Prevención secundaria del ictus

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Neurología Vascular

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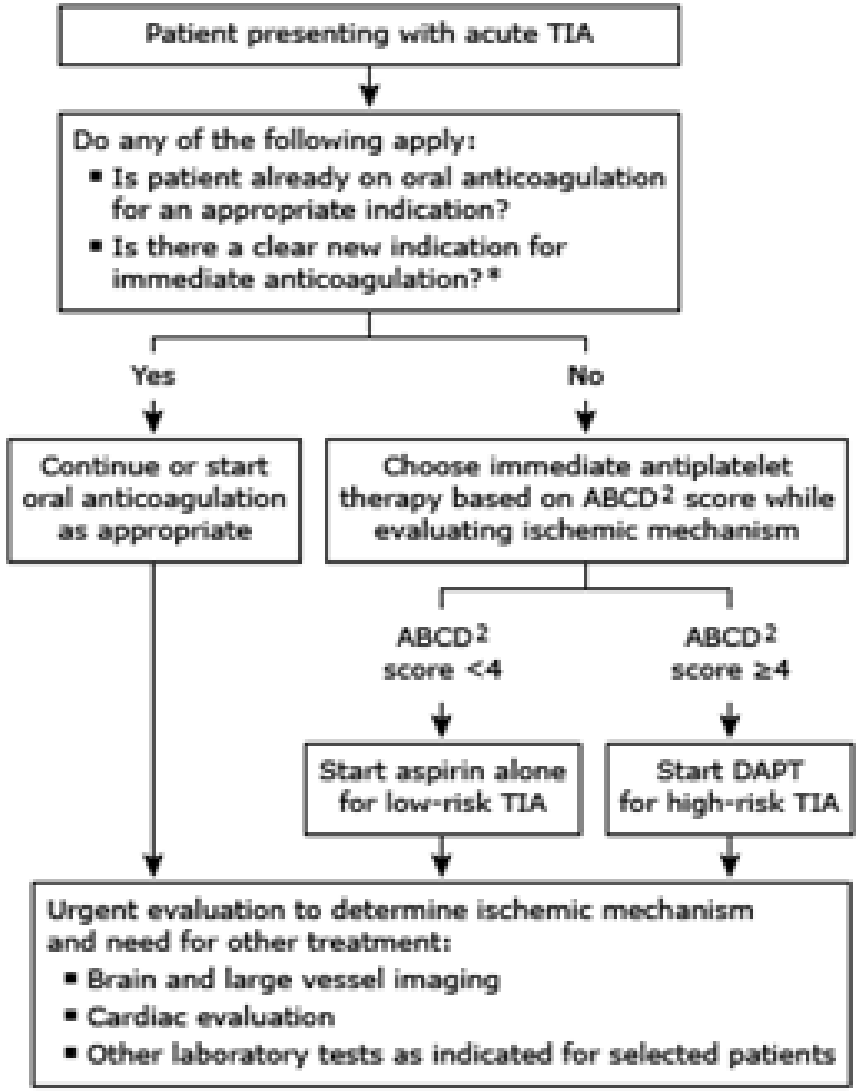
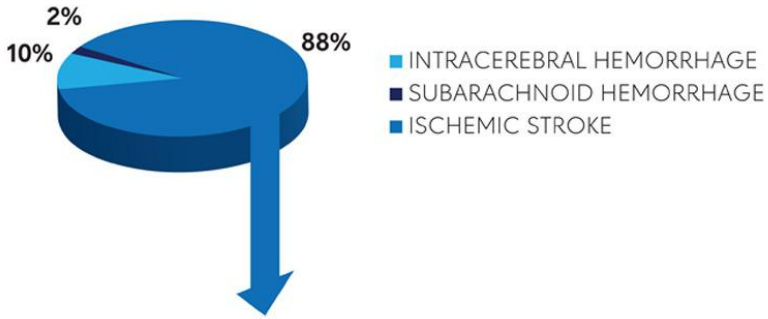
Immediate antithrombotic treatment of transient ischemic attack (TIA)



