Reunión Anual
SOCIEDAD ESPAÑOLA DE
NEURORRADIOLOGÍA

20 - 22 de octubre de 2022

ZARAGOZA
Sede: Cámara de Comercio

S.E.N.R
Sociedad Española de Neurorradiología

Vessel wall imaging: protocolo de imagen y principales indicaciones

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Neurorradiología Intervencionista

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ComBINE
Club Bibliográfico NEurovascular

Sin conflictos que os interesen…

OBJETIVOS DOCENTES

¿Por qué realizar el estudio?

Protocolo de imagen

Principales indicaciones

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CONCLUSIONES

¿Por qué realizar el estudio? → Necesidad de estudiar la pared y no solo la luz arterial…

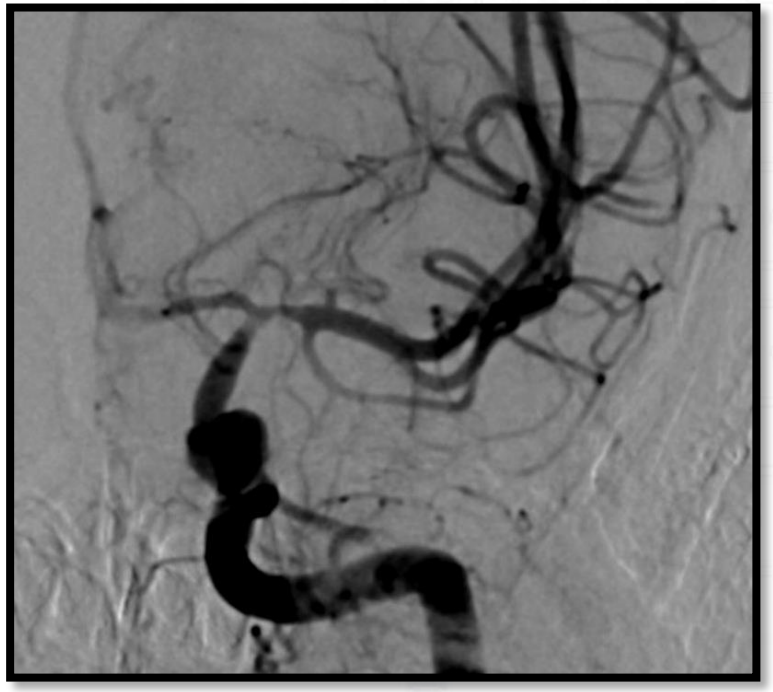
Protocolo de imagen → Protocolo de imagen dirigido a lo que buscamos…

Principales indicaciones

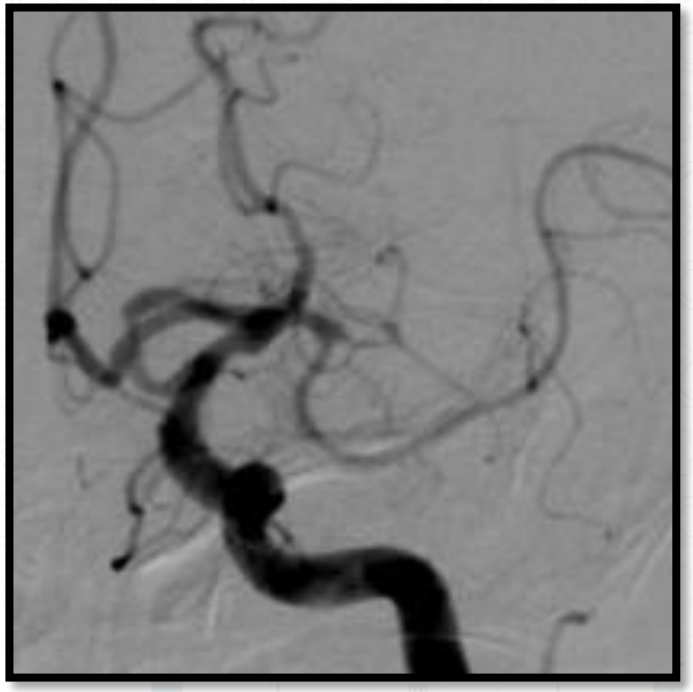
- DxDif Vasculopatía (Vasculitis, SVCR, Ateromatosis)
- Ictus Criptogénico → Detectar Ateromatosis Intracraneal
- Aneurismas ≤6 mm → Detección Riesgo Rotura

¿POR QUÉ?

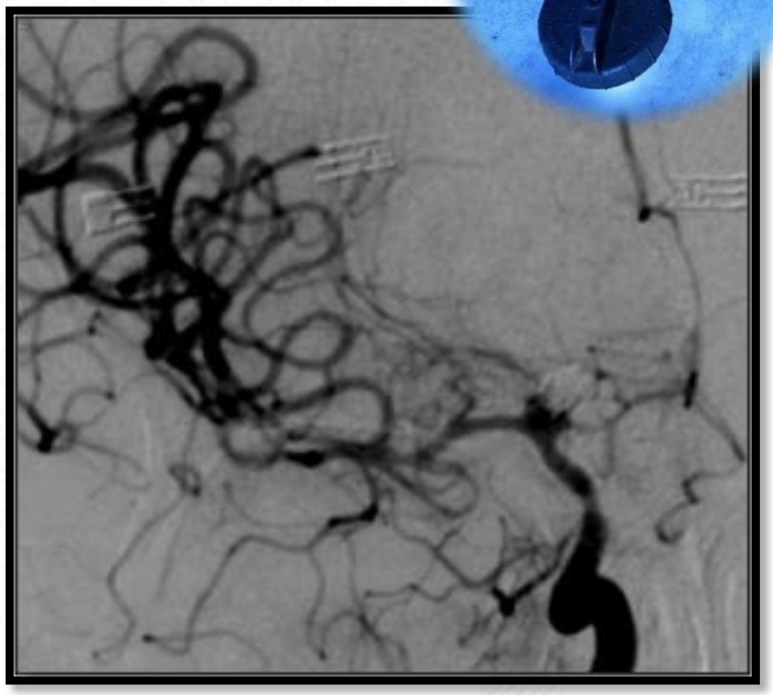
¿POR QUÉ?



Vasculitis



Ateromatosis



Vasospasmo HSA aneurismática

PROTOCOLO

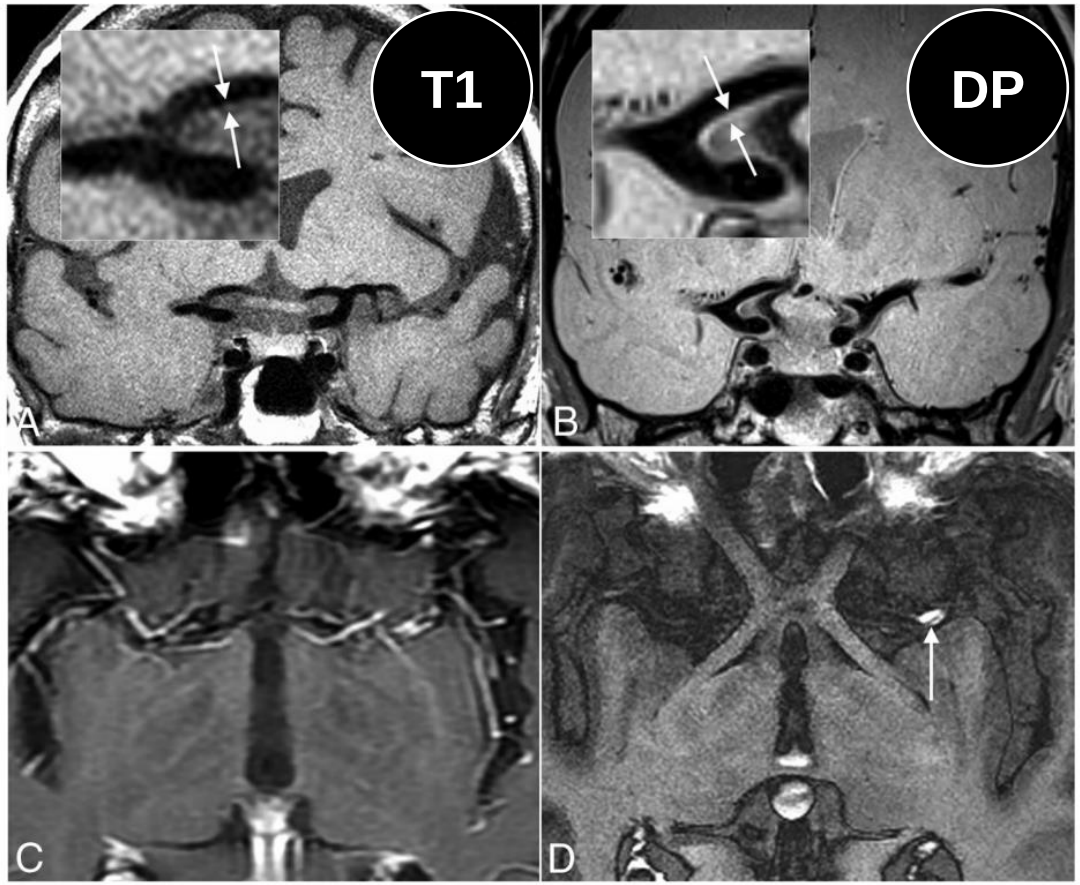
PRINCIPALES REQUERIMIENTOS

- → Alta resolución espacial (3T)
  - → 0,4 x 0,4 x 2 mm (5-7 min)
  - → 0,6 x 0,6 x 2 mm (≈5 min)
- → Multiplanares 2D o adquisiciones 3D
  - → Dependiendo de la indicación clínica
- → T1 (sangre) / DP (LCR)
- → Supresión sangre y LCR

PRACTICE GUIDELINE

Intracranial Vessel Wall MRI: Principles and Expert Consensus Recommendations of the American Society of Neuroradiology

D.M. Mandell, M. Mossa-Basha, Y. Qiao, C.P. Hess, F. Hui, C. Matouk, M.H. Johnson, M.J.A.P. Daemen, A. Vossough, M. Edjlali, D. Saloner, S.A. Ansari, B.A. Wasserman, and D.J. Mikulis, on behalf of the Vessel Wall Imaging Study Group of the American Society of Neuroradiology



AJNR. 2017 Feb;38:218-229

INDICACIONES

DxDif Vasculopatía (Vasculitis, SVCR, Ateromatosis)

Ictus Criptogénico → Detectar Ateromatosis Intracraneal

Aneurismas ≤6 mm → Detección Riesgo Rotura

Survey of the American Society of Neuroradiology Membership on the Use and Value of Intracranial Vessel Wall MRI

M. Mossa-Basha, C. Zhu, C. Yuan, L. Saba, D.A. Saloner, M. Edjlali, N.V. Stence, D.M. Mandell, J.M. Romero, Y. Qiao, D.J. Mikulis, and B.A. Wasserman

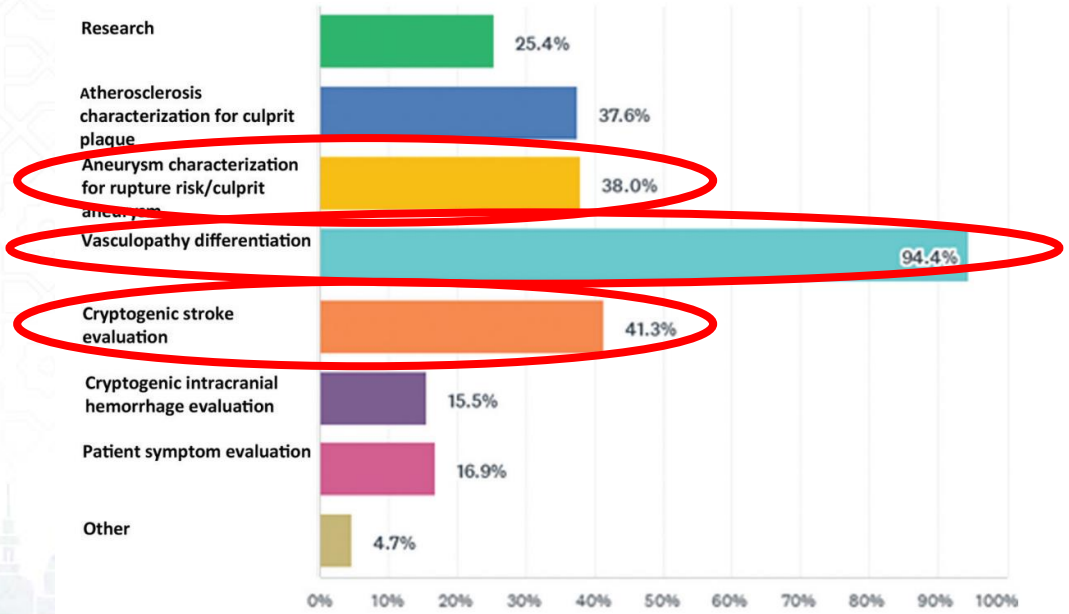


FIG 3. For what primary purpose does your institution perform intracranial vessel wall imaging? (choose all that apply) Respondents = 213.

