Actualización en los protocolos de tratamiento endovascular de la patología estenótica arterial intra y extracraneal

Dra. Eva González. Hospital Universitario de Cruces. Bilbao

Guía ESC 2017 sobre el diagnóstico y tratamiento de la enfermedad arterial periférica, desarrollada en colaboración con la European Society for Vascular Surgery (ESVS)

Documento sobre la enfermedad arterioesclerótica de las arterias extracraneales carótidas y vertebrales, mesentéricas, renales y de las extremidades inferiores y superiores

Avalado por la European Stroke Organization (ESO)

Grupo de Trabajo para el Diagnóstico y Tratamiento de la Enfermedad Arterial Periférica de la Sociedad Europea de Cardiología (ESC) y la European Society for Vascular Surgery (ESVS)

Rev Esp Cardiol. 2018;71(2):111.e1-e69

Recomendaciones sobre la revascularización de pacientes con enfermedad sintomática de las arterias carótidas*

Recomendación	Clase	Nivel
Se recomienda la EAC para los pacientes sintomáticos con estenosis carotídea del 70-99%, siempre que la tasa documentada de muerte/accidente cerebrovascular asociada con el procedimiento sea < [illegible]	I	A
Se debe considerar la EAC para los pacientes sintomáticos con estenosis carotídea del 50-69%, siempre que la tasa documentada de muerte/accidente cerebrovascular asociada con el procedimiento sea < [illegible]	IIa	A
Para pacientes recientemente sintomáticos con estenosis del 50-99% que presenten características anatómicas adversas o comorbilidades por las que se los considere con «alto riesgo para EAC», se debe considerar el ESC siempre que la tasa documentada de muerte/accidente cerebrovascular asociada con el procedimiento sea < [illegible]	IIa	B
Cuando esté indicada la revascularización de un paciente con «riesgo quirúrgico normal» y enfermedad carotídea sintomática, el ESC puede ser una alternativa a la cirugía siempre que la tasa documentada de muerte/accidente cerebrovascular asociada con el procedimiento sea < [illegible]	IIb	B
Cuando se decida revascularizar a un paciente sintomático con estenosis carotídea del 50-99%, se recomienda llevarlo a cabo lo antes posible, preferiblemente en los primeros 14 días desde el inicio de los síntomas	I	A
No se recomienda la revascularización de pacientes con estenosis carotídeas < 50%	III	A

*Accidente cerebrovascular o AIT en los primeros 6 meses.

Tabla 2
Niveles de evidencia

Nivel de evidencia A	Datos procedentes de múltiples ensayos clínicos aleatorizados o metanálisis
Nivel de evidencia B	Datos procedentes de un único ensayo clínico aleatorizado o de grandes estudios no aleatorizados
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INTRODUCCION

El ictus es la segunda causa de muerte después de la cardiopatía isquémica.

AIT<24h/Stroke >24h

↓

Exploración de los TSA y de los vasos cerebrales

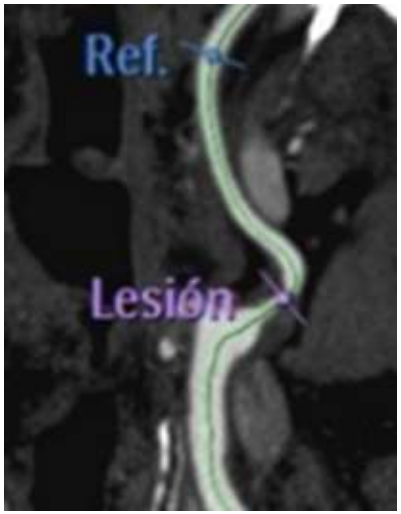
↓

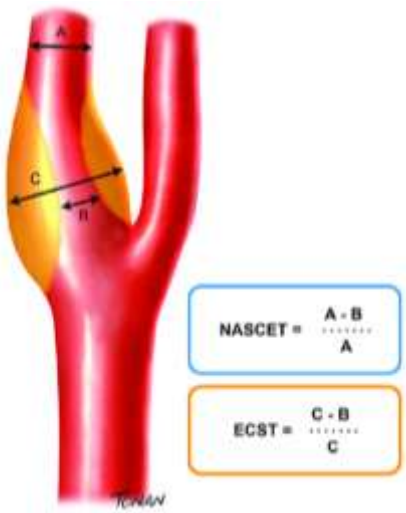
ED RM TC

(1) **Ateroesclerosis (15-20% Estenosis de Carótida)**
(2) Cardioembolica
(3) Occlusión pequeño vaso
(4) Otras etiologias (arteritis, disección)

DEFINICION

- Estenosis carotídea: estenosis > 50% de ACI extracraneal según método NASCET(North American Symptomatic Carotid Endarterectomy Trial)





NASCET	ECST
30%	65%
40%	70%
50%	75%
60%	80%
70%	85%
80%	91%
90%	97%

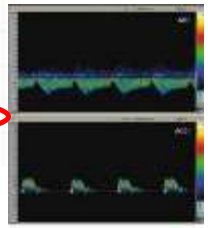
- Estenosis sintomática: síntomas 6 meses previos
- Estenosis asintomática: sin síntomas previos o síntomas hace más de 6 meses .

DIAGNOSTICO DE LA ESTENOSIS CAROTIDEA

DIAGNOSTICO ECOGRAFIA DOPPLER

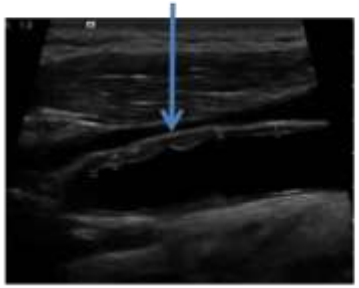
- Modalidad de imagen de primera línea.
- Cribado y diagnóstico del grado de estenosis con medidas de velocidad

Criterios	Grado de estenosis arterial					
	< 50%	50-69%	70-79%	80-89%	≥ 90%	Oclusión
Signos directos						
VSM	< 125	125-230	> 230	> 300	Variable	NA
VDF	< 40	40-100	> 100	Variable	Variable	NA
Signos indirectos						
VSM postestenosis en ACI	Normal	Normal	≥ 50	< 50	< 30	NA
Flujo colateral en AO	No	No	No/↓/invertido	↓/invertido	↓/invertido	↓/invertido
Flujo colateral en PW	No	No	No/presente	Presente	Presente	Presente

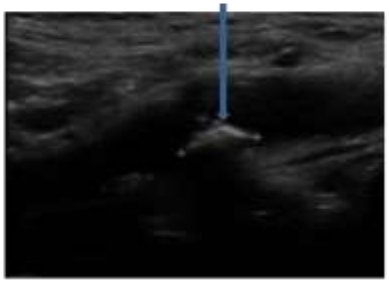


- Evaluación morfológica de la placa

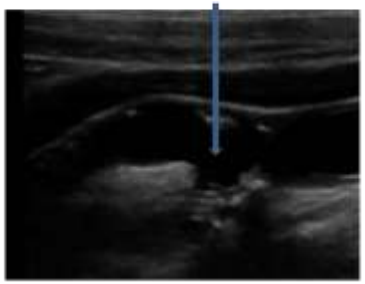
lipídica



cálcica



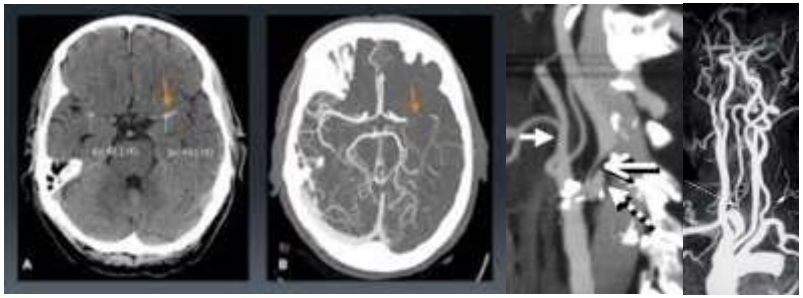
ulcerada

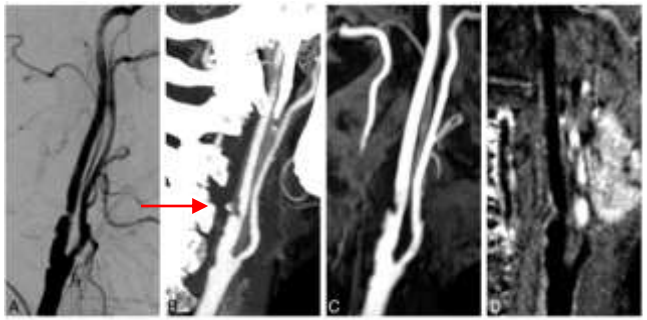


La combinación de ED con Eco Doppler transcraneal (EDT)

- Repercusión de la estenosis carotídea en la **reserva cerebral hemodinámica**
- Detección de **microembolias o hits** de una placa inestable → INDICACIÓN TERAPEÚTICA

DIAGNOSTICO ANGIOTC





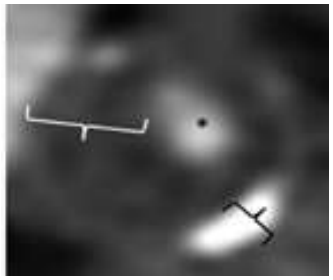
Detalle anatómico de arco aórtico, circulación intracraneal y parénquima cerebral.

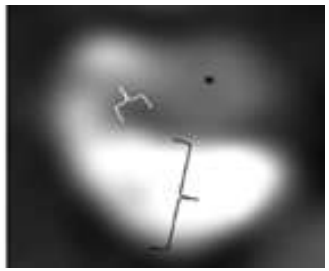
- Gran velocidad, imágenes simultánea de los tejidos blandos, hueso y vasos, reconstrucción 2D y 3D
- Discrimina entre accidentes isquémicos y hemorrágicos
- Fiabilidad superior a 95% en oclusiones carotídeas
- En la planificación del stent carotídeo, superior a la RM en la detección de calcio

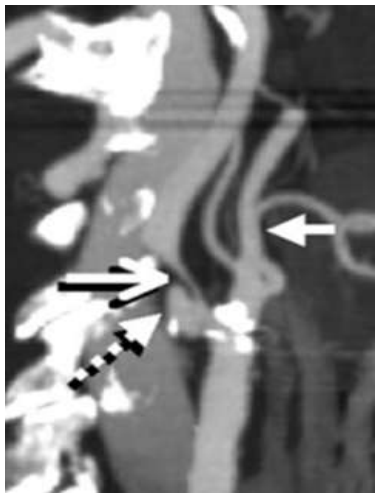
CT Angiographic Features of Symptom-Producing Plaque in Moderate-Grade Carotid Artery Stenosis

A. Gupta, E.E. Mtui, H. Baradaran, G. Salama, A. Pandya, H. Kamel, A. Giambrone, and P.C. Sanelli

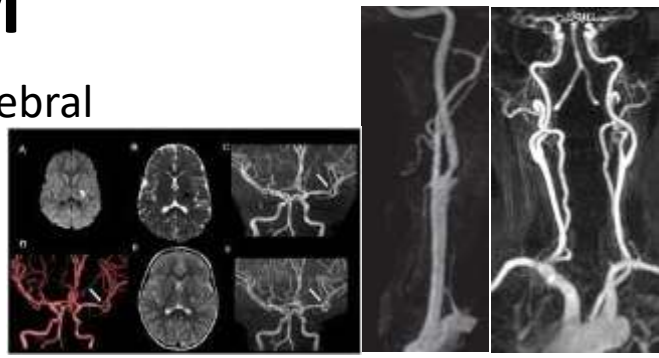
- Características de placa (ulceración, calcificaciones).
- Placas blandas <50 UH, centro rico en lípidos, mas sintomáticas
- Placas calcificadas > 120 UH, mas asintomáticas





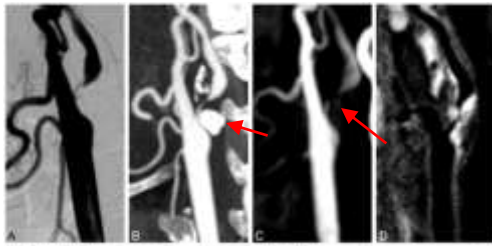


DIAGNOSTICO ANGIORM



Valoración de arco aórtico, polígono de Willis y parénquima cerebral

- Ausencia de radiación ionizante
- Dirección del flujo
- Isquemia cerebral precoz e infarto silente
- Escasa valoración de la calcificación vascular, importante para tratamiento con stent y tendencia a sobreestimar la severidad de las estenosis



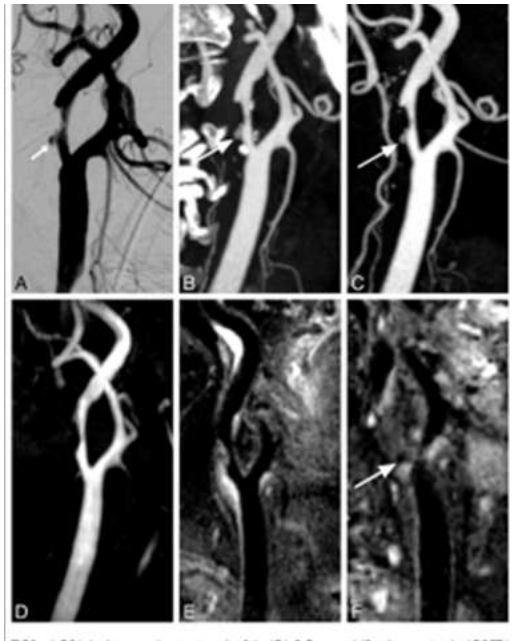
-MRA sin Gd es una alternativa en pacientes con fracaso renal.

Estudio comparativo AngioTC, black-blood MRA y TOF MRA en la detección de estenosis carotídea.

*TOF MRA, limitado por la reducción de la intensidad de señal si el flujo es lento y turbulento.

*BB MRA es comparable con el AngioTC y DSA en la valoración de la estenosis carotídea.

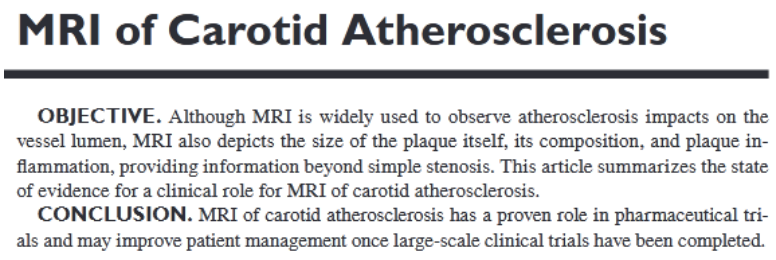
*BB MRA es superior al TOF tanto en la valoración de la estenosis y de la morfología de la placa.



RM

Es la prueba de elección para el estudio de la ***morfología de la placa*** carotídea, **placas de alto riesgo** de TIA o Stroke

- Adelgazamiento o rotura de la capa fibrosa
- Centro necrótico rico en lípidos
- IPH
- Ulceración
- Realce de la adventicia con Gd
- Irregularidades en la superficie de la placa



MRI of Carotid Atherosclerosis

OBJECTIVE. Although MRI is widely used to observe atherosclerosis impacts on the vessel lumen, MRI also depicts the size of the plaque itself, its composition, and plaque inflammation, providing information beyond simple stenosis. This article summarizes the state of evidence for a clinical role for MRI of carotid atherosclerosis.

CONCLUSION. MRI of carotid atherosclerosis has a proven role in pharmaceutical trials and may improve patient management once large-scale clinical trials have been completed.

– Mayor prevalencia en pacientes sintomáticos

– Marcadores de riesgo de ictus en pacientes asintomáticos

ARTERIOGRAFIA(ASD)

- Gold standard.

- Valoración multiplanar y 3D

- Especialmente útil en la valoración del sifón carotídeo y de la enfermedad vascular intracraneal

- Como papel diagnóstico dada su asociación con posibles eventos neurológicos, solo reemplaza a las técnicas de imagen (ED, RM, TC), si los resultados son discordantes

Estenosis 70-99%	Sensibilidad	Especificidad	CP+	CP-
Angio RMN	95% (92-97) 94 (92-96) 91 (89-93) 95 (92-96) 94 (88-97)	90% (86-93) 93 (89-95) 88 (87-90) 92 (90-93) 93 (89-96)	9,5	0,06
Eco Doppler	86% (84-89) 89 (85-92)	87% (84-90) 84 (77-89)	6,6	0,16
Angio TAC	77 (68-84)	95 (91-97)	15,4	0,24
RMN	88 (82-92)	84 (76-97)	5,5	0,14
Estenosis 50-69%	**Sensibilidad**	**Especificidad**	**CP+**	**CP-**
Angio RMN	77 (59-89)	97 (93-99)	25,6	0,24
Eco Doppler	36 (25-49)	91 (87-94)	4	0,7
Angio TAC	67 (30-90)	79 (63-89)	3,2	0,42
RMN	37 (26-49)	91 (78-97)	4,1	0,69
Oclusiones	**Sensibilidad**	**Especificidad**	**CP+**	**CP-**
Angio RMN	98% (94-100) 95 (91-97) 99 (97-100) 77 (59-89)	100% (99-100) 99 (99-100) 99,6 (99-100) 97 (93-99)	Infinito	0,02
Eco Doppler	96% (94-98) 0.83 (73-90)	100% (99-100) 84 (62-95)	Infinito	0,04
Angio TAC	67 (30-90)	79 (63-89)	3,2	0,3
RMN	81 (70-88)	88 (76-95)	6,75	0,22

EUROPEAN SOCIETY FOR VASCULAR SURGERY (ESVS) 2023 CLINICAL PRACTICE GUIDELINES ON THE MANAGEMENT OF ATHEROSCLEROTIC CAROTID AND VERTEBRAL ARTERY DISEASE

Table 3: sensitivity and specificity of DUS, CTA and CEMRA, compared with DSA*

		DUS	CTA	CEMRA
Sensitivity	Occlusion	97%	97%	99%
	Stenosis	89%	75-85%	94-95%
Specificity	Occlusion	99%	99%	99.6%
	Stenosis	84%	93-96%	92-93%

** Data derived from Rojoa[91] and Wardlaw[199]. DUS = Duplex ultrasound; CTA = computed tomographic angiography; CEMRA = contrast enhanced magnetic resonance angiography; DSA = digital subtraction angiography.*

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Recomendaciones sobre las pruebas de imagen de las arterias carótidas extracraneales

Recomendación	Clase[a]	Nivel[b]
Se recomienda ED (como prueba de imagen de primera línea), ATC o ARM para evaluar la extensión y la gravedad de la estenosis de la carótida extracraneal[99]	I	B
Cuando se considere el ISC, se recomienda ARM o ATC tras todo estudio con ED para evaluar el arco aórtico y la circulación extracraneal e intracraneal[99]	I	B
Cuando se considere EAC, se recomienda corroborar el cálculo de la estenosis obtenido por ED mediante ARM o ATC (o repetir el estudio con ED por un equipo vascular experto)[99]	I	B

***Se recomienda no realizar una ASD de forma sistemática (recomendación IIIB) excepto si existen importantes discrepancias entre exploradores o entre pruebas diagnósticas y en casos seleccionados de difícil diagnóstico o lesiones múltiples

TRATAMIENTO ENDOVASCULAR DE ESTENOSIS CAROTIDEA

TRATAMIENTO

El tratamiento médico asociado a revascularización (quirúrgica o endovascular) disminuye el riesgo de ictus cerebral.

Tratamiento médico Antiagregación y control de los factores de riesgo (HTA, colesterol, diabetes) disminuye 4% riesgo de ictus a los dos años

Endarterectomía y la **Terapia Endovascular** mejora resultados del tratamiento médico(AAS) en ECS >70% (si mortalidad perioperatoria < 6%)

NASCET(North American Symptomatic Carotid Endarterectomy Trial)

- Sintomáticos estenosis > 70% Reducción absoluta del riesgo del **17%**

ECST(European Carotid Surgery Trial)

- Sintomáticos estenosis > 70% Reducción absoluta del riesgo del **21 %**

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No se recomienda la revascularización de pacientes con estenosis carotídeas < 50%	III	A

*Accidente cerebrovascular o AIT en los primeros 6 meses.

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PACIENTES ANTICOAGULADOS CON SINTOMAS RECURRENTES

Recommendation 64 (New)	Class	Level	References ToE
For patients who have been started on anticoagulation (on the basis that cardiac embolism was considered the most likely cause of their transient ischaemic attack or stroke) but who then report recurrent event(s) in the territory ipsilateral to a 50-99% carotid stenosis whilst on therapeutic levels of anticoagulation, carotid endarterectomy or carotid artery stenting is recommended.	I	C	Expert opinion

SINDROME DE ISQUEMIA OCULAR

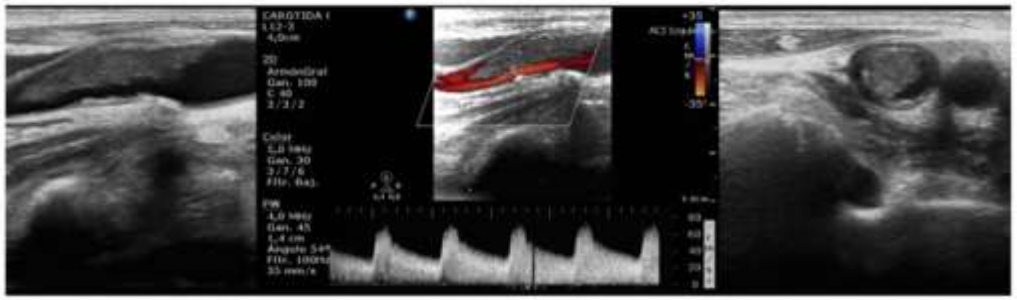
Recommendation 62 (New)	Class	Level	References ToE
For patients with confirmed ocular ischaemia syndrome and a 50-99% ipsilateral carotid stenosis, carotid endarterectomy or carotid stenting should be considered to prevent further ischaemia induced retinal neovascularisation.	IIa	C	83,431

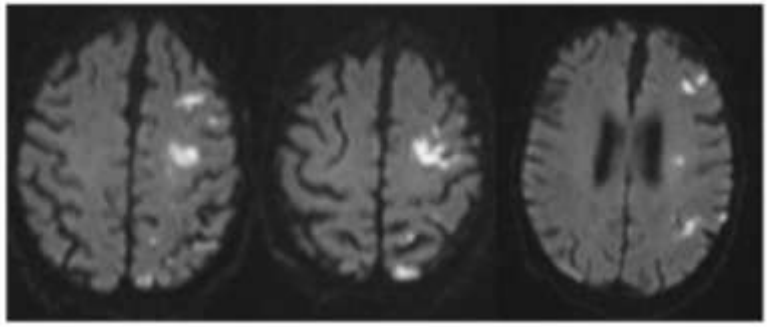
PREVENCION DEFICIT COGNITIVO

Recommendation 22 (Unchanged)	Class	Level	References
For patients with a 70-99% asymptomatic carotid stenosis, carotid interventions are not recommended for the prevention of cognitive impairment until a causal association between severe asymptomatic carotid stenoses and cognitive decline has been established.	III	B	21,87

TRATAMIENTO

TROMBO CAROTIDEO FLOTANTE





Recommendation 58 (New)	Class	Level	References ToE
For patients presenting with recent carotid territory symptoms and evidence of free floating thrombus within the carotid artery, therapeutic anticoagulation is recommended.	I	C	49,54

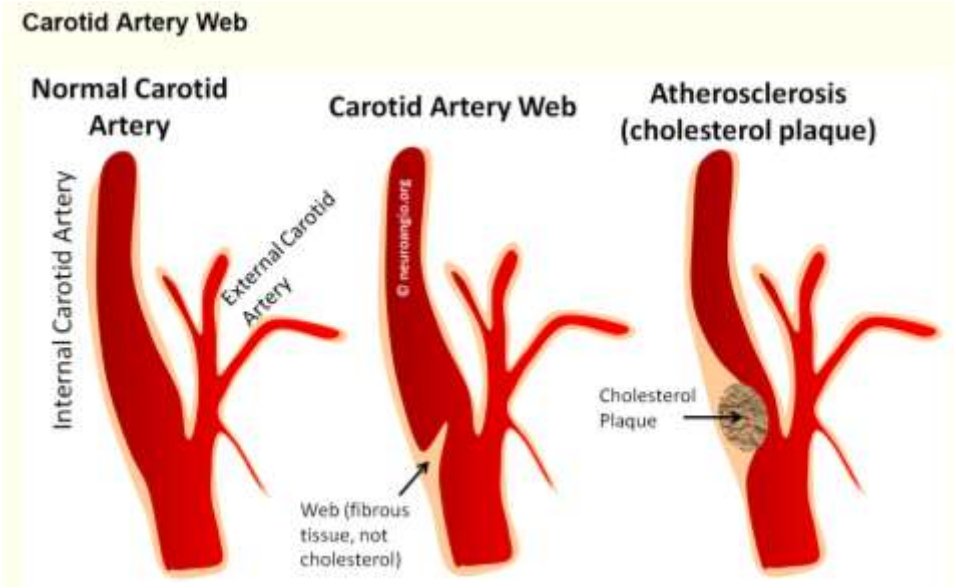
TTO MEDICO

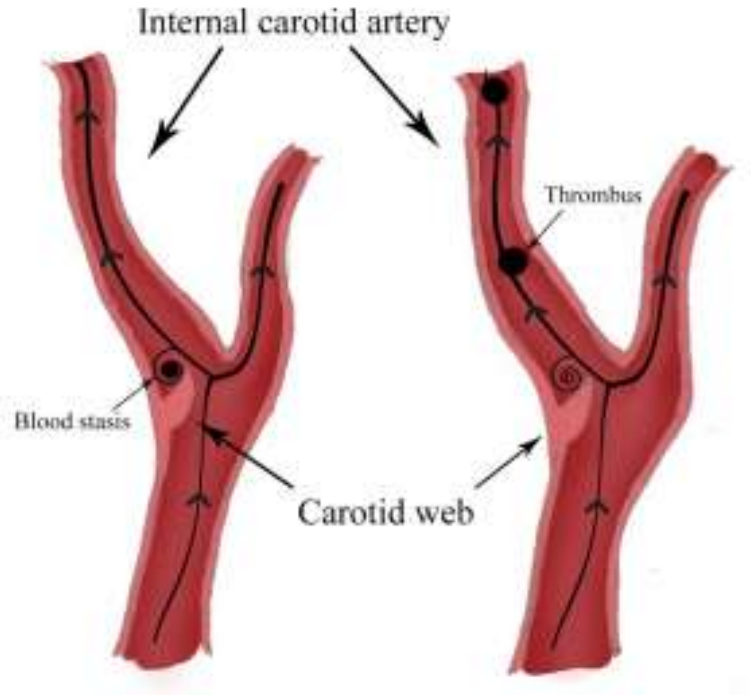
Recommendation 59 (New)	Class	Level	References ToE
For patients presenting with recent carotid territory symptoms and free floating thrombus who develop recurrent symptoms whilst receiving anticoagulation therapy, surgical or endovascular removal of the thrombus may be considered.	IIb	C	Expert Opinion

