.
- DISTINTAS ÁREAS DE PH POR METABOLISMO ANAERÓBICO

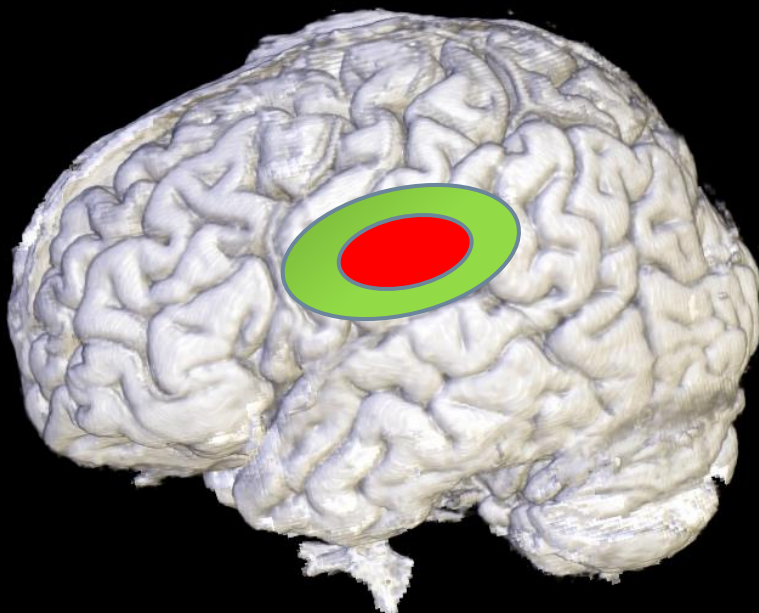


VIABILIDAD VARIABLE

CORE

EVENTO CLAVE EN LA EVOLUCIÓN CLÍNICA Y PREDICTOR DEL RIESGO DE SANGRADO!!

VOLUMEN FINAL > 70-100ml MARCADOR DE MALA EVOLUCIÓN CLÍNICA



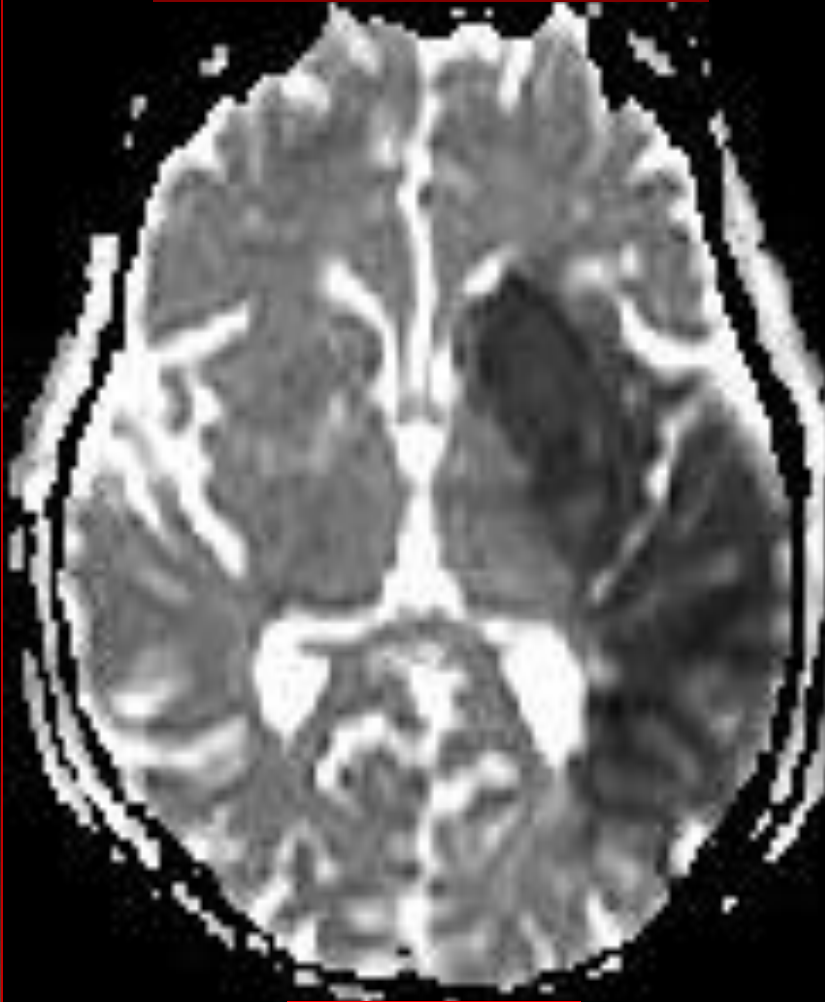
Mullins ME, Schaefer PW, Sorensen AG, et al. CT and conventional and diffusion-weighted MR imaging in acute stroke: study in 691 patients at presentation to the emergency department. *Radiology*. 2002; 224(2):353–360

Arsava, E.; Ay, H.; Singhal, AB.; Ona, Wu; Furie, KL.; Sorenson, AG. An Infarct Volume Threshold on Early DWI to Predict Unfavorable Clinical Outcome. Presented at: International Stroke Conference; New Orleans, LA, USA. 20–22 February 2008; 173. Sanak D, Nosal V, Horak D, et al. Impact of diffusion-weighted MRI-measured initial cerebral infarction volume on clinical outcome in acute stroke patients with middle cerebral artery occlusion treated by thrombolysis. *Neuroradiology*. 2006; 48(9):632–639.

DEFINICIÓN

EVALUACIÓN

CORE



MAPA DE ADC

- TC SIN CONTRASTE
- ASPECTS SCALE
- IMÁGENES “CRUDAS” aTC
- DISMINUCION SEVERA VSC
- DWI/MAPA DE ADC

SENSIBILIDAD 91-100%

ESPECIFICIDAD 86-100%

Mullins ME, Schaefer PW, Sorensen AG, et al. CT and conventional and diffusion-weighted MR imaging in acute stroke: study in 691 patients at presentation to the emergency department. *Radiology*. 2002; 224(2):353–360

Latchaw RE, Alberts MJ, Lev MH, et al. Recommendations for imaging of acute ischemic stroke. A scientific statement from the American Heart Association.

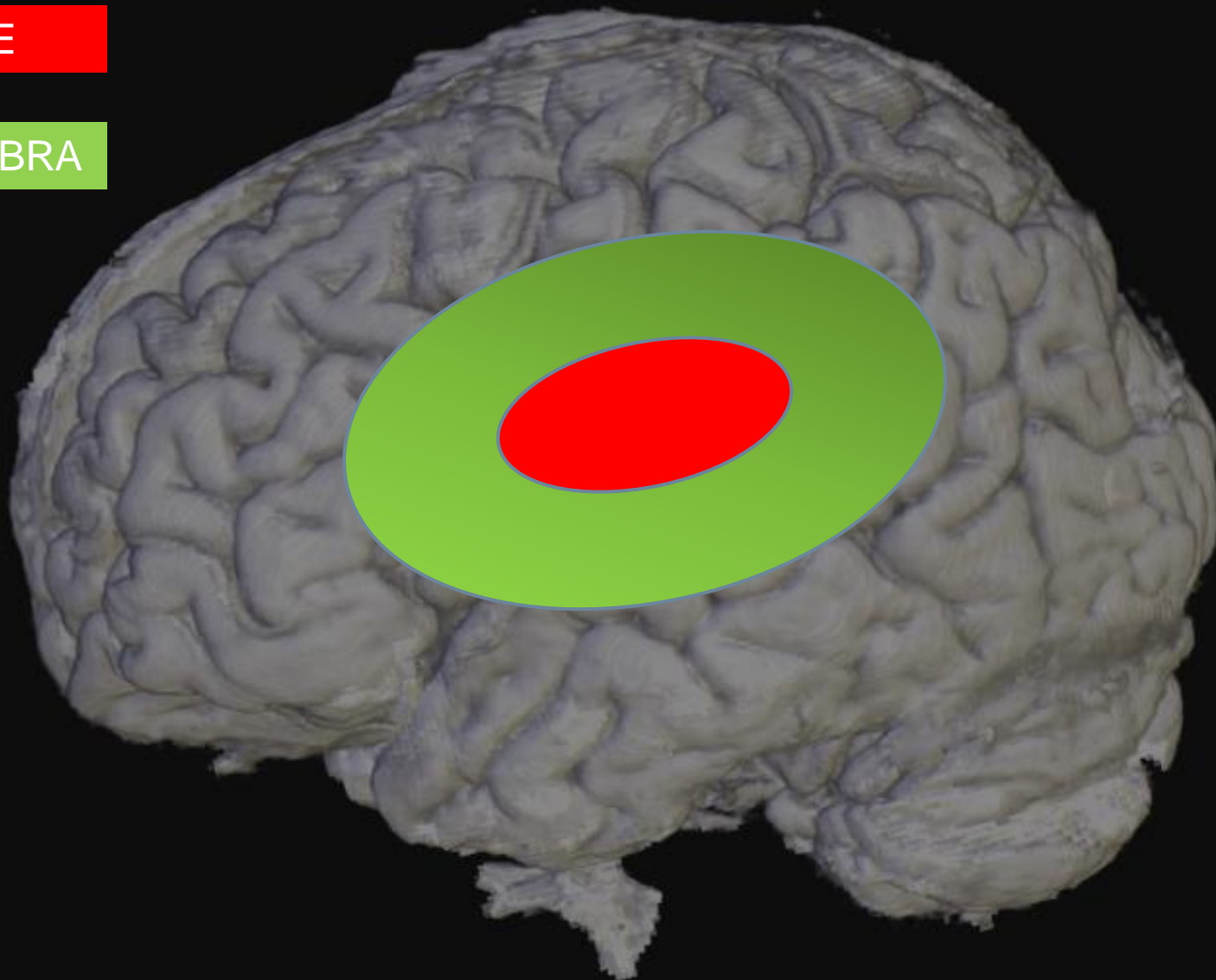
Stroke. 2009; 40(11):3646–3678.