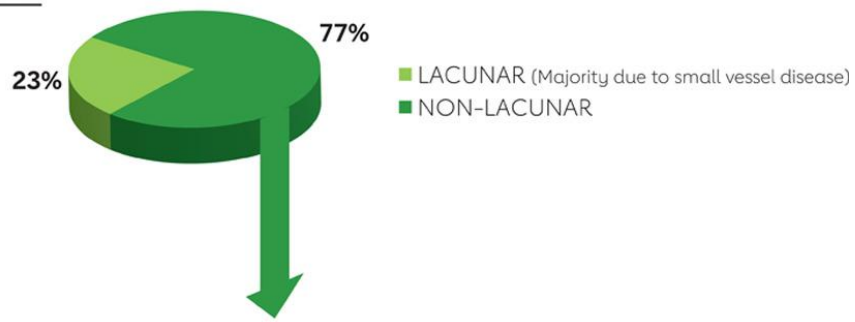
ABCD² score	
Age:	
≥60 years	+1
<60 years	0
BP at TIA presentation:	
SBP ≥140 or DBP ≥90	+1
SBP <140 and SBP <90	0
Clinical features:	
Unilateral weakness	+2
Isolated speech disturbance	+1
Other	0
Duration of TIA symptoms:	
≥60 minutes	+2
10 to 59 minutes	+1
<10 minutes	0
Diabetes:	
Present	+1
Absent	0