TTO QUIRURGICO
O ENDOVASCULAR

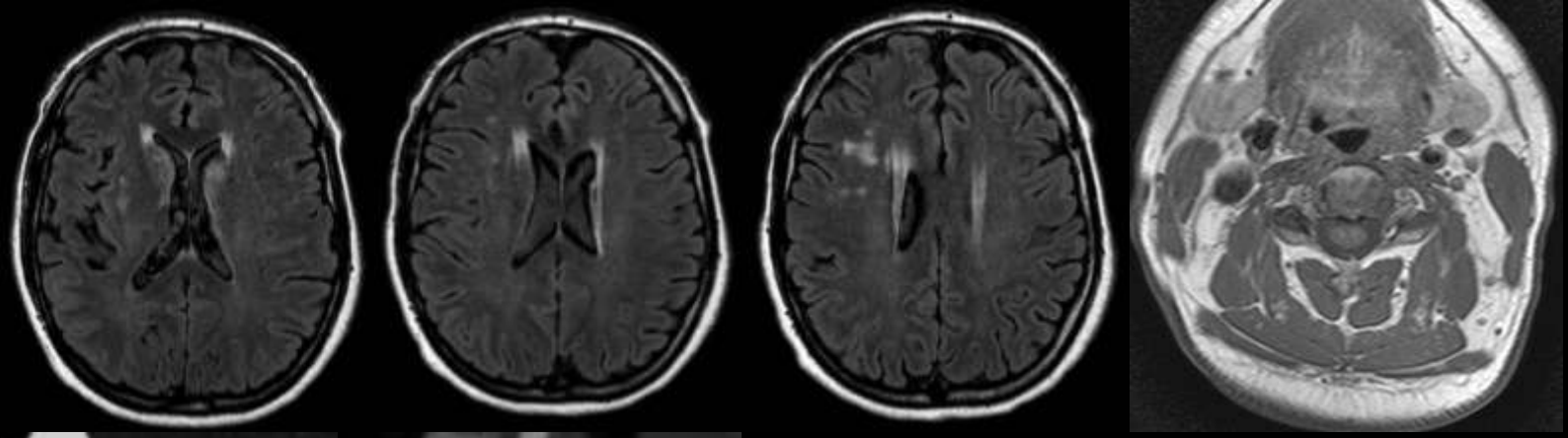
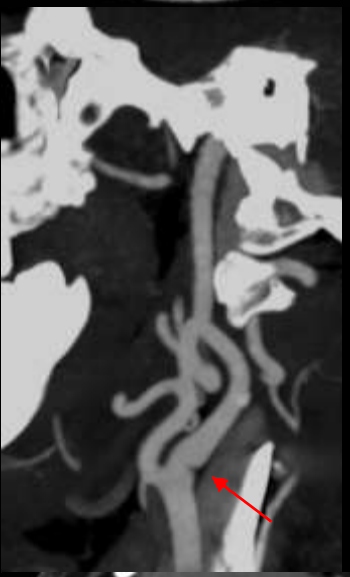
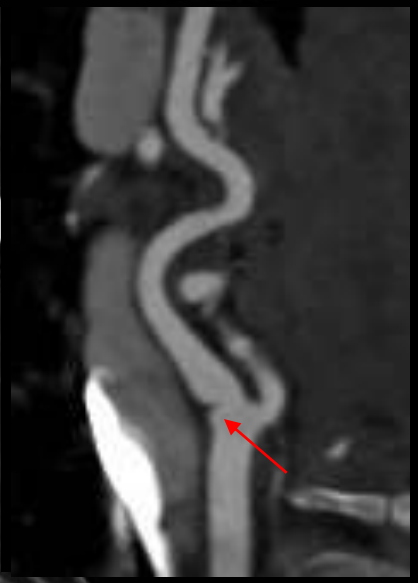
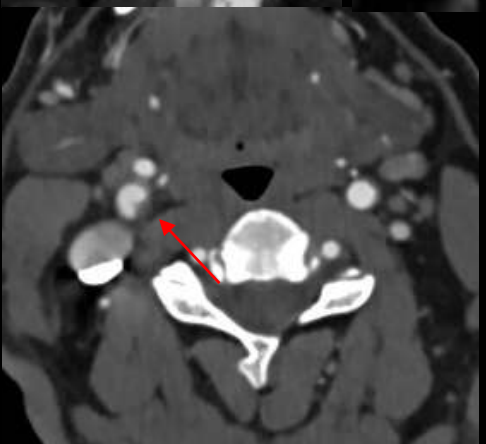
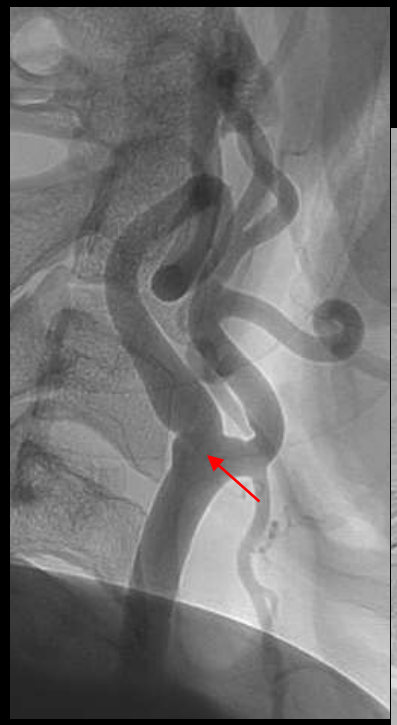
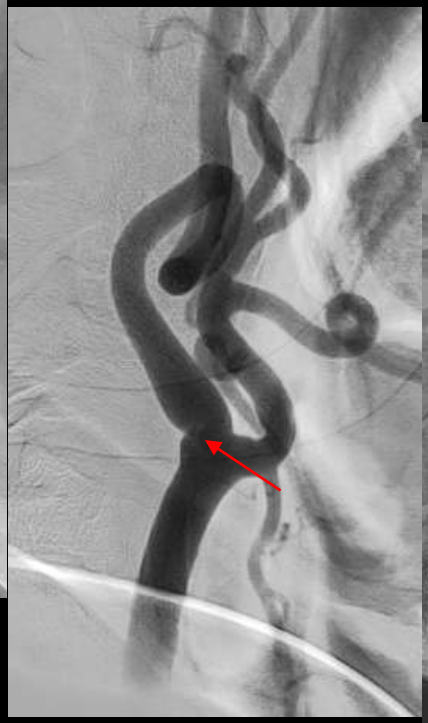
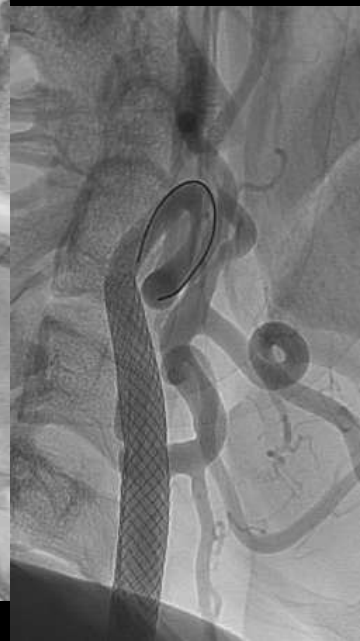
CAROTID WEB

Recommendation 61 (New)	Class	Level	References ToE
For symptomatic patients with a carotid web in whom no other cause for stroke can be identified after detailed neurovascular work up, carotid endarterectomy or carotid artery stenting may be considered to prevent recurrent stroke.	IIb	C	19,69,241, 426,427





Crecimiento de tejido conectivo

Cual es el tratamiento óptimo de la estenosis carotídea?

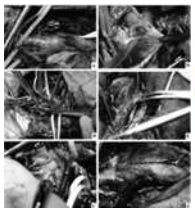
Estudios aleatorizados analizaron la eficacia y seguridad del CAS respecto a CEA

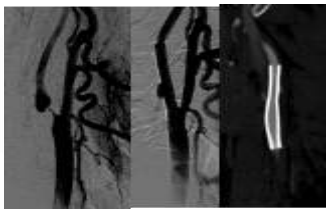
-Stenting and Angioplasty with Protection in Patients at High Risk for Endarterectomy (SAPPHIRE)

Diferencia estadísticamente significativa a favor de la angioplastía con stent

-Endarterectomy versus angioplasty in patients with symtomatic severe carotid stenosis (EVA-3S)

La incidencia de ictus en el grupo tratado con stent es mayor





-Carotid and Vertebral Artery Transluminal Angioplasty Study (CAVATAS)
-Stent protected angioplasty versus carotid endarterectomy study (SPACE)
-Carotid revascularization endarterectomy versus stent trial (CREST)
-International carotid stenting study (ICSS)

Sin demostrar diferencias en la morbimortalidad ni en la eficacia a largo plazo

La revascularización llevada a cabo por cirujanos o intervencionistas expertos, es efectiva y segura.

EDAD?

*Endarterectomía mayor eficacia > 70 años

* Stent mayor eficacia <70 años

Recommendation 42 (Unchanged)	Class	Level	References
For patients aged ≥70 years who have experienced a carotid territory transient ischaemic attack or ischaemic stroke within the preceding 6 months in association with a 50-99% carotid stenosis, it is recommended that they should be treated by carotid endarterectomy, rather than carotid stenting.	I	A	169

Recommendation 43 (Unchanged)	Class	Level	References
For patients aged <70 years who have experienced a carotid territory transient ischaemic attack or ischaemic stroke within the preceding 6 months in association with a 50-99% carotid stenosis, carotid artery stenting may be considered an alternative to endarterectomy, provided the documented 30 day risk of death/stroke is <6%.	IIb	A	169

Comité multidisciplinar y auditar resultados <6% (sintomáticos) <3% (asintomáticos)

Recommendation 6 (Unchanged)	Class	Level	References
Multidisciplinary team review is recommended to reach consensus decisions regarding the indications for, and treatment of, patients with carotid stenosis regarding carotid endarterectomy, carotid stenting or optimal medical therapy.	I	C	201

Recommendation 7 (Unchanged)	Class	Level	References
Independent neurological assessment before and after carotid interventions is recommended to audit peri-procedural risks	I	C	202,203

ALTO RIESGO PARA ENDARTERECTOMIA → **TTO ENDOVASCULAR**

- Radiación previa
- Estenosis recurrente
- Oclusión carotídea contralateral
- Parálisis del nervio laríngeo recurrente contralateral
- Acceso quirúrgico difícil «cuello hostil» , bifurcaciones altas

Recommendation 54 (New)	Class	Level	References ToE
For recently symptomatic patients with 50-99% stenoses and contralateral carotid occlusion or previous cervical radiation therapy, the choice of carotid endarterectomy or carotid artery stenting should be considered on an individual basis.	IIa	B	72,151,422

Recommendation 55 (Unchanged)	Class	Level	References
For recently symptomatic patients with 50-99% stenoses with anatomical features or co-morbidities that are considered by the multidisciplinary team to be higher risk for carotid endarterectomy, carotid stenting should be considered as an alternative to endarterectomy, providing the documented 30 day risk of death/stroke is <6%.	IIa	B	223,282, 315,316

CAROTIDAS ASINTOMATICAS

TRATAMIENTO MEDICO

Recommendation 9 (Regraded)	Class	Level	References
For patients with >50% asymptomatic carotid stenosis, lower dose aspirin (75-325mg daily) should be considered, mainly for the prevention of late myocardial infarction and other cardiovascular events.	IIa	C	213,216

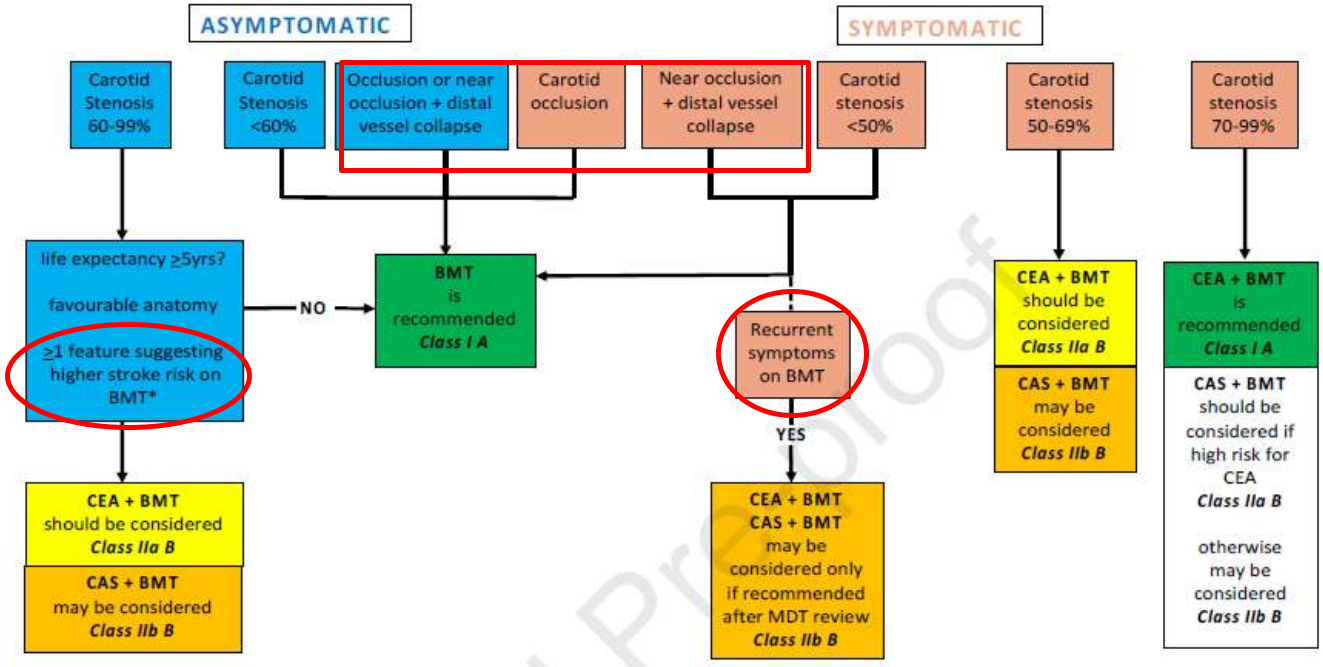
Recommendation 13 (Regraded)	Class	Level	References
For patients with asymptomatic carotid stenosis, lipid lowering therapy with statins (with or without ezetimibe) is recommended for the long-term prevention of stroke, myocardial infarction, and other cardiovascular events.	I	B	111,228,229

Recommendation 15 (Unchanged)	Class	Level	References
For patients with asymptomatic or symptomatic carotid stenoses and hypertension, antihypertensive treatment is recommended.	I	A	236

BENEFICIO DE REVASCULARIZACION EN CAROTIDAS ASINTOMATICAS (morbimortalidad<3%)

Clinical/Imaging features associated with an increased risk of late stroke in patients with asymptomatic 50 - 99% stenosis treated medically.

Clínica[a]	AIT/accidente cerebrovascular contralateral[121]
Imagen cerebral	Infarto homolateral silente[122]
Imagen por ultrasonidos	Progresión de la estenosis (> 20%)[123] Embolización espontánea en el Doppler transcraneal (HITS)[124] Reserva vascular cerebral alterada[125] Placas de gran tamaño[b,126] Placas ecolucentes[96] Área negra yuxtaluminal aumentada (hipoecogénica)[127]
ARM	Hemorragia en la placa[128] Núcleo necrótico rico en lípidos



CAROTID NEAR OCCLUSION

Endarterectomy, Stenting, or Medical Treatment for Symptomatic Carotid Near-Occlusion: Results from CAOS, a Multicenter Registry Study

A. Garcia-Pastor, A. Gil-Núñez, J.M. Ramirez-Moreno, N. González-Nafría, J. Tejada, F. Moniche, J.C. Portilla-Cuenca, P. Martínez-Sánchez, B. Fuentes, M.A. Garrero-García, M.A. de Lecíñana, J. Masjuan, D.C. Verge, Y. Aladro, V. Parkhutik, A. Lago, A.M. de Arce-Borda, M. Utero-Ruiz, R. Delgado-Mederos, A. Pampliega, Á. Ximenez-Carrillo, M. Bártulos-Iglesias, and E. Castro-Reyes, on behalf of the Stroke Project of the Spanish Cerebrovascular Diseases Study Group

ABSTRACT

BACKGROUND AND PURPOSE: The treatment of symptomatic carotid near-occlusion is controversial. Our aim was to analyze the results of carotid endarterectomy and carotid artery stent placement in patients with symptomatic carotid near-occlusion and to identify factors related to technical failure, periprocedural complications, and restenosis.

MATERIALS AND METHODS: We conducted a multicenter, prospective nonrandomized study. Patients with angiography-confirmed carotid near-occlusion were included. We assessed the revascularization rate and periprocedural stroke or death. Twenty-four-month clinical and carotid imaging follow-up was performed, and rates of carotid restenosis or occlusion, ipsilateral stroke, and mortality were analyzed. Carotid artery stent placement, carotid endarterectomy, and medical treatment were compared.

RESULTS: One hundred forty-one patients were included. Forty-four carotid artery stent placement and 23 carotid endarterectomy procedures were performed within 6 months after the event. Complete revascularization was achieved in 83.6%, 81.8% in the carotid artery stent placement group and 87% with carotid endarterectomy ($P = .360$). Periprocedural stroke or death occurred in 6% (carotid artery stent placement = 2.3%; carotid endarterectomy = 13%; $P = .077$) and was not related to revascularization failure. The carotid restenosis or occlusion rate was 8.3% (5% restenosis, 3.3% occlusion) with carotid artery stent placement it was 10.5%; and with carotid endarterectomy it was 4.5% ($P = .499$). The 24-month cumulative rate of ipsilateral stroke was 4.8% in the carotid artery stent placement group, 17.4% for carotid endarterectomy, and 13.1% for medical treatment ($P = .223$). Mortality was 12%, 4.3%, and 5.6%, respectively ($P = .422$). Revascularization failure and restenosis occurred more frequently in patients with full collapse compared with patients without full collapse (33.3% versus 5.6%, $P = .009$; 21.4% versus 1.9%, $P = .032$, respectively).

CONCLUSIONS: Carotid artery stent placement and carotid endarterectomy are associated with high rates of failure and periprocedural stroke. Carotid near-occlusion with full collapse appears to be associated with an increased risk of technical failure and restenosis. Carotid near-occlusion revascularization does not seem to reduce the risk of stroke at follow-up compared with medical treatment.

Recommendation 56 (Unchanged)	Class	Level	References
For symptomatic patients with carotid near occlusion and distal vessel collapse, carotid endarterectomy and carotid stenting are not recommended, unless as part of a randomised controlled trial.	III	B	357

Recommendation 57 (New)	Class	Level	References ToE
For patients with carotid near occlusion and distal vessel collapse with recurrent carotid territory symptoms (despite best medical therapy), carotid endarterectomy or carotid artery stenting may be considered only after multidisciplinary team review	IIb	C	78,110, 126,423

Carotid Angioplastia and Stenting without protection devices: Safety and efficacy oncerns-Single center experience (Clin Neuroradiol 2011 Jun;21(2):65-73

A randomized trial of carotid artery stenting with and without cerebral protection

AJNR Am J Neuroradiol. 2007 Aug;28(7):1378-83.

Carotid stenting without use of balloon angioplasty and distal protection devices: preliminary experience in 100 cases.

Maynar M[1], Baldi S, Rostagno R, Zander T, Rabellino M, Llorens R, Alvarez J, Barajas F.

Carotid Artery Stenting without Angioplasty and Cerebral Protection: A Single-Center Experience with up to 7 Years' Follow-Up

Are Distal Protection Devices 'Protective' During Carotid Angioplasty and Stenting?

Tiziano Tallarita, MD; Alejandro A. Rabinstein, MD; Harry Cloft, PhD; David Kallmes, MD; Gustavo S. Oderich, MD; Robert D. Brown, MD; Giuseppe Lanzino, MD

NO PROTECCION

Neurosurgery. 2017 Jan 1;80(1):60-64. doi: 10.1227/NEU.0000000000001367.

Carotid Artery Angioplasty and Stenting Without Distal Embolic Protection Devices.

Binning MJ[1], Maxwell CR[1], Stofko D[2], Zerr M[3], Maghazehe K[3], Liebman K[1], Hakma Z[1], Lewis-Diaz C[3], Veznedaroglu E[1].

Cerebrovasc Dis. 2010 Feb;29(3):282-9. doi: 10.1159/000275505. Epub 2010 Jan 15.

Filter-protected versus unprotected carotid artery stenting: a randomised trial.

Macdonald S[1], Evans DH, Griffiths PD, McKevitt FM, Venables GS, Cleveland TJ, Gaines PA.

Impact of cerebral protection devices on early outcome of carotid stenting.

Castriota F[1], Cremonesi A, Manetti R, Liso A, Oshola K, Ricci E, Balestra G.

Author information

Abstract

PURPOSE: To evaluate the impact of cerebral protection devices on the procedural safety and outcome of carotid stent procedures.

METHODS: From June 1997 to July 2001, 275 consecutive patients (208 men; mean age 71 +/- 7.4 years) underwent percutaneous angioplasty and/or stenting of the extracranial carotid artery. In the first 125 (45.4%) patients, the procedures were performed without cerebral protection. After January 2000, protection devices were routinely used (150 [54.6%] patients), including the Angioguard filter, GuardWire occlusion system, TRAP Vascular Filtration System, EPI Filter Wire, NeuroShield, Parodi Anti-Emboli System, and Medicorp occlusive balloon.

RESULTS: The percutaneous procedures were effective in 273 (99.3%) patients. No death or major stroke occurred in either group. In the unprotected group, 5 (4.0%) complications occurred: 3 (2.4%) minor strokes, 1 (0.8%) transient ischemic attack (TIA), and 1 (0.8%) subarachnoid hemorrhage. In the patients treated under cerebral protection, there were 2 (1.3%) complications: 1 (0.7%) minor stroke and 1 (0.7%) subarachnoid hemorrhage. There were 4 (3.2%) periprocedural embolic complications in the unprotected group versus 1 (0.7%) in the protected patients.

CONCLUSIONS: Our data suggest that percutaneous dilation and stenting of the carotid arteries protected by cerebral protection devic... event...

Abstract

...ackground—Distal embolization of debris during percutaneous carotid artery stenting may ...sult in neurological deficit. Filter devices for cerebral protection potentially reduce the risk ...f embolization.

...ethods and Results—Elective carotid stent implantation using 3 different types of distal ...ter protection devices was attempted in 88 consecutive lesions (84 patients) in the internal ...rotid artery that had ...

PROTECCION

Protected Carotid Stenting

Clinical Advantages and Complications of Embolic Protection Devices in 442 Consecutive Patients

Alberto Cremonesi, MD; Raffaella Manetti, MD; Francesco Setacci, MD; Carlo Setacci, MD; Fausto Castriota, MD

Background and Purpose—Periprocedural embolization of debris during carotid stenting interventions may result in neurological deficit. This study was designed to evaluate in-hospital and 30-day adverse events in patients percutaneously treated for carotid artery disease with embolic protection devices.

Methods—From 1999 to June 2002, a total of 442 consecutive patients underwent percutaneous angioplasty and/or stenting of the extracranial carotid artery. The endovascular procedure was conducted under embolic protection devices.

Results—The percutaneous procedure was successful in 440 of 442 patients (99.5%). No periprocedural death occurred with any embolic protection device. All in-hospital stroke/death and 30-day ipsilateral stroke/death rate was 1.1%. The overall complication rate was 3.4%. Major adverse events included 1 major stroke (0.2%), 4 intracranial hemorrhages (0.9%), 1 carotid artery wall fissuration (0.2%), and 1 diffuse cardioembolism (0.2%). Minor adverse events included 4 minor strokes (0.9%) and 4 transient ischemic attacks (0.9%). The cerebral protection device-related complications were 4 (0.9%): 1 case of abrupt closure of the internal carotid artery because of spiral dissection (0.2%), 1 case of trapped guide wire (0.2%), and 2 cases of intimal dissection (0.5%). Transient loss of consciousness, tremors, and fasciculations were present in 6 of 40 patients (15%) in whom occlusive protection devices were used.

Conclusions—Our data suggest that percutaneous stenting of the carotid artery when a cerebral protection device is used is feasible and effective but not without potential complications. However, a long learning curve may exist for the proper use of some embolic protection devices. (*Stroke*. 2003;34:1936-1943.)

A Systematic Review of the Literature

Andreas Kastrup, MD; Klaus Gröschel, MD; Hilmar Krapf, MD; Bernhard R. Brehm, MD; Johannes Dichgans, MD; Jörg B. Schulz, MD

Background—Carotid angioplasty and stenting (CAS) is increasingly being used for treatment of symptom... asymptomatic carotid artery disease (CAD). To evaluate the efficacy of cerebral protection devices in p... thromboembolic complications during CAS, we conducted a systematic review of studies reporting on the inc... minor stroke, major stroke, or death within 30 days after CAS.

Summary of Review—We searched for studies published between January 1990 and June 2002 by means of a... search and a cumulative review of reference lists of all relevant publications. In 2357 patients a total of 2... procedures had been performed without protection devices, and in 839 patients 896 CAS procedures had been p... with protection devices. Both groups were similar with respect to age, sex distribution, cerebrovascular risk fac... indications for CAS. In many studies the periprocedural complication rates had not been presented sepa... patients with symptomatic and asymptomatic CAD. The combined stroke and death rate within 30 days... symptomatic and asymptomatic patients was 1.8% in patients treated with cerebral protection devices comp... 5.5% in patients treated without cerebral protection devices (χ^2=19.7, P<0.001). This effect was mainly... decrease in the occurrence of minor strokes (3.7% without cerebral protection versus 0.5% with cerebral p... χ^2=22.4, P<0.001) and major strokes (1.1% without cerebral protection versus 0.3% with cerebral protection... P<0.05), whereas death rates were almost identical (≈0.8%; χ^2=0.3, P=0.6).