AJNR 2022;43:951–57

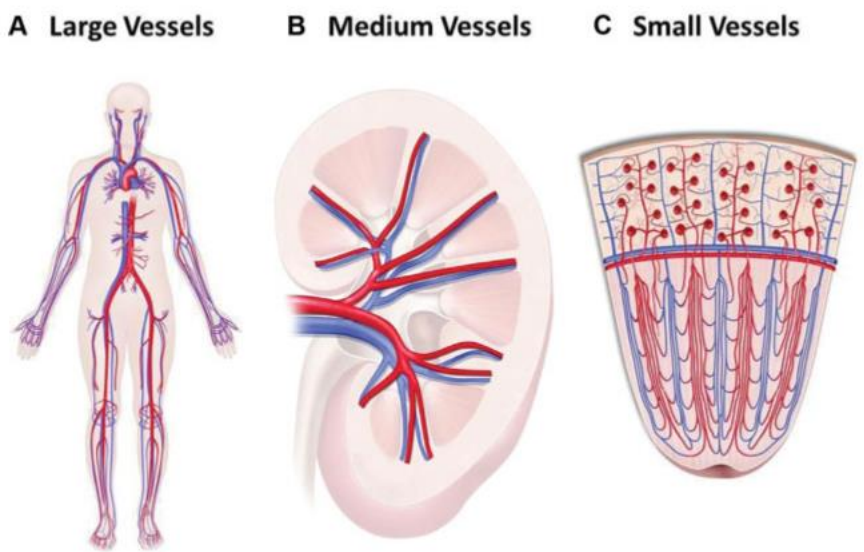

Vasculitis…

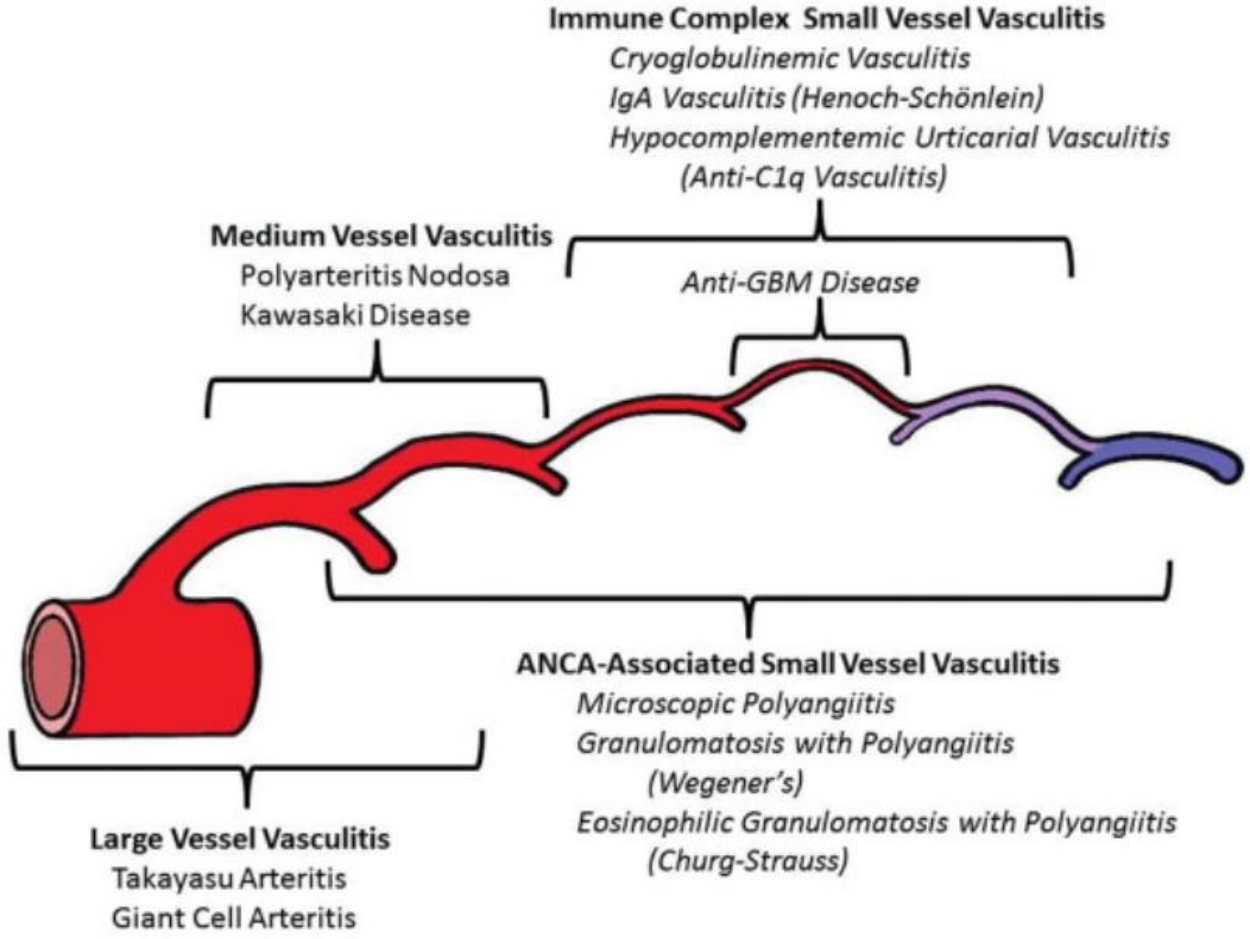
INDICACIONES (DxDif Vasculopatía: Vasculitis)

SPECIAL ARTICLE

2012 Revised International Chapel Hill Consensus Conference Nomenclature of Vasculitides

J. C. Jennette,[1] R. J. Falk,[1] P. A. Bacon,[2] N. Basu,[3] M. C. Cid,[4] F. Ferrario,[5] L. F. Flores-Suarez,[6] W. L. Gross,[7] L. Guillevin,[8] E. C. Hagen,[9] G. S. Hoffman,[10] D. R. Jayne,[11] C. G. M. Kallenberg,[12] P. Lamprecht,[13] C. A. Langford,[10] R. A. Luqmani,[14] A. D. Mahr,[15] E. L. Matteson,[16] P. A. Merkel,[17] S. Ozen,[18] C. D. Pusey,[19] N. Rasmussen,[20] A. J. Rees,[21] D. G. I. Scott,[22] U. Specks,[16] J. H. Stone,[23] K. Takahashi,[24] and R. A. Watts[25]





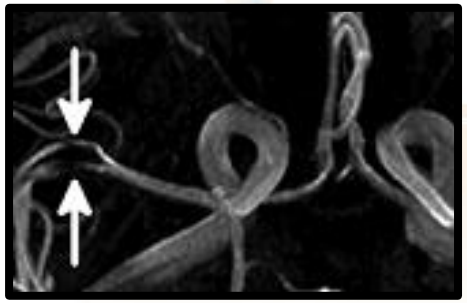
Arthritis Rheum. 2013 Jan;65:1-11

INDICACIONES (DxDif Vasculopatía: Vasculitis)

Grupo heterogéneo caracterizado por la **INFLAMACIÓN y NECROSIS** de la pared de los vasos

SIGNO DIRECTO → Pared vascular Engrosada e Hipercaptante

SIGNOS INDIRECTOS

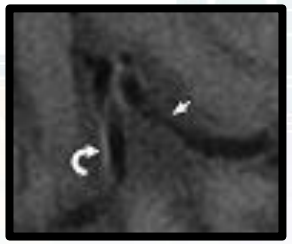


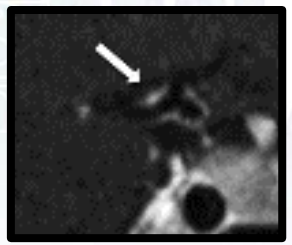
- Déficit de perfusión cerebral
- Lesiones isquémicas
- Lesiones hemorrágicas (HIP/HSA)
- Estenosis vasculares
- **Captación Leptomeningea**

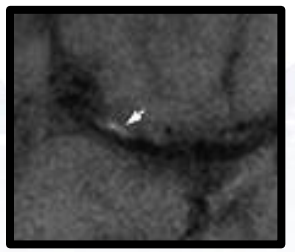
Int J Stroke 2007;2:184–190 / RadioGraphics 2014; 34:873–894

INDICACIONES (DxDif Vasculopatía)