IMÁGENES DE LA PENUMBRA

...el problema de la perfusión...
... y de la evaluación de las
colaterales

CORE

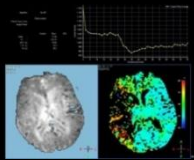
PENUMBRA



PERFUSIÓN

RM T₂

- GADOLINIO
- CBV, CBF, TTP, T_{max}
- COBERTURA TOTAL

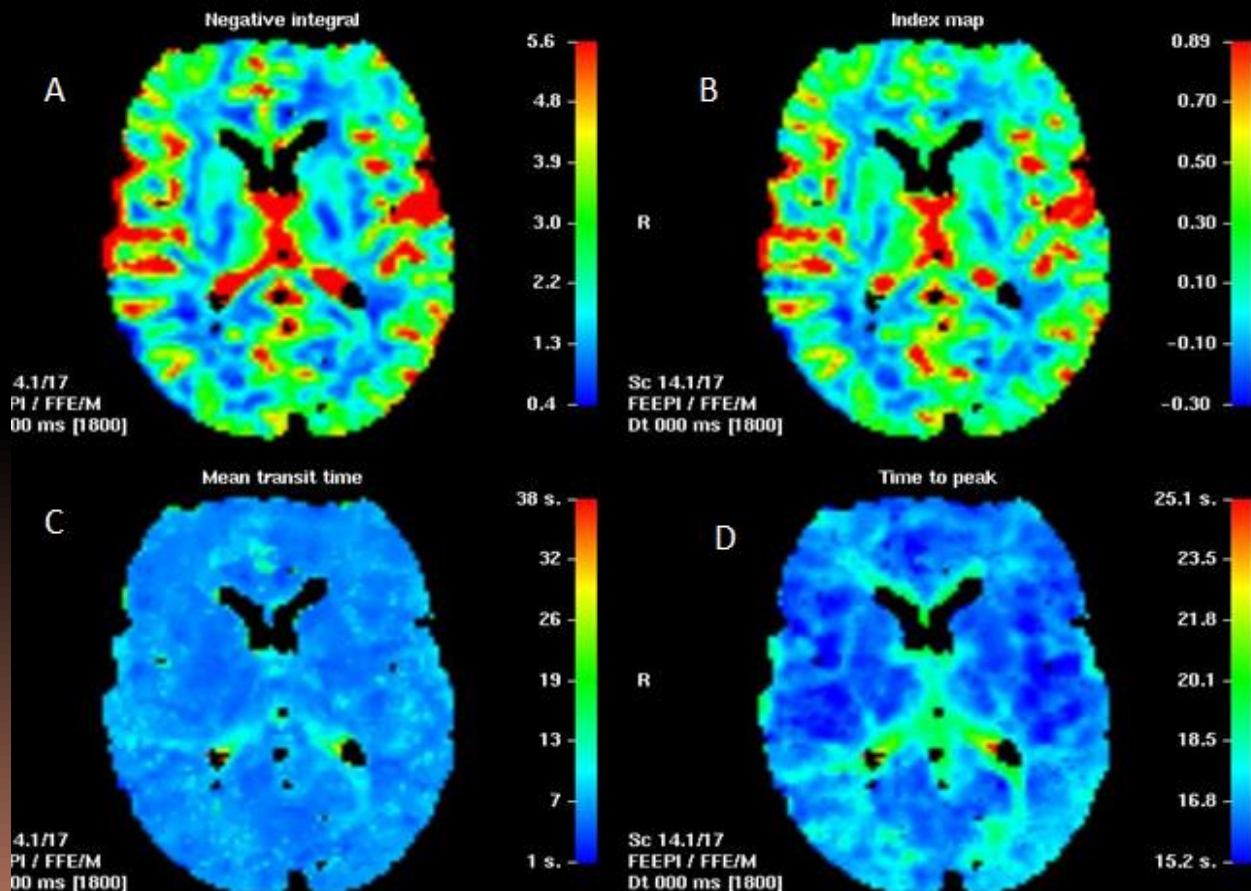


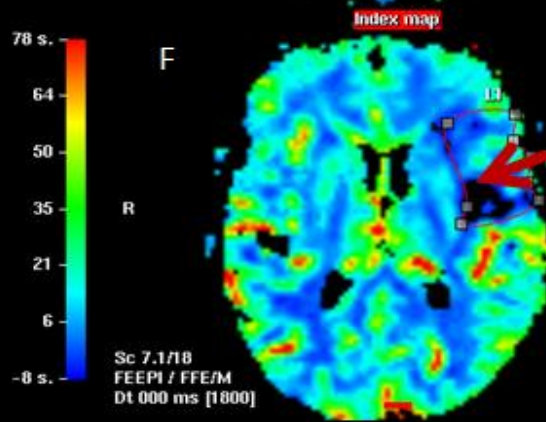
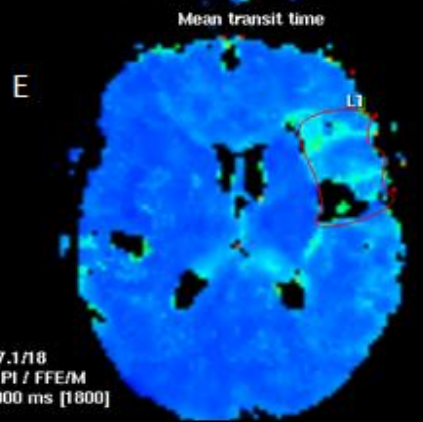
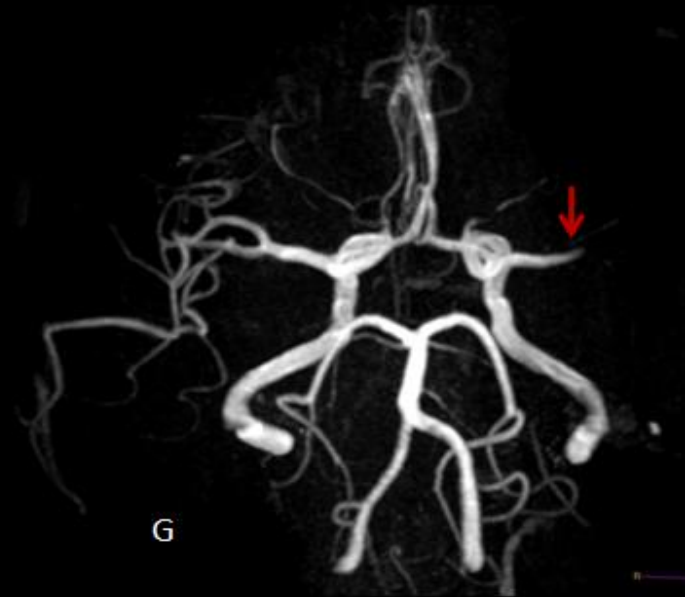
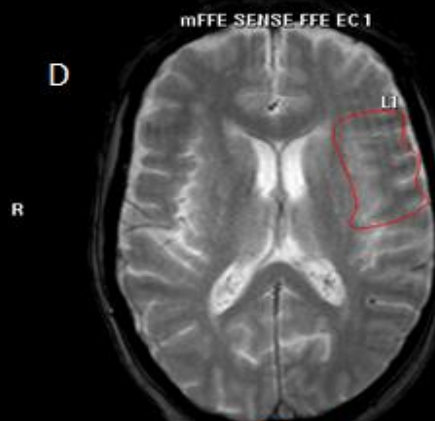
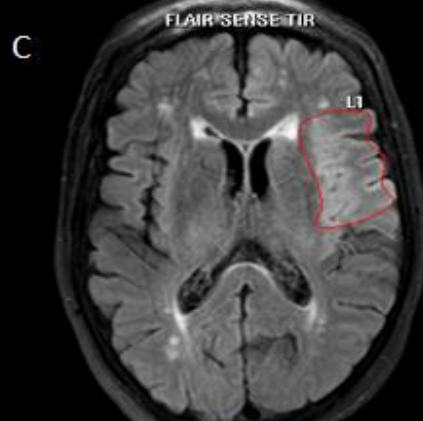
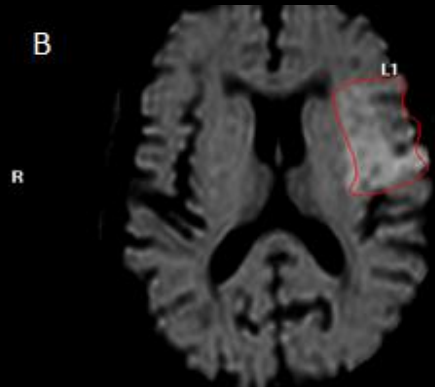
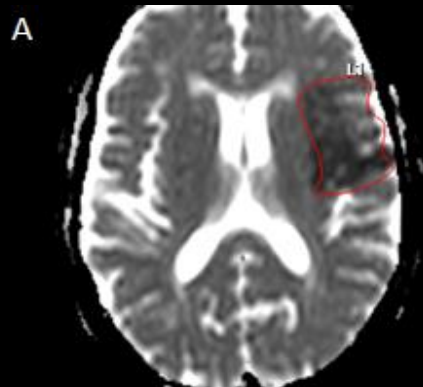
TC (pTC)

- YODO
- VSC, TTM, FSC
- COBERTURA PARCIAL

4) QUÉ TEJIDO ES POTENCIALMENTE SALVABLE?

PENUMBRA: TEJIDO ISQUÉMICO, NO FUNCIONANTE PERO TODAVÍA VIVO QUE MORIRÁ A MENOS QUE SE REPERFUNDA





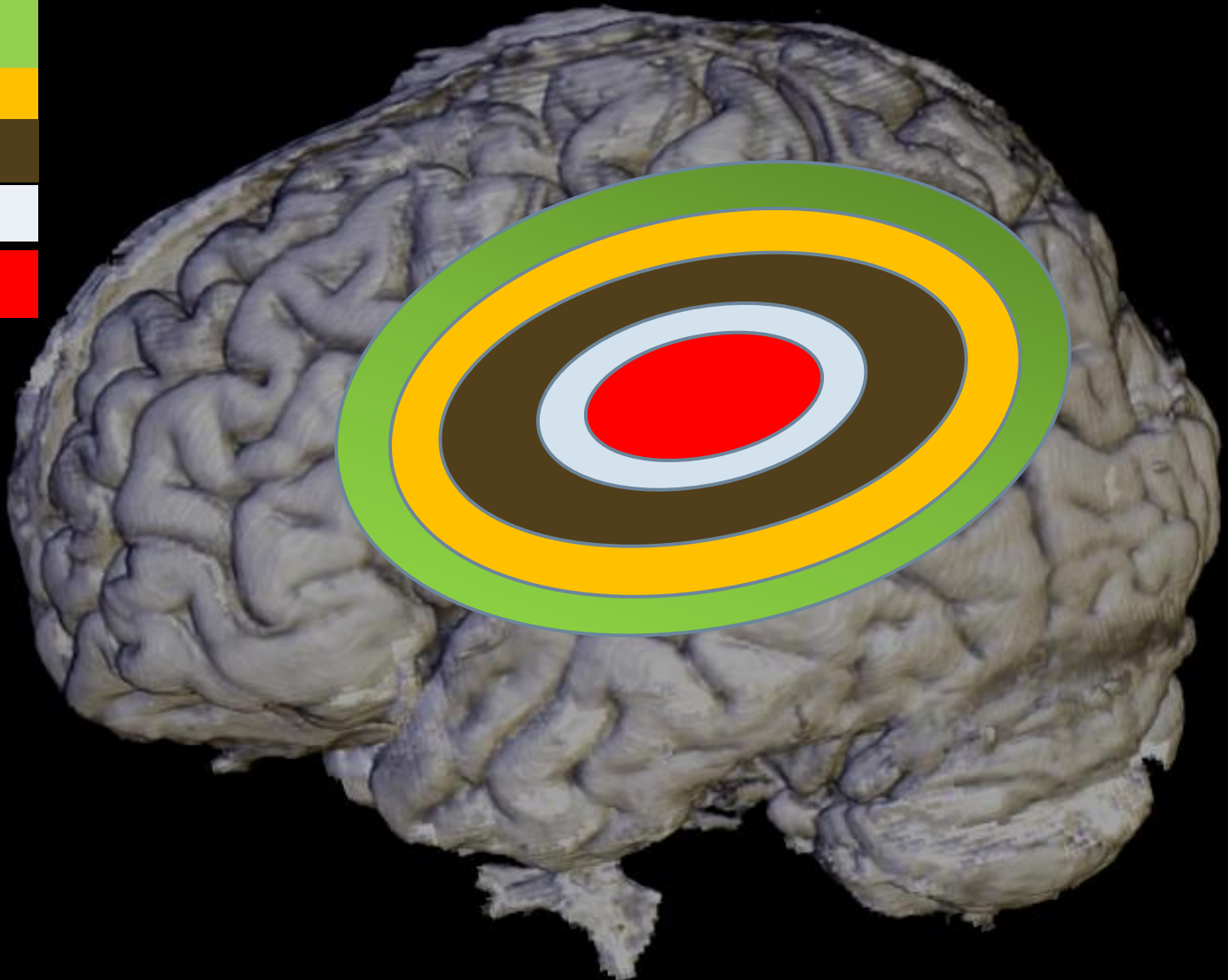
**OLIGOHEMIA
BENIGNA**

ZONA BORDER

PENUMBRA

ZONA BORDER

CORE

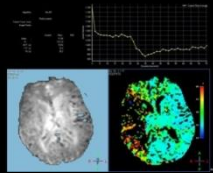


**OLIGOHEMIA BENIGNA: TEJIDO HIOPERFUNDIDO AÚN FUNCIONANTE ,
QUE SOBREVIVIRÁ INDEPENDIENTEMENTE DE LA REPERFUSIÓN**

PERFUSIÓN

RM T₂

- GADOLINIO
- CBV, CBF, TTP, Tmax y MTT



TC (pTC)