Copyrights apply

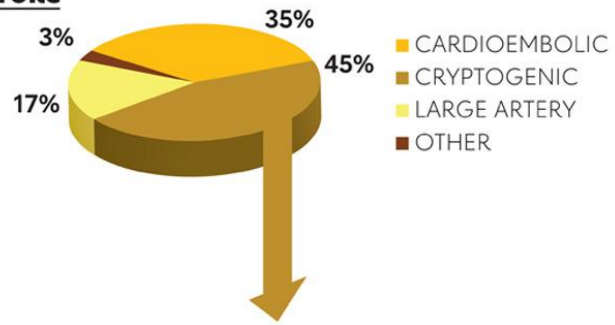
Stroke



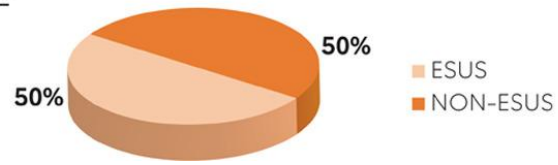
Ischemic Stroke



Non-lacunar Stroke



Cryptogenic Stroke



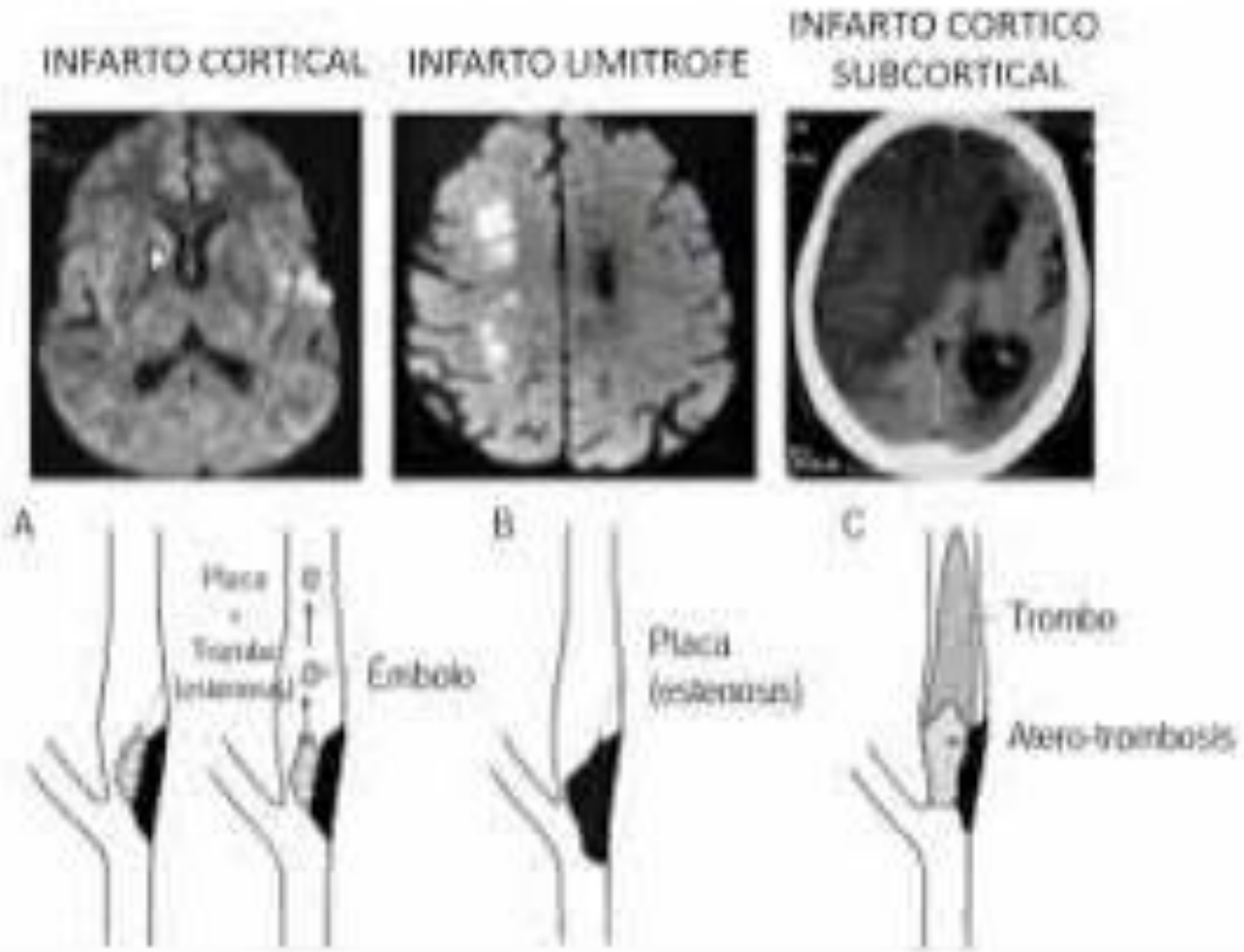
Clasificación etiológica del ictus

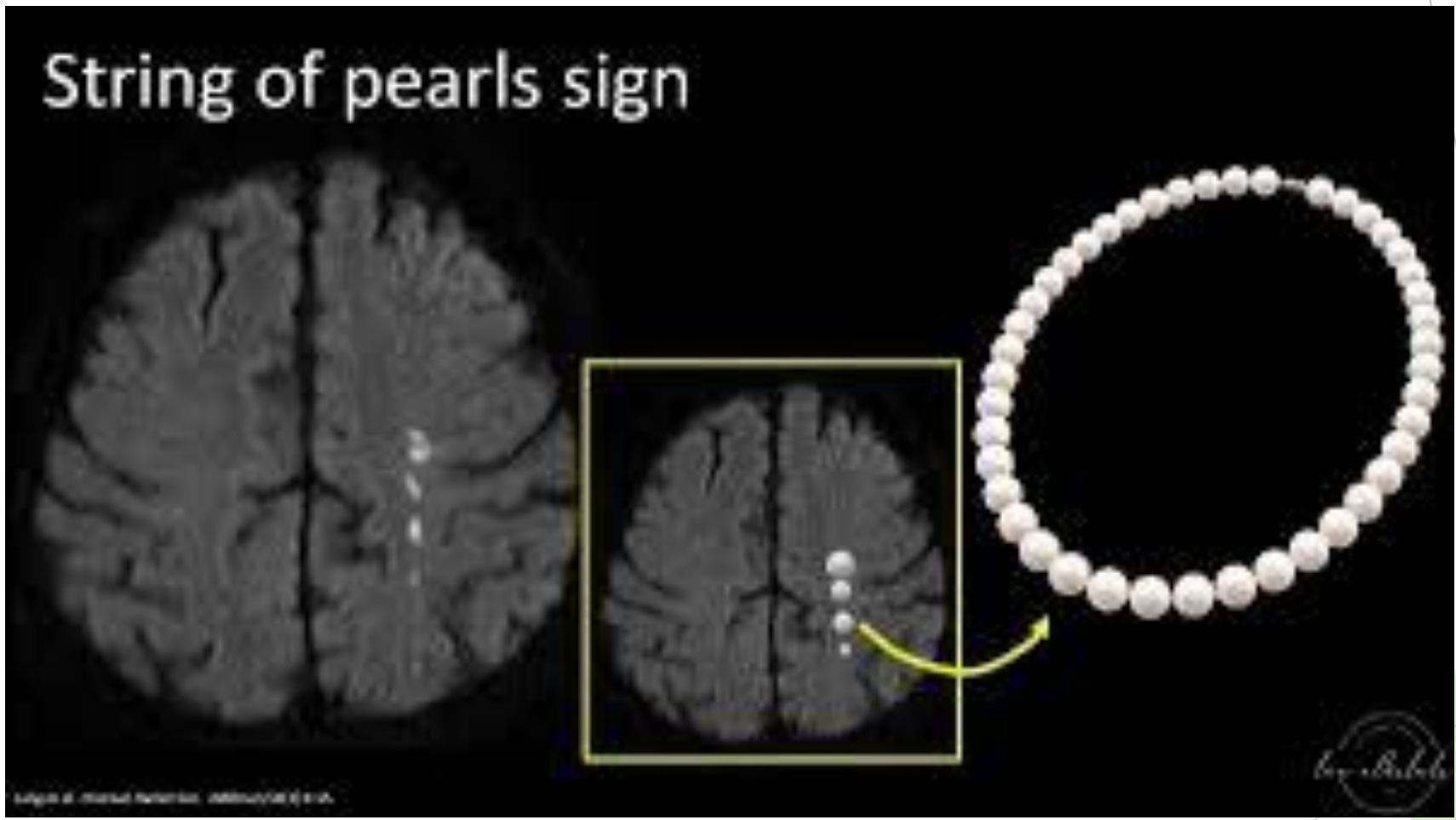
Clasificación TOAST de subtipos de accidente cerebrovascular isquémico agudo