NORMAL	SVCR	VASCULITIS	ATEROMATOSIS
T1			
T1 Gd			

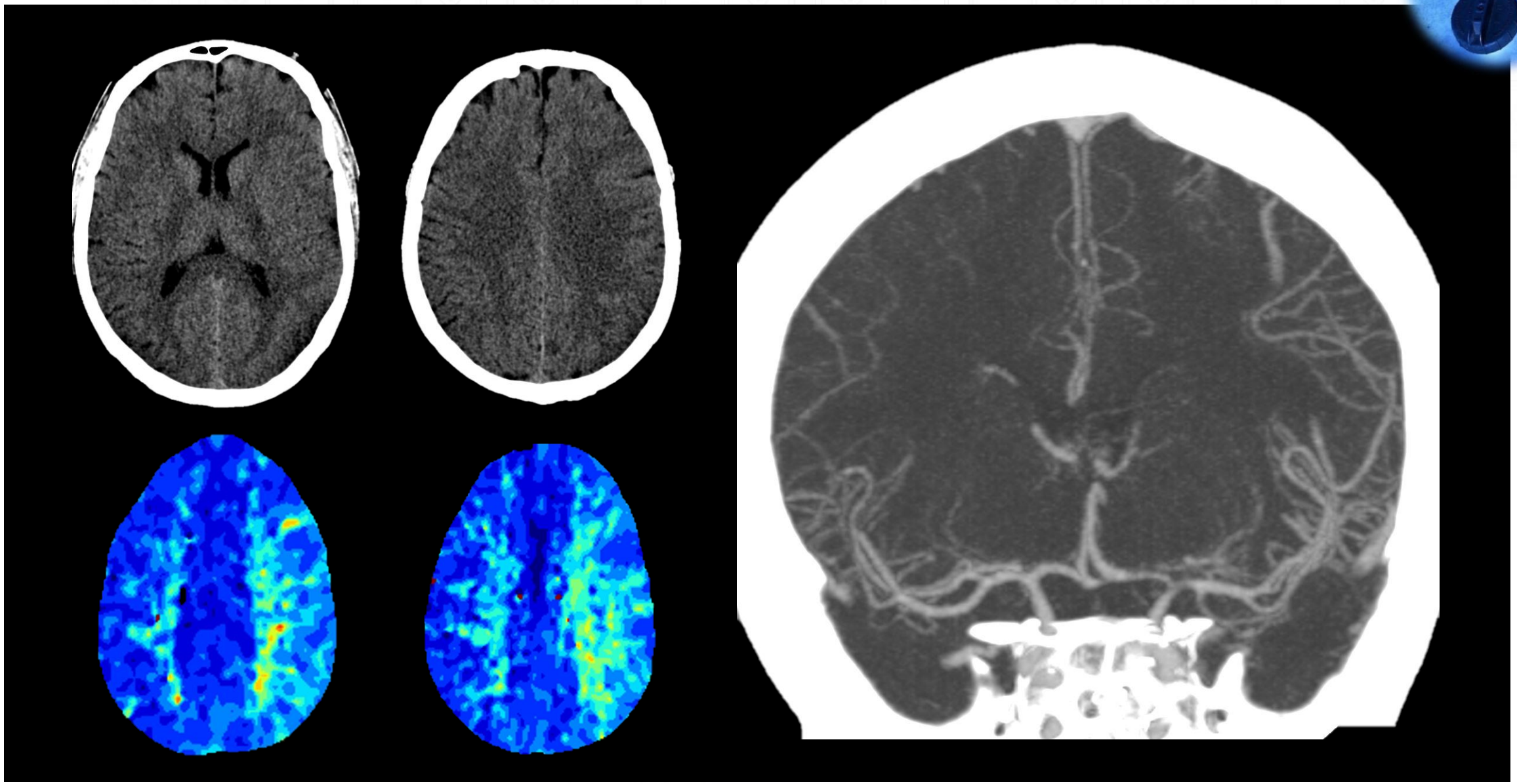




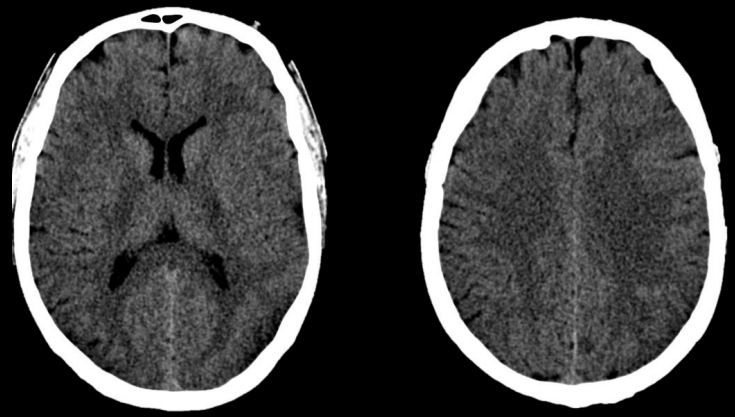


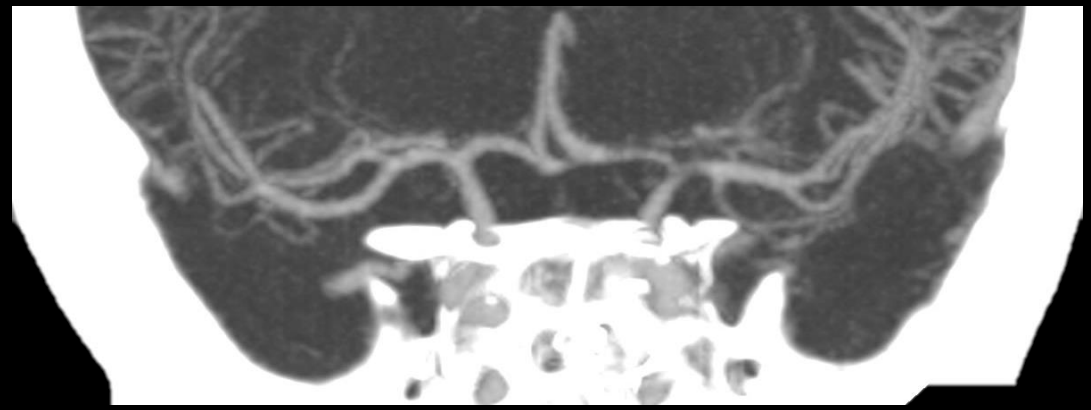
Radiology 2013; 267:667-679 / Stroke 2015;46:1567-1573

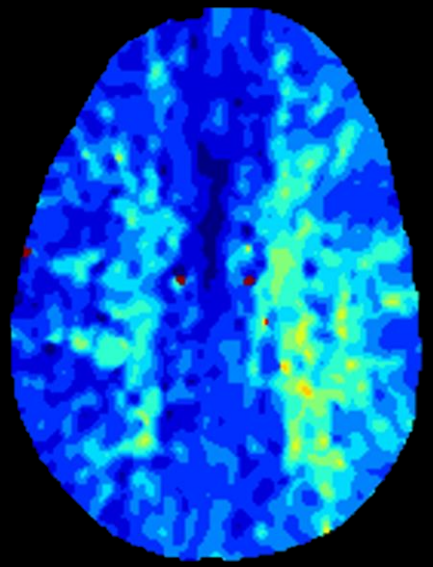
INDICACIONES (DxDif Vasculopatía: Vasculitis)

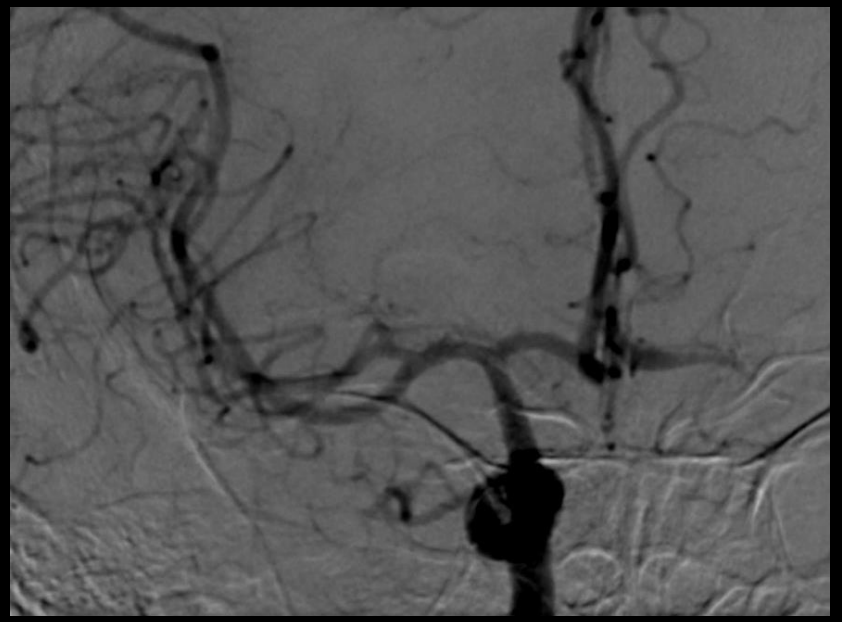


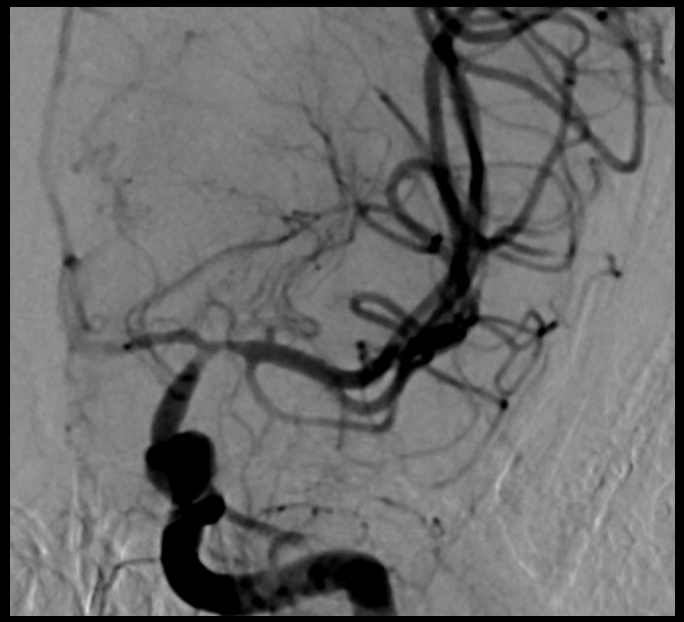
INDICACIONES (DxDif Vasculopatía: Vasculitis)