- YODO
- VSC

ARTERIAL SP

-
- M...ADO CON RF
- CBF

FLAT PANEL

- PRINCIPIOS DE CT+ DSA
- SALA DSA

CUANTIFICACION INDIRECTA DE LA PERFUSION A TRAVÉS DE
MODELOS
MATEMÁTICOS (DECONVOLUCIÓN)

•Konstas AA, Goldmakher GV, Lee TY, Lev MH. Theoretic basis and technical implementations of CT perfusion in acute ischemic stroke, part 1: theoretic basis. AJNR Am J Neuroradiol. 2009; 30(4):662–668.

Butcher KS, Parsons M, MacGregor L, et al. Refining the perfusion–diffusion mismatch hypothesis. Stroke. 2005; 36(6):1153–1159.

• Kane I, Carpenter T, Chappell F, et al. Comparison of 10 different magnetic resonance perfusion imaging processing methods in acute ischemic stroke: effect on lesion size, proportion of patients
Yoo et al. Page 19

•**ESCASA REPRODUCIBILIDAD ENTRE LOS DISTINTOS SOFTWARE DE LAS DIFERENTES MARCAS**

•**RM Y CT NO PERMITEN LA CUANTIFICACION ABSOLUTA LO QUE DETERMINA SOLO LA COMPARACIÓN DE VOLUMENES EN EL MISMATCH ENTRE EL CORE Y EL TEJIDO HIPOPERFUNDIDO**

•**TTM Y T_{max} UTILIZAN DECONVOLUCIÓN EN EL POSTPROCESO**

The background features a complex network of glowing blue lines and dots, resembling a neural network or a data visualization. The lines are semi-transparent and intersect, with bright red glowing points at various locations. The overall color palette is dominated by deep blues and vibrant reds against a dark background.

EL DESAFÍO...

**...ES DIFERENCIAR CORE, OLIGOHEMIA BENIGNA Y
PENUMBRA**



**..LOS PARÁMETROS DE PERFUSIÓN NO REFLEJAN
ACTIVIDAD METABÓLICA
TEJIDO MUERTO Y EN PROCESO DE MUERTE PUEDEN TENER FLUJO
NORMAL**

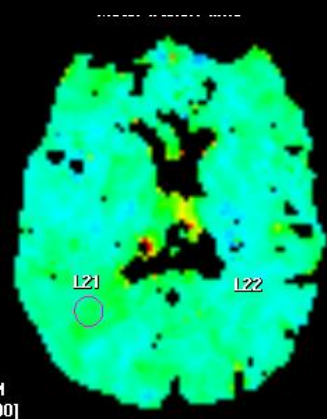


PENUMBRA: CONCEPTO DINÁMICO

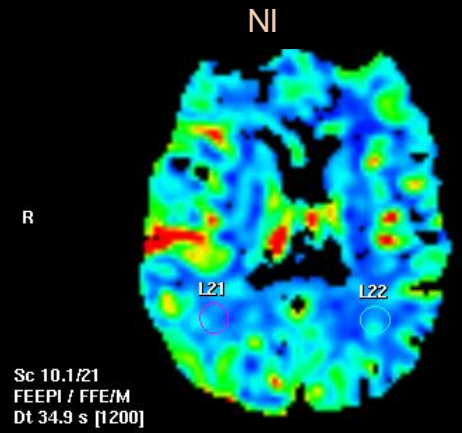


R

/21
FFE/M
s [1200]

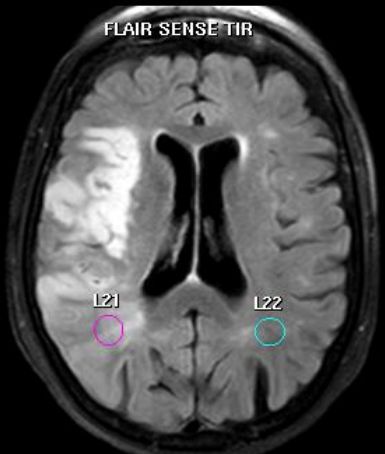


46 s.
38
31
23
16
9
1 s.



1.02
0.78
0.55
0.32
0.08
-0.15

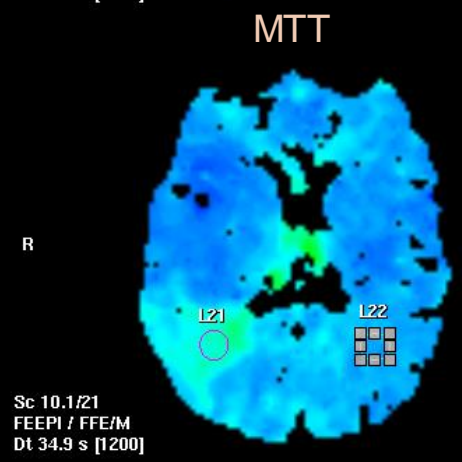
Sc 10.1/21
FEEPI / FFE/M
Dt 34.9 s [1200]



FLAIR SENSE TIR

L21

L22

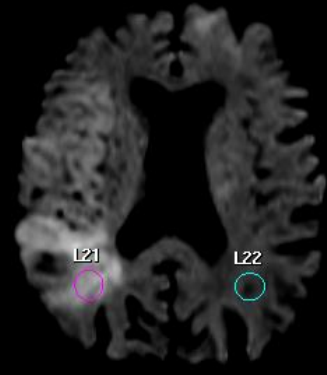


56 s.
49
42
36
29
22
16 s.

Sc 10.1/21
FEEPI / FFE/M
Dt 34.9 s [1200]

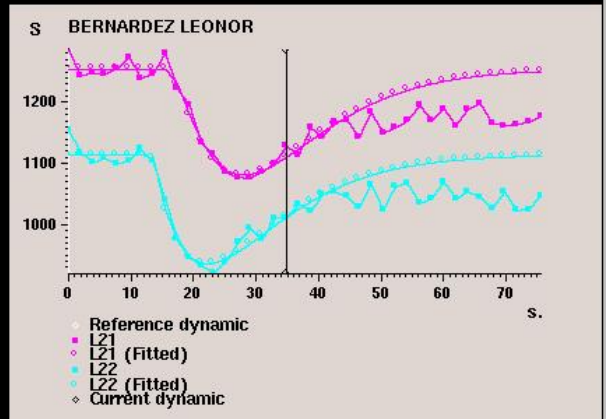
eDWI HR SENSE DwISE

R



L21

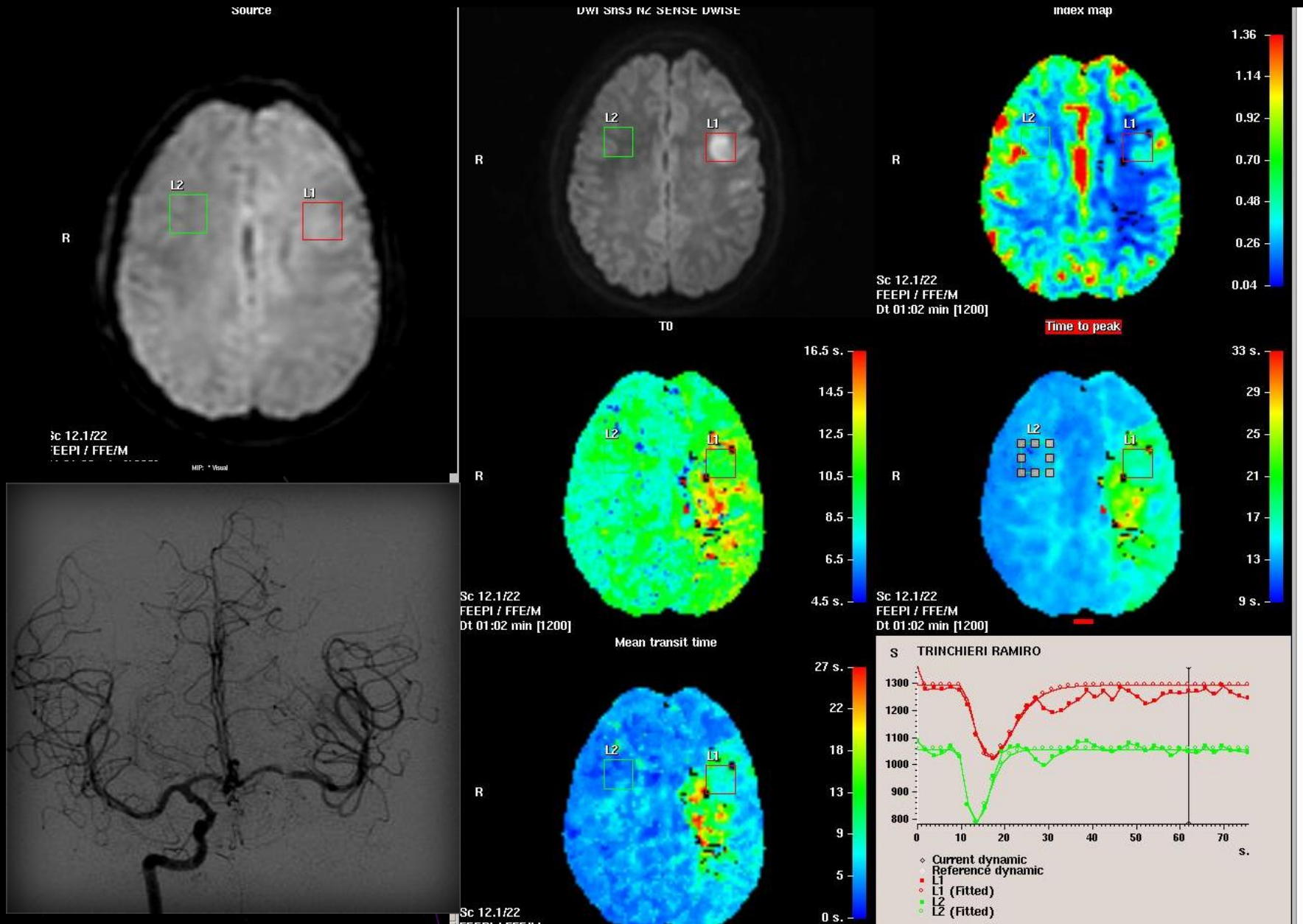
L22



CUALES SON LOS FACTORES QUE DETERMINAN LA TASA DE TRANSFORMACIÓN DE LA PENUMBRA EN CORE?