Aterosclerosis de grandes arterias
Cardioembolismo
Oclusión de vasos pequeños
Ictus de otra etiología determinada
Ictus de etiología indeterminada
Dos o más causas identificadas
Evaluación negativa
Evaluación incompleta

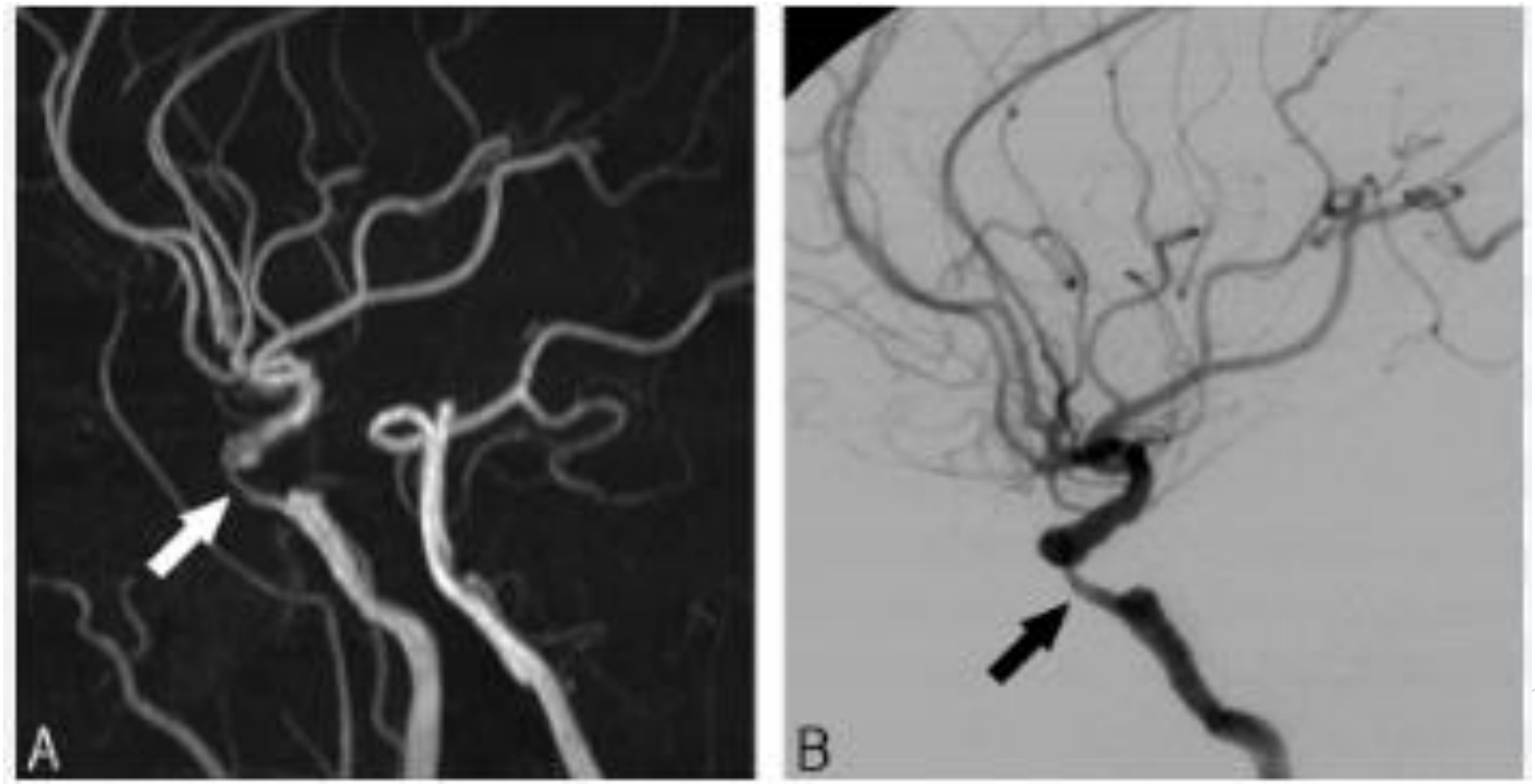
Ateromatosis Carotídea

Mecanismos Fisiopatológicos de la isquemia cerebra




String of pearls sign

Ateromatosis intracraneana



- ACV + estenosis ≥70%: recurrencia 1 año: 18%.
- SAMMPRIS: doble AA 3 meses seguido de AAS sólo: recurrencia 1 año: 12%.
- WASSID: AAS sola: recurrencia a 1 años: 25%.

5.1.1. Intracranial Large Artery Atherosclerosis

Recommendations for Intracranial Large Artery Atherosclerosis
Referenced studies that support recommendations are summarized in online Data Supplements 20–27.

COR	LOE	Recommendations
		Antithrombotic Therapy
1	B-R	1. In patients with a stroke or TIA caused by 50% to 99% stenosis of a major intracranial artery, aspirin 325 mg/d is recommended in preference to warfarin to reduce the risk of recurrent ischemic stroke and vascular death.[335,336]
2a	B-NR	2. In patients with recent stroke or TIA (within 30 days) attributable to severe stenosis (70%–99%) of a major intracranial artery, the addition of clopidogrel 75 mg/d to aspirin for up to 90 days is reasonable to further reduce recurrent stroke risk.[336–339]
2b	B-NR	3. In patients with recent (within 24 hours) minor stroke or high-risk TIA and concomitant ipsilateral >30% stenosis of a major intracranial artery, the addition of ticagrelor 90 mg twice a day to aspirin for up to 30 days might be considered to further reduce recurrent stroke risk.[340]
2b	C-LD	4. In patients with stroke or TIA attributable to 50% to 99% stenosis of a major intracranial artery, the addition of cilostazol 200 mg/day to aspirin or clopidogrel might be considered to reduce recurrent stroke risk.[341–344]

		Angioplasty and Stenting
2b	C-LD	7. In patients with severe stenosis (70%-99%) of a major intracranial artery and actively progressing symptoms or recurrent TIA or stroke after institution of aspirin and clopidogrel therapy, achievement of SBP <140 mm Hg, and high- intensity statin therapy (so-called medical failures), the usefulness of angioplasty alone or stent placement to prevent ischemic stroke in the territory of the stenotic artery is unknown.[350–352]
3: Harm	A	8. In patients with stroke or TIA attributable to severe stenosis (70%–99%) of a major intracranial artery, angioplasty and stenting should not be performed as an initial treatment, even for patients who were taking an antithrombotic agent at the time of the stroke or TIA.[353–359]

- **Mejor tto médico vs Angioplastia**: mayor tasa de eventos cerebrovasculares o muerte a los 30 días en el grupo de angioplastia
- **Bypass vs mejor tto médico**: tasas más altas de ACV en pacientes con bypass.

Estenosis de gran vaso de arteria extracraneana

Randomized Controlled Trial > N Engl J Med. 2020 Jan 2;382(1):9. doi: 10.1056/NEJMoa1910355. Epub 2019 Nov 18.

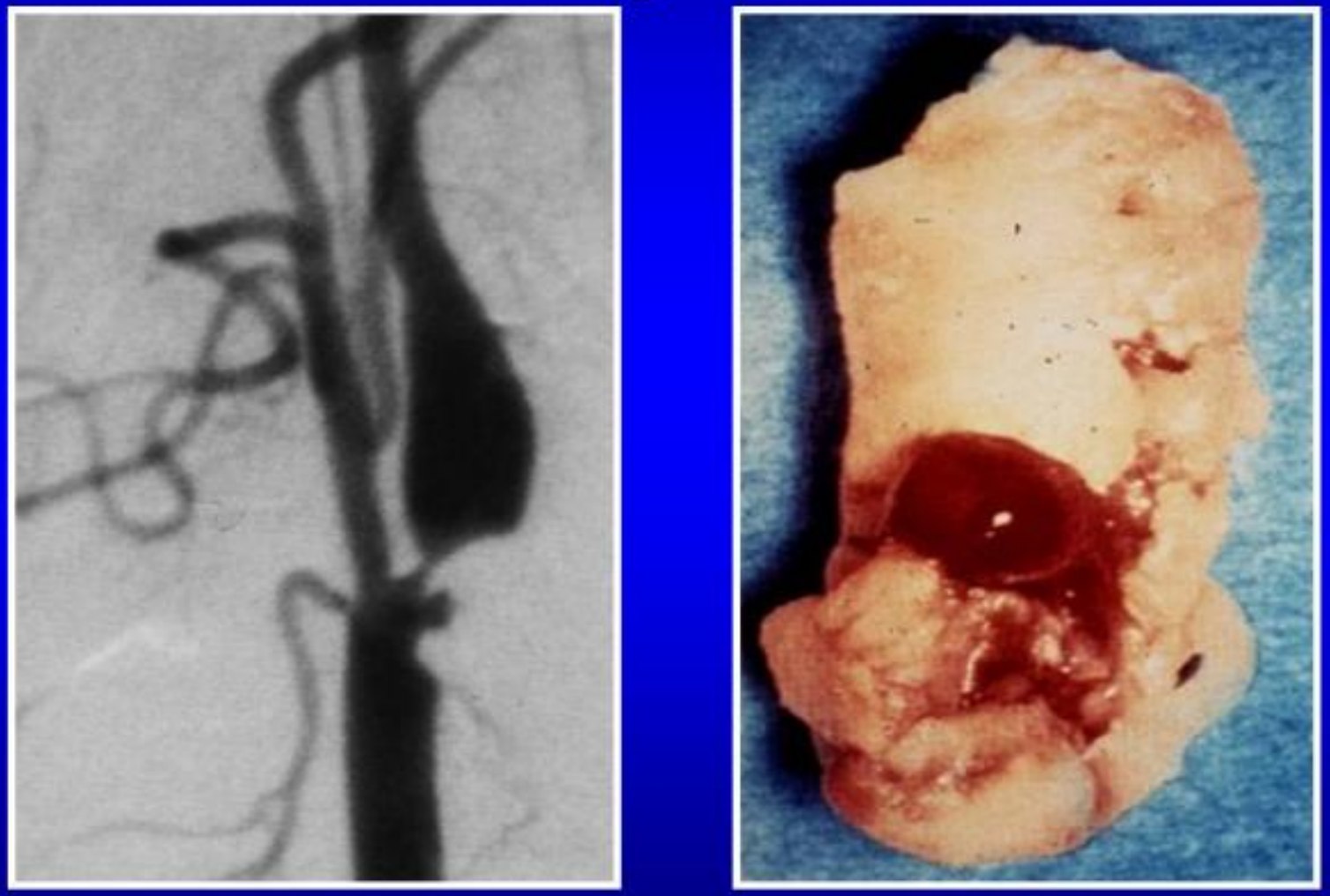
A Comparison of Two LDL Cholesterol Targets after Ischemic Stroke

Pierre Amarenco [1], Jong S Kim [1], Julien Labreuche [1], Hugo Charles [1], Jérémie Abtan [1], Yannick Béjot [1], Lucie Cabrejo [1], Jae-Kwan Cha [1], Grégory Ducrocq [1], Maurice Giroud [1], Celine Guidoux [1], Cristina Hobeanu [1], Yong-Jae Kim [1], Bertrand Lapergue [1], Philippa C Lavallée [1], Byung-Chul Lee [1], Kyung-Bok Lee [1], Didier Leys [1], Marie-Hélène Mahagne [1], Elena Meseguer [1], Norbert Nighoghossian [1], Fernando Pico [1], Yves Samson [1], Igor Sibon [1], P Gabriel Steg [1], Sang-Min Sung [1], Pierre-Jean Touboul [1], Emmanuel Touzé [1], Olivier Varenne [1], Éric Vicaut [1], Nessima Yelles [1], Eric Bruckert [1]; Treat Stroke to Target Investigators

ACV en los últimos 3 meses o AIT en los últimos 15 días + evidencia de aterosclerosis cerebral o coronaria

	<70 mg/dL (1.8mmol/L)	90-110 mg/dL (2.3-2.8mmol/L)
Participantes	1430	1430
ACV, IAM, nuevos síntomas, muerte cardiovascular	8.5%	10.9%

Carotid Endarterectomy: Conventional