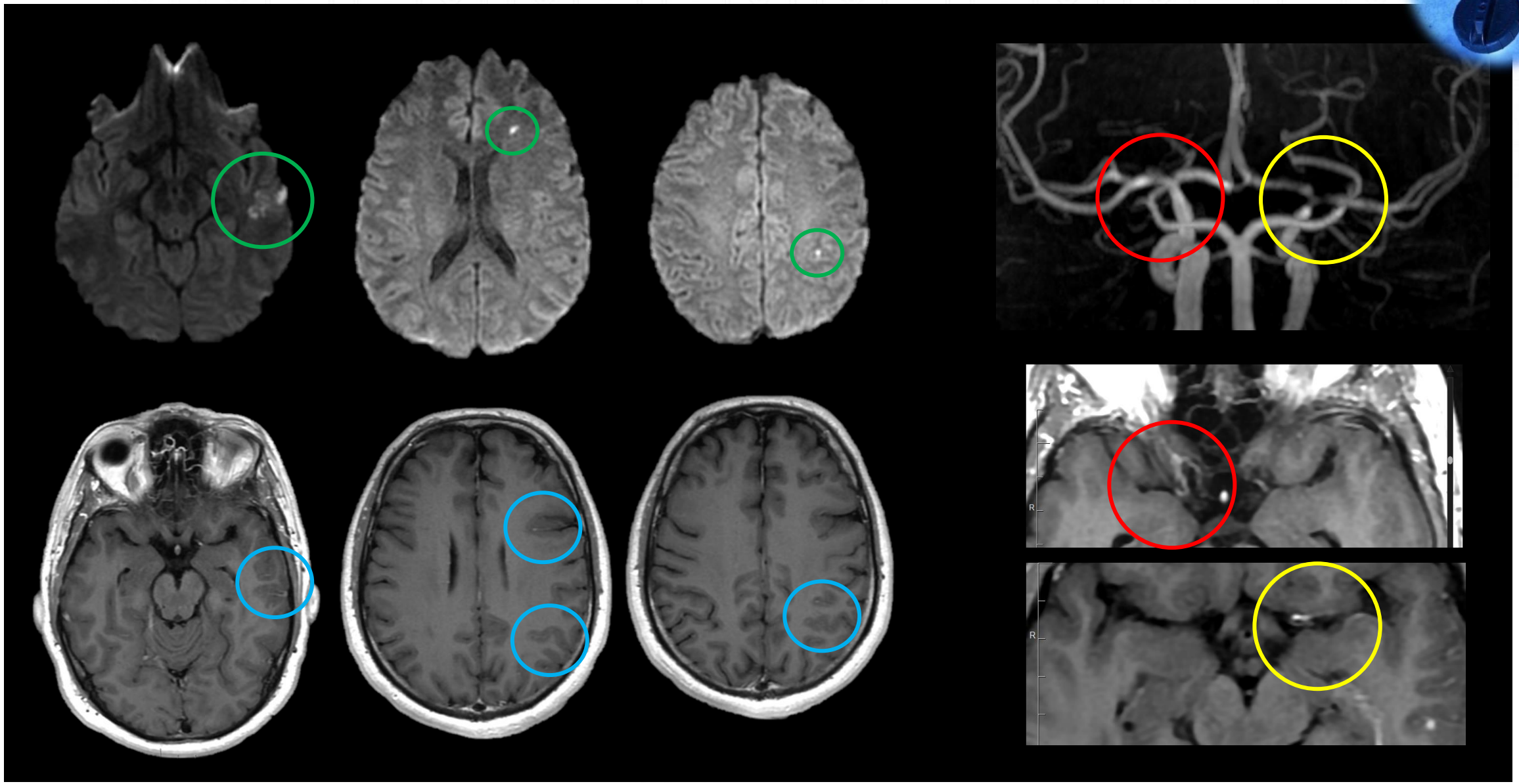




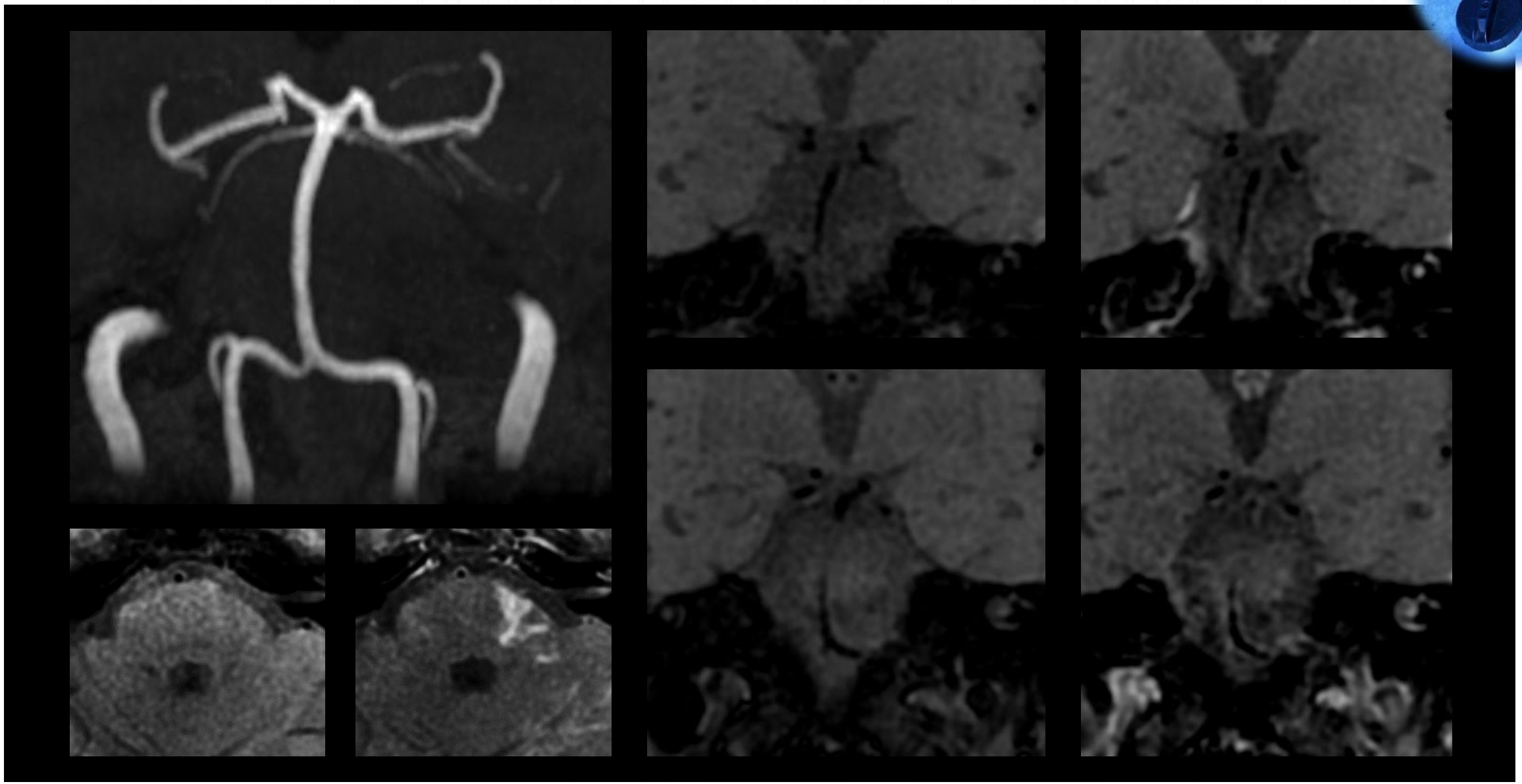




INDICACIONES (DxDif Vasculopatía: Vasculitis)



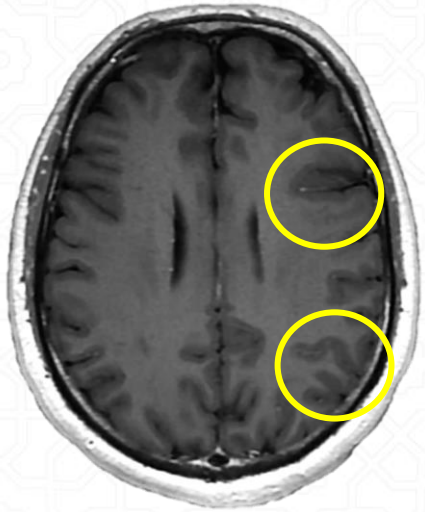
INDICACIONES (DxDif Vasculopatía: Vasculitis)

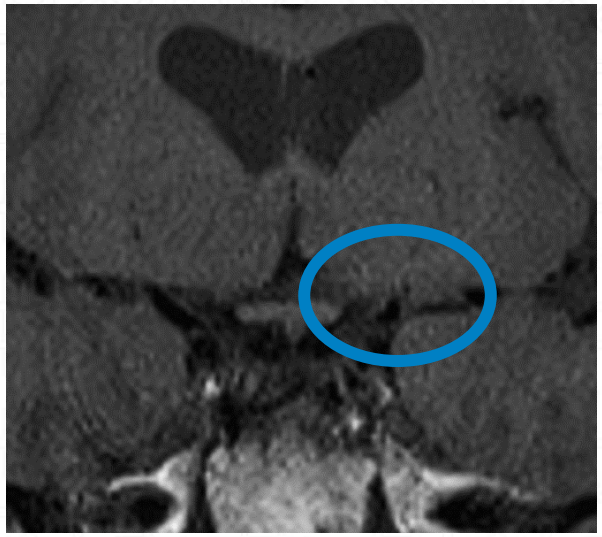


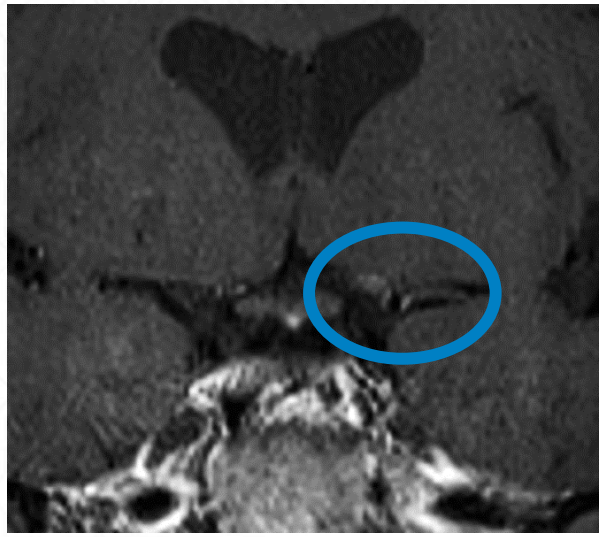
INDICACIONES (DxDif Vasculopatía)

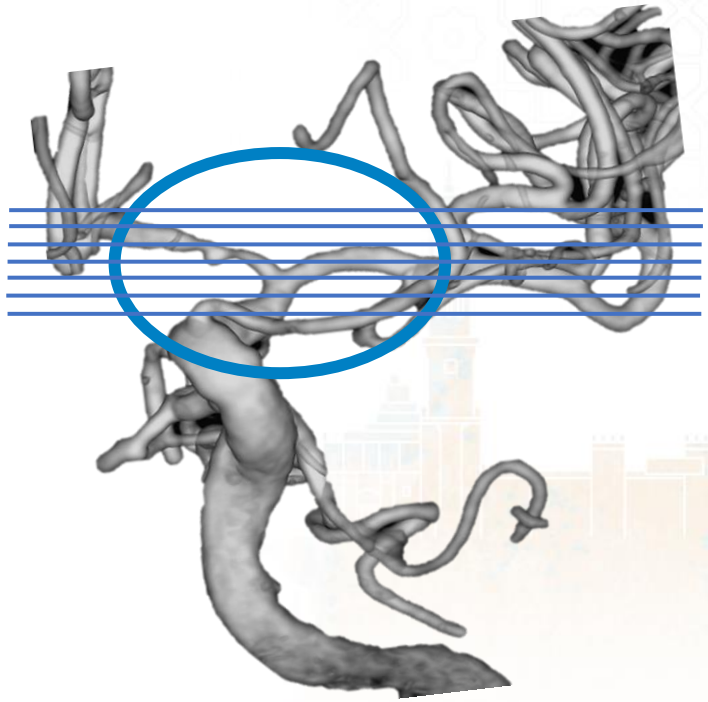
PROTOCOLO

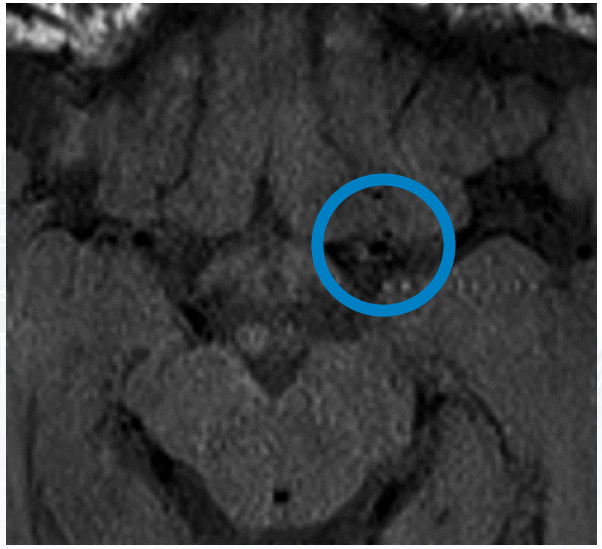
- → Sospecha de vasculitis
- → 2D Axial y Coronal
- → Sag 3D T1 (Captación Leptomeníngea)

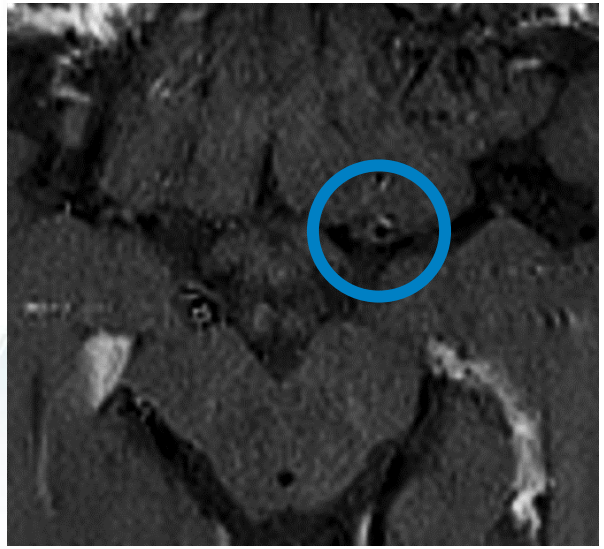













Ateroma...

Reunión Anual
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NEURORRADIOLOGÍA

INDICACIONES (Ictus Criptogénico)

Autopsy Prevalence of Proximal Extracranial Atherosclerosis in Patients With Fatal Stroke

Mikael Mazighi, MD, PhD; Julien Labreuche, BS; Fernando Gongora-Rivera, MD; Charles Duyckaerts, MD, PhD; Jean-Jacques Hauw, MD, PhD; Pierre Amarenco, MD

In the evaluation of 339 autopsy cases with ischemic stroke

↓

40% of ICAD lesions found showed minimal to no stenosis

ORIGINAL ARTICLE

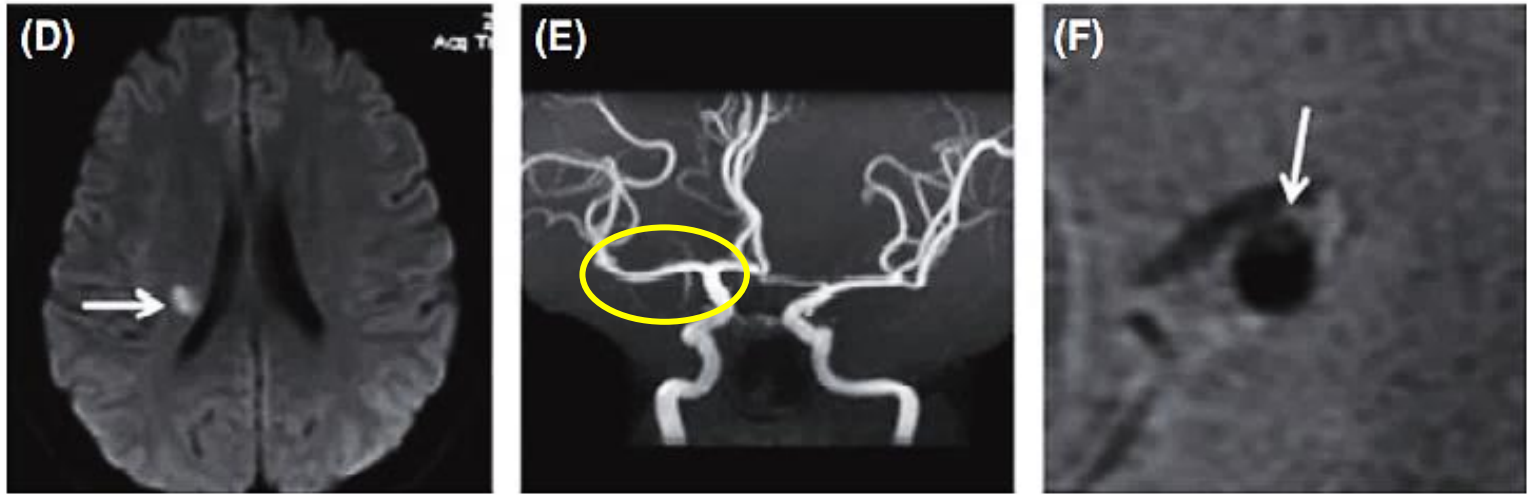
CNS Neuroscience & Therapeutics

Intracranial Artery Atherosclerosis and Lumen Dilation in Cerebral Small-Vessel Diseases: A High-resolution MRI Study

Wei-Hai Xu,[1] Ming-Li Li,[2] Jing-Wen Niu,[1] Feng Feng,[2] Zheng-Yu Jin[2] & Shan Gao[1]

1 Department of Neurology, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences, Beijing, China
2 Department of Radiology, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences, Beijing, China

In this study, the MCA wall abnormalities in patients with DBIs and WMLs were investigated by HR-MRI. An MCA plaque ipsilateral to an acute DBI, often involving superior wall, was seen in as high as 45.6% patients. MCA wall thickening and widening of outer-wall boundaries were revealed in both DBIs and WMLs, while MCA lumen dilation was prominent in the patients with WMLs.