- COLATERALES**
- SUSCEPTIBILIDAD A LA ISQUEMIA DEL TEJIDO CEREBRAL**
- DESPOLARIZACIÓN PERINFARTO**

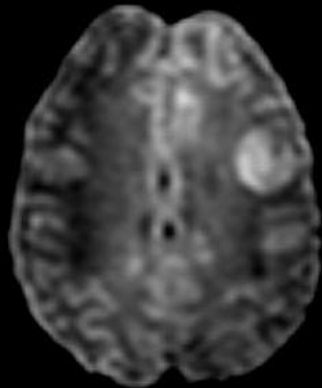
...DEFINIR CON LOS MAPAS DE PERFUSIÓN LA IRREVERSIBILIDAD EL TEJIDO POTENCIALMENTE SALVABLE Y LA TASA DE CRECIMIENTO DEL INFARTO ESTÁ AFECTADA POR ESTAS
CONSIDERACIONES FISIOLÓGICAS



M/16 A OBSTRUCCIÓN PROXIMAL M1

Source

R



Sc 10.1/23
FEEPI / FFE/M
Dt 000 ms [1200]

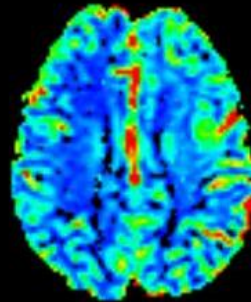
Slice	23	-	+
Dynamic	1	-	+
Reference	1	-	+

TRINCHIERI RAMIRO
MR perfusion

M/16 A/
CONTROL POST TTO

Negative integral

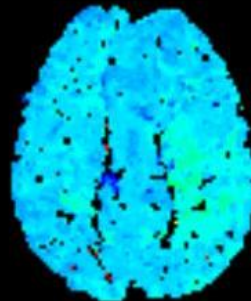
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Dt 000 ms [1200]

T0

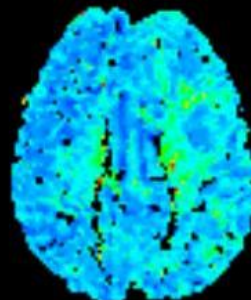
R



Sc 10.1/23
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Dt 000 ms [1200]

Mean transit time

R

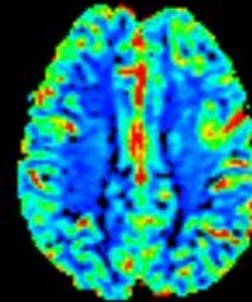


Sc 10.1/23
FEEPI / FFE/M
Dt 000 ms [1200]

Index map



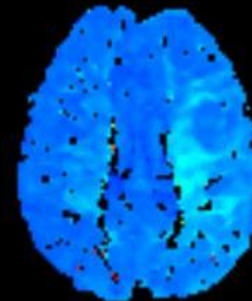
R



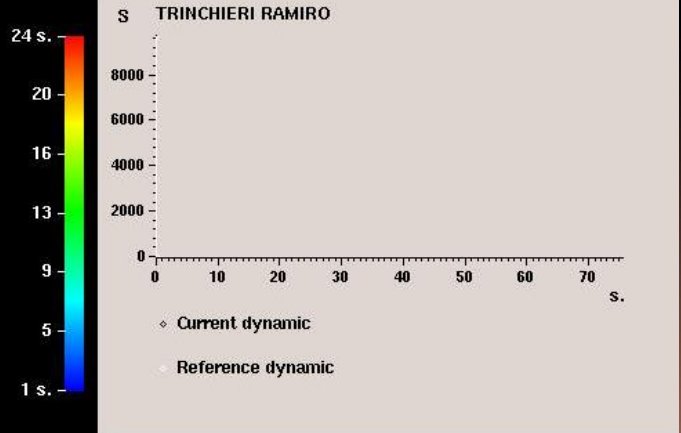
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Dt 000 ms [1200]



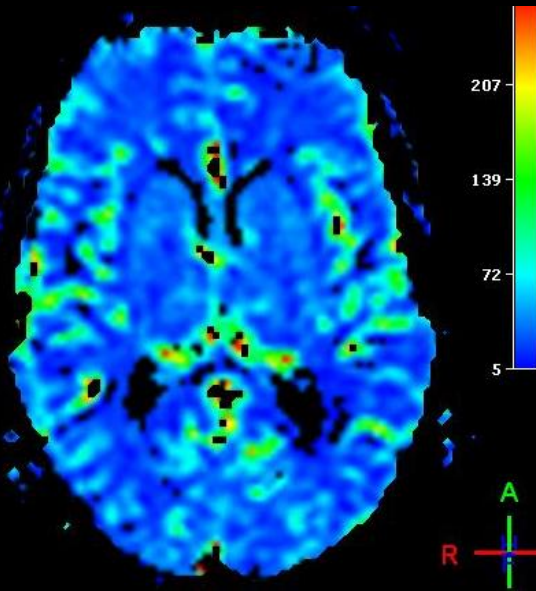
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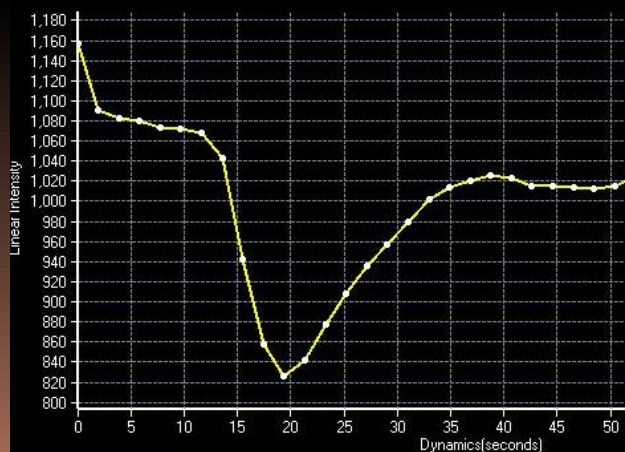
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Dt 000 ms [1200]