Conclusions—On the basis of this early analysis of single-center studies, the use of cerebral protection devices a... reduce thromboembolic complications during CAS. These technical aspects should be taken into account b... initiation of further randomized trials comparing CAS with carotid endarterectomy. (*Stroke*. 2003;34:813-81...

Neuroprotection During Carotid Artery Stenting Using the GORE Flow Reversal System: 30-Day Outcomes in the EMPiRE Clinical Study

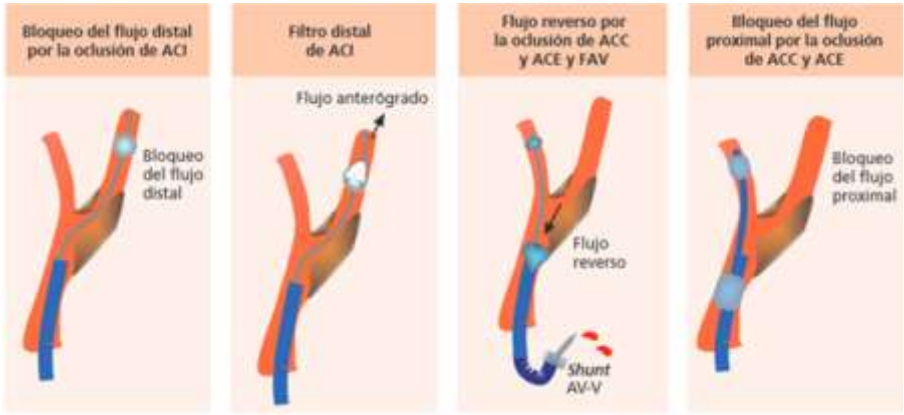
Daniel G. Clair, MD, L. Nelson Hopkins, MD, Manish Mehta, MD, Karthikeshwar Kasirajan, MD, Marc Schermerhorn, MD, Claudio Schönholz, MD, Christopher J. Kwolek, MD, Mark K. Eskandari, MD, Richard J. Powell, MD, and Gary M. Ansel, MD, for the EMPiRE Clinical Study Investigators

¿PROTECCION?

3 Fases de riesgo en la implantación de stent :

- Fase A **"diagnostic phase“** cateterización cuidadosa de TSA y carótida, heparinización

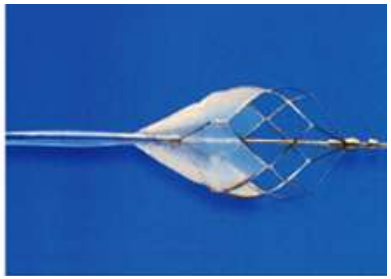
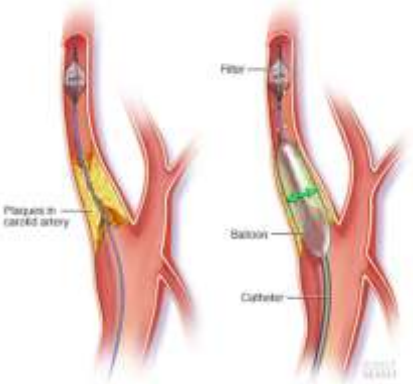
- Fase B **"interventional phase"** PD o PP, evitar predilatación y postdilatación stent celda cerrada



- Fase C **"early post-intervention phase“** HTA, antiagregación

SISTEMAS DE PROTECCION DISTAL



Idea atractiva, pero varios factores limitan su eficacia y su uso es tema de controversia:

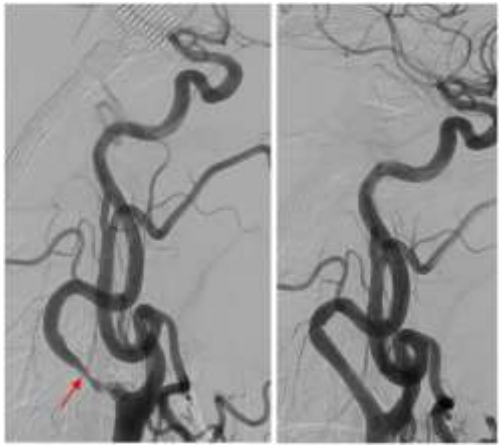
-Colocación y retirada del filtro a veces dificultosa en vasos tortuosos

-Vasoespasmo, disección

-Atravesar la estenosis sin protección genera émbolos

Disminuir la manipulación y los sistemas que cruzan la estenosis reduce el riesgo embólico durante CAS

ESTENOSIS PREOCLUSIVAS NO PREDILATACION



J Vasc Surg. 2008 Apr;47(4):760-5. doi: 10.1016/j.jvs.2007.11.058. Epub 2008 Mar 4.

A randomized trial of carotid artery stenting with and without cerebral protection.

Barbato JE[1], Dillavou E, Horowitz MB, Jovin TG, Kanal E, David S, Makaroun MS.

- **Lesiones embólicas en DW MRI 24 horas:** 72% con protección vs 44% sin protección (J Vasc Surg 2008;47:760-5)

Radiology. 2005 Feb;234(2):493-9. Epub 2004 Dec 22.

Carotid angioplasty and stent placement: comparison of transcranial Doppler US data and clinical outcome with and without filtering cerebral protection devices in 509 patients.

Vos JA[1], van den Berg JC, Ernst SM, Bufkens MJ, Overtoom TT, Mauser HW, Vogels OJ, van Heesewijk HP, Moll FL, van der Graaf Y, Mali WP, Ackerstaff RG.

- Mayor **numero de microembolias Doppler US transcraneal** en pacientes tratados con filtros (Radiology 2005;234:493-99)

SISTEMAS DE PROTECCION PROXIMAL

Disminuyen el numero de lesiones en difusión en RM cerebral. No obstante estas lesiones no tienen mayor traducción sintomática

Catheter Cardiovasc Interv. 2010 Jul 1;76(1):1-8. doi: 10.1002/ccd.22439.

Safety and effectiveness of the INVATEC MO.MA proximal cerebral protection device during carotid artery stenting: results from the ARMOUR pivotal trial.

Solo 15% eran sintomáticos

← Proximal Embolic Protection Device in external carotid artery (MoMa)

- El balón de oclusión puede provocar una **disminución del flujo sanguíneo cerebral.**
- La oclusión vascular **no es siempre tolerada**
- Requieren **colateralidad del polígono de Willis**
- Requieren introductores de calibre grueso **9F**

← Proximal Embolic Protection Device in common carotid artery (MoMa)

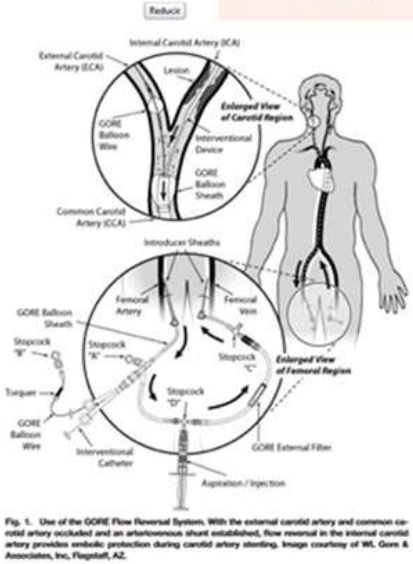


Fig. 1. Use of the GORE Flow Reversal System. With the external carotid artery and common carotid artery occluded and an arteriovenous shunt established, flow reversal in the internal carotid artery provides embolic protection during carotid artery stenting. Image courtesy of W. L. Gore & Associates, Inc, Flagstaff, AZ.

«La eficacia y seguridad de los sistemas de protección cerebral durante CAS es controvertida»

Actualmente no hay ningún estudio randomizado y prospectivo que haya analizado la eficacia de estos dispositivos.

EVA-3S mostró beneficio en el uso de sistemas de protección

SAPPHIRE no demostró diferencias con o sin sistemas de protección

ICSS la tasa de ictus y de lesiones isquémicas agudas observadas en RM

- con protección (73%)
- sin protección (34%)

SPACE

- Grupo de celda cerrada, el uso de los filtros produjo un aumento en la tasa de complicaciones
- Grupo de celda abierta los sistemas de protección mostraron beneficio

Guía ESC 2017 sobre el diagnóstico y tratamiento de la enfermedad arterial periférica, desarrollada en colaboración con la European Society for Vascular Surgery (ESVS)

Artículo especial / Rev Esp Cardiol. 2018;71(2):111.e1-e69

Recomendaciones sobre el uso de dispositivos de protección contra embolias durante el procedimiento de implante de *stent* carotídeo

Recomendación	Clase[a]	Nivel[b]
Se debe considerar el uso de dispositivos de protección contra embolias para los pacientes que se someten a implante de *stent* carotídeo	IIa	C

Tabla 2
Niveles de evidencia

Nivel de evidencia A	Datos procedentes de múltiples ensayos clínicos aleatorizados o metaanálisis
Nivel de evidencia B	Datos procedentes de un único ensayo clínico aleatorizado o de grandes estudios no aleatorizados
Nivel de evidencia C	Consenso de opinión de expertos y/o pequeños estudios, estudios retrospectivos, registros

Tabla 1
Clases de recomendación

Grados de recomendación	Definición	Expresiones propuestas
Clase I	Evidencia y/o acuerdo general en que un determinado procedimiento diagnóstico/tratamiento es beneficioso, útil y efectivo	Se recomienda/está indicado
Clase II	Evidencia contradictoria y/o divergencia de opinión acerca de la utilidad/eficacia del tratamiento	
Clase IIa	El peso de la evidencia/opinión está a favor de la utilidad/eficacia	Se debe considerar
Clase IIb	La utilidad/eficacia está menos establecida por la evidencia/opinión	Se puede recomendar
Clase III	Evidencia o acuerdo general en que el tratamiento no es útil/efectivo en algunos casos puede ser perjudicial	No se recomienda

NEW RECOMMENDATIONS IN THE 2023 GUIDELINES

Recommendation 87 (Unchanged)	Class	Level	References
For patients undergoing carotid artery stenting, cerebral protection systems should be considered	IIa	C	224,316, 490

PROTECCION

Recommendation 88 (New)	Class	Level	References ToE
For patients undergoing carotid artery stenting, decisions regarding choice of cerebral protection (filter, proximal flow reversal) should be considered at the discretion of the operator.	IIa	B	108,131, 141,224, 316,490

Recommendation 89 (Unchanged)	Class	Level	References
For patients undergoing carotid artery stenting, it is not recommended to deploy proximal cerebral protection devices in patients with advanced common carotid disease or external carotid artery disease (if an occlusion balloon is to be positioned in the external carotid artery) or in patients with contralateral occlusion and insufficient collateralisation.	III	C	491

NEW RECOMMENDATIONS IN THE 2023 GUIDELINES

Recommendation 85 (New)	Class	Level	References ToE
For patients undergoing carotid artery stenting, when pre-dilatation is planned, balloon diameters <5 mm should be considered in order to reduce the risk of	IIa	C	113

Recommendation 86 (New)	Class	Level	References ToE
For patients undergoing carotid artery stenting, post-dilatation is not recommended when the residual stenosis is <30%, in order to reduce haemodynamic instability.	III	B	113

PREDILATACION
POSTDILATACION

Recommendation 83 (New)	Class	Level	References ToE
For patients undergoing carotid artery stenting, decisions regarding stent design (open cell, closed cell) should be considered at the discretion of the operator.	IIa	B	53,123, 141

Recommendation 84 (New)	Class	Level	References ToE
For patients undergoing elective carotid artery stenting, dual layer mesh covered stents may be considered.	IIb	C	486

TIPO DE STENT

RESULTADOS

Resultados periprocedimiento- 30 días	% n193
AIT	(1,03%) 2
Stroke no discapacitante o menor	(1,55%) 3
Stroke discapacitante o mayor	0
Hemorragía intracraneal	0
Neurotoxicidad	(0,51%) 1
SHP	(2,06%) 4
IAM	(0,51%) 1
Muerte	(0,51%) 1

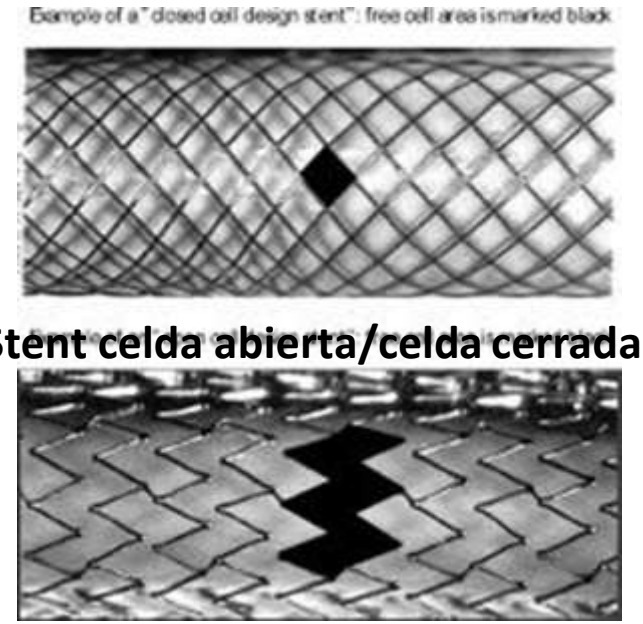
PROTECCION

Fase C **"early post-intervention phase“**

- Control de la TA

- Doble antiagregación

- Stent celda cerrada



Stent celda abierta/celda cerrada

Reducción estadisticamente significativa de eventos neurológicos postprocedimiento

Eur J Vasc Endovasc Surg. 2007 Feb;33(2):135-41; discussion 142-3. Epub 2006 Nov 9.

Does free cell area influence the outcome in carotid artery stenting?

Bosiers M[1], de Donato G, Deloose K, Verbist J, Peeters P, Castriota F, Cremonesi A, Setacci C.

Recommendation 31 (Regraded)	Class	Level	References
For recently symptomatic patients undergoing carotid stenting, combination antiplatelet therapy with aspirin (75-325mg daily) and clopidogrel is recommended. Clopidogrel (75mg daily) should be started at least three days prior to stenting or as a single 300mg loading dose in urgent cases. Aspirin and clopidogrel should be continued for at least four weeks after stenting and then long term antiplatelet monotherapy (preferably clopidogrel 75mg daily) should be continued indefinitely.	I	C	81,221, 226,318

ANTIAGREGACION

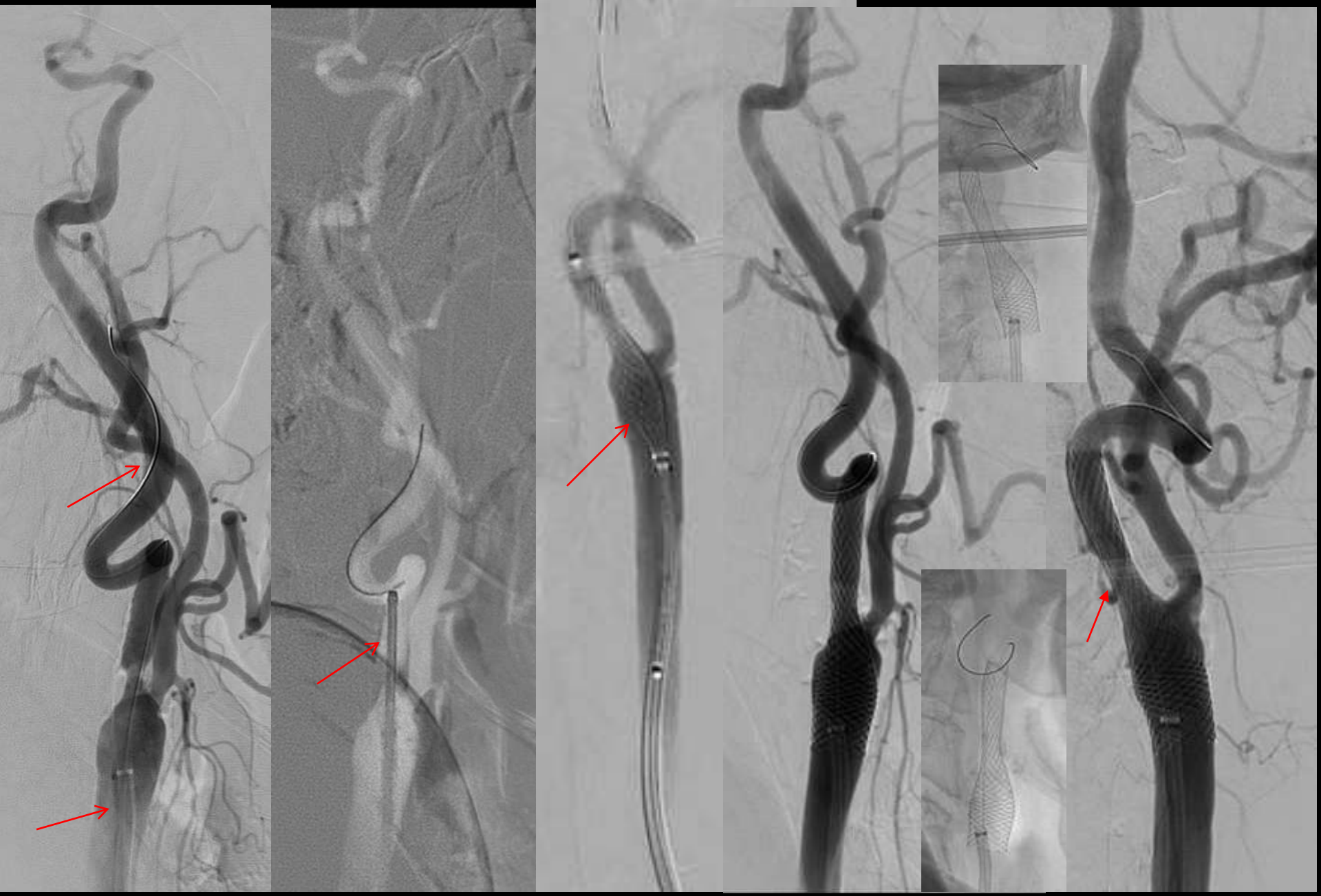
Figure 6: anticoagulation and antiplatelet strategies in CAS patients who are taking anticoagulants pre-operatively.

ANTICOAGULACION

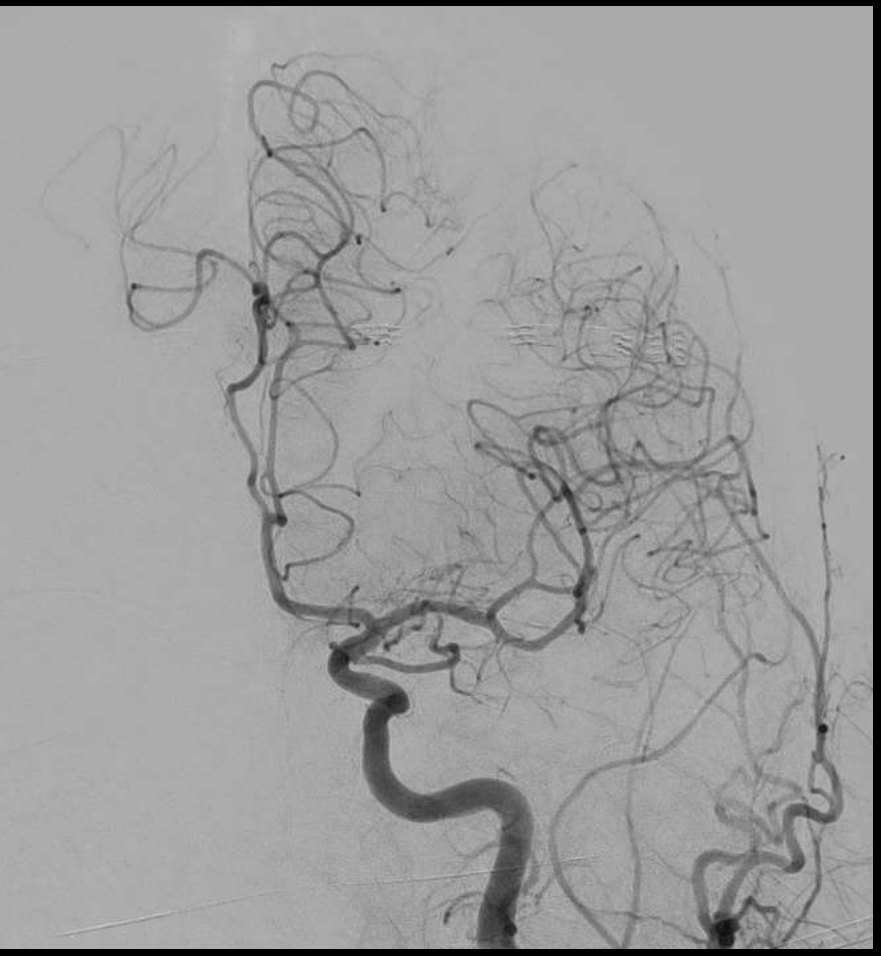
PROCEDIMIENTO

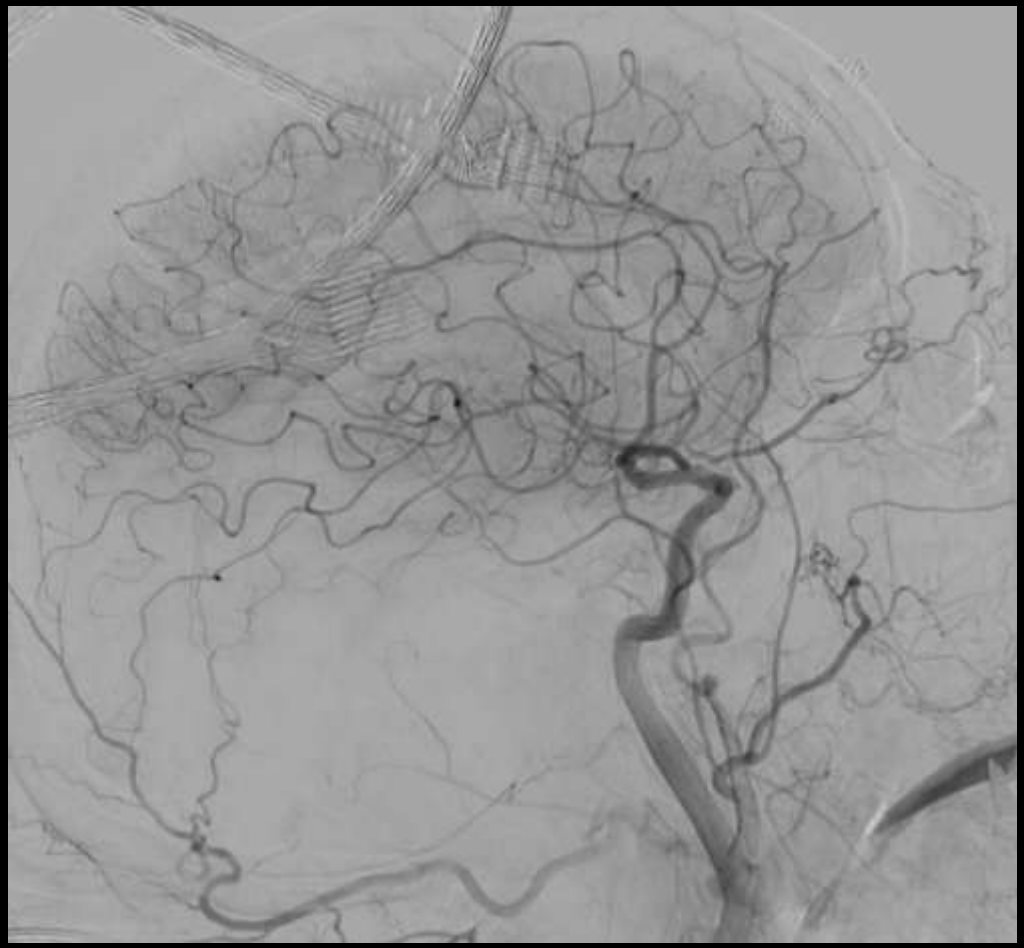
- Anestesia local, acceso femoral o radial
- Heparina i.v tras punción femoral
- Atropina

Recommendation 81 (Regraded)	Class	Level	References
For patients undergoing carotid artery stenting, intravenous atropine or glycopyrrolate is recommended prior to balloon inflation to prevent hypotension, bradycardia or asystole	I	C	477,478



Control intracraneal





SEGUIMIENTO

- Examen Neurológico y Doppler 24 horas

- Seguimiento Clínico y Doppler 1,3,6,12 meses y anualmente.

REESTENOSIS

Recommendation 102 (Regraded)	Class	Level	References
For patients experiencing a late ipsilateral stroke or transient ischaemic attack in the presence of an ipsilateral 50-99% re-stenosis, re-do carotid endarterectomy or carotid artery stenting is recommended.	I	B	357

Recommendation 105 (Unchanged)	Class	Level	References
For carotid stent patients who develop an asymptomatic re-stenosis >70%, medical management is recommended.	I	A	555

TRATAMIENTO PRECOZ?