INDICACIONES (Ictus Criptogénico)

Ictus Criptogénico
+
FRCV

→ **VWI**

~~Placa Ateromatosa Intracraneal~~ → **40 mg** Atorvastatina
Mono-Antiagregación

Placa Ateromatosa Intracraneal → **80 mg** Atorvastatina
Doble-Antiagregación ?

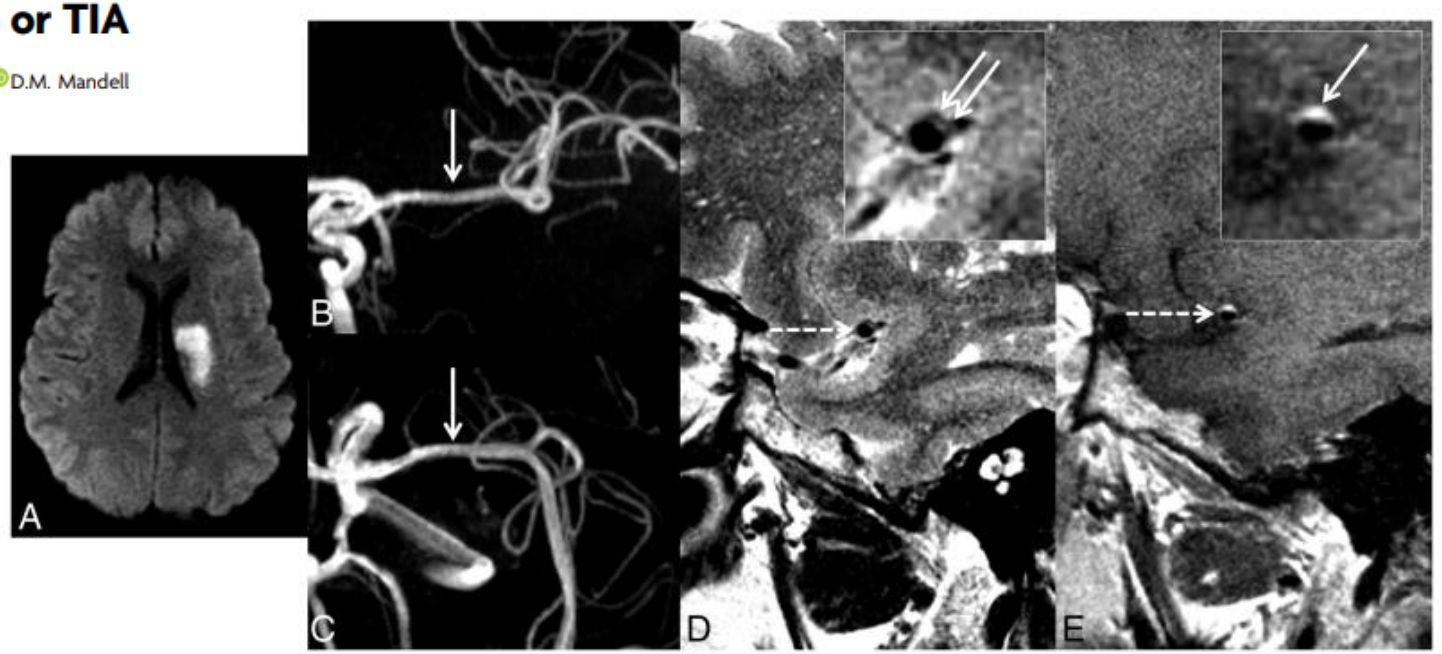
Diagnostic Impact of Intracranial Vessel Wall MRI in 205 Patients with Ischemic Stroke or TIA

J.D. Schaafsma, S. Rawal, J.M. Coutinho, J. Rasheedi, D.J. Mikulis, C. Jaigobin, F.L. Silver, and D.M. Mandell

The etiologic classification

was altered by intracranial VWI

in 55% (112/205) of patients



Reunión Anual
SOCIEDAD ESPAÑOLA DE
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INDICACIONES (Ictus Criptogénico)

Ictus Criptogénico
+
FRCV

→ **VWI**

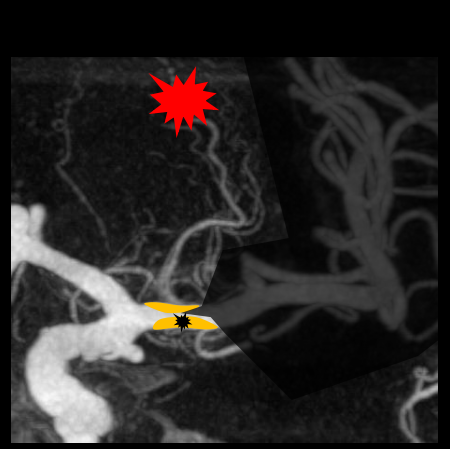
~~Placa Ateromatosa Intracraneal~~ → **40 mg** Atorvastatina

Mono-Antiagregación

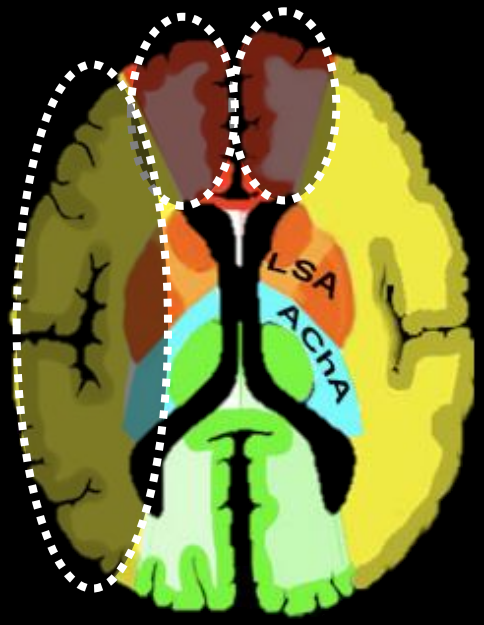
Placa Ateromatosa Intracraneal → **80 mg** Atorvastatina

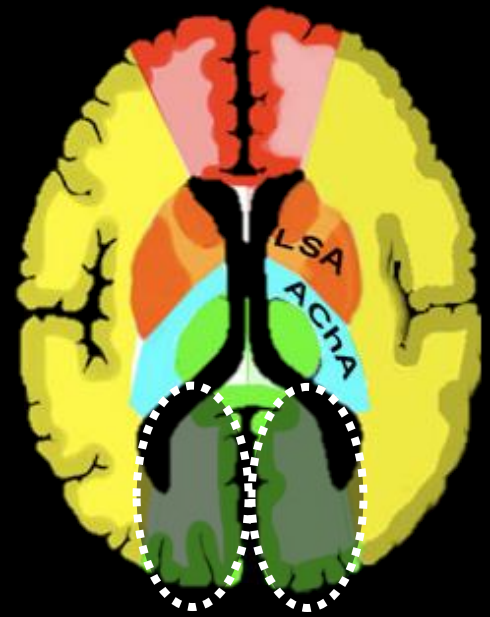
Doble-Antiagregación ?

¿Ictus con FA + Placa Ateromatosa Intracraneal? ¿Anticoagulación o Antiagregación?



¿ MULTITERRITORIAL ?



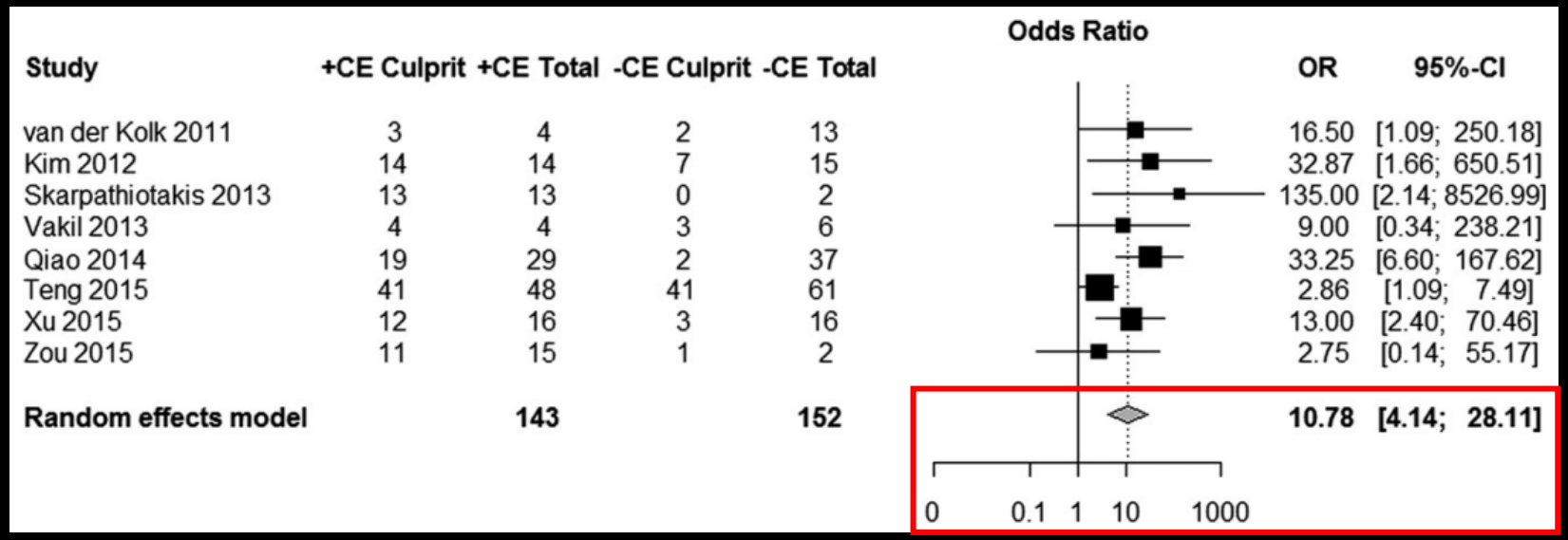


INDICACIONES (Ictus Criptogénico)

Gadolinium Enhancement in Intracranial Atherosclerotic Plaque and Ischemic Stroke: A Systematic Review and Meta-Analysis

Ajay Gupta, MD; Hediyeh Baradaran, MD; Khalid Al-Dasuqi; Ashley Knight-Greenfield, MD; Ashley E. Giambrone, PhD; Diana Delgado, MLS; Drew Wright, MS, MLS; Zhongzhao Teng, PhD; James K. Min, MD; Babak B. Navi, MD, MS; Costantino Iadecola, MD; Hooman Kamel, MD