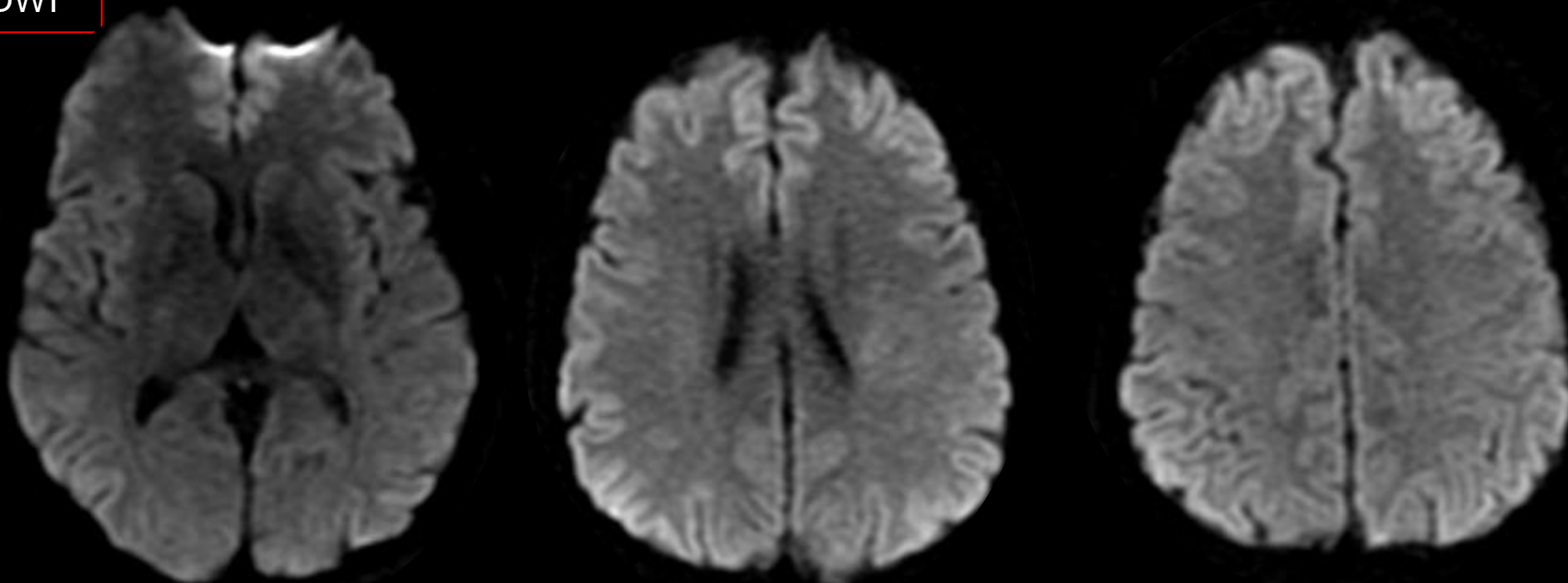
OTROS USOS DE PWI PARA EL DIAGNOSTICO, MANEJO Y PRONÓSTICO EN ACV



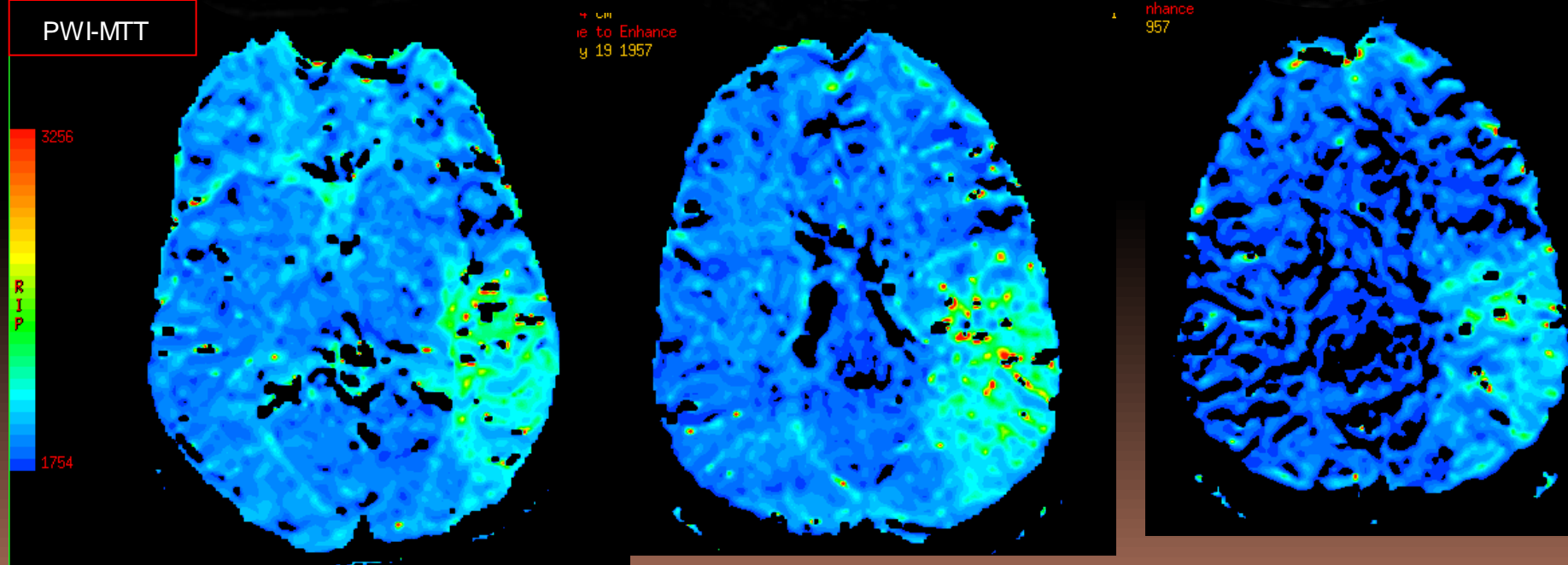
- DIAGNÓSTICO DIFERENCIAL DE “ACV MIMICS”
- DETERMINACIÓN DE TIPO DE ACV
- DETECCIÓN DE OTROS TERRITORIOS VASCULARES “RIESGO” NO VISIBLES POR OTROS MÉTODOS.
- EVALUACIÓN DE PACIENTES CON AIT, DWI NORMAL Y PWI ALTERADA

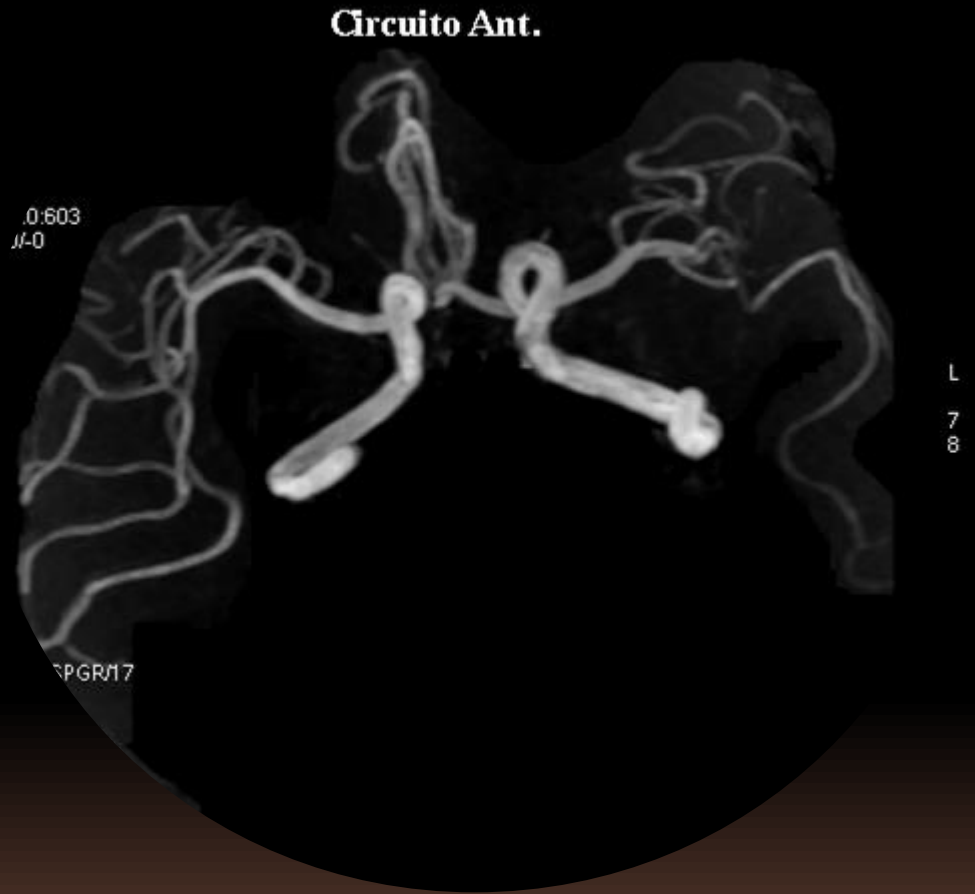
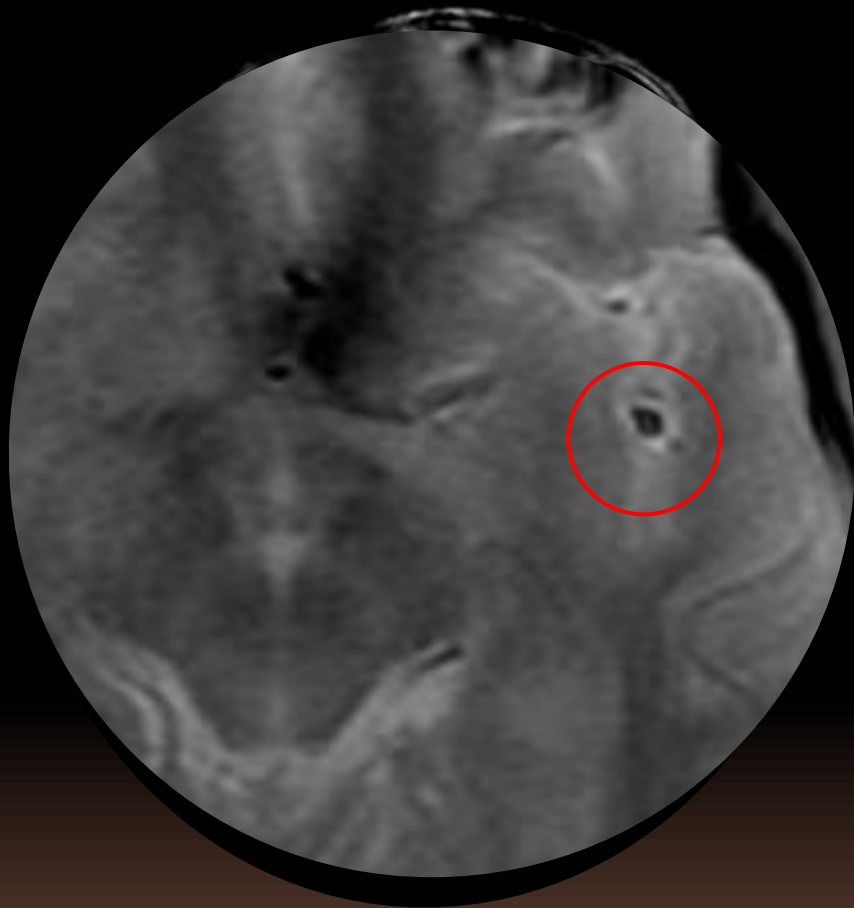


DWI

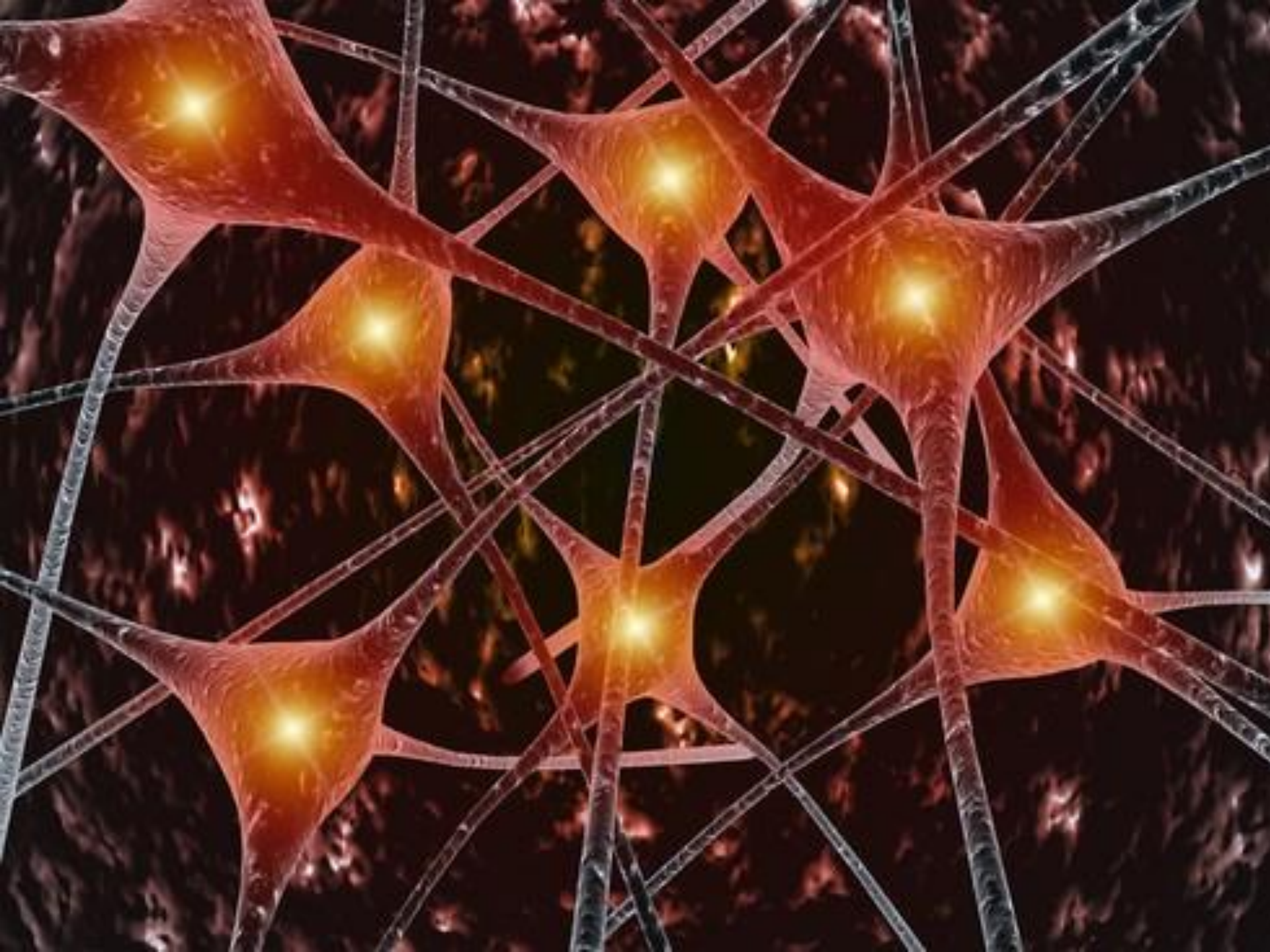


PWI-MTT





TROMBOSIS ACM IZQUIERDA



MEDICINA BASADA EN LA EVIDENCIA

ESTRICTA ADHERENCIA A LA PREMISA **EL TIEMPO ES CEREBRO**

ENFOQUE INDIVIDUAL

ADHERENCIA A LA PREMISA **EL TIEMPO ES FISIOLÓGÍA**

- BIOMARCADOR COLATERALES

DETRACTORES DE PWI

ADHERENCIA A OTROS MISMATCH: **CLÍNICA, ANGIORM o TC**

SELECCIÓN POR IMÁGENES PARA TERAPIA IV

TEORIA DE MISMATCH LIMITACIONES

- **MISMATCH DWI/PWI >20% ES UN LIMITE ARBITRARIO**
- **NO HAY CONSENSO SOBRE QUE PARÁMETROS DE PWI DEBEN SER UTILIZADOS PARA EVALUAR EL MISMATCH**
- **MTT y TTP SOBRESTIMAN EL TEJIDO EN RIESGO**