Recommendation 44 (Unchanged)	Class	Level	References
For symptomatic patients with a 50-99% stenosis in whom a carotid intervention is considered appropriate, it is recommended that this be performed as soon as possible, preferably within 14 days of symptom onset.	I	A	358,359

Riesgo de ictus:
***5-8% primeras 48 horas**
***17% a las 72 horas**
***8-22% a los 7 días**
***11-25% a los 14 días.**
***28% a los dos años.**

Recommendation 46 (Unchanged)	Class	Level	References
For patients with 50-99% stenoses who experience a disabling stroke (modified Rankin score ≥3), or whose area of infarction exceeds one third of the ipsilateral middle cerebral artery territory, or who have altered consciousness/drowsiness, it is recommended to defer carotid interventions to minimise the risks of post-operative parenchymal haemorrhage.	I	C	388,389

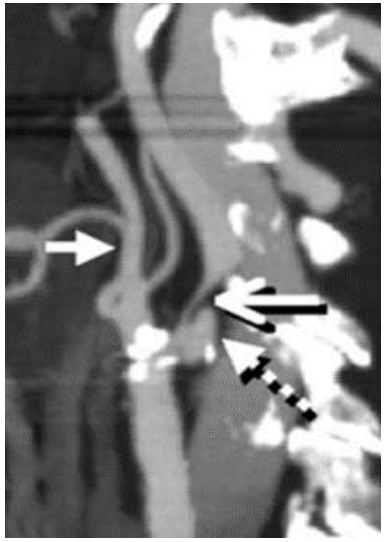
Recommendation 47 (Unchanged)	Class	Level	References
For patients with 50-99% stenoses who present with stroke in evolution or crescendo transient ischaemic attacks, urgent carotid endarterectomy should be considered, preferably within 24 hours.	IIa	C	80,392-394

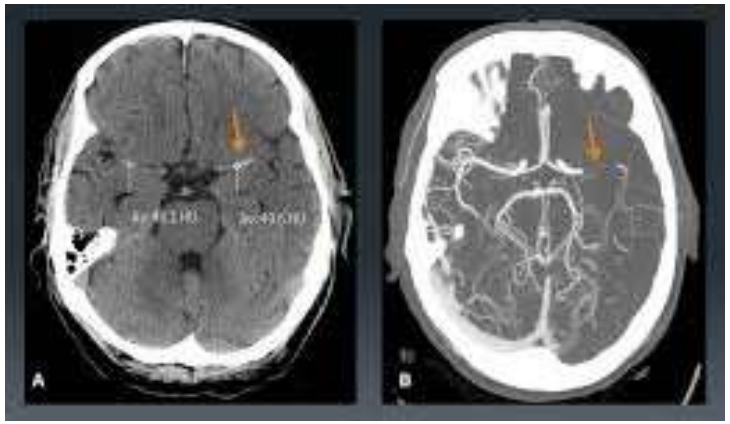
AIT/Stroke

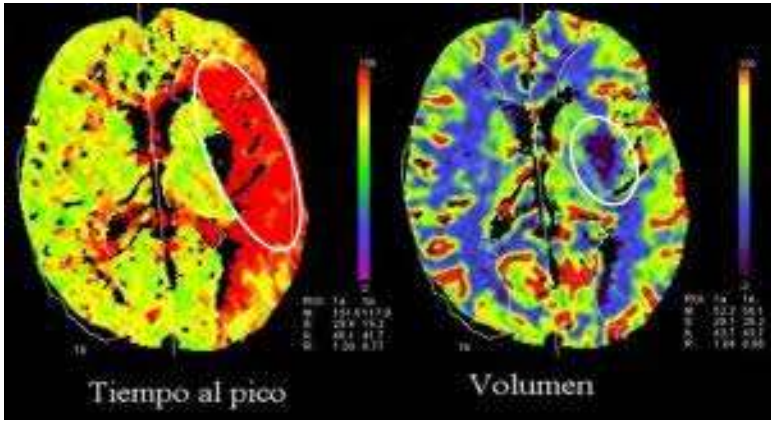
CAROTIDAS URGENTES

Para tratar la lesión en tándem es necesario tratar la carótida?

TC craneal, angio TC troncos supraaórticos y polígono de Willis(stop arterial) y perfusión(tejido viable).







AHA/ASA Guideline

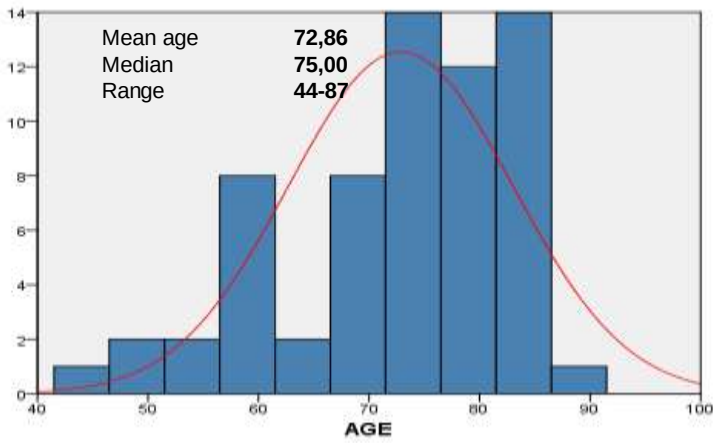
Ischemic Stroke: 2019 Update to the 2018 Guidelines for the Early Management of Acute Ischemic Stroke

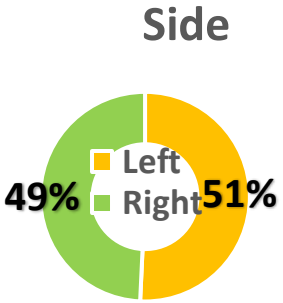
7. Treatment of tandem occlusions (both extracranial and intracranial occlusions) when performing mechanical thrombectomy may be reasonable.	**IIb**	**B-R**	Recommendation revised from 2015 Endovascular.

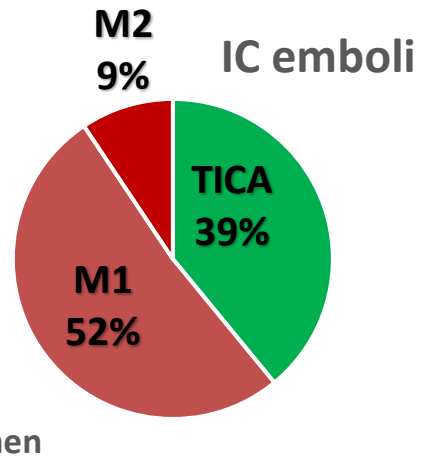
New Recommendations in the 2023

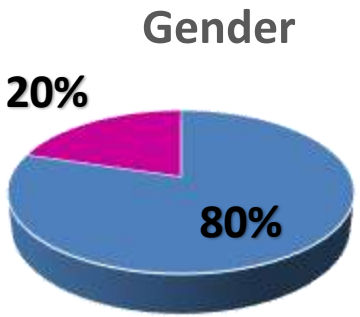
Recommendation 51 (New)	Class	Level	References ToE
For a patient with acute ischaemic stroke undergoing intracranial mechanical thrombectomy with a tandem 50-99% carotid stenosis and a small area of ipsilateral infarction, synchronous carotid stenting may be considered in the presence of poor antegrade internal carotid artery flow or poor collateralisation via the circle of Willis after mechanical thrombectomy.	IIb	C	Expert Opinion

En nuestra serie 12.64% lesión en tandem









Resultados: Dependencia

METODO: Técnica de recanalización

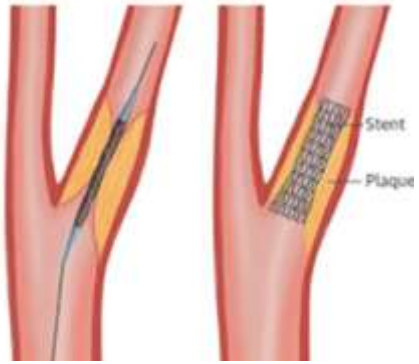
NEUROSURGICAL FOCUS
Neurosurg Focus 42 (4):E16, 2017

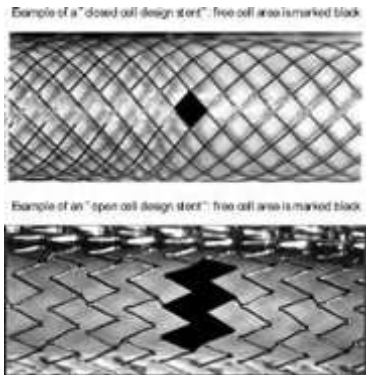
Management of acute ischemic stroke due to tandem occlusion: should endovascular recanalization of the extracranial or intracranial occlusive lesion be done first?

Leonardo Rangel-Castilla, MD,[1,5,6] Gary B. Rajah, MD,[5] Hakeem J. Shakir, MD,[1,5]
Hussain Shallwani, MD,[1,5] Sirin Gandhi, MD,[4,5] Jason M. Davies, MD, PhD,[1,2,5]
Kenneth V. Snyder, MD, PhD,[1,4,5,7] Elad I. Levy, MD, MBA,[1,3,5,7] and Adnan H. Siddiqui, MD, PhD,[1,3,5,7,8]

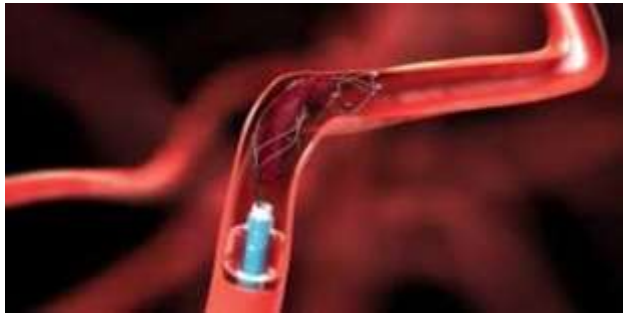
- **Distal a proximal**
  - Reduce el tiempo de recanalización intracraneal y el tiempo de isquemia.
- **Proximal a distal**
  - Aumenta las colaterales y la presión de perfusión cerebral, mientras se realiza la recanalización distal.
  - Reduce el ratio intraprocedimiento de embolización distal por una placa inestable una vez colocado el stent
  - Mejora la visualización distal.

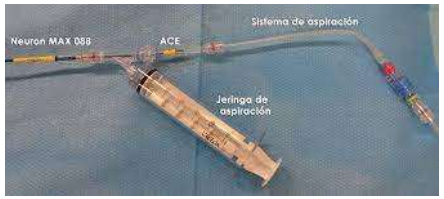
Revascularización carotídea proximal a distal:
- aspiración del trombo
- stent si oclusión





Seguido por trombectomía mecánica con stent retriever y cateter balón





«Terapia antiagregante EN AGUDO»

–**Stent carotídeo convencional** en agudo (Inyesprin 450-900mg iv bolo intraprocedimiento)

TC 24 horas, Clopidogrel 300 mg y Adiro 100mg

1 mes Adiro 100mg/día + Clopidogrel 75mg/día, posteriormente Adiro 100mg/día

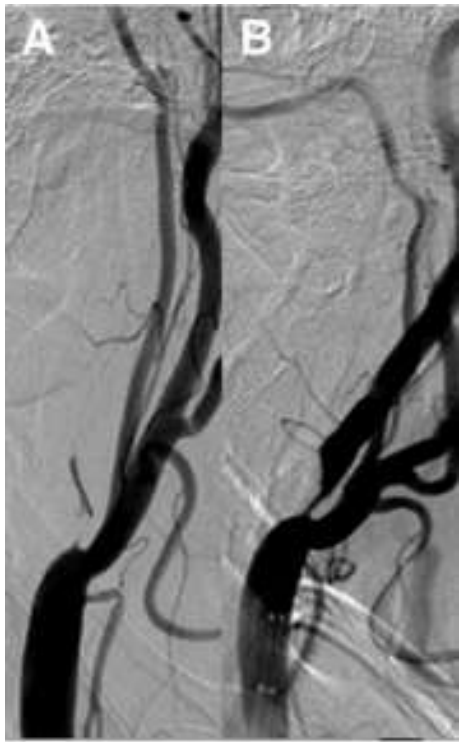
– **Stent tipo flow diverter** por una disección carotídea,doble antiagregación intraprocedimiento (Tirofiban 0'4mcg/kg/min x 30min iv e Inyesprin iv)

TC 24h Clopidogrel 300mg y Adiro 100mg

6 meses Adiro 100mg/día + Clopidogrel 75mg/día, posteriormente Adiro 100mg/día

Diagnostico diferencial

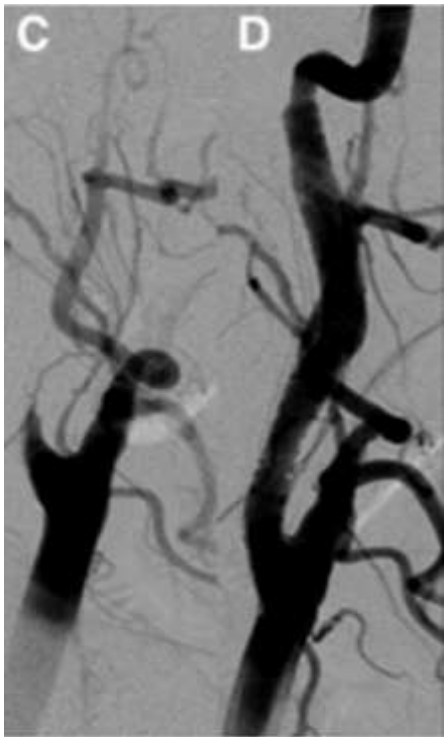
Estenosis por ateromatosis:
Bulbar calcificada



- >45 años, hipertensión, hipercolesterolemia

- Progresión de la ateromatosis, placa inestable

Estenosis por disección: Suprabulbar «flame shape» (2-3cm superior a ACC)



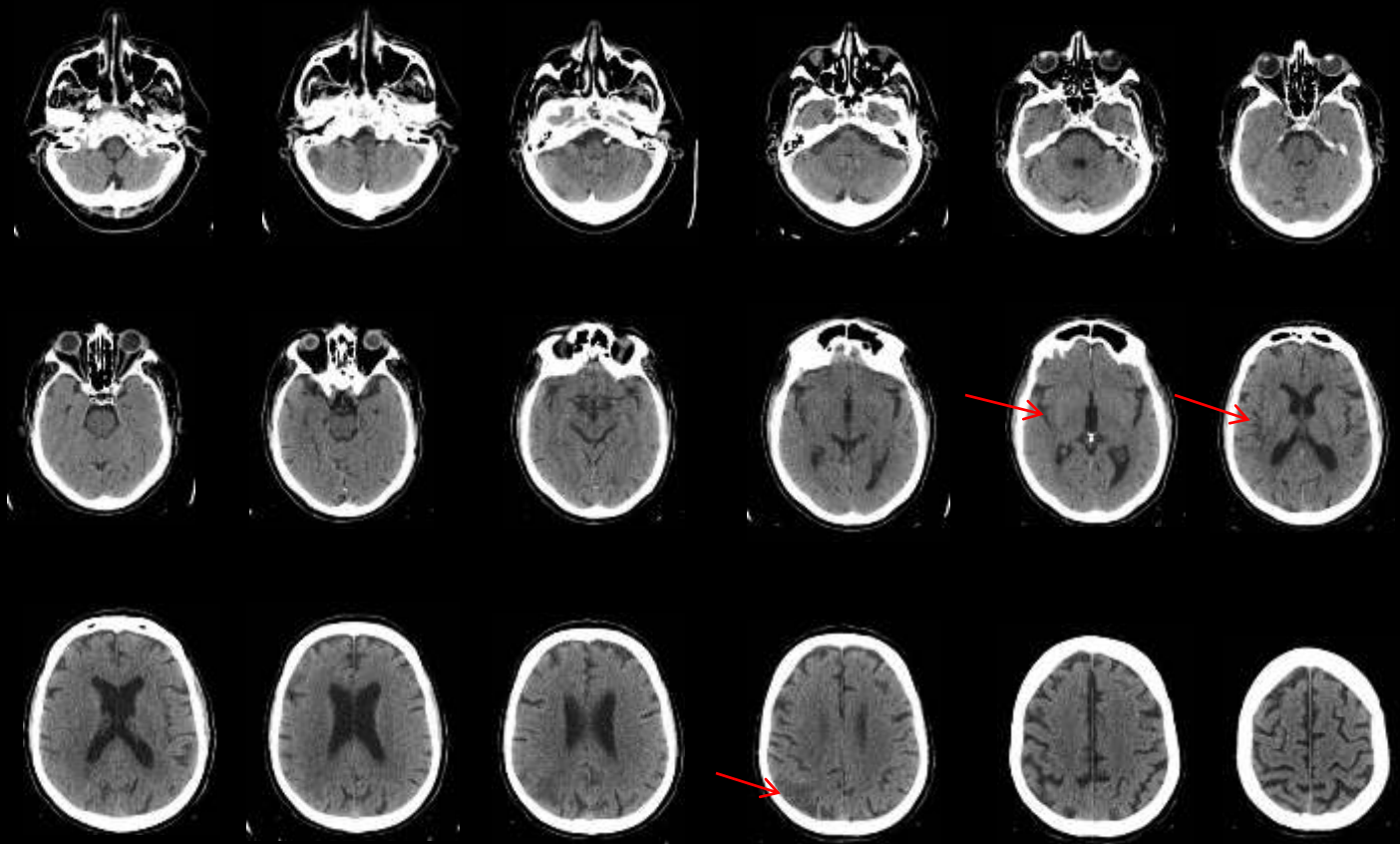
- Jovenes 16-45 años (20-25% de stroke <45 años)

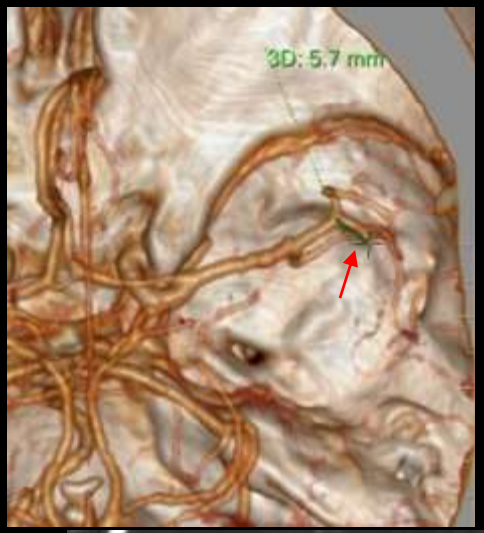
- Rotura de la íntima o vasa vasorum , entrada de sangre en la túnica media y creación de una falsa luz

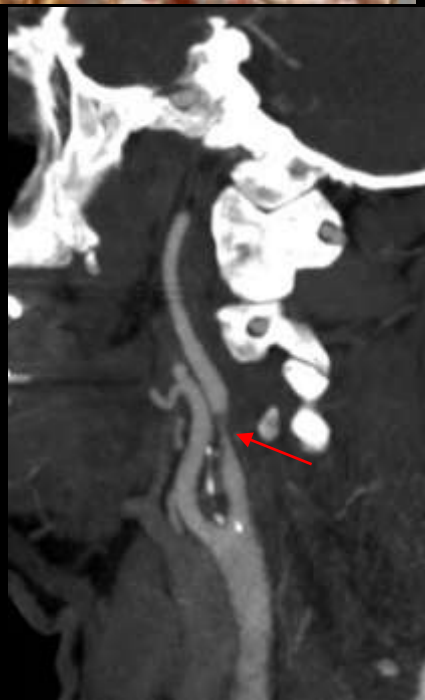
Si no presentan clínica(circulación colateral) tratamiento conservador(anticoagulación), con potencial capacidad de curación

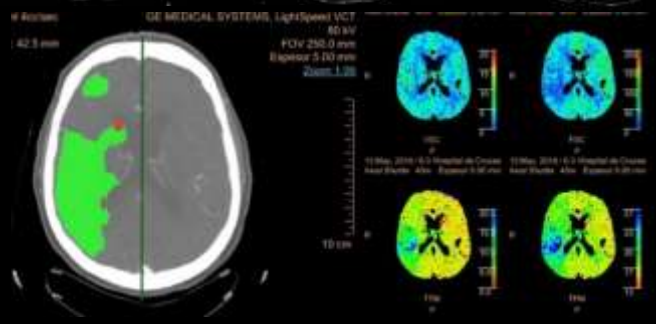
TANDEM ACI ATEROMATOSA Y M2

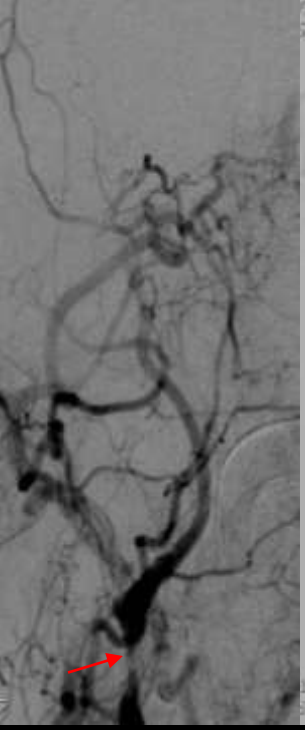
ASPECTS 8(insula, M6)