J Am Heart Assoc. 2016;5:e003816

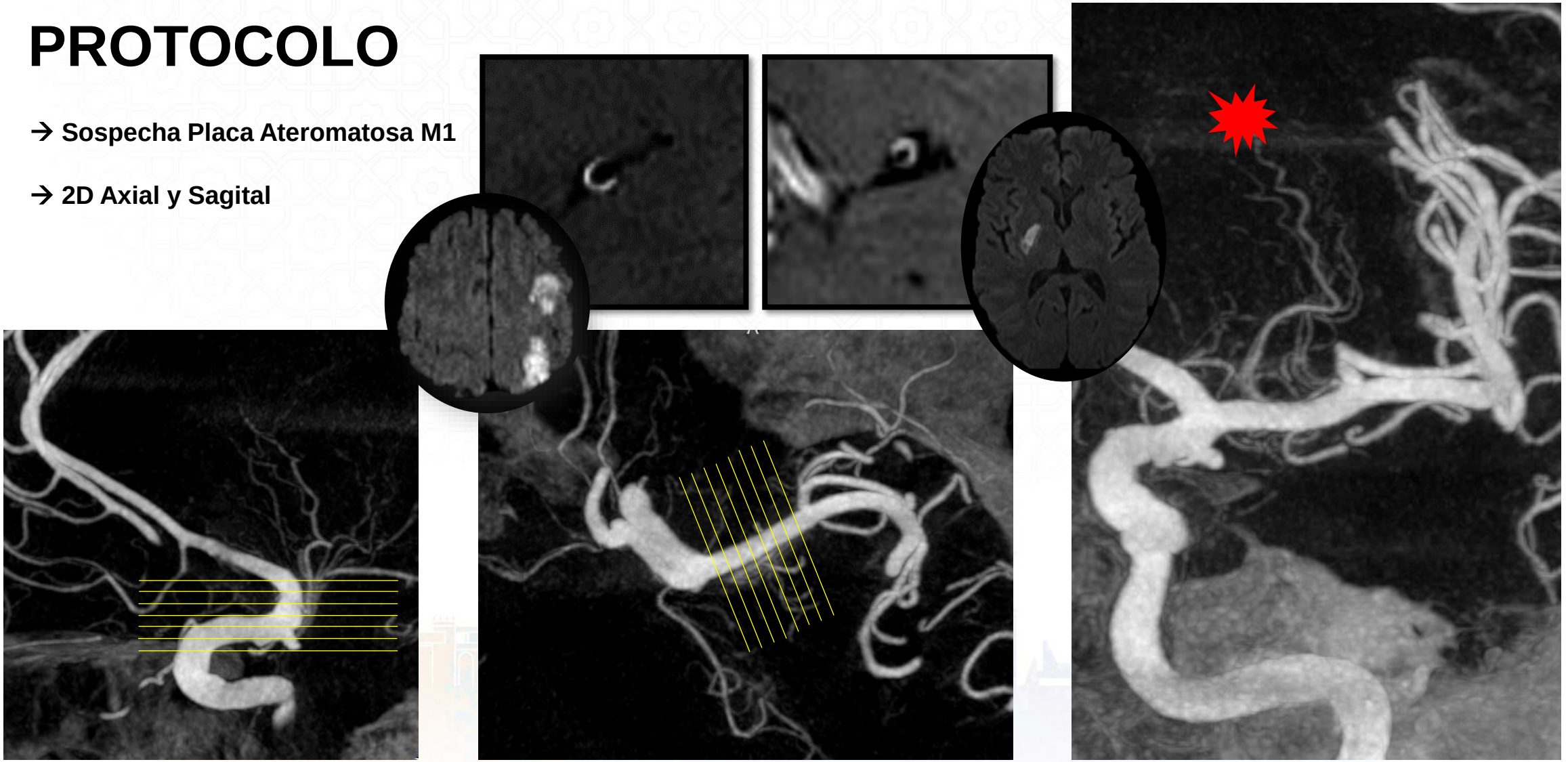


INDICACIONES (Ictus Criptogénico)

PROTOCOLO

→ Sospecha Placa Ateromatosa M1

→ 2D Axial y Sagital

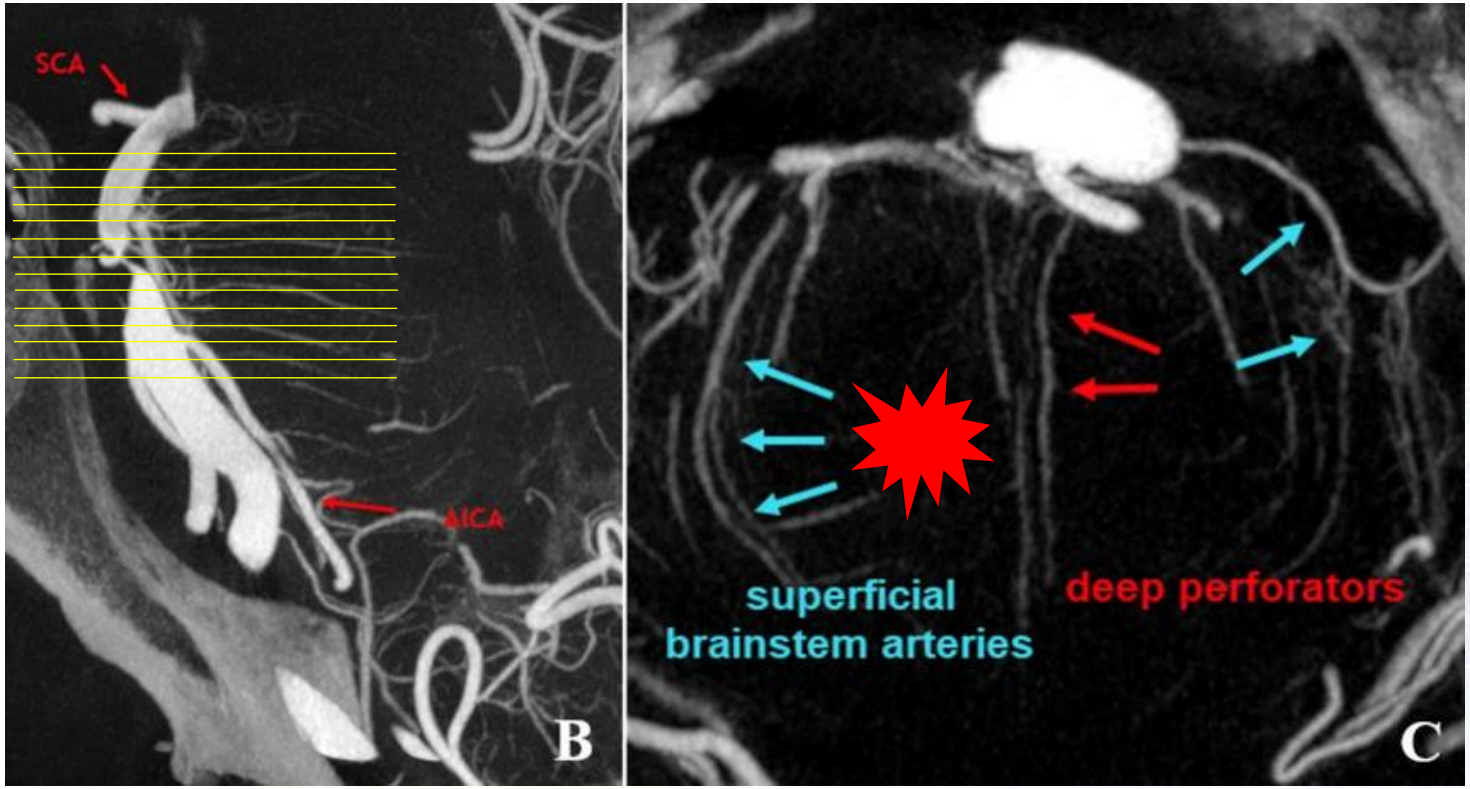


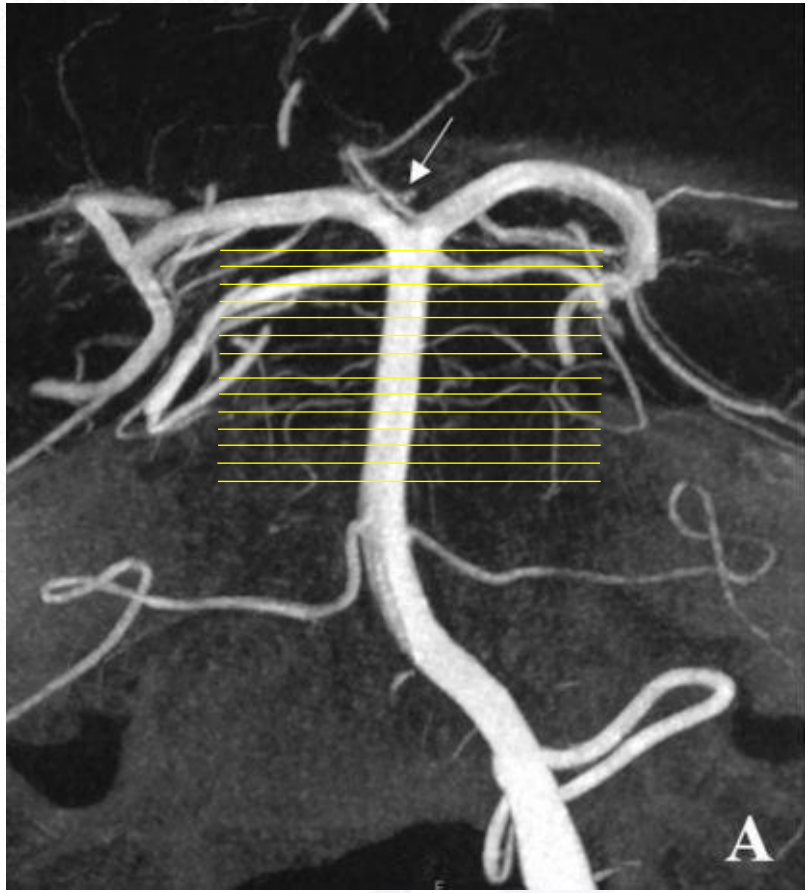
INDICACIONES (Ictus Criptogénico)