LA ESCASA ESTANDARIZACIÓN DE LOS PARAMETROS DE PERFUSIÓN Y LAS DIFERENCIAS ENTRE LOS DISTINTOS SOFTWARE HACE QUE MUCHOS TRIALS CUESTINEN SU UTILIZACION EN LA PRÁCTICA CLÍNICA

MEDICINA BASADA EN LA EVIDENCIA

ESTRICTA ADHERENCIA A LA PREMISA **EL TIEMPO ES CEREBRO**

ENFOQUE INDIVIDUAL

ADHERENCIA A LA PREMISA **EL TIEMPO ES FISIOLÓGÍA**

- BIOMARCADOR COLATERALES

DETRACTORES DE PWI

ADHERENCIA A OTROS MISMATCH: **CLÍNICA, ANGIORM o TC**

SELECCIÓN POR IMÁGENES PARA TERAPIA IV

TEORIA DE MISMATCH

Hacke W, Albers G, Al-Rawi Y, et al. The Desmoteplase in Acute Ischemic Stroke Trial (**DIAS**): a Phase II MRI-based 9-hour window acute stroke thrombolysis trial with intravenous desmoteplase. *Stroke*. 2005; 36(1):66–73.

Furlan AJ, Eyding D, Albers GW, et al. Dose Escalation of Desmoteplase for Acute Ischemic Stroke (**DEDAS**): evidence of safety and efficacy 3 to 9 hours after stroke onset. *Stroke*. 2006; 37(5):1227–1231.

Albers GW, Thijs VN, Wechsler L, et al. Magnetic resonance imaging profiles predict clinical response to early reperfusion: the diffusion and perfusion imaging evaluation for understanding stroke evolution (**DEFUSE**) study. *Ann Neurol*. 2006; 60(5):508–517

Schellinger PD, Thomalla G, Fiehler J, et al. MRI-based and CT-based thrombolytic therapy in acute stroke within and beyond established time windows: an analysis of 1210 patients. *Stroke* 2007; 38(10):2640–2645.

ESTE ESTUDIO MULTICÉNTRICO MUESTRA EVIDENCIA POR IMÁGENES FAVORABLE QUE SOSTIENE QUE **LAS COLATERALES COMO EXPRESIÓN DE LA FISIOLÓGÍA** SON MÁS IMPORTANTES **QUE EL TIEMPO** PARA DETERMINAR LA EVOLUCIÓN CLÍNICA EXTENDIENDO LA VENTANA TERAPÉUTICA A 6HS

SELECCIÓN DE PACIENTES CON PWI 20% > DWI

MEDICINA BASADA EN LA EVIDENCIA

ESTRICTA ADHERENCIA A LA PREMISA EL TIEMPO ES CEREBRO

ENFOQUE INDIVIDUAL

ADHERENCIA A LA PREMISA EL TIEMPO ES FISIOLÓGÍA

DETRACTORES DE PWI

ADHERENCIA A OTROS MISMATCH: CLÍNICA, ANGIORM o TC

SELECCIÓN POR IMÁGENES PARA TERAPIA IV

OTROS MISMATCH DWI- CLINICA

Davalos A, Blanco M, Pedraza S, et al. The clinical-DWI mismatch: a new diagnostic approach to the brain tissue at risk of infarction. *Neurology*. 2004

**VOLUMEN DWI <25ml NIHSS >8 : DETERIORO NEUROLÓGICO TEMPRANO
ASOCIACION CON CRECIMIENTO DEL INFARTO**

Yoo AJ, Barak ER, Copen WA, et al. Combining acute diffusion-weighted imaging and mean transmit time lesion volumes with National Institutes of Health Stroke Scale Score improves the prediction of acute stroke outcome. *Stroke*. 2010;

VOLUMEN DWI <72ml NIHSS >8 y <20 : BUENA EVOLUCIÓN CLINICA

SELECCIÓN POR IMÁGENES PARA TERAPIA IV

OTROS MISMATCH DWI- ANGIORM

Lansberg MG, Thijs VN, Bammer R, et al. The MRA-DWI mismatch identifies patients with stroke who are likely to benefit

- OCLUSIÓN ARTERIAL PROXIMAL (ACI, ACM y M1) CON VOLUMEN DE DWI <25 ML
- ESTENOSIS ARTERIAL PROXIMAL O VASOS DISTALES (M2, ACP Y ACA) ANOMALES CON VOLUMEN DE DIFUSIÓN <15ML

DWI- ANGIORM
BUENA EVOLUCIÓN CLÍNICA

A sunset over the ocean with a white text box overlay. The sun is low on the horizon, casting a golden glow across the sky and reflecting on the water. The sky transitions from a deep blue at the top to a bright orange near the horizon. The water is dark blue with a shimmering path of light from the sun. In the foreground, there are dark silhouettes of land and buildings.

EL 25 % DE LOS STROKES OCURREN DURANTE EL SUEÑO.

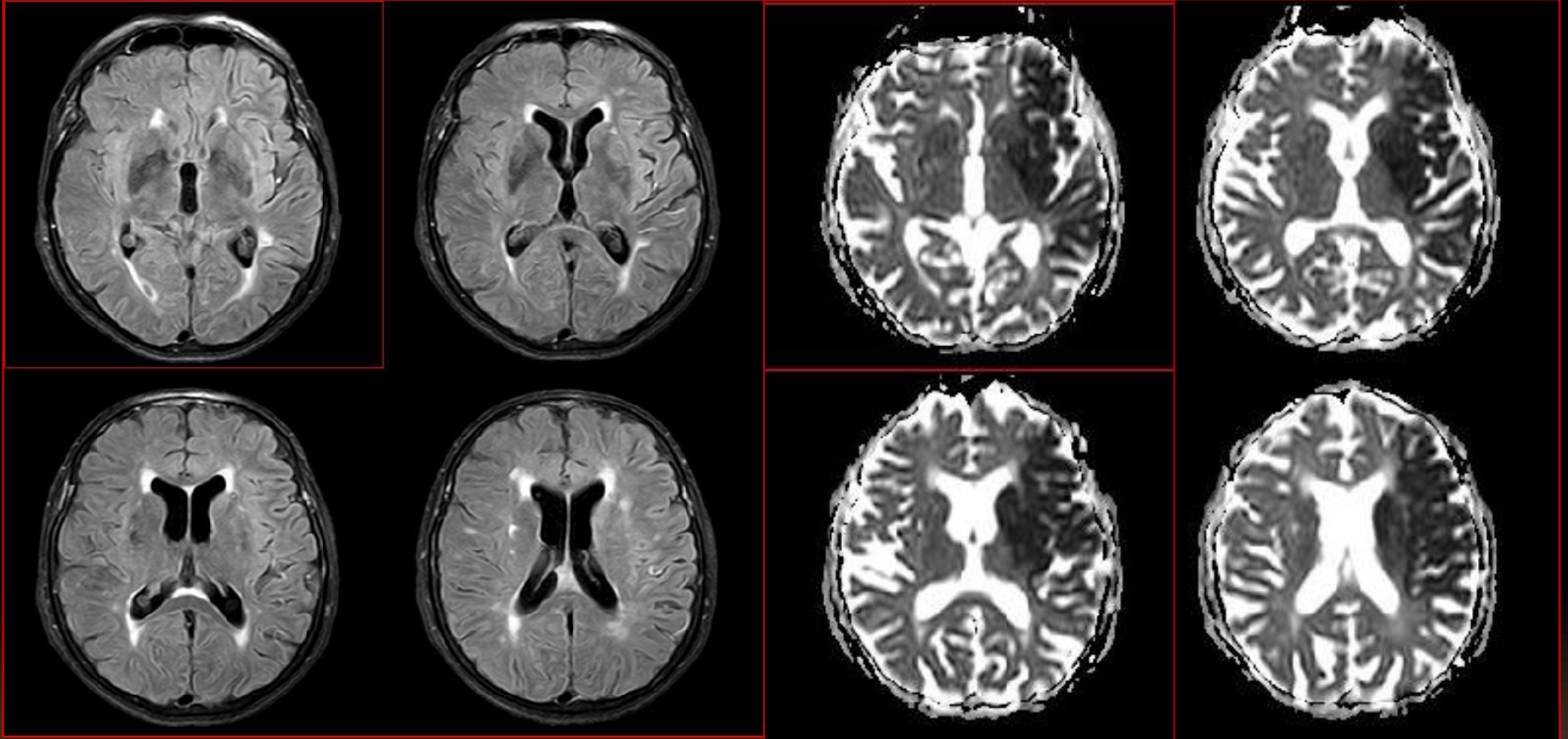
MUCHOS PACIENTES SON EXCLUIDOS DE LA TERAPIA TROMBOLITICA!!