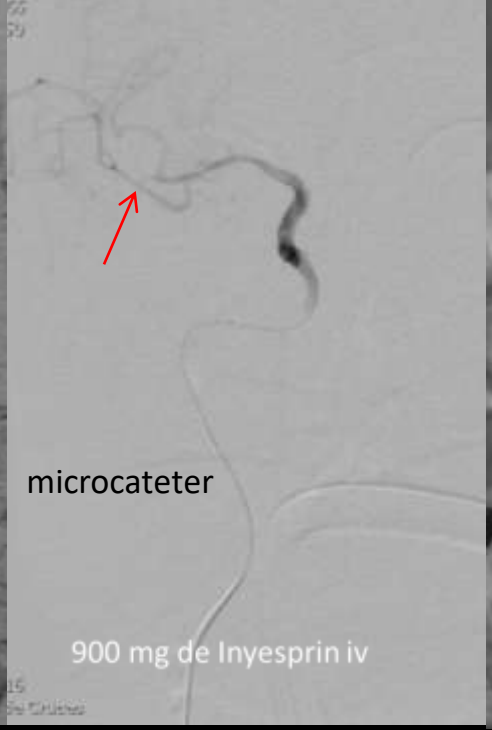


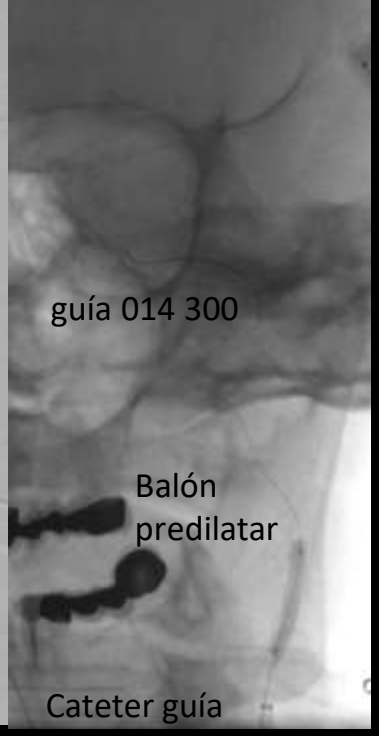


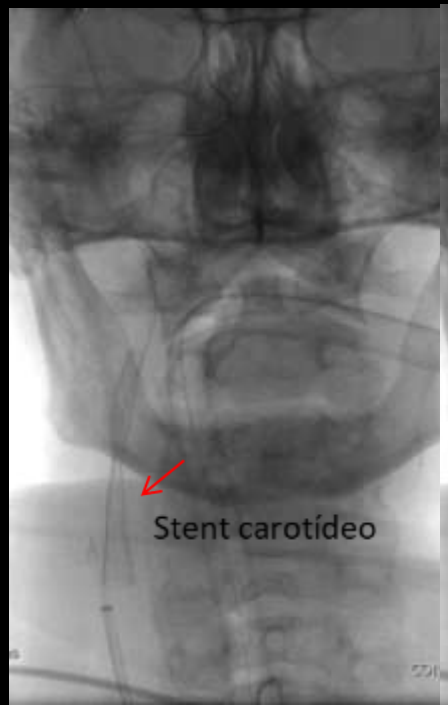


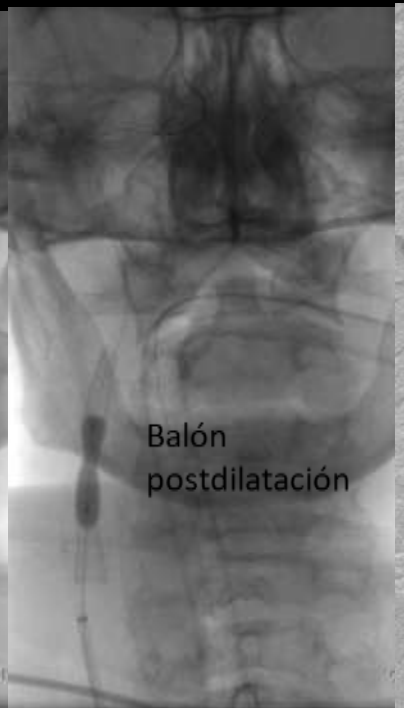


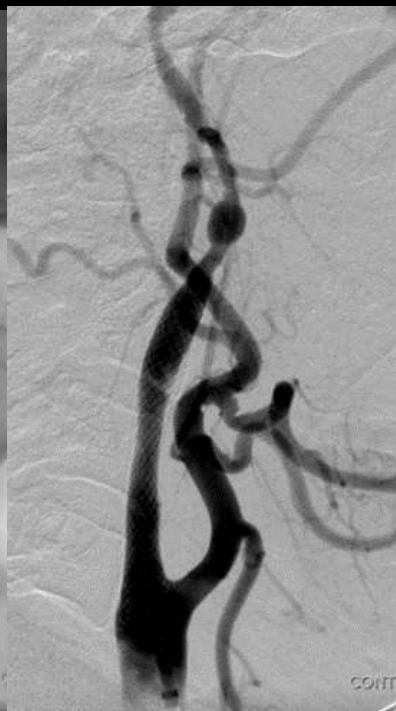


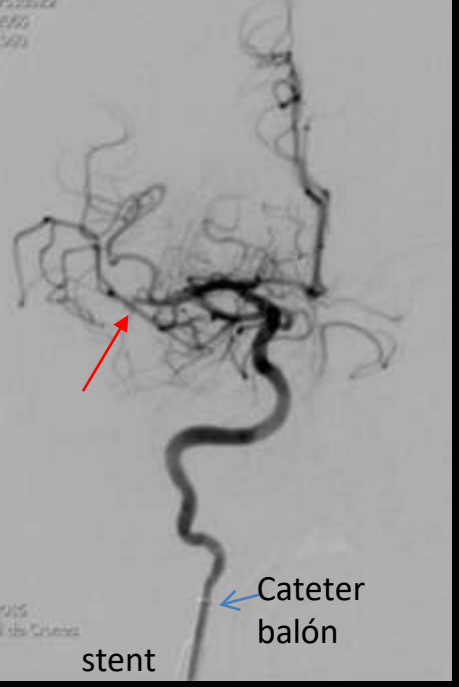

microcateter
900 mg de Inyesprin iv

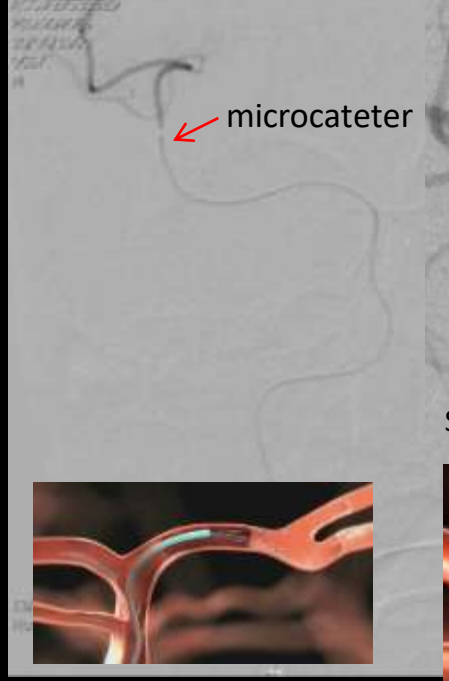

guía 014 300
Balón
predilatar
Cateter guía


Stent carotídeo


Balón
postdilatación




Cateter
balón
stent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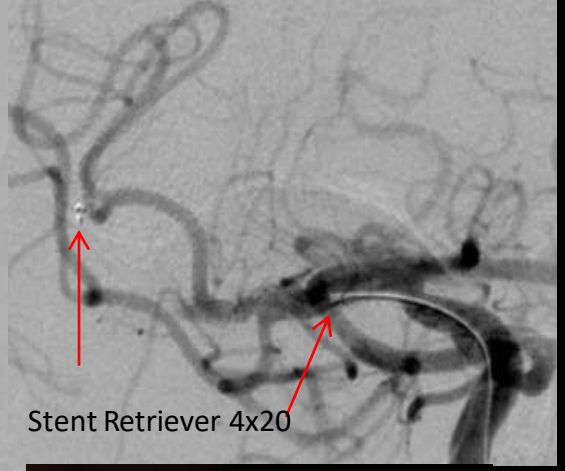
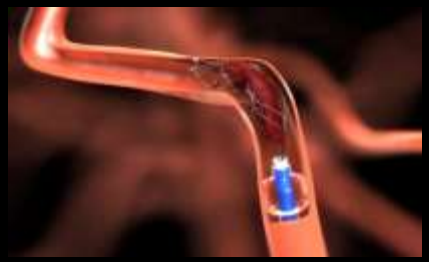
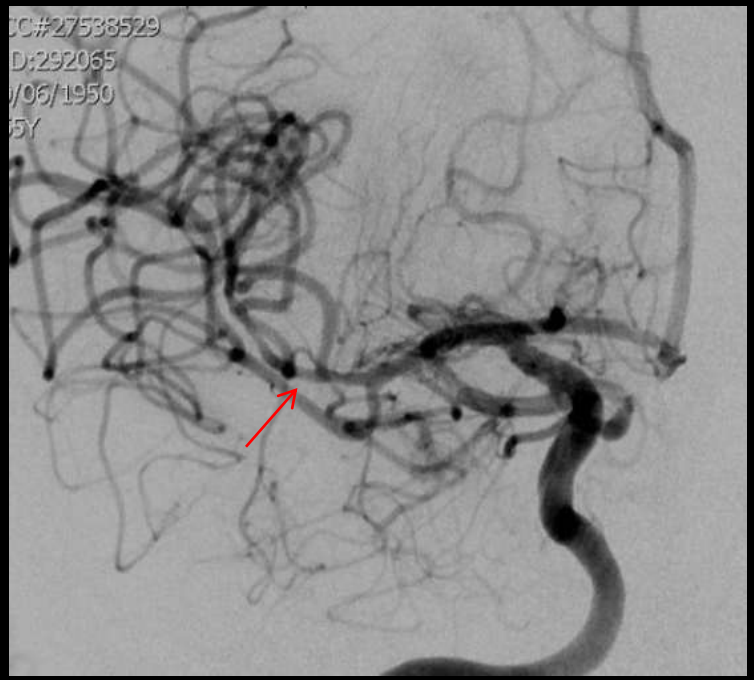
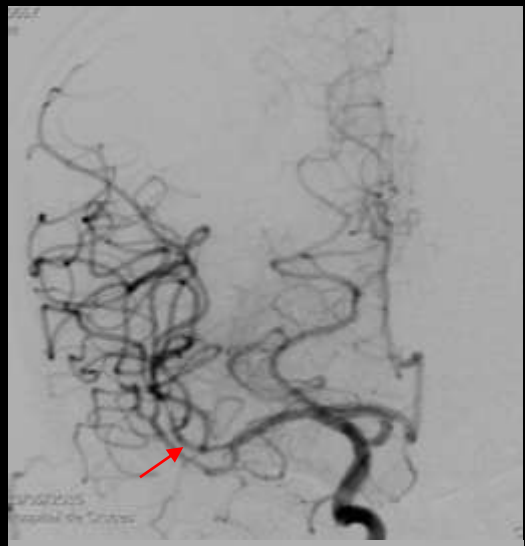
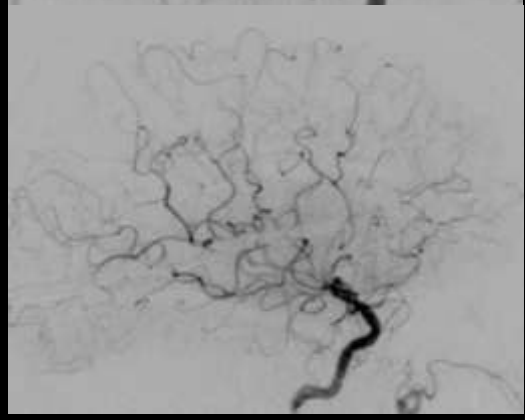

Stent Retriever 4x20



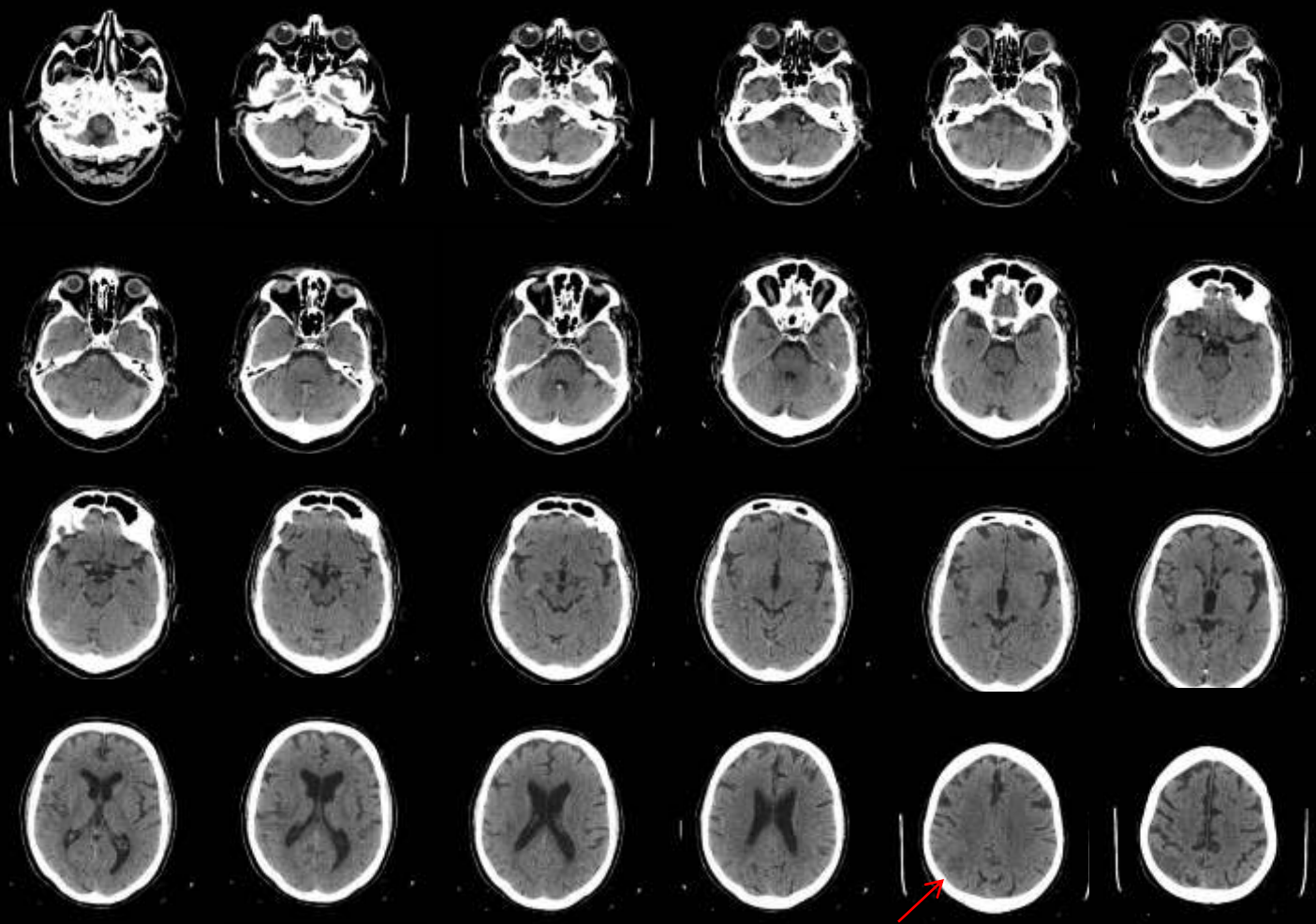






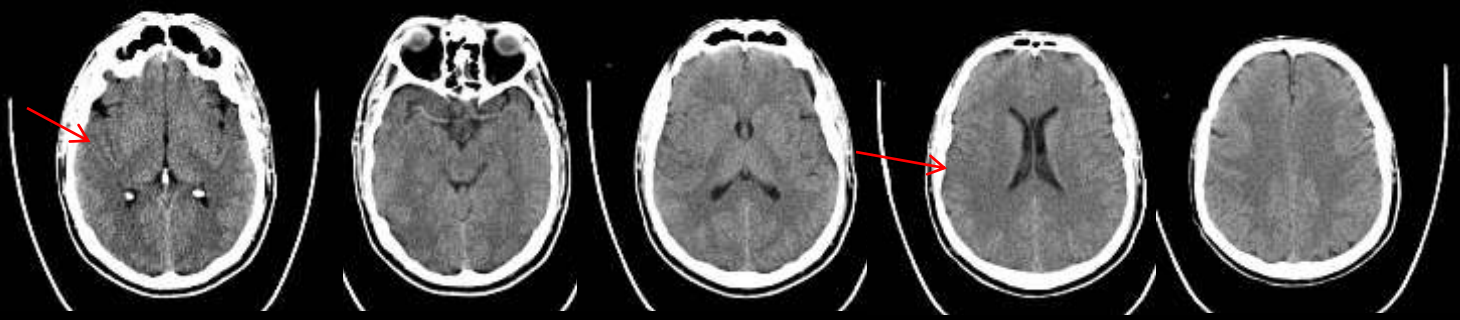
TC 24h

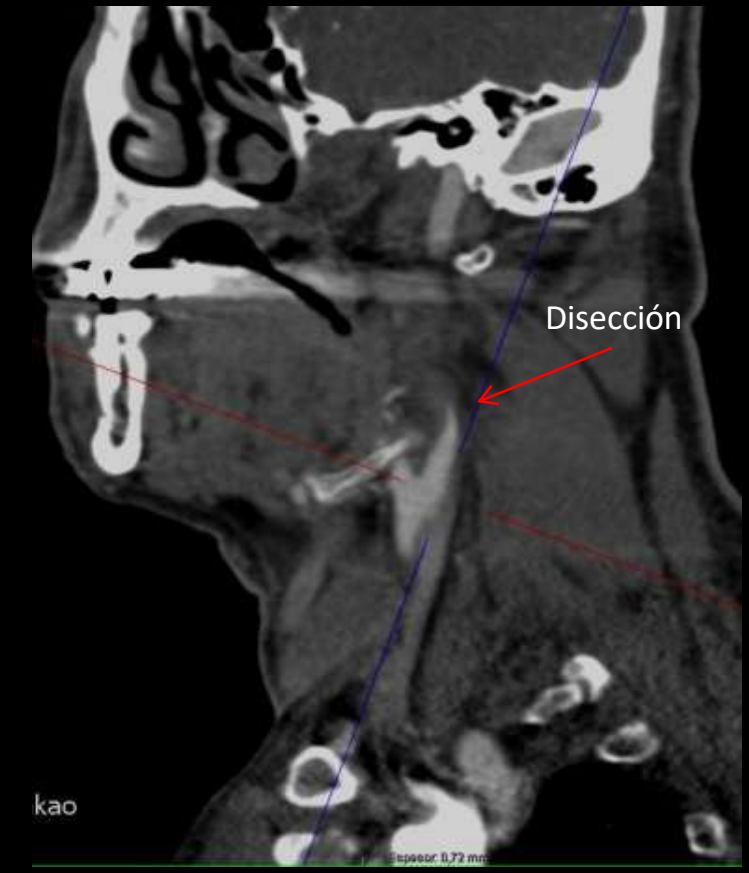
NIHSS 24h 3
mRs alta 0

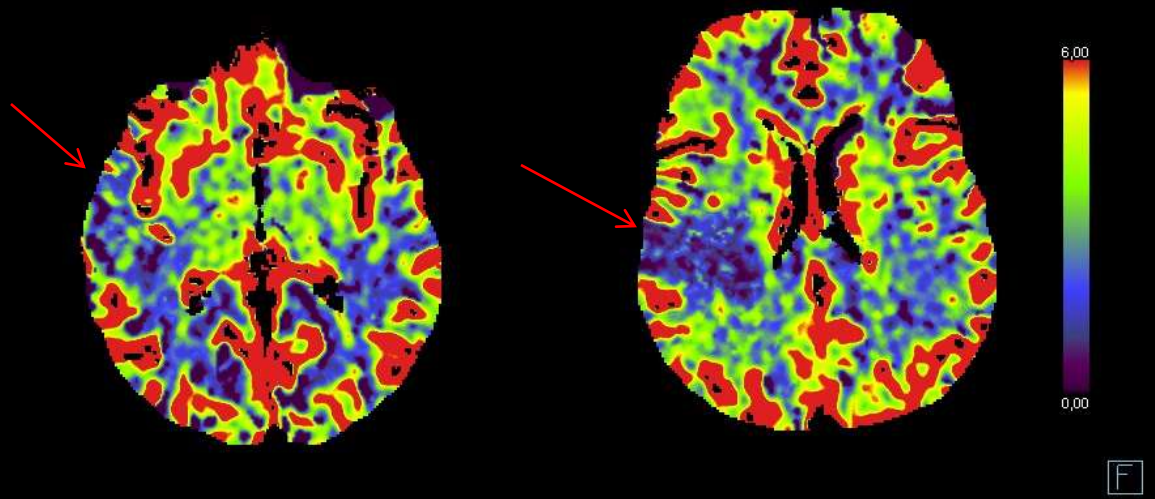


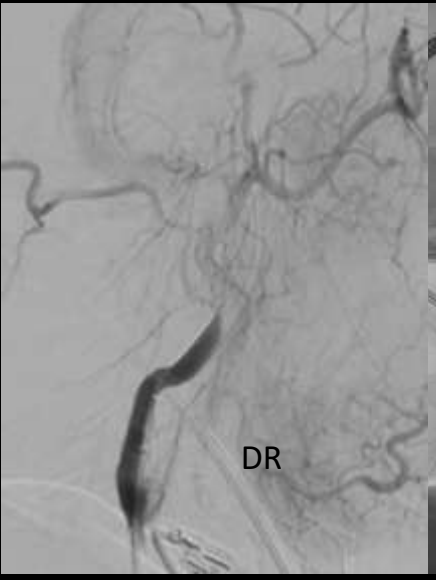
Pequeña hipodensidad corticosubcortical parietal derecha

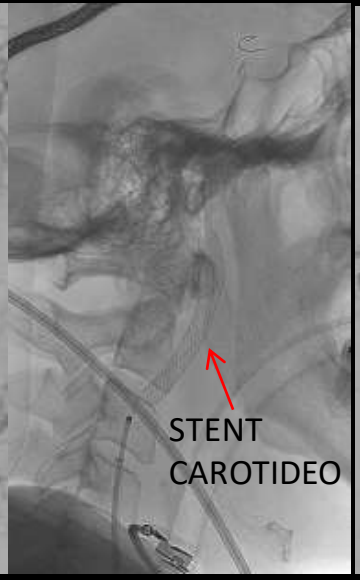
TANDEM DISECCION ACI Y M2 DR

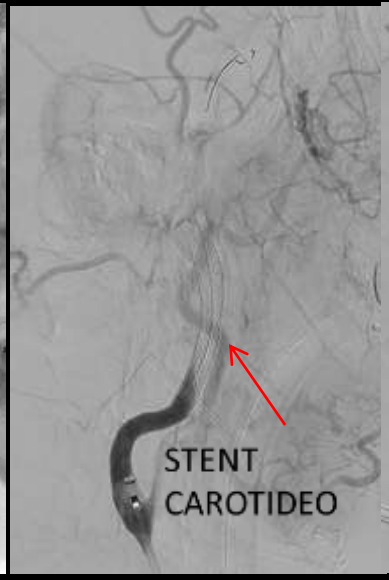







DR


STENT
CAROTIDEO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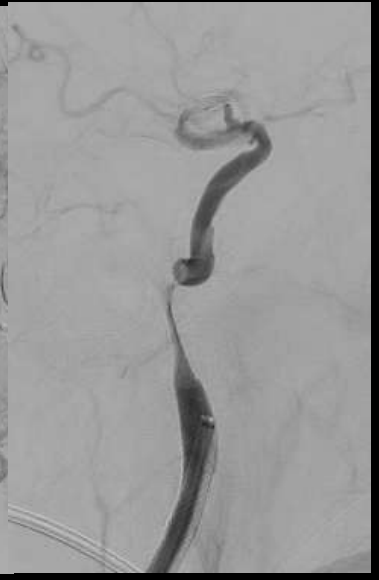
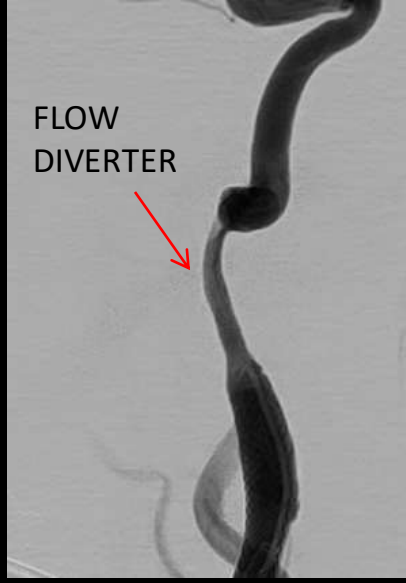
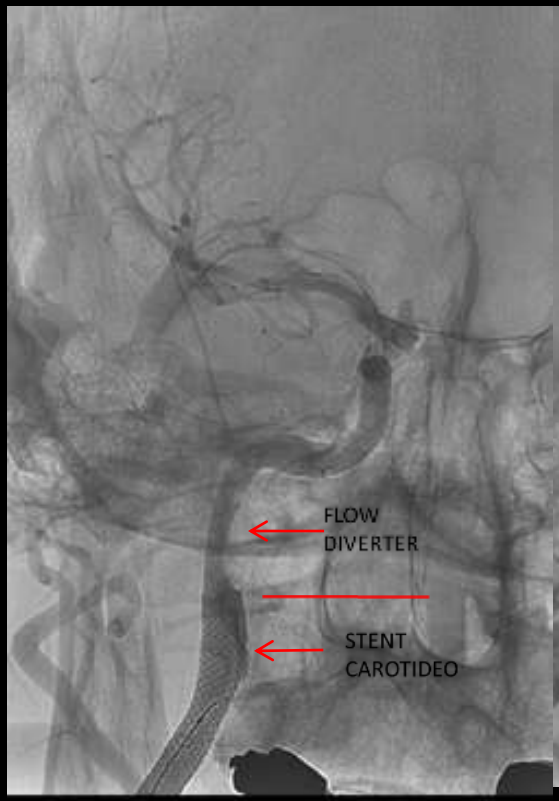
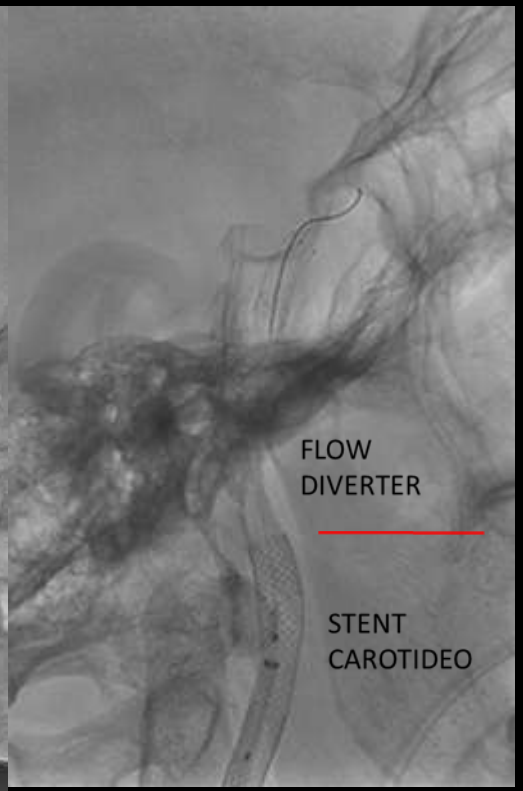
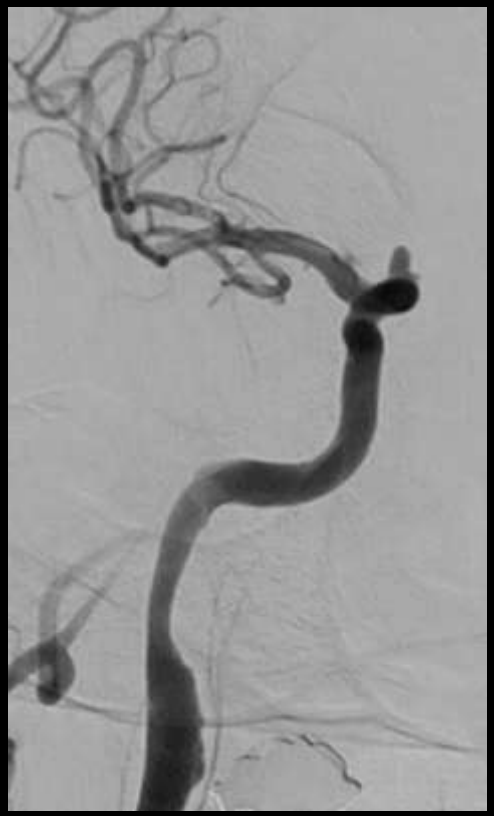
CAROTIDEO