PROTOCOLO

→ **Sospecha Placa Ateromatosa Arteria Basilar**

→ **2D Axial y Sagital**





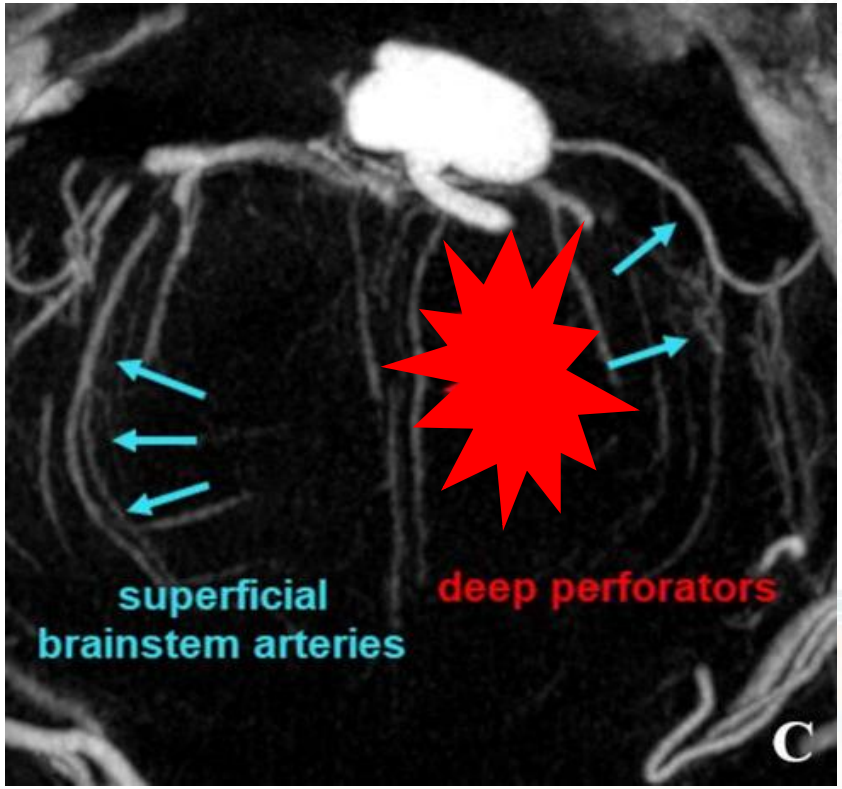
J NeuroIntervent Surg 2021;13:580–584

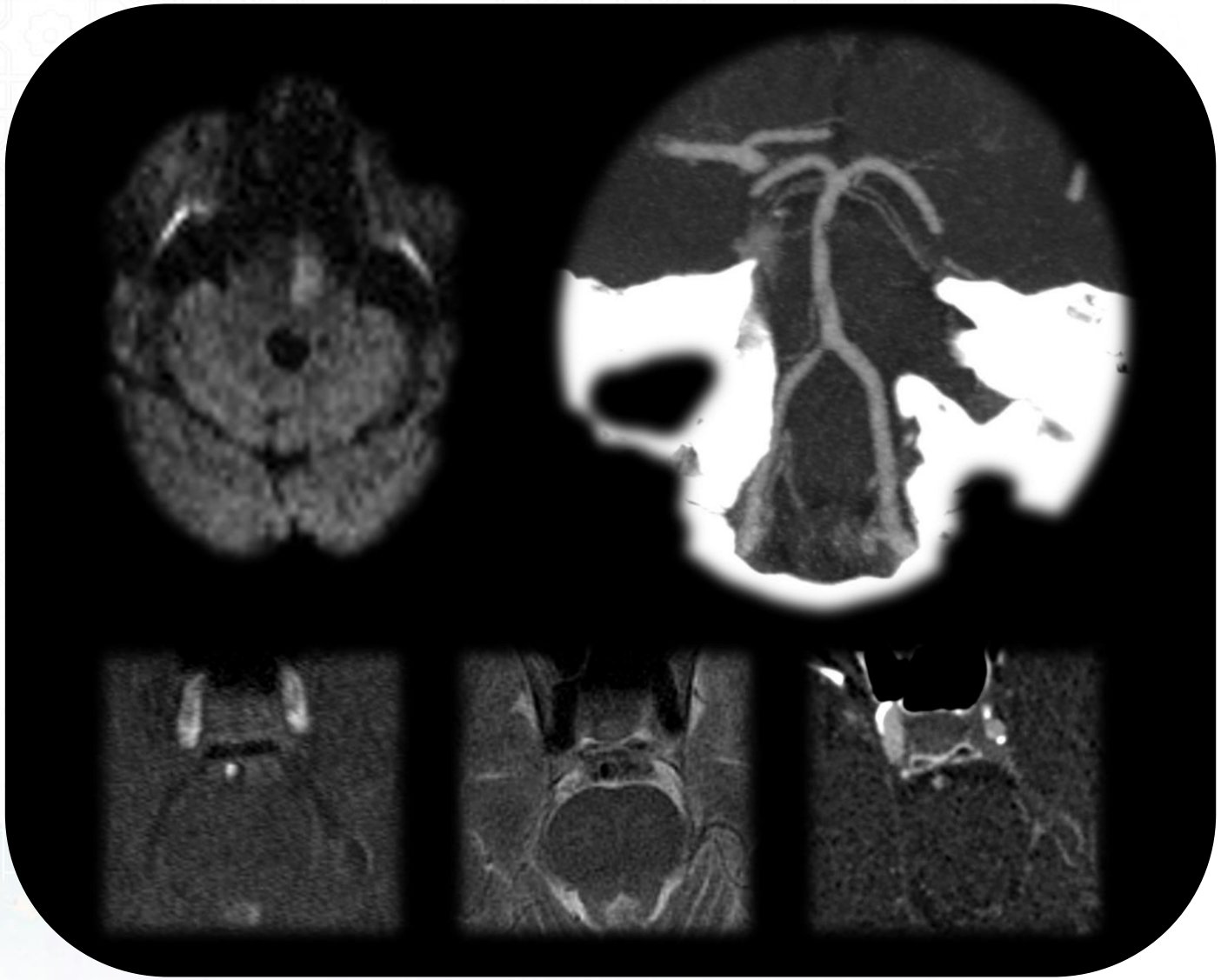
INDICACIONES (Ictus Criptogénico)

PROTOCOLO

→ Sospecha Placa Ateromatosa Arteria Basilar

→ 2D Axial y Sagital



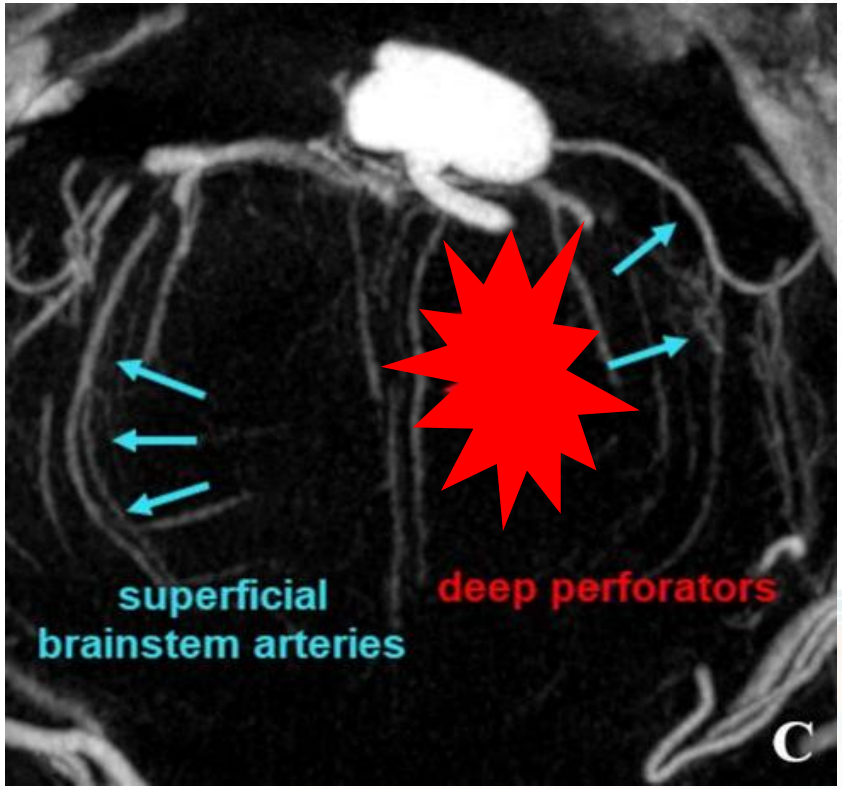


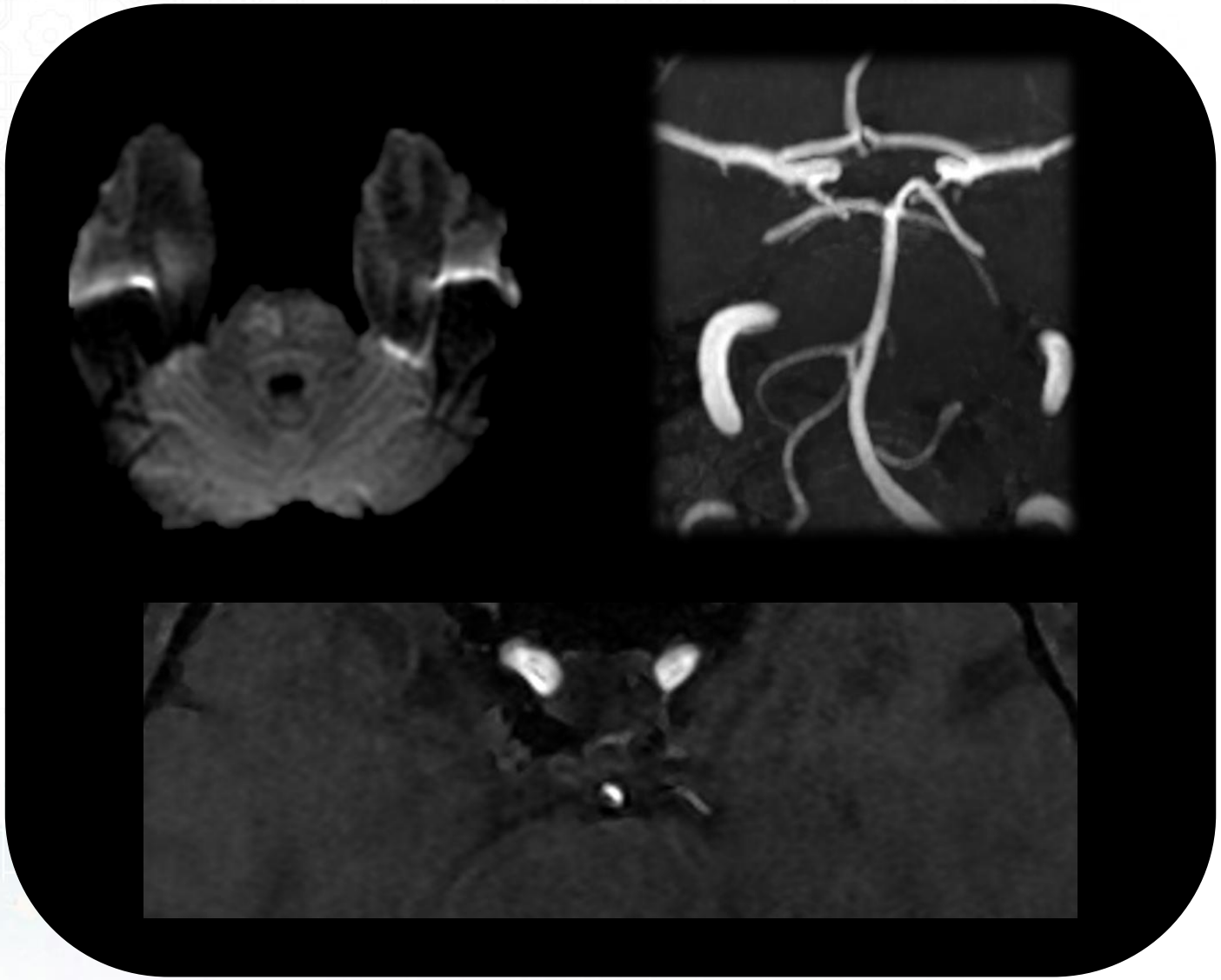
INDICACIONES (Ictus Criptogénico)