DWI-FLAIR mismatch for the identification of patients with acute ischaemic stroke within 4·5 h of symptom onset (PRE-FLAIR): a multicentre observational study

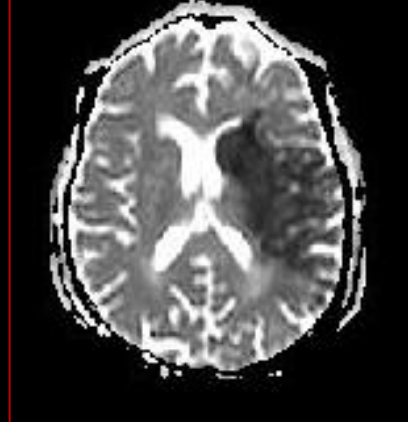
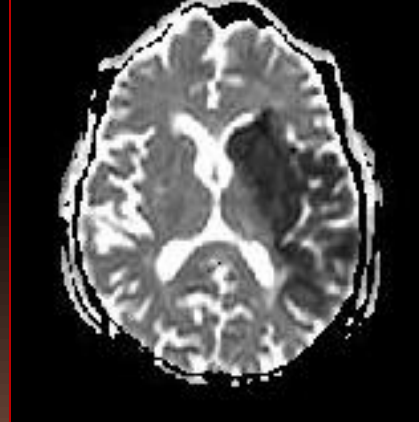
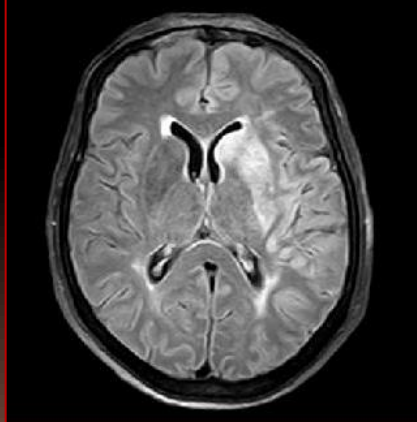
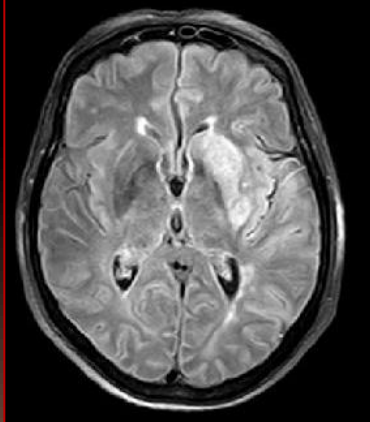
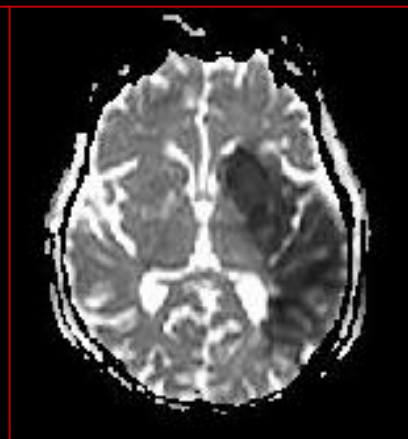
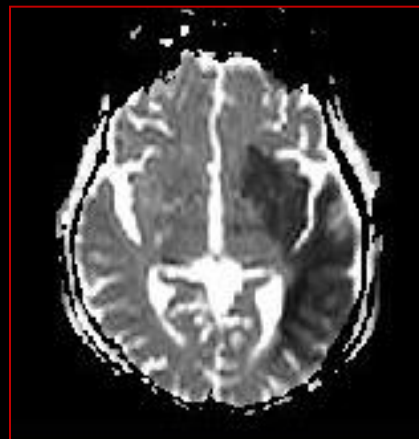
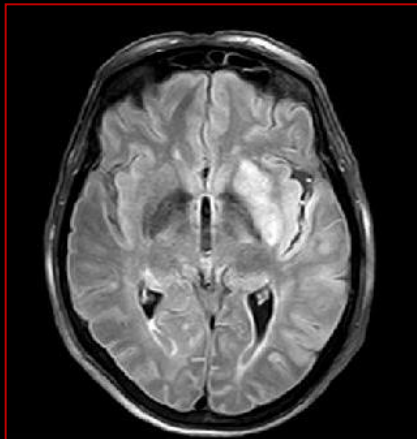
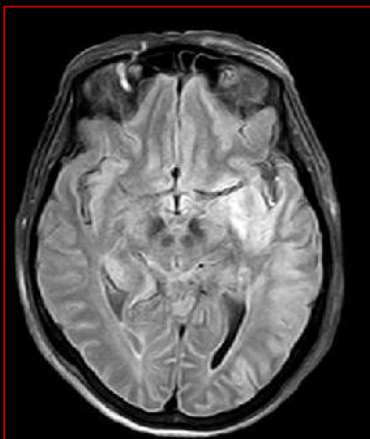
Götz Thomalla, Bastian Cheng, Martin Ebinger, Qing Hao, Thomas Tourdias, Ona Wu, Jong S Kim, Lorenz Breuer, Oliver C Singer, Steven Warach, Soren Christensen, Andras Treszl, Nils D Forkert, Ivana Galinovic, Michael Rosenkranz, Tobias Engelhorn, Martin Köhrmann, Matthias Endres, Dong-Wha Kang, Vincent Dousset, A Gregory Sorensen, David S Liebeskind, Jochen B Fiebach, Jens Fiehler, Christian Gerloff, for the STIR and VISTA Imaging Investigators

**MISMATCH DWI-FLAIR
TIEMPO EVOLUCIÓN STROKE**

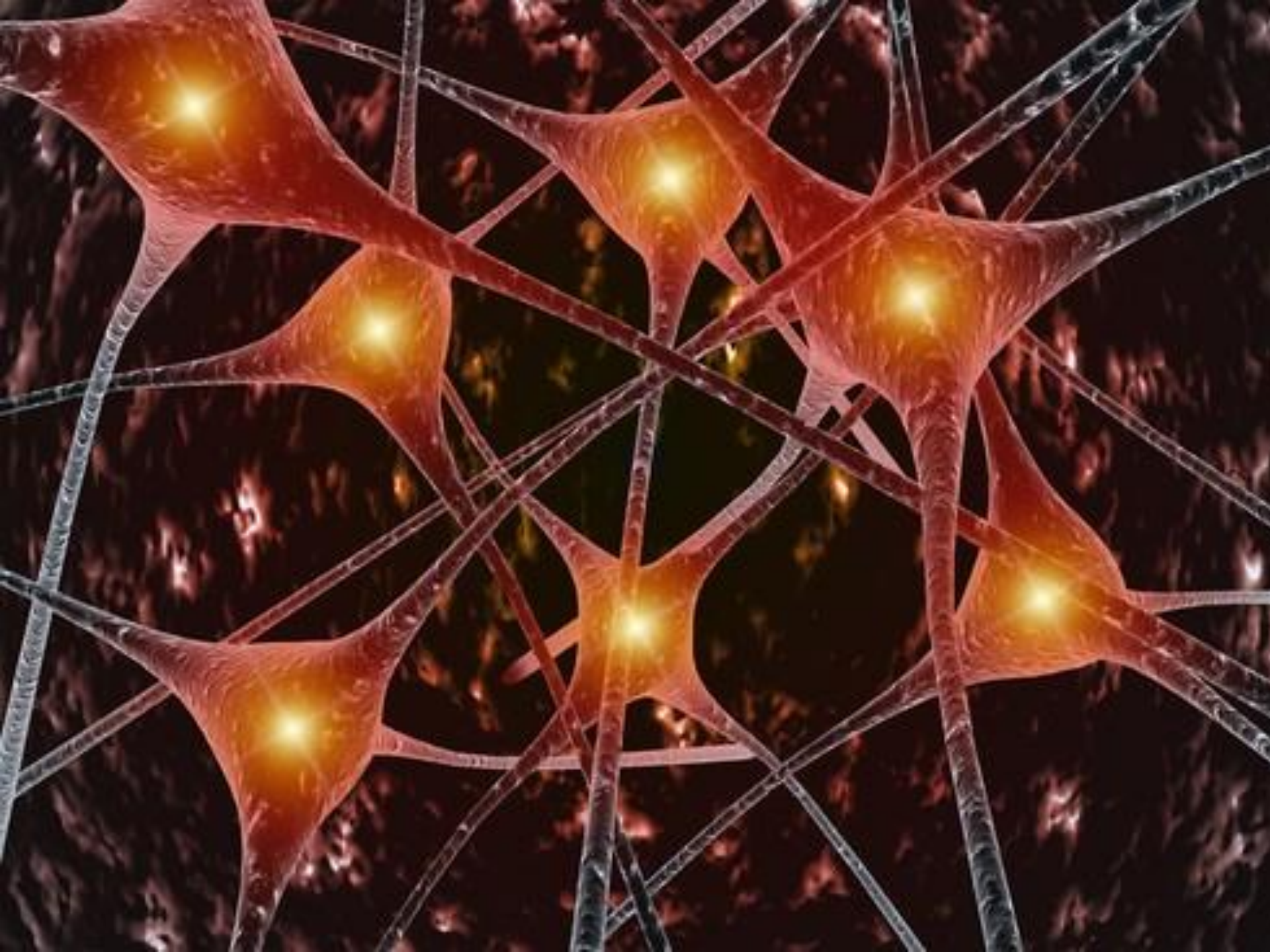


FLAIR (-) > 3 HORAS < 4.5 HORAS

**MISMATCH DWI-FLAIR
TIEMPO EVOLUCION STROKE**

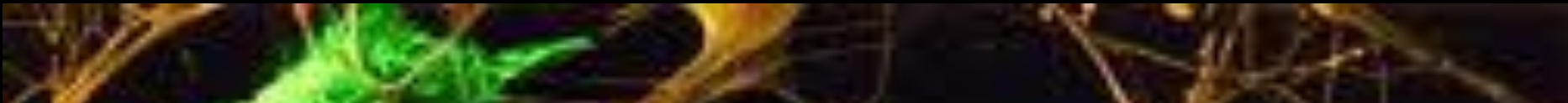


FLAIR (+) < 4.5 HORAS



EN CONCLUSION
EL TIEMPO ES CEREBRO...





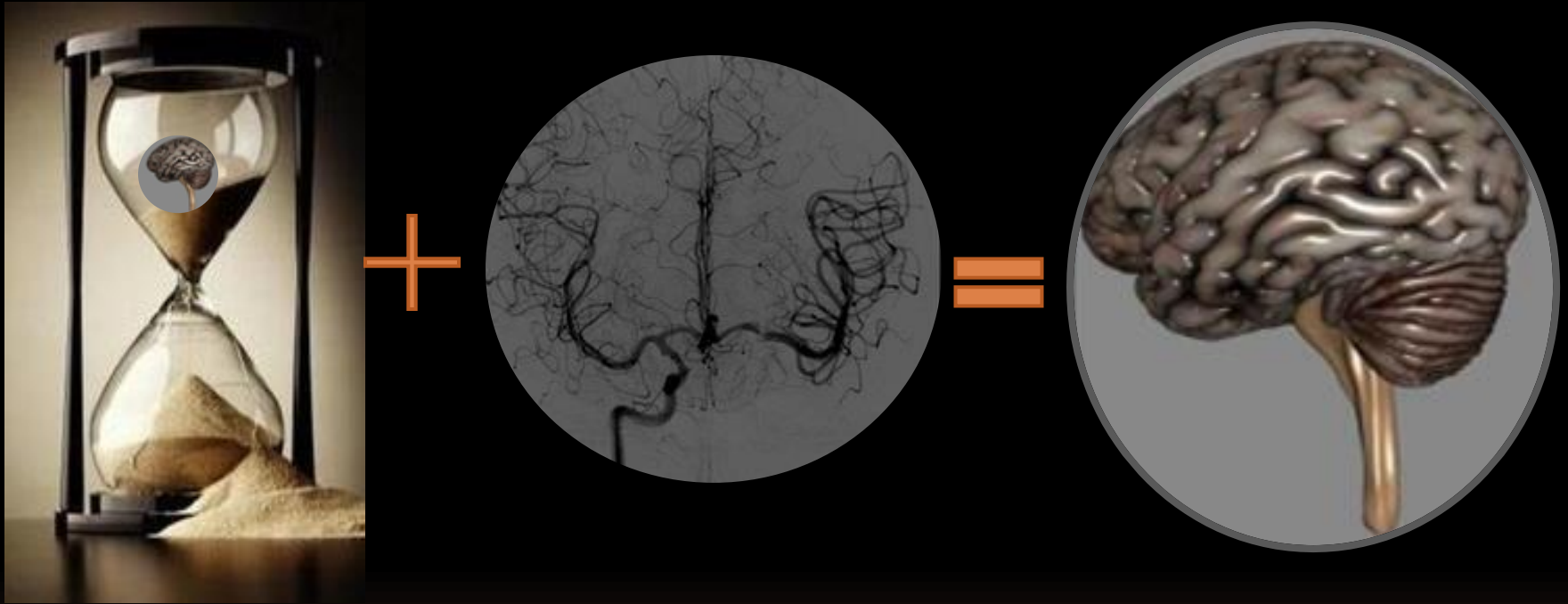
ACTUALMENTE LA SELECCIÓN DE PACIENTES CON ACV PARA TERAPIAS DE REPERFUSIÓN ESTA BASADO **EN EL TIEMPO DE APARICIÓN DE SÍNTOMAS**. ESTE ABORDAJE ES RAZONABLE EN LAS 3-4.5hs DONDE PROBABLEMENTE EXISTE TEJIDO POTENCIALMENTE SALVABLE. SIN EMBARGO, **NIEGA LA FISIOLÓGÍA, YA QUE LAS COLATERALES VARIAN ENTRE INDIVIDUOS** Y PROBABLEMENTE JUEGUEN UN ROL PREPONDERANTE MÁS ALLÁ DE ESTA VENTANA