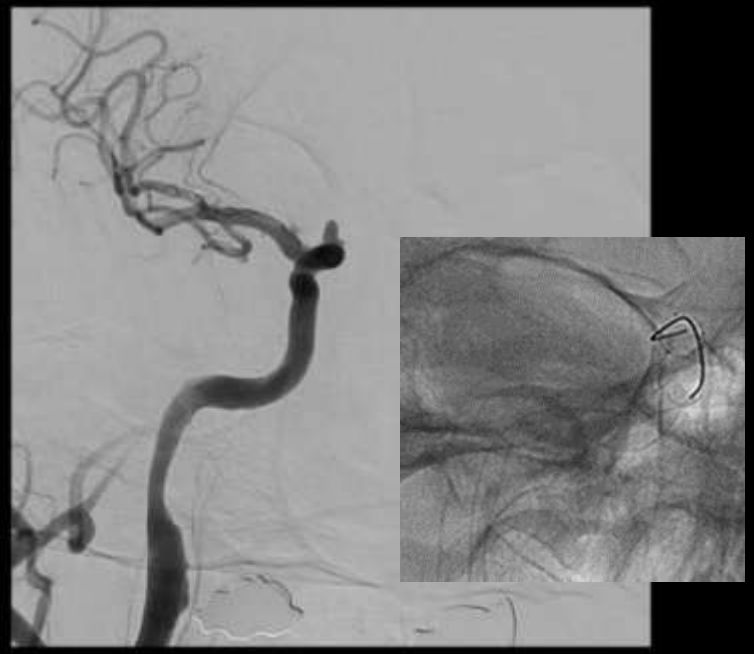


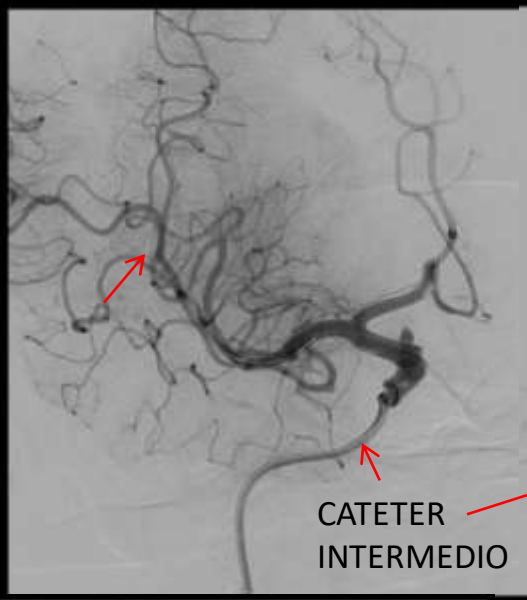

FLOW
DIVERTER

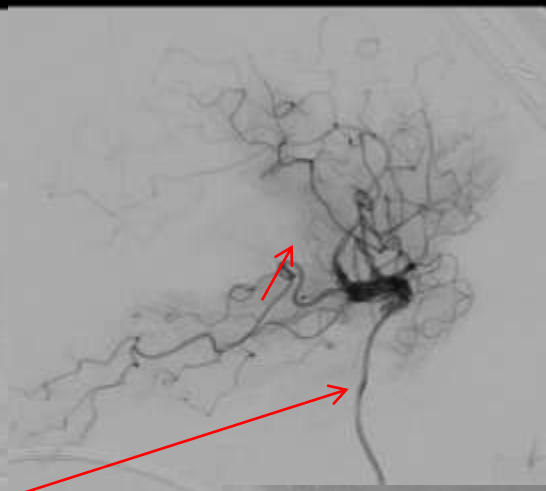

FLOW
DIVERTER
STENT
CAROTIDEO


FLOW
DIVERTER
STENT
CAROTIDEO



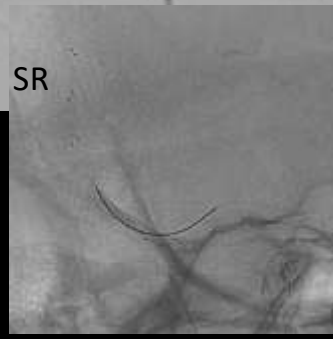


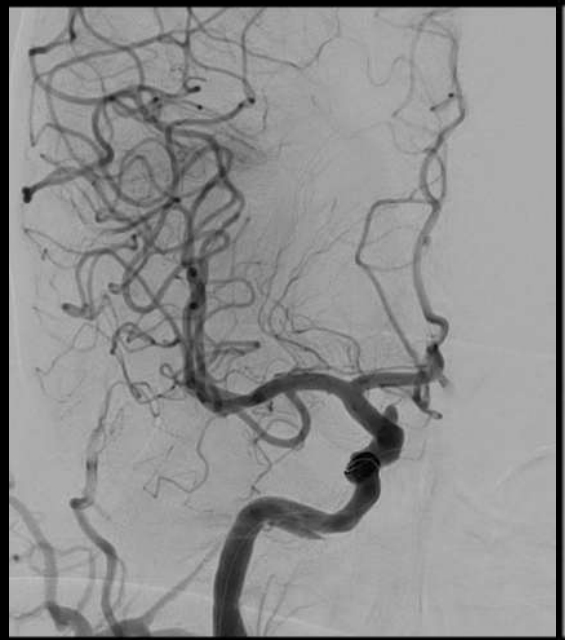




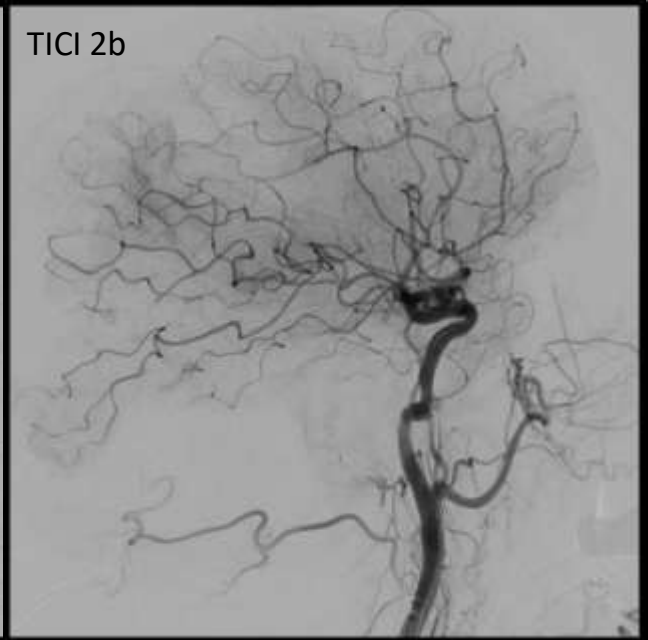
CATETER
INTERMEDIO

SR

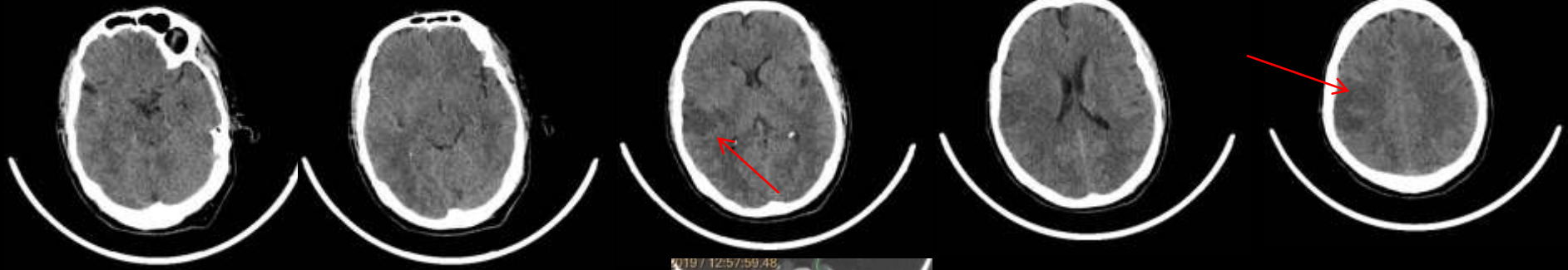


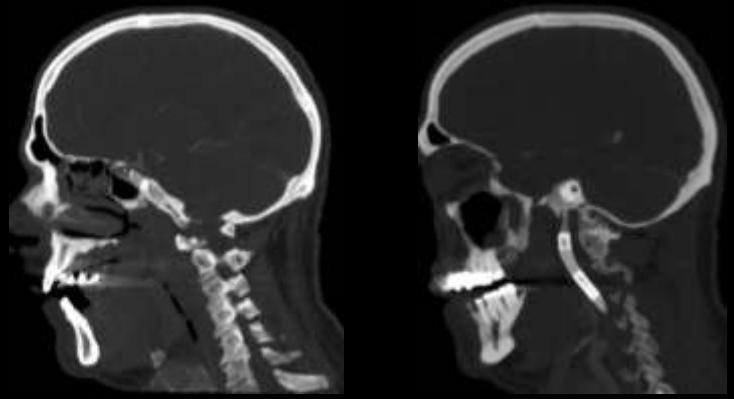


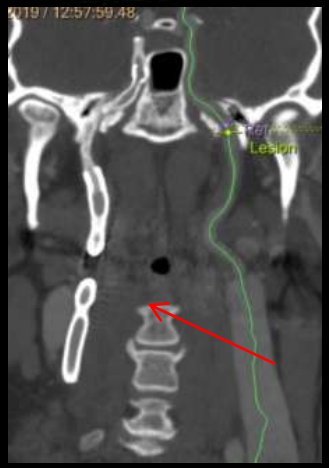
TICI 2b

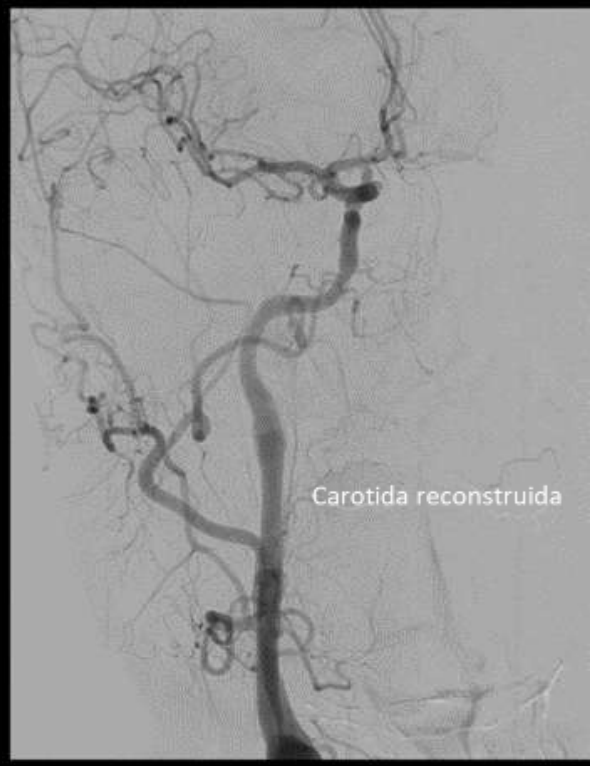


TC 24 horas

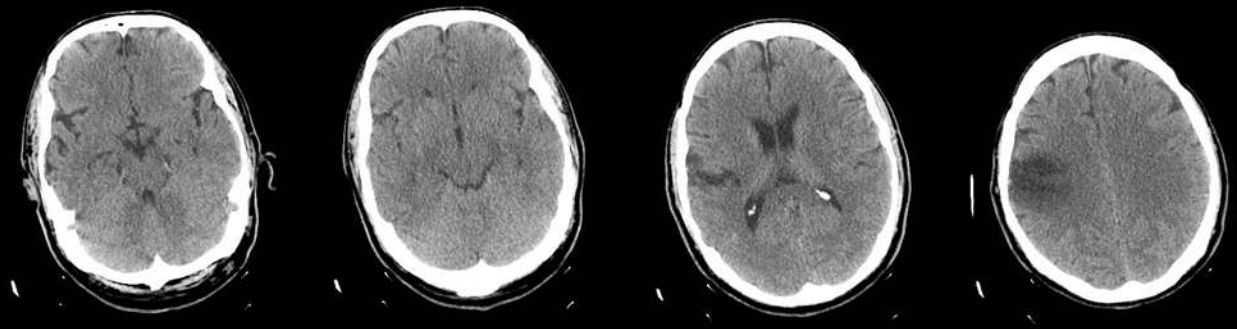








mRs 1 a 3 meses



TRATAMIENTO ENDOVASCULAR DE LA ESTENOSIS INTRACRANEAL

INTRODUCCION

- La estenosis aterosclerótica intracraneal (EAIC), estrechamiento de la luz de un vaso cerebral >50%, puede causar un ictus.

- Localización mas frecuente ACM, seguido de Basilar y ACI.

- Prevalencia mayor en Asia (30-50% de ictus isquémico), (8-10% de ictus isquémico) en Occidente.

- Diagnóstico: TCD, MRA, CTA.

Angiografía gold standard, oclusión-- estenosis preoclusiva, colateralidad.

VALORACION DEL TRATAMIENTO

- El **Tratamiento Endovascular(TE)** y el **Tratamiento Médico(TM)** se pueden utilizar para prevenir el ictus recurrente causado por Estenosis Intracraneal Sintomática (EIS).

- El **trial EC-IC bypass** falló en mostrar beneficio sobre el TM en el tratamiento de la estenosis de la ACM.

- Los resultados del primer trial controlado randomizado, Stenting versus Aggressive Medical Therapy for Intracranial Arterial Stenosis (**SAMMPRIS**), no mostraron ventajas de PTAS(percutaneous transluminal angioplasty and stenting) sobre el TM en la EIS.

- Las **Guías** permiten el uso de angioplastia con o sin stent para la EIS severa(70%-99%) de una arteria mayor intracranial, si presenta clínica progresiva a pesar de TM agresivo.

- La eficacia y seguridad del TE comparado con el TM en el tratamiento de la EIS no esta clara.

¿El TE+TM es beneficioso para el tratamiento de la EIS comparado con el TM solo?

Revisamos los ensayos controlados aleatorizados (ECA) que compararon el TE+TM con TM solo, para el tratamiento de la EIS

Base de datos Cochrane de Revisiones Sistemáticas | Revisión - Intervención

Tratamiento endovascular versus médico para la estenosis arterial intracraneal sintomática

Tao Wang, Jichang Luo, Xue Wang, Kun Yang, Vikram Jadhav, Peng Gao, Yan Ma, Na Zhao, Liqun Jiao
Declaraciones de intereses de los autores

Versión publicada: 11 agosto 2020 Historial de versiones
https://doi.org/10.1002/14651858.CD013267.pub2

*Las modalidades de **TE** incluyeron:

- Angioplastia sola
- Stent balón espandible
- Angioplastia+stent autoexpandible

*El **TM** incluyó:

-Doble antiagregación (Adiro+ Clopidogrel)
-Control de los factores de riesgo HTA, hiperlipidemia y diabetes

Características de los estudios revisados

- **Tipos de participantes**
  - 632 participantes(318 ET,312 TM)
  - 18 a 85 años,
  - TIA o stroke atribuible al território intracraneal estenótico

- **Tipos de estudios**

Se incluyen 3 triales controlados randomizados(RCTs) que comparan TE+TM con TM solo en el manejo de la EIS

-----Dos ensayos, SAMMPRIS and VISSIT (Vitesse Stent Ischemic Therapy)

- múltiples centros (raza blanca)
- <3 semanas desde el inicio de la clínica
- estenosis ≥ 70% de ACI, ACM, vertebral, basilar
- dispositivos metálicos (stents)

*SAMMPRIS con Wingspan stent autoespandible (Chimowitz 2011).

*VISSIT con PHAROS stent balon-expandible (Zaidat 2015)

-----Un ensayo

- un solo centro chino(chinos)
- >3 semanas desde el inicio de la clínica
- estenosis ≥ 70% de ACM (Miao 2012).
- diferentes tipos de TE

Análisis de los datos

- El desenlace principal fue la **muerte por cualquier causa o el accidente cerebrovascular,** en los tres meses siguientes a la asignación al azar.

- Los desenlaces secundarios incluyeron **muerte por cualquier causa o accidente cerebrovascular, accidente cerebrovascular ipsilateral y dependencia,** despues de tres meses de la asignación al azar.

Primary outcomes

- **Safety outcomes: short-term death or stroke**

El TE comparado con TM, mayor ratio de **muerte o stroke** a 30 días

- No hubo diferencias entre subgrupos **stent auto-espandible y balón espandible**

- Peor outcome el subgrupo de **tratamiento de <3 semanas** desde el inicio de los síntomas

Secondary outcomes

Short-term outcomes

-TE comparado con TM, asocia peor outcome a los 30 días en **stroke ipsilateral , isquémico y hemorrágico.**

-No hubo diferencias significaticas en **AIT** a 30 días

Long-term outcomes

-TE comparado con TM peor outcome al año de **muerte y stroke ipsilateral , isquémico y hemorrágico**

-No hubo diferencias significaticas en **AIT y dependencia** al año

Resultados

- **El TE asoció una mayor tasa de mortalidad o ictus posterior en la revisión temprana y tardía.**

- **No hubo grandes diferencias en las tasas de AIT y dependencia a largo plazo.**

- En comparación con el TM, el TE resulta en una tasa mayor de:

  - muerte o accidente cerebrovascular
  - accidente cerebrovascular ipsilateral
  - accidente cerebrovascular isquémico
  - accidente cerebrovascular hemorrágico

  30 días

  -
  - muerte o el accidente cerebrovascular
  - el accidente cerebrovascular ipsilateral
  - el accidente cerebrovascular isquémico
  - el accidente cerebrovascular hemorrágico

  Año

“TIEMPO PARA LA INTERVENCIÓN”

- No está clara la repercusión que tiene la intervención mas tardía (después de 3 semanas del evento), puede ser un factor que afecte al outcome, parece mas seguro

- Varios estudios soportan estos resultados. Miao 2015 and Gao 2016, muestran un ratio de muerte o stroke a 30 días de 4.3% y 2% respectivamente, cuando el TE es realizado despues de 3 semanas. (Esto puede estar relacionado con la inestabilidad de la placa y el mayor riesgo de reperfusion)

JAMA | Original Investigation

Effect of Stenting Plus Medical Therapy vs Medical Therapy Alone on Risk of Stroke and Death in Patients With Symptomatic Intracranial Stenosis
The CASSISS Randomized Clinical Trial

Peng Gao, MD; Tao Wang, MD; Daming Wang, MD; David S. Liebeskind, MD; Huaizhang Shi, MD; Tianxiao Li, MD; Zhenwei Zhao, MD; Yiling Cai, MD; Wei Wu, MD; Weiwen He, MD; Jia Yu, MD; Bingjie Zheng, MD; Haibo Wang, PhD; Yangfeng Wu, PhD; Adam A. Dmytriw, MD; Timo Krings, MD; Colin P. Derdeyn, MD; Liqun Jiao, MD; for the CASSISS Trial Investigators

IMPORTANCE Prior randomized trials have generally shown harm or no benefit of stenting added to medical therapy for patients with symptomatic severe intracranial atherosclerotic stenosis, but it remains uncertain as to whether refined patient selection and more experienced surgeons might result in improved outcomes.

OBJECTIVE To compare stenting plus medical therapy vs medical therapy alone in patients with symptomatic severe intracranial atherosclerotic stenosis.

DESIGN, SETTING, AND PARTICIPANTS Multicenter, open-label, randomized, outcome assessor–blinded trial conducted at 8 centers in China. A total of 380 patients with transient ischemic attack or nondisabling, nonperforator (defined as nonbrainstem or non–basal ganglia end artery) territory ischemic stroke attributed to severe intracranial stenosis (70%-99%) and beyond a duration of 3 weeks from the latest ischemic symptom onset were recruited between March 5, 2014, and November 10, 2016, and followed up for 3 years (final follow-up: November 10, 2019).

INTERVENTIONS Medical therapy plus stenting (n = 176) or medical therapy alone (n = 182). Medical therapy included dual-antiplatelet therapy for 90 days (single antiplatelet therapy thereafter) and stroke risk factor control.

MAIN OUTCOMES AND MEASURES The primary outcome was a composite of stroke or death within 30 days or stroke in the qualifying artery territory beyond 30 days through 1 year. There were 5 secondary outcomes, including stroke in the qualifying artery territory at 2 years and 3 years as well as mortality at 3 years.

RESULTS Among 380 patients who were randomized, 358 were confirmed eligible (mean age, 56.3 years; 263 male [73.5%]) and 343 (95.8%) completed the trial. For the stenting plus medical therapy group vs medical therapy alone, no significant difference was found for the primary outcome of risk of stroke or death (8.0% [14/176] vs 7.2% [13/181]; difference, 0.4% [95% CI, −5.0% to 5.9%]; hazard ratio, 1.10 [95% CI, 0.52-2.35]; $P = .82$). Of the 5 prespecified secondary end points, none showed a significant difference including stroke in the qualifying artery territory at 2 years (9.9% [17/171] vs 9.0% [16/178]; difference, 0.7% [95% CI, −5.4% to 6.7%]; hazard ratio, 1.10 [95% CI, 0.56-2.16]; $P = .80$) and 3 years (11.3% [19/168] vs 11.2% [19/170]; difference, −0.2% [95% CI, −7.0% to 6.5%]; hazard ratio, 1.00 [95% CI, 0.53-1.90]; $P = .99$). Mortality at 3 years was 4.4% (7/160) in the stenting plus medical therapy group vs 1.3% (2/159) in the medical therapy alone group (difference, 3.2% [95% CI, −0.5% to 6.9%]; hazard ratio, 3.75 [95% CI, 0.77-18.13]; $P = .08$).

CONCLUSIONS AND RELEVANCE Among patients with transient ischemic attack or ischemic stroke due to symptomatic severe intracranial atherosclerotic stenosis, the addition of percutaneous transluminal angioplasty and stenting to medical therapy, compared with medical therapy alone, resulted in no significant difference in the risk of stroke or death within 30 days or stroke in the qualifying artery territory beyond 30 days through 1 year. The findings do not support the addition of percutaneous transluminal angioplasty and stenting to medical therapy for the treatment of patients with symptomatic severe intracranial atherosclerotic stenosis.

8 centros en China

n358

- **Mejor selección de pacientes** (exclusión de perforantes, troncoencefalo, ganglios de la base)

  TIA o Stroke en MRI no discapacitante

  EIS>70% de una arteria mayor intracraneal
- **Despues de 3 semanas de los síntomas**

- Primary outcome
  - Stroke o muerte a 30 días
  - Stroke 30 días-1 año
- Secundary outcome
  - Strokea 2-3 años y muerte a 3 años

- **CONCLUSION**

Los hallazgos no soportan la adicción de angioplastia y stent al TM, en pacientes con Estenosis Intracraneal Severa Sintomática, ya que no disminuye el riesgo de stroke y muerte a 30 días, ni de stroke en 30 días al año(8% TE vs 7,2% TM)

Conclusión

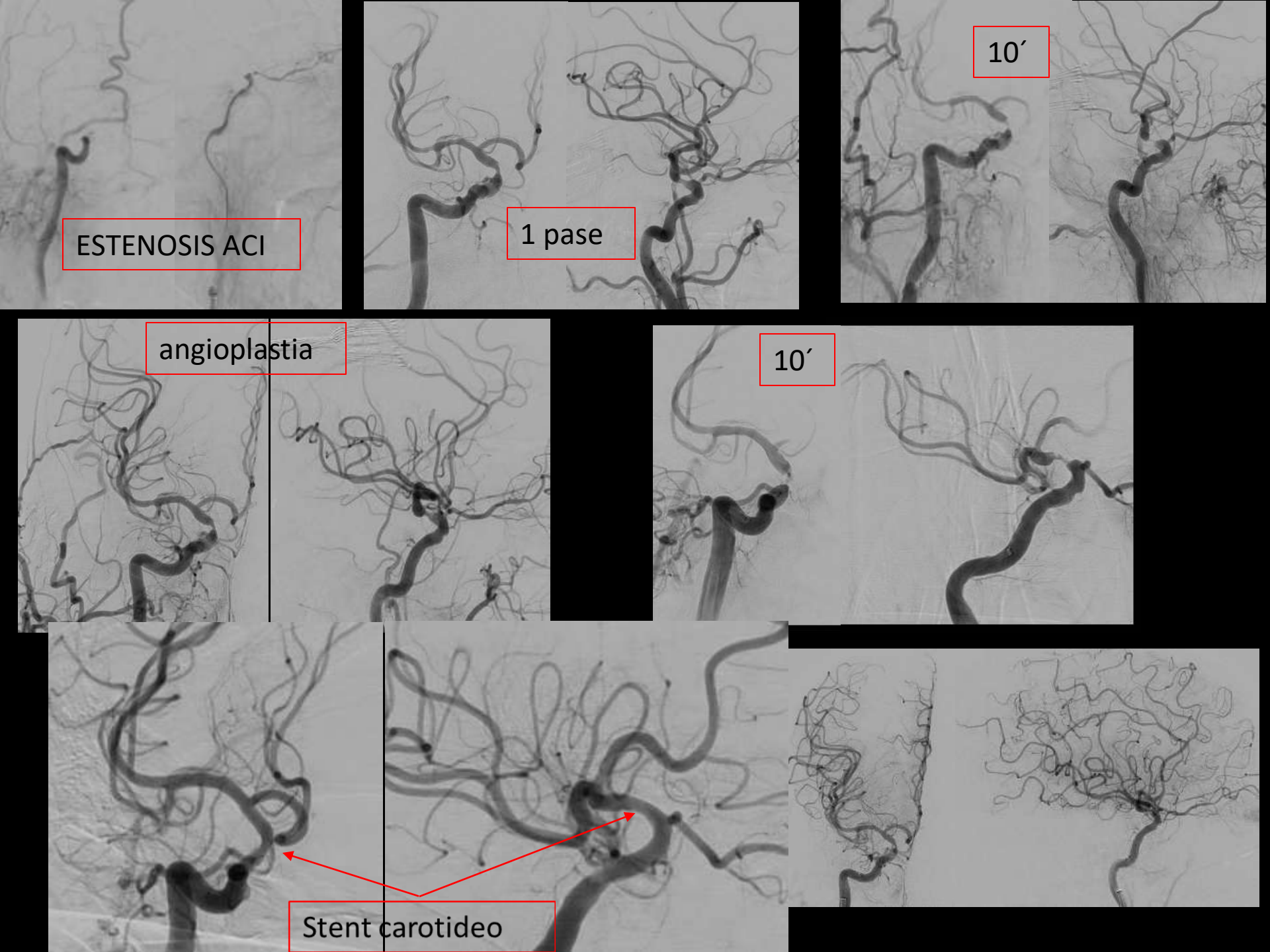
- El TE comparado con el TM, en pacientes con estenosis aterosclerótica intracraneal sintomática grave reciente, no previene el ictus recurrente y parece tener un mayor riesgo.

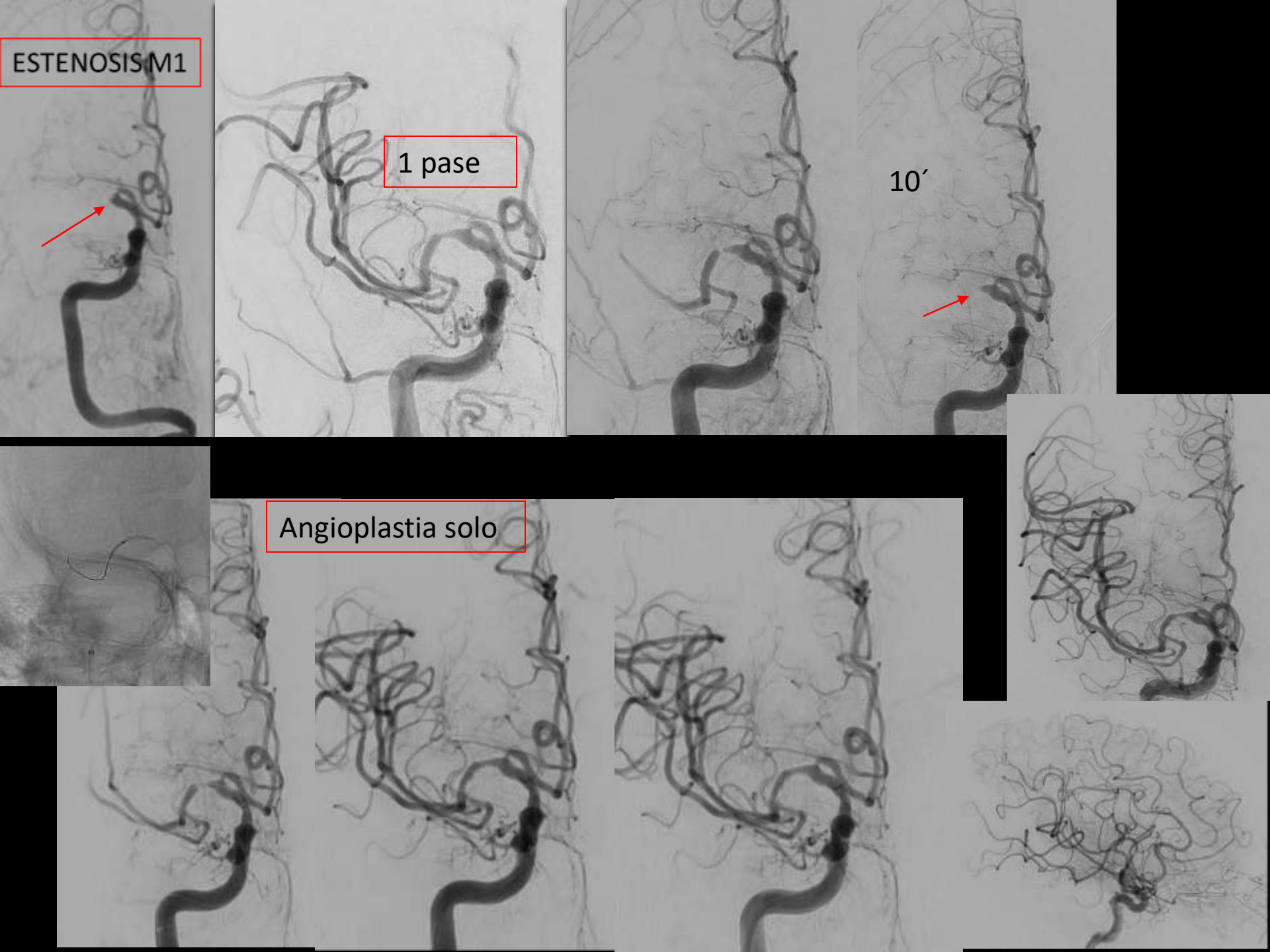
- Sin embargo el TE podría beneficiar a pacientes seleccionados con estenosis intracranial sintomática e hipoperfusión que no responden al mejor TM (Abualhasan 2019; Padalia 2018).

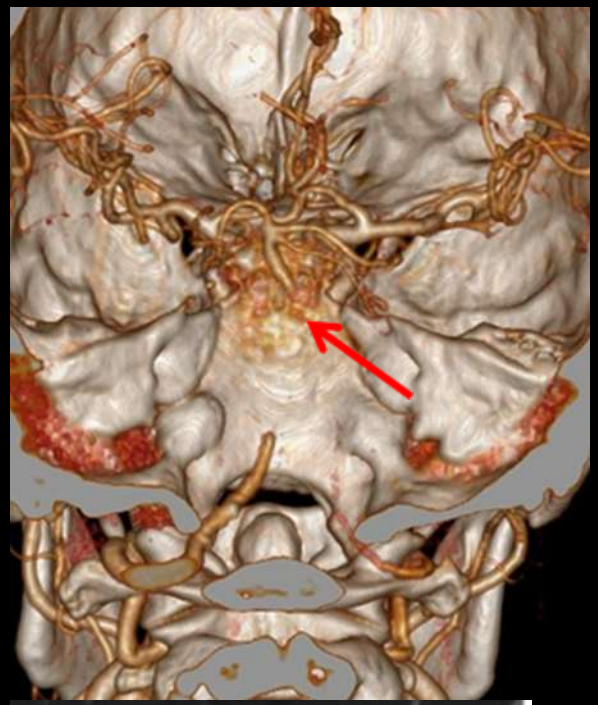
El WEAVE (Wingspan Stent System Post Market Surveillance) trial para revalorar la seguridad perioperatoria del Wingspan en pacientes con estenosis intracranial sintomática >70% y falta de respuesta al TM, con 2.6% de ratio de complicaciones perioperatorias (Alexander 2019).

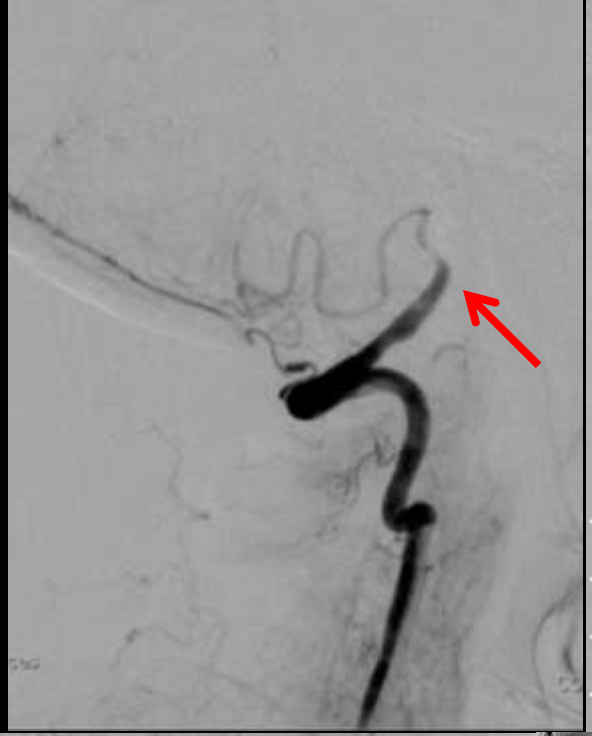
TRATAMIENTO DE ESTENOSIS INTRACRANEAL EN AGUDO

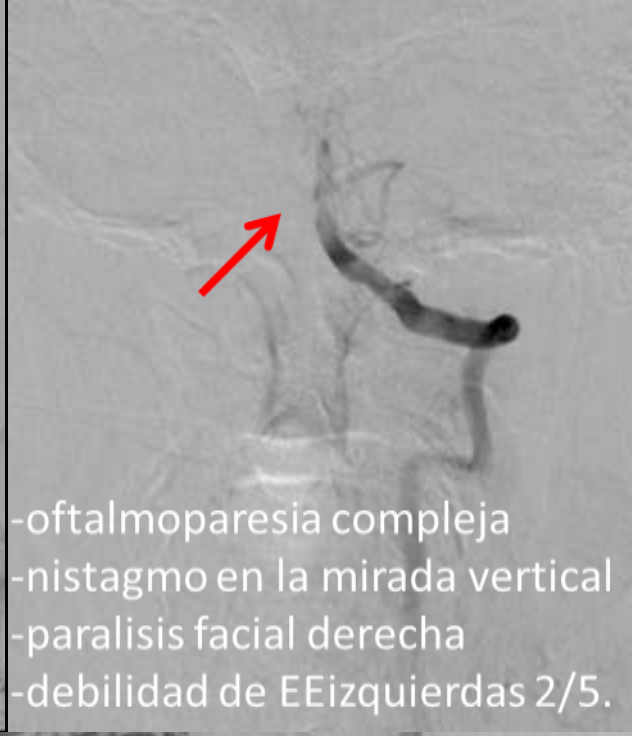
- Tirofiban 0’4mcg/kg/min x 30min iv e Inyesprin iv
- TC 24h Clopidogrel 300mg y Adiro 100mg
- 6 meses Adiro 100mg/día + Clopidogrel 75mg/día, posteriormente Adiro 100mg/día


ESTENOSIS ACI
1 pase
10´
angioplastia
10´
Stent carotideo

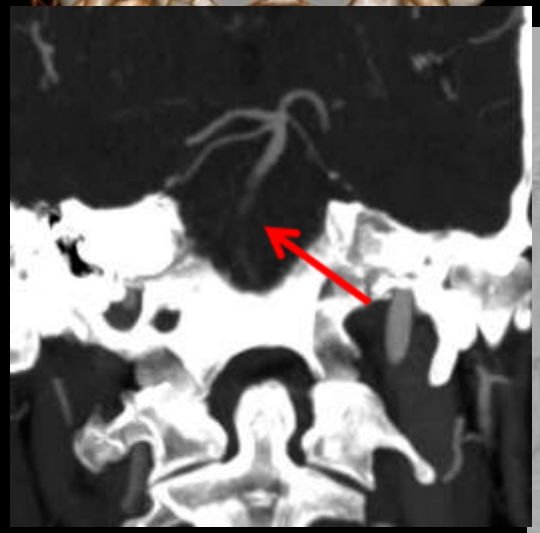

ESTENOSIS M1
1 pase
10´
Angioplastia solo

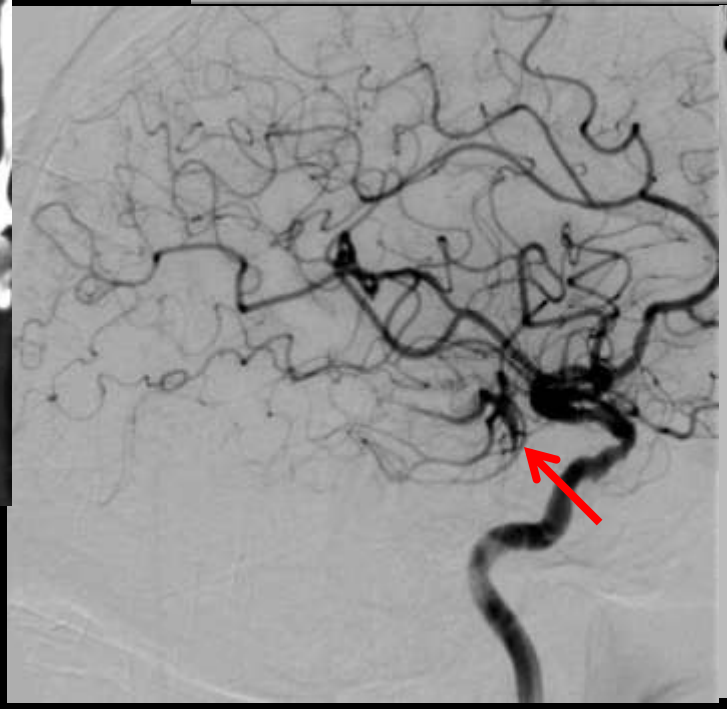


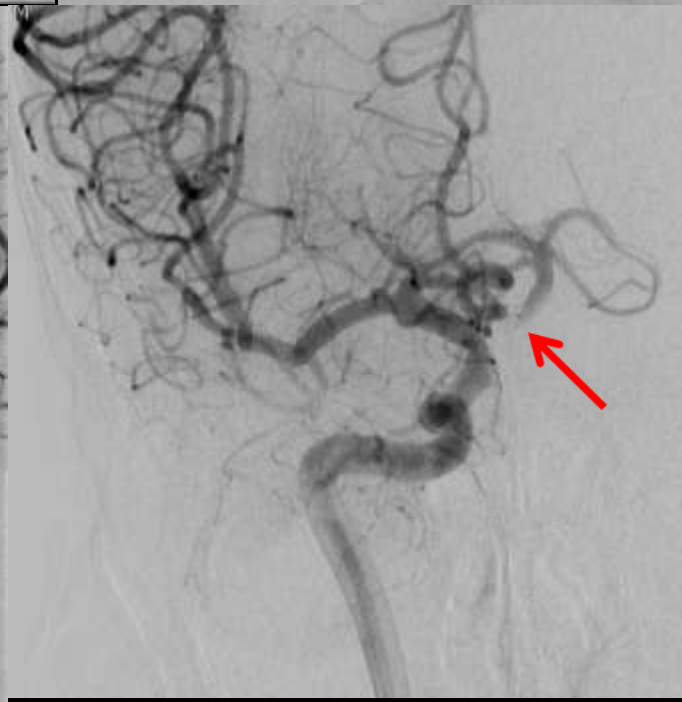


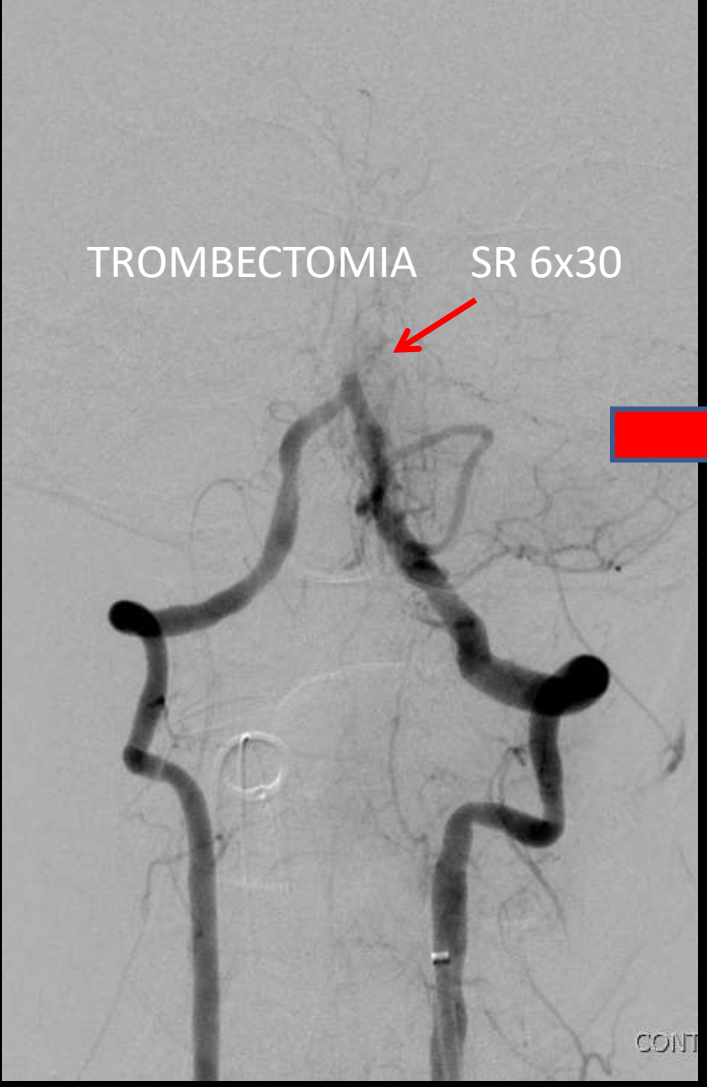


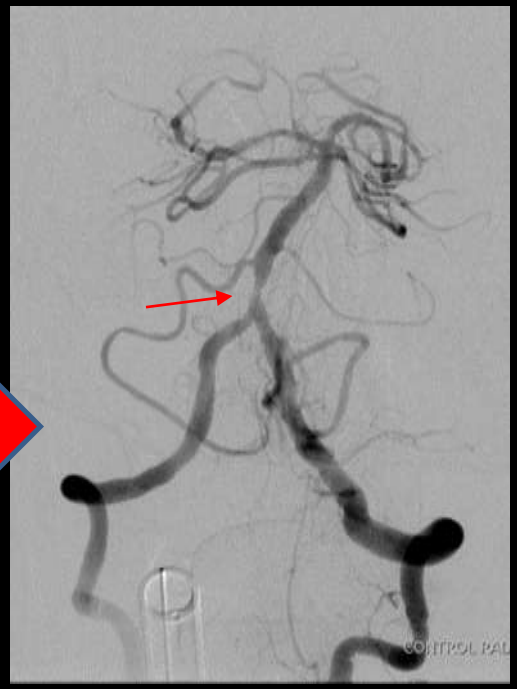
-oftalmoparesia compleja
-nistagmo en la mirada vertical
-paralisis facial derecha
-debilidad de EEizquierdas 2/5.



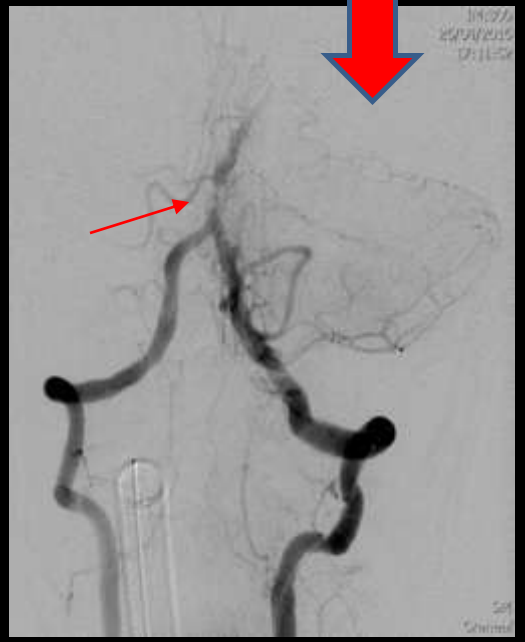


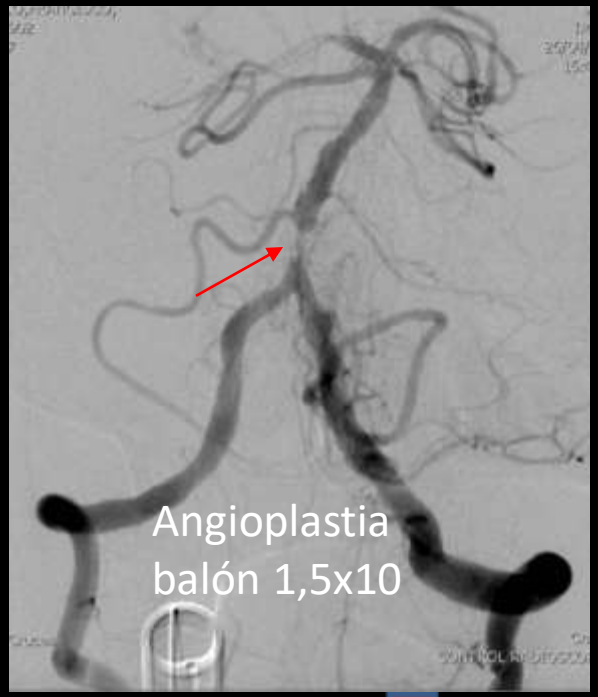


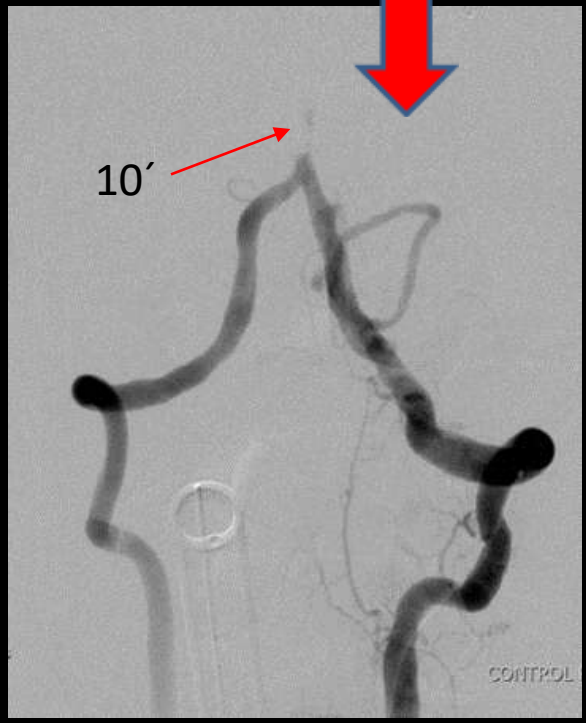


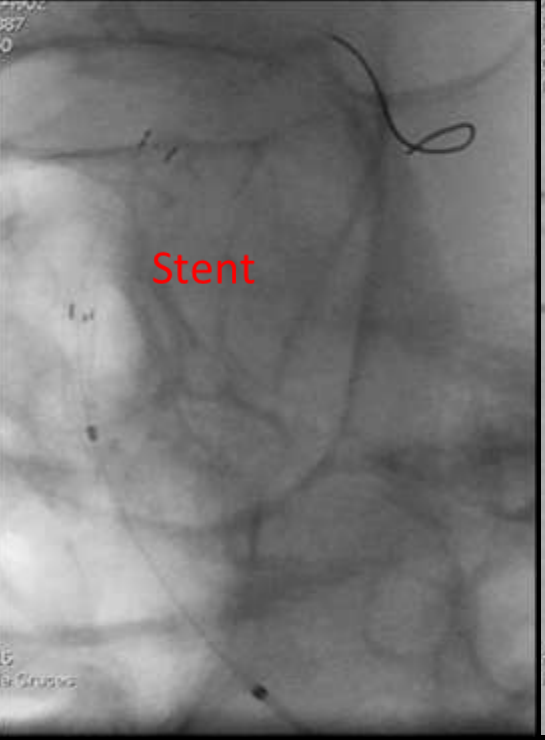


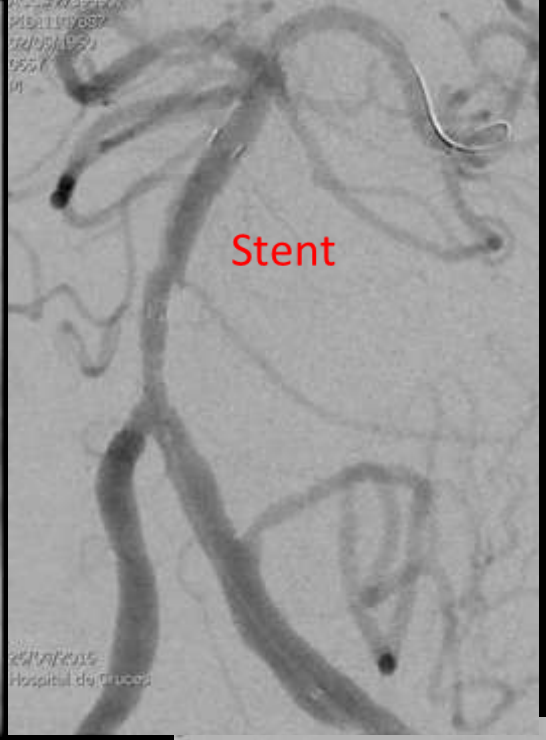
Tras un pase de TM








Stent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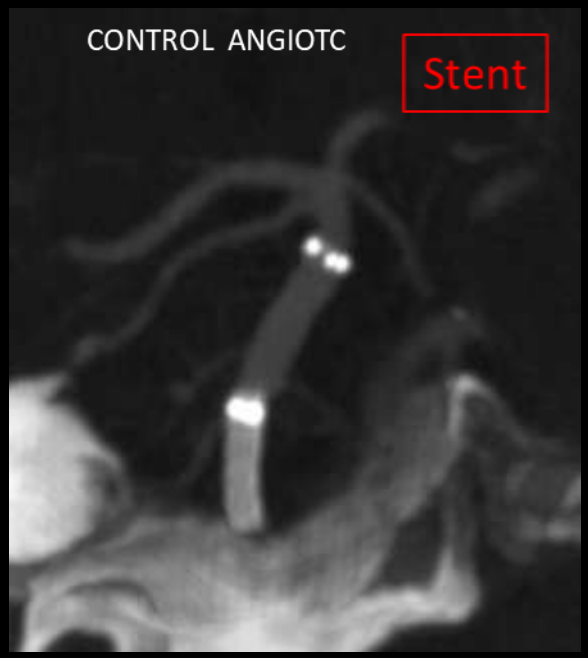
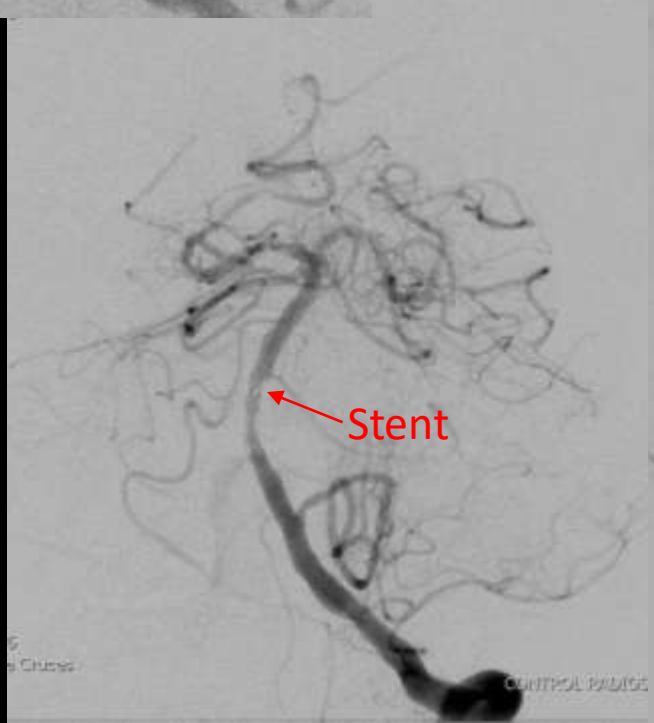
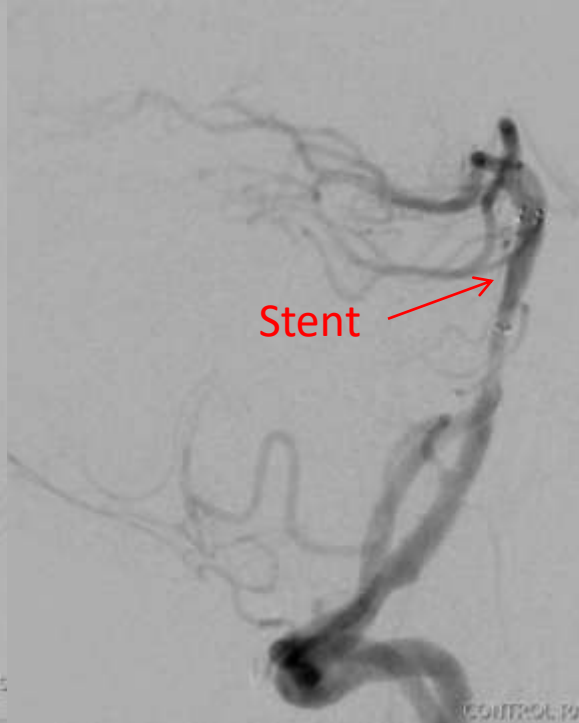
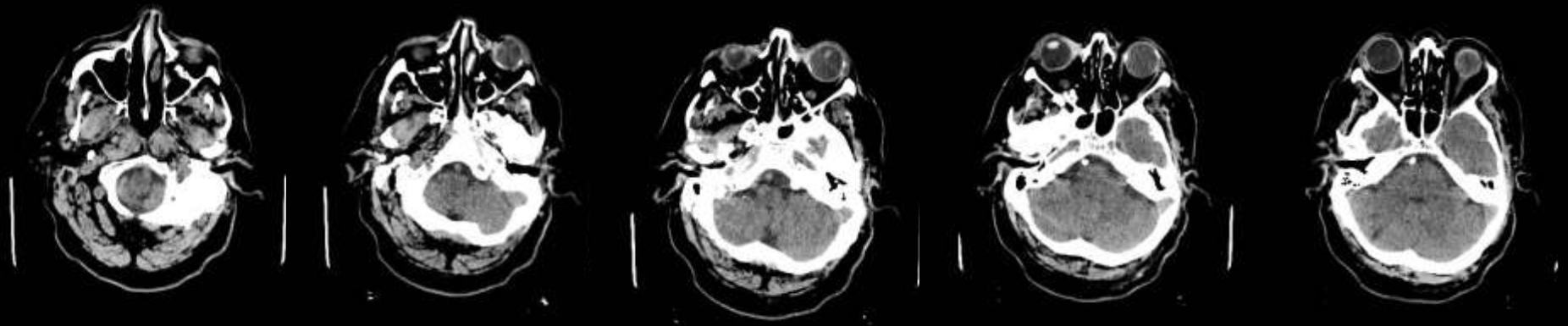

CONTROL ANGIOTC
Stent

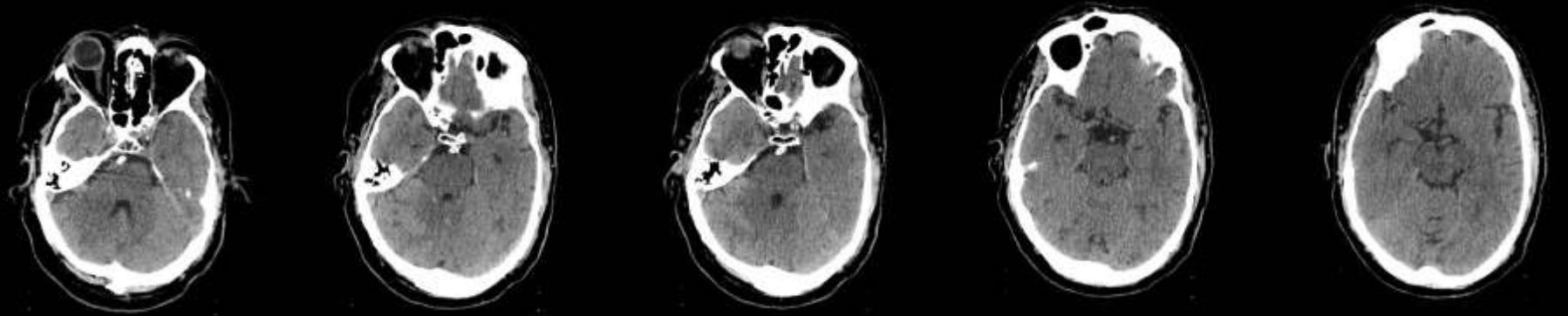

Stent


Stent

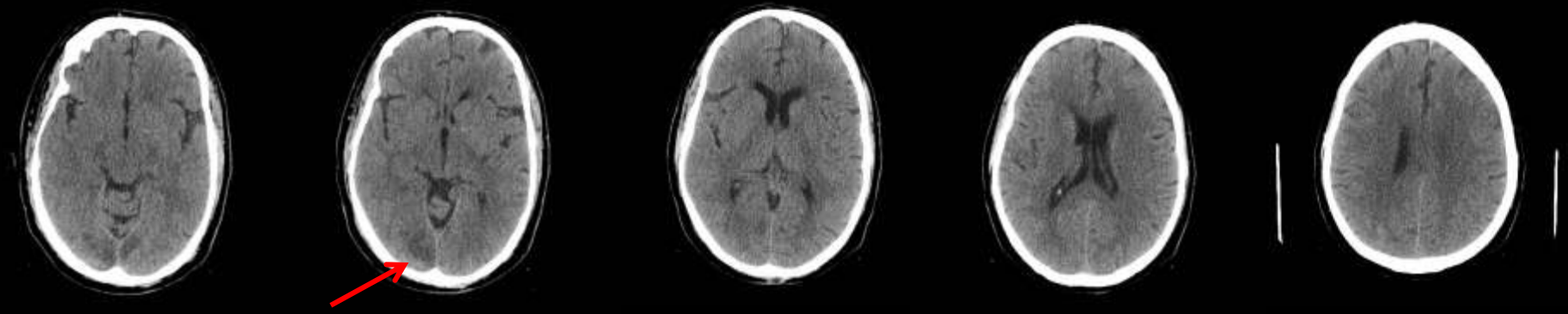
CONTROL TC



Durante el ingreso presenta una mejoria clínica progresiva



Al alta ataxia leve de la marcha sin otras alteraciones



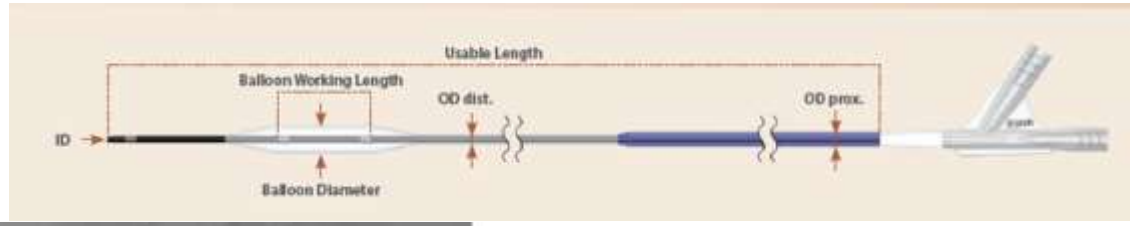
Actualización en los protocolos de tratamiento endovascular de la patología estenótica arterial intra y extracraneal

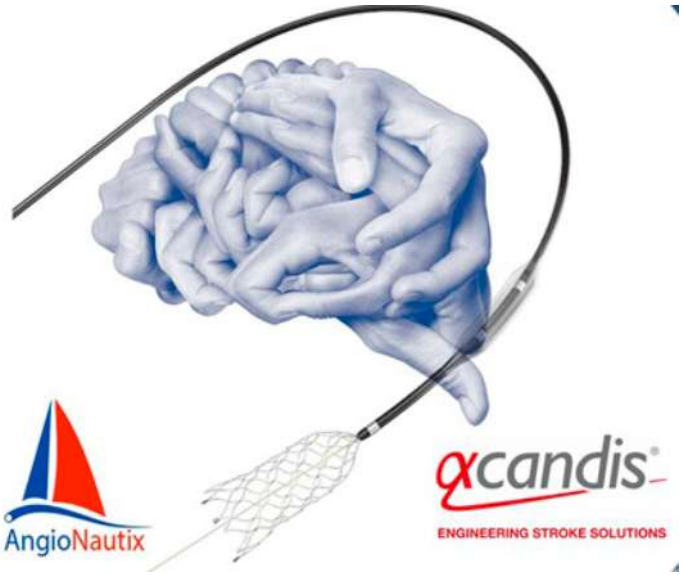
Dra. Eva González. Hospital Universitario de Cruces. Bilbao

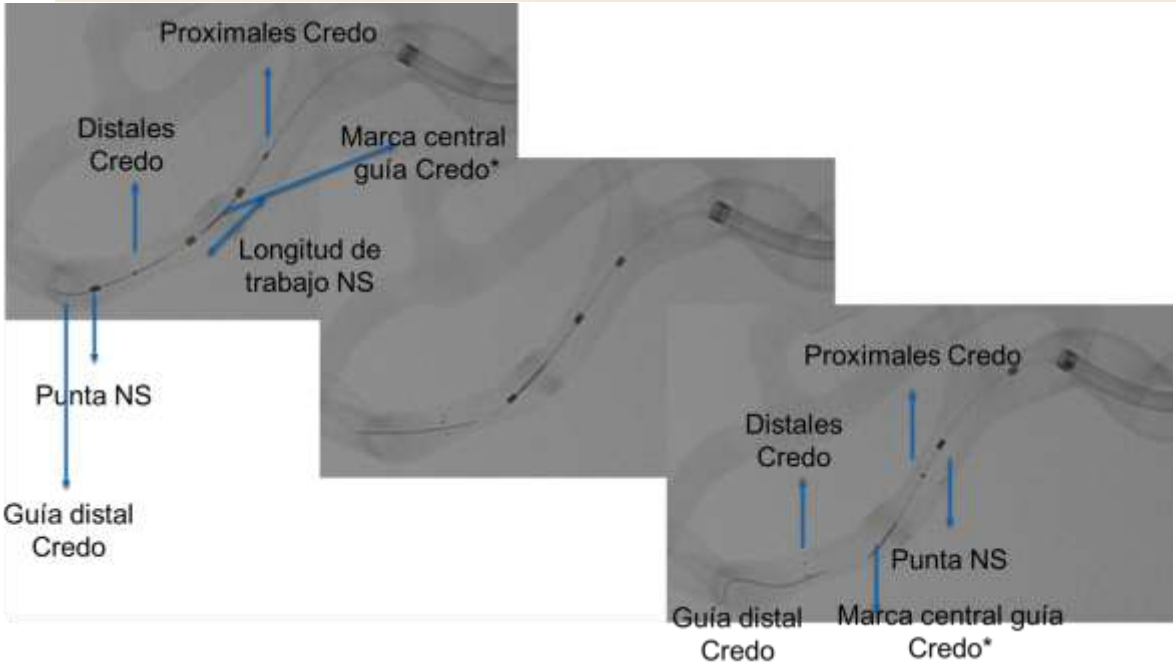
0-TICI-0

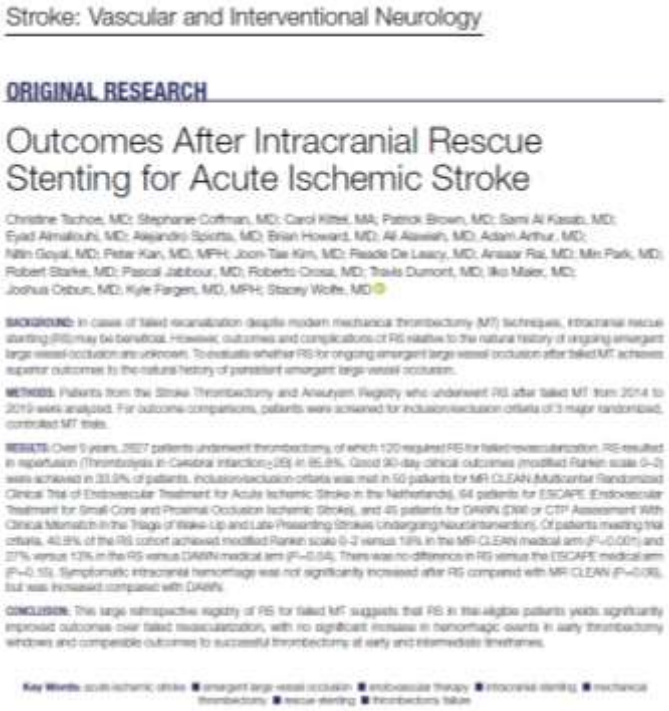
- Registro de implantación de stents intracraneal como técnica de rescate de trombectomía fallida al tercer pase, en el contexto del ictus agudo

NeuroSpeed









Stroke: Vascular and Interventional Neurology

ORIGINAL RESEARCH

Outcomes After Intracranial Rescue Stenting for Acute Ischemic Stroke

Christine Tachos, MD; Stephanie Coffman, MD; Carol Kittel, MA; Patrick Brown, MD; Sami Al Kasab, MD; Eyad Almallouhi, MD; Alejandro Spiotta, MD; Brian Howard, MD; Ali Alawieh, MD; Adam Arthur, MD; Nitin Goyal, MD; Peter Kan, MD, MPH; Joon-Tae Kim, MD; Reade De Leacy, MD; Ansaar Rai, MD; Min Park, MD; Robert Starke, MD; Pascal Jabbour, MD; Roberto Crosa, MD; Travis Dumont, MD; Iko Maier, MD; Joshua Osburn, MD; Kyle Fargen, MD, MPH; Stacey Wolfe, MD

BACKGROUND: In cases of failed recanalization despite modern mechanical thrombectomy (MT) techniques, intracranial rescue stenting (RS) may be beneficial. However, outcomes and complications of RS relative to the natural history of ongoing emergent large vessel occlusion are unknown. To evaluate whether RS for ongoing emergent large vessel occlusion after failed MT achieves superior outcomes to the natural history of persistent emergent large vessel occlusion.

METHODS: Patients from the Stroke Thrombectomy and Aneurysm Registry who underwent RS after failed MT from 2014 to 2019 were analyzed. For outcome comparisons, patients were screened for inclusion/exclusion criteria of 3 major randomized, controlled MT trials.

RESULTS: Over 5 years, 2827 patients underwent thrombectomy, of which 120 required RS for failed revascularization. RS resulted in reperfusion (Thrombolysis in Cerebral Infarction ≥2b) in 85.8%. Good 90-day clinical outcomes (modified Rankin scale 0–2) were achieved in 33.9% of patients. Inclusion/exclusion criteria was met in 50 patients for MR CLEAN (Multicenter Randomized Clinical Trial of Endovascular Treatment for Acute Ischemic Stroke in the Netherlands), 64 patients for ESCAPE (Endovascular Treatment for Small Core and Proximal Occlusion Ischemic Stroke), and 45 patients for DAWN (DWI or CTP Assessment With Clinical Mismatch in the Triage of Wake-Up and Late Presenting Strokes Undergoing Neurointervention). Of patients meeting trial criteria, 40.8% of the RS cohort achieved modified Rankin scale 0–2 versus 18% in the MR CLEAN medical arm ($P<0.001$) and 27% versus 13% in the RS versus DAWN medical arm ($P=0.04$). There was no difference in RS versus the ESCAPE medical arm ($P=0.15$). Symptomatic intracranial hemorrhage was not significantly increased after RS compared with MR CLEAN ($P=0.06$), but was increased compared with DAWN.

CONCLUSION: This large retrospective registry of RS for failed MT suggests that RS in this eligible patients yields significantly improved outcomes over failed revascularization, with no significant increase in hemorrhagic events in early thrombectomy windows and comparable outcomes to successful thrombectomy at early and intermediate timeframes.

Key Words: acute ischemic stroke ■ emergent large vessel occlusion ■ endovascular therapy ■ intracranial stenting ■ mechanical thrombectomy ■ rescue stenting ■ thrombectomy failure

CONCLUSION
En el tratamiento endovascular del ictus isquémico el rescate con stent mejora el outcome respecto a la revascularización fallida sin aumento significativo de la sICH

Estudio multicéntrico retrospectivo

Análisis de los pacientes del STAR(Stroke Trrombectomy and Aneurysm Registry) con tratamiento Stent Rescate(RS) tras TE fallido, entre 2014-2019.

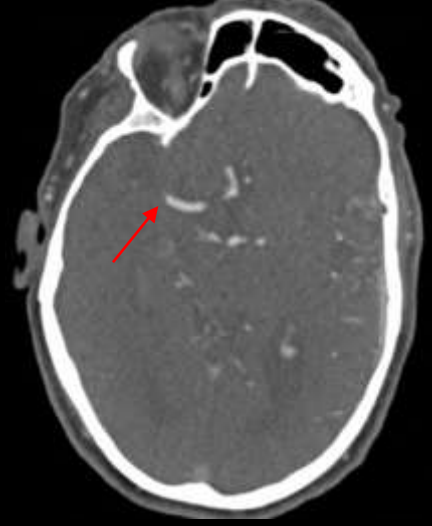
Outcome comparativo con el manejo médico 3 triales randomizados de TM(MR CLEAN, DAWN, ESCAPE)

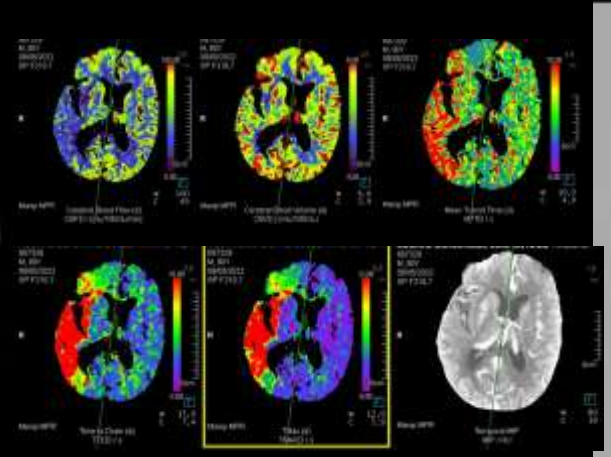
- Fallo de revascularización con TM, n120:
  - Intracraneal ateroesclerosis
  - Disección
  - Placa ulcerada
  - Trombo intramural o intraluminal
- 72,5% ACI y M1
- Media de pases 3 previo rescate
- Angioplastia+Stent autoespandible(EZ-Atlas)+ , balón expandible -
- 29,2% rTPA
- Inhibidores IIb/IIIa previo stent---Doble antiagregación

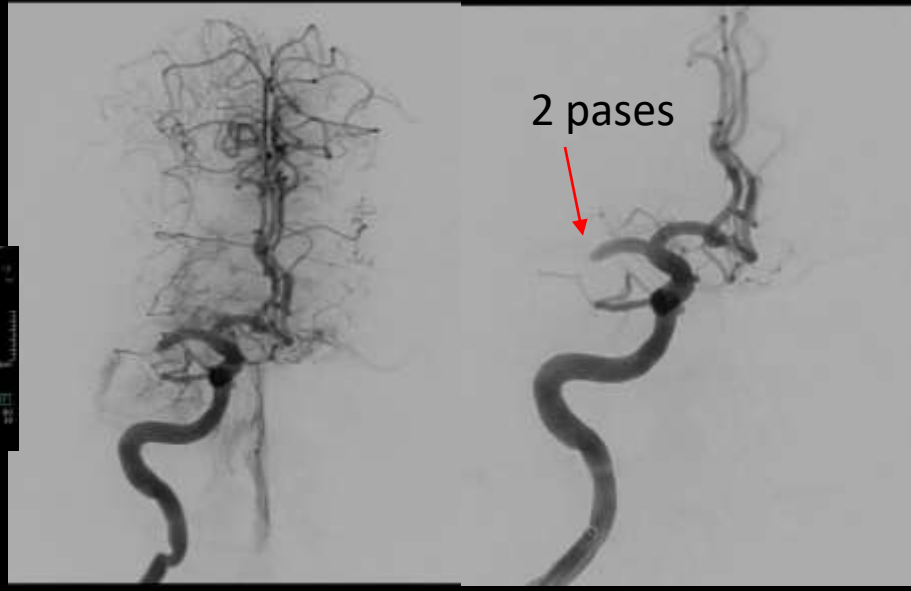
TICI>2b 85,8%

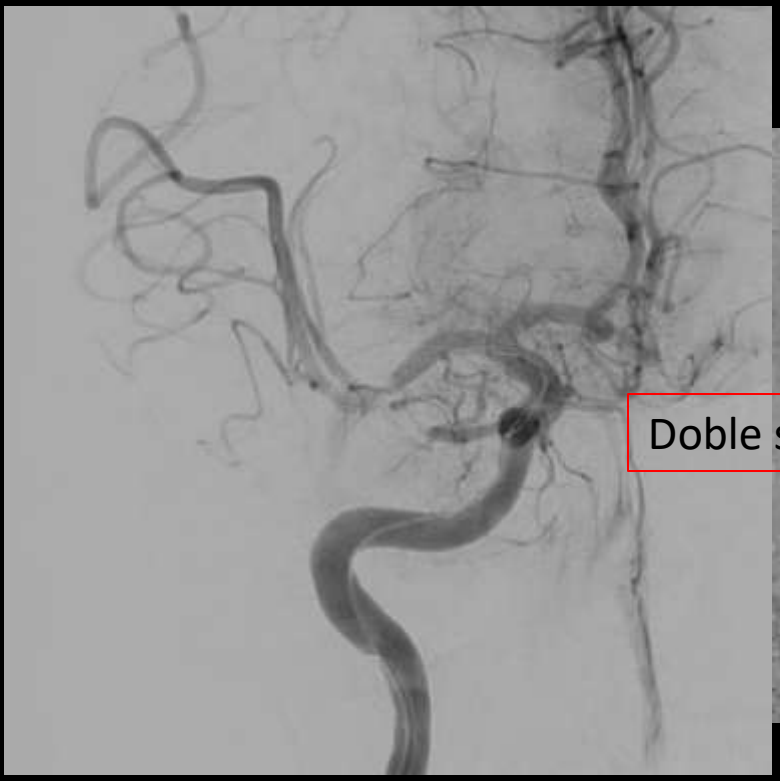
- **sICH 10%**
- **mRS 0-2 90 días: 33,9% rescate stent vs 12,9% fallo de la revascularización(TICI0-2a)**

Se necesitan estudios prospectivos que demuestren dicho beneficio

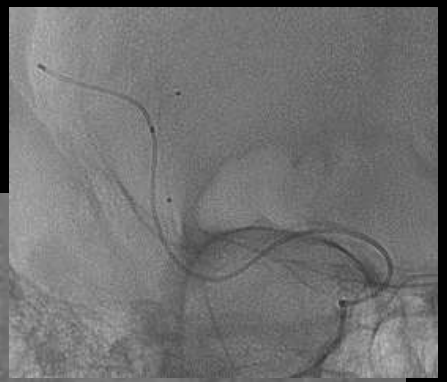


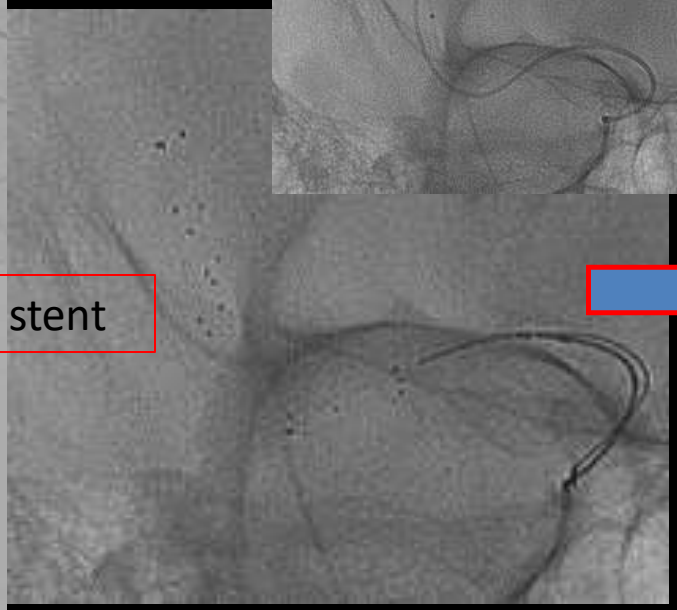


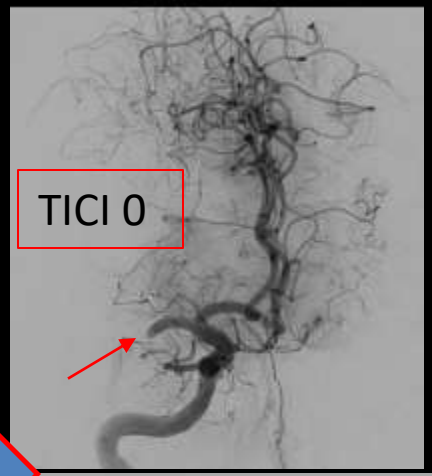


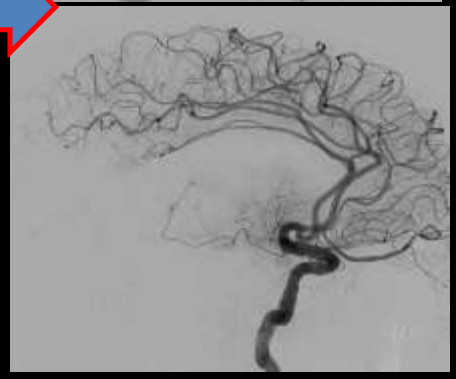


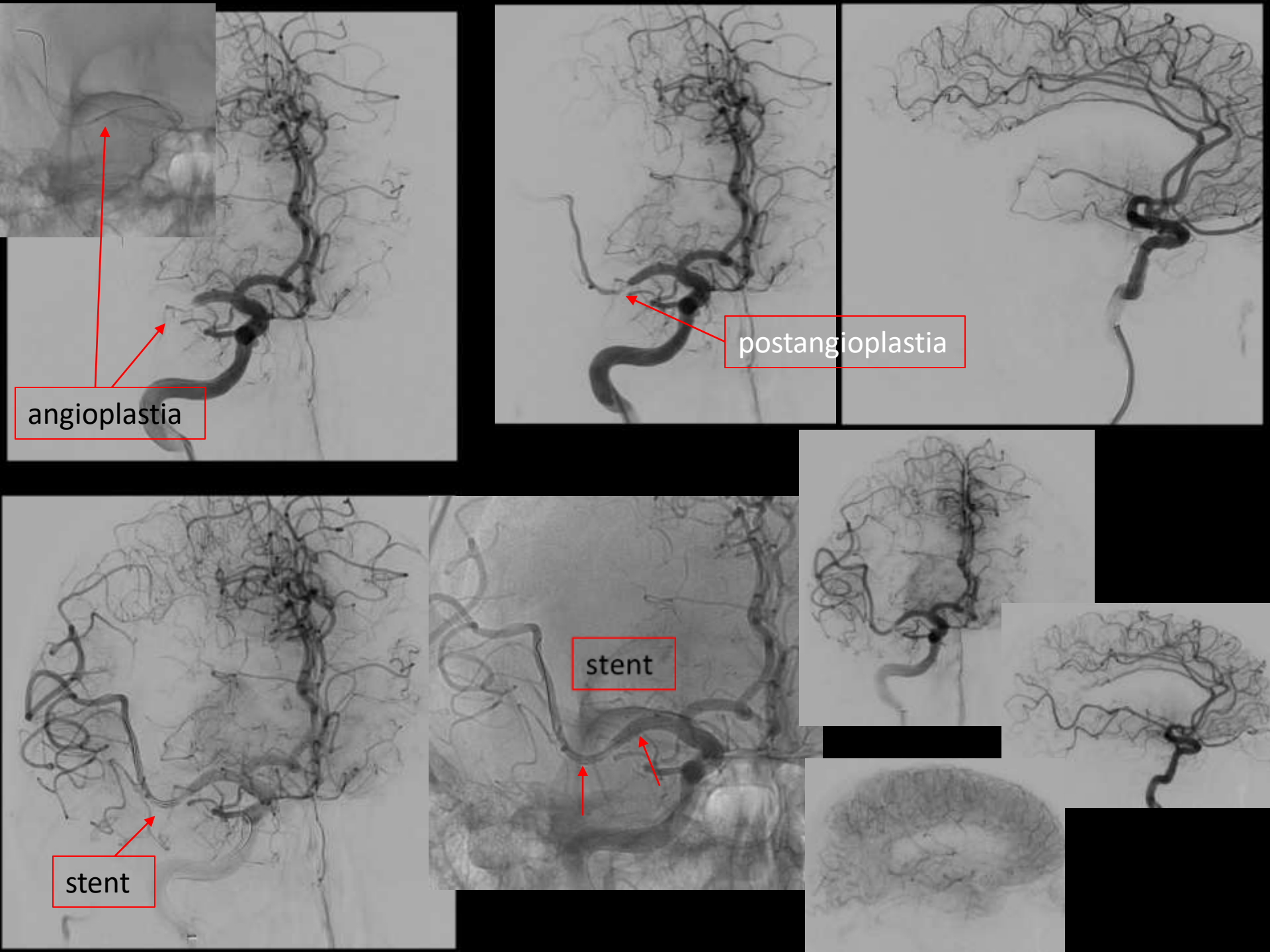
Doble stent










angioplastia
postangioplastia
stent
stent

TC 24 HORAS