PROTOCOLO

→ Sospecha Placa Ateromatosa Arteria Basilar

→ 2D Axial y Sagital



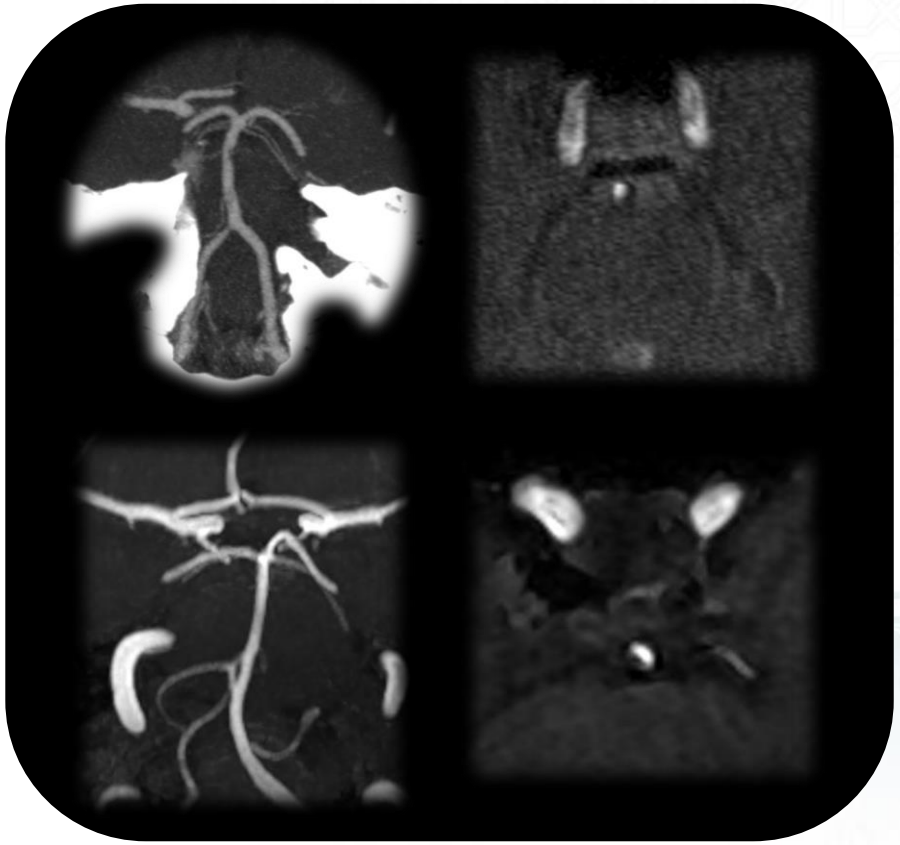


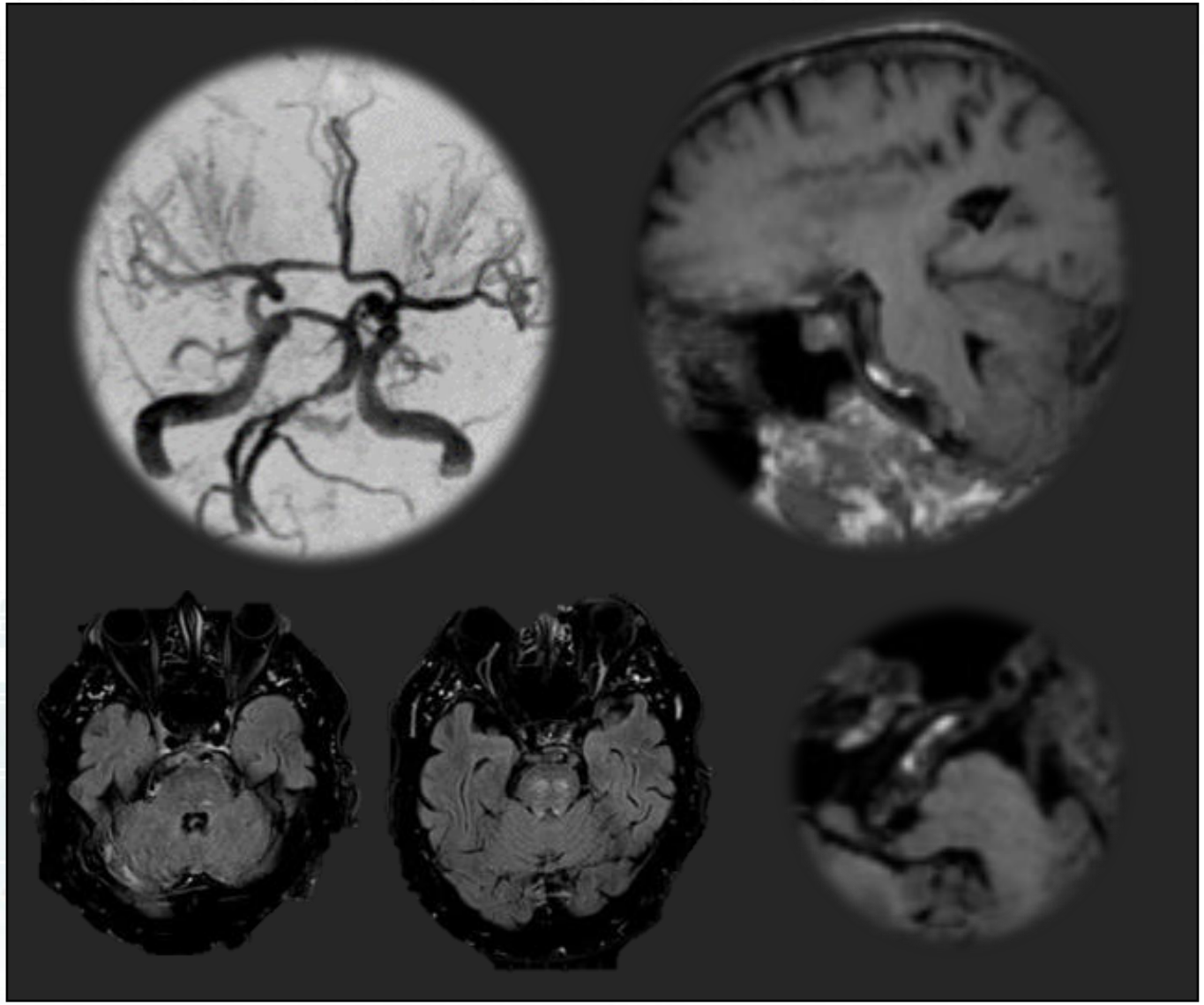
INDICACIONES (Ictus Criptogénico)

PROTOCOLO

→ Sospecha Placa Ateromatosa Arteria Basilar

→ 2D Axial y Sagital





Aneurismas…

Reunión Anual
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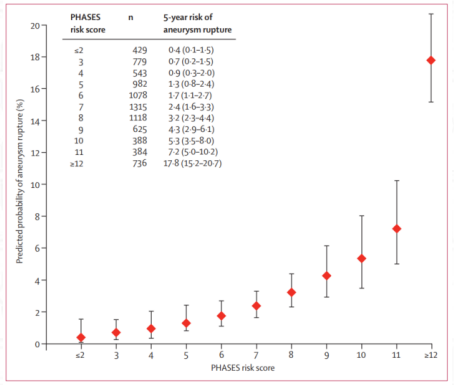
INDICACIONES (Aneurismas ≤ 6 mm)

Development of the PHASES score for prediction of risk of rupture of intracranial aneurysms: a pooled analysis of six prospective cohort studies

Jacoba P Greving, Marieke J H Wermer, Robert D Brown Jr, Akio Morita, Seppo Juvela, Masahiro Yonekura, Toshihiro Ishibashi, James C Torner, Takeo Nakayama, Gabriël J E Rinkel, Ale Algra



A Populations from North America and European countries other than Finland

Size	No hypertension, no history of SAH — Aneurysm location: ICA	MCA	ACA	Pcom/ posterior	Age	Hypertension, no history of SAH — Aneurysm location: ICA	MCA	ACA	Pcom/ posterior	Age	Both hypertension and history of SAH — Aneurysm location: ICA	MCA	ACA	Pcom/ posterior
≥20 mm	7	13	>15	>15	≥70 years	10	>15	>15	>15	≥70 years	14	>15	>15	>15
10·0–19·9 mm	2	4	6	7		3	5	8	9		4	7	11	13
7·0–9·9 mm	1	1	3	3		1	2	3	4		2	3	5	6
<7 mm	0	1	1	1		0	1	1	2		1	1	2	3
≥20 mm	5	9	15	>15	<70 years	7	12	>15	>15	<70 years	10	>15	>15	>15
10·0–19·9 mm	1	2	4	5		2	3	6	7		3	5	8	9
7·0–9·9 mm	1	1	2	2		1	1	2	3		1	2	3	4
<7 mm	0	0	1	1		0	1	1	1		0	1	2	2

Edad (70 años)

HTA

HSA previa

Tamaño Aneu

Localización Aneu

Aneurismas ≤ 6 mm

< 2% Riesgo de rotura

en 5 años

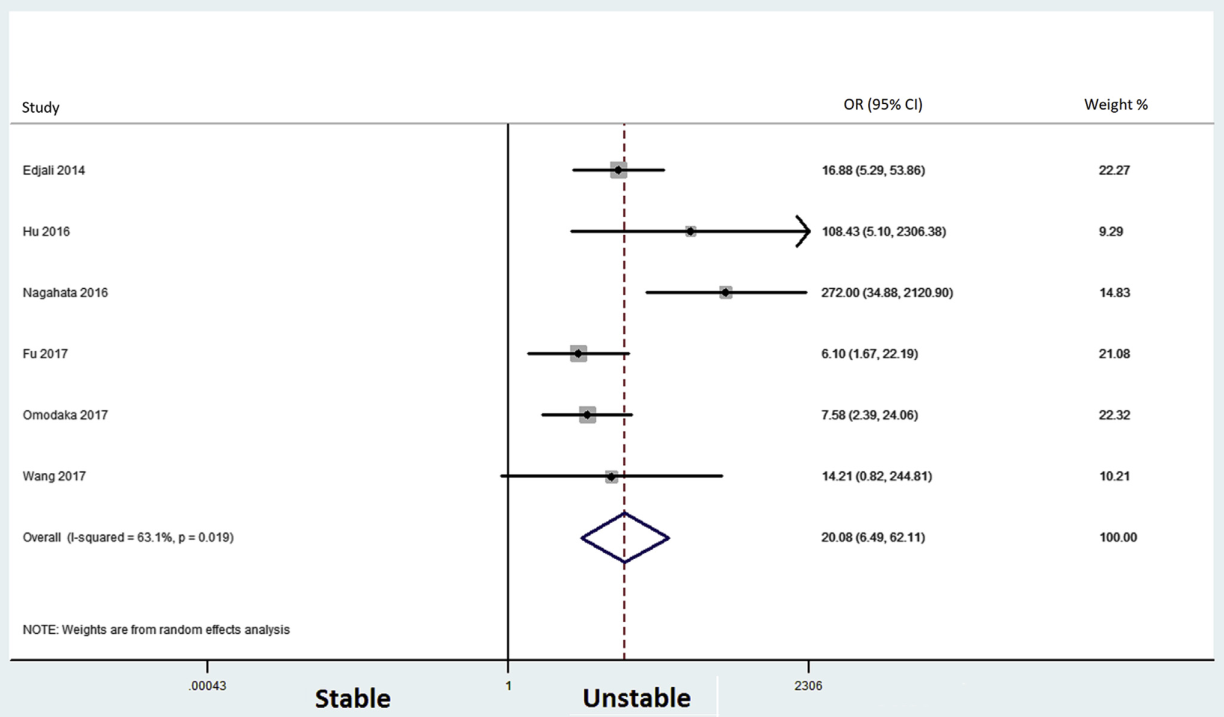
Lancet Neurol. 2014;13:59-66

INDICACIONES (Aneurismas ≤ 6 mm)

Vessel Wall Imaging of Intracranial Aneurysms: Systematic Review and Meta-analysis

Pavlos Texakalidis[1,2], Christopher Alan Hilditch[3], Vance Lehman[4], Giuseppe Lanzino[1], Vitor Mendes Pereira[3], Waleed Brinjikji[1,3,4]

Aneurismas ≤ 6 mm
< 2% Riesgo de rotura
en 5 años



CAPTACIÓN → INESTABILIDAD (VPP 55%)

~~CAPTACIÓN~~ → ESTABILIDAD (VPN 96%)

Detección de la Inestabilidad

Seguimiento de la Estabilidad

INDICACIONES (Aneurismas ≤ 6 mm)

PROTOCOLO

- → **Sospecha Aneurisma “Inestable”**
- → **Volumétrico 3D…**
- → **2D Coronal y Sagital eje Aneurisma**

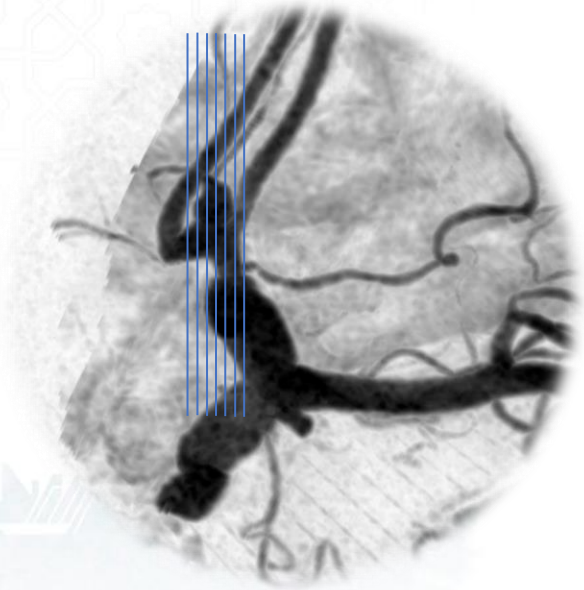
Detección de la Inestabilidad

Seguimiento de la Estabilidad

Aneurismas ≤ 6 mm

< 2% Riesgo de rotura

en 5 años



CONCLUSIONES

¿Por qué realizar el estudio? → Necesidad de estudiar la pared y no solo la luz arterial…

Protocolo de imagen → Protocolo de imagen dirigido a lo que buscamos…

Principales indicaciones

- DxDif Vasculopatía (Vasculitis, SVCR, Ateromatosis)
- Ictus Criptogénico → Detectar Ateromatosis Intracraneal
- Aneurismas ≤6 mm → Detección Riesgo Rotura

1º Detectar Ateromatosis Intracraneal

2º DxDif Vasculopatía

High-Resolution Magnetic Resonance Vessel Wall Imaging for the Evaluation of Intracranial Vascular Pathology

Justin E. Vranic, MD[a,*], Jason B. Hartman, MD[b], Mahmud Mossa-Basha, MD[b]

KEYWORDS

• Vessel-wall imaging • Intracranial vasculopathy • Atherosclerosis • Aneurysm

KEY POINTS

- High-resolution magnetic resonance intracranial vessel wall imaging (IVWI) provides valuable insights into specific pathologic processes affecting the walls of intracranial blood vessels.
- IVWI allows for differentiation of intracranial vasculopathies that would not otherwise be possible using conventional luminal imaging techniques.
- When used appropriately, IVWI boosts diagnostic confidence and may aid in patient prognostication.

PRACTICE GUIDELINE

Intracranial Vessel Wall MRI: Principles and Expert Consensus Recommendations of the American Society of Neuroradiology

D.M. Mandell, M. Mossa-Basha, Y. Qiao, C.P. Hess, F. Hui, C. Matouk, M.H. Johnson, M.J.A.P. Daemen, A. Vossough, M. Edjlali, D. Saloner, S.A. Ansari, B.A. Wasserman, and D.J. Mikulis, on behalf of the Vessel Wall Imaging Study Group of the American Society of Neuroradiology

ABSTRACT

SUMMARY: Intracranial vessel wall MR imaging is an adjunct to conventional angiographic imaging with CTA, MRA, or DSA. The technique has multiple potential uses in the context of ischemic stroke and intracranial hemorrhage. There remain gaps in our understanding of intracranial vessel wall MR imaging findings and research is ongoing, but the technique is already used on a clinical basis at many centers. This article, on behalf of the Vessel Wall Imaging Study Group of the American Society of Neuroradiology, provides expert consensus recommendations for current clinical practice.

ABBREVIATIONS: RCVS = reversible cerebral vasoconstriction syndrome; VW-MR imaging = vessel wall MR imaging

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Review

Intracranial vessel wall imaging: applications, interpretation, and pitfalls

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