LAS NEUROIMÁGENES, MR Y CT BRINDAN IMPORTANTE INFORMACIÓN SOBRE EL ESTADO DEL PARENQUIMA Y SON ÚTILES COMO GUIA EN EL DIAGNÓSTICO Y TRATAMIENTO



ARTERIAS COLATERALES



“ TIEMPO Y COLATERALES SON CEREBRO ”

Schellinger PD, Thomalla G, Fiehler J, et al. MRI-based and CT-based thrombolytic therapy in acute stroke within and beyond established time windows: an analysis of 1210 patients. *Stroke*. 2007; 38(10):2640–2645.

Impact of Collateral Status Evaluated by Dynamic Computed Tomographic Angiography on Clinical Outcome in Patients With Ischemic Stroke

Ido R. van den Wijngaard, MD; Jelis Boiten, MD, PhD; Ghislaine Holswilder, MSc; Ale Algra, MD, PhD; Diederik W.J. Dippel, MD, PhD; Birgitta K. Velthuis, MD, PhD; Marieke J.H. Wermer, MD, PhD*; Marianne A.A. van Walderveen, MD, PhD*

Background and Purpose—Status of collateral circulation is a strong predictor of outcome after acute ischemic stroke. Our aim was to compare the predictive value of strategies for collateral blood flow assessment with dynamic computed tomographic angiography (CTA) and conventional single-phase CT angiography.

Methods—Patients with a proximal middle cerebral artery occlusion underwent noncontrast CT, single-phase CTA and whole brain CT perfusion/dynamic CTA within 9 hours after stroke onset. We defined poor outcome as a score on the modified Rankin Scale score of ≥ 3 . The association between collateral score and clinical outcome at 3 months was analyzed with Poisson regression. The prognostic value of collateral scoring with dynamic CTA and single-phase CTA in addition to age, stroke severity, and noncontrast CT was assessed with logistic regression and summarized with the area under the curve.

Results—Seventy patients were included, with a mean age of 68 years. We observed an increased risk of poor outcome in patients with poor collaterals on single-phase CTA (risk ratio, 1.8; 95% confidence interval, 1.0–3.1) and on dynamic CTA (risk ratio, 2.0; 95% confidence interval, 1.5–2.7). The prediction of poor clinical outcome by means of collateral adjustment was better with dynamic CTA (area under the curve, 0.84; likelihood ratio test $P < 0.01$) than by single-phase CTA (area under the curve, 0.80; likelihood ratio test $P = 0.33$).

Conclusions—Collateral assessment with dynamic CTA better predicts clinical outcome at 3 months than single-phase conventional CTA.

Clinical Trial Registration—URL: <http://www.trialregister.nl/trialreg>. Unique identifier: NTR1804. URL: <http://www.clinicaltrials.gov>. Unique identifier: NCT00880113.

(*Stroke*. 2015;46:3398-3404. DOI: 10.1161/STROKEAHA.115.010354.)

Key Words: angiography ■ four-dimensional computed tomography ■ risk ■ stroke

Topical Review

Section Editors: Chelsea S. Kidwell, MD, and Jean-Marc Olivot, MD, PhD

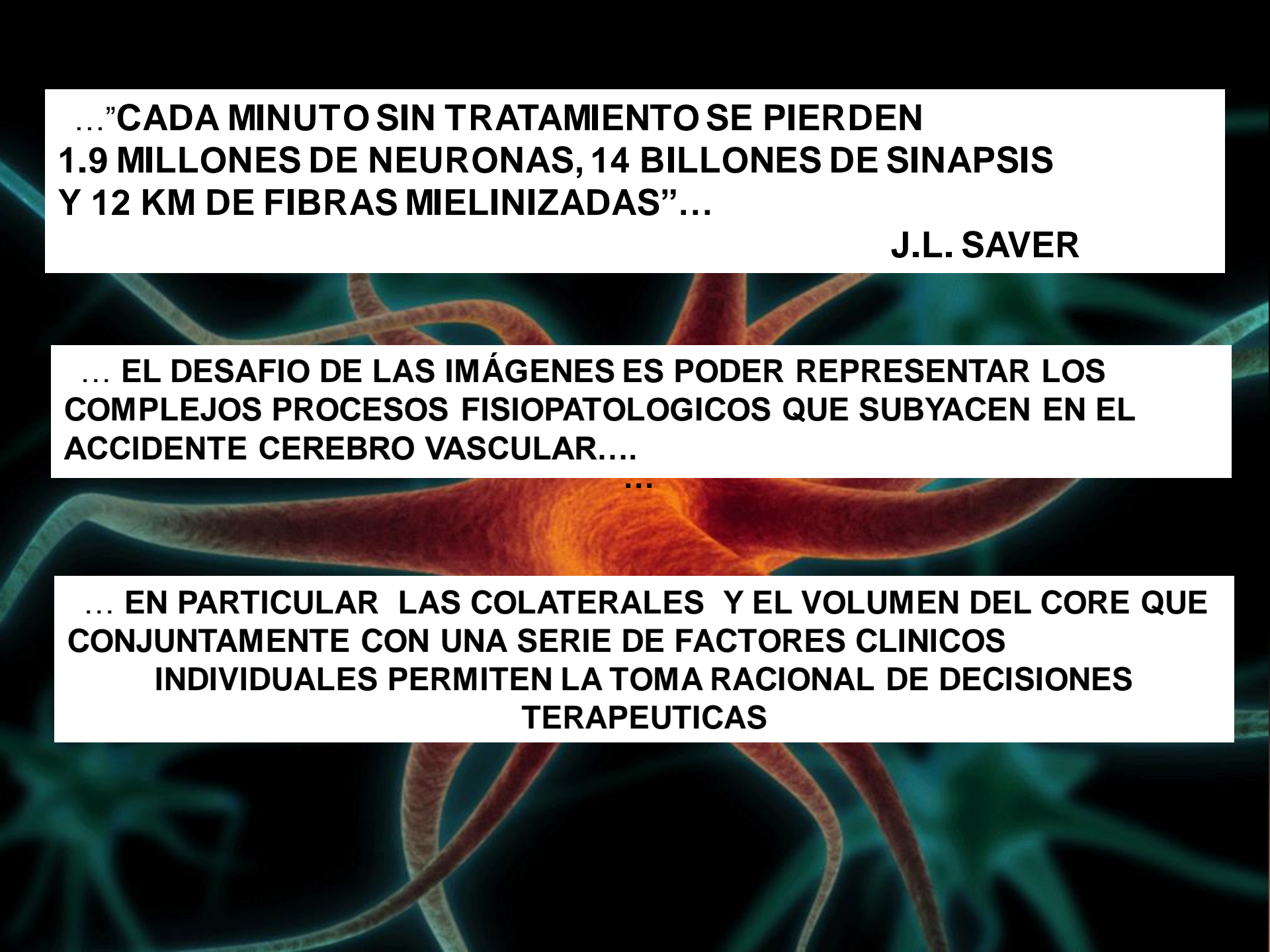
Comparing Vessel Imaging Noncontrast Computed Tomography/Computed Tomographic Angiography Should Be the New Minimum Standard in Acute Disabling Stroke

Andrew M. Demchuk, MD; Bijoy K. Menon, MD, MSc; Mayank Goyal, MD

Calgary, Room 1162, 1403 29 St NW, Calgary, Alberta, T2N 2T9, Canada. E-mail ademchuk@ucalgary.ca
(*Stroke*. 2016;47:273-281. DOI: 10.1161/STROKEAHA.115.009171.)
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	CTA	MRA	TCD/TCCD
Time requirement for acquisition and interpretation	3–5 min	With screening/preparing/imaging time: ≈30 min	10–30 min
Accessibility	CT technology in most hospitals, available 24×7, mostly near ED	Not available 24×7	Large operator dependence
Safety	Radiation risk low CIN: 3% Allergic: 1/10 000	No risk	No risk
ICH management	Secondary causes (aneurysm and AVM) CTA spot sign		
Occlusion detection	High accuracy proximally	Less accurate distally than CTA	Proximal occlusion only
Collateral assessment	Robust Multiphase CTA captures delay	Limited Dynamic MRA has potential	No value
Great vessel/catheter access	Robust	More artifacts	No value
Validation as selection tool in acute stroke RCTs	5 positive endovascular RCTs
Potential as surrogate measure of treatment effect	Ideal tool for recanalization assessment	Cannot accurately assess distal vasculature	Yes
Emerging techniques	Dynamic CTA Multiphase CTA		

AVM indicates arteriovenous malformation; CIN, contrast-induced nephropathy; CTA, computed tomographic angiography; ED, emergency department; ICH, intracerebral hemorrhage; MRA, magnetic resonance angiography; RCT, randomized controlled trial; TCD, transcranial Doppler; and TCCD, transcranial color Doppler.



**...”CADA MINUTO SIN TRATAMIENTO SE PIERDEN
1.9 MILLONES DE NEURONAS, 14 BILLONES DE SINAPSIS
Y 12 KM DE FIBRAS MIELINIZADAS”...**

J.L. SAVER

**... EL DESAFIO DE LAS IMÁGENES ES PODER REPRESENTAR LOS
COMPLEJOS PROCESOS FISIOPATOLOGICOS QUE SUBYACEN EN EL
ACCIDENTE CEREBRO VASCULAR....**

...

**... EN PARTICULAR LAS COLATERALES Y EL VOLUMEN DEL CORE QUE
CONJUNTAMENTE CON UNA SERIE DE FACTORES CLINICOS
INDIVIDUALES PERMITEN LA TOMA RACIONAL DE DECISIONES
TERAPEUTICAS**

A complex, glowing network of neurons, likely representing a neural network or brain activity. The neurons are depicted as bright orange and yellow points with intricate, branching structures extending outwards, set against a dark, almost black background. The overall appearance is that of a highly interconnected and active neural system.

MUCHAS GRACIAS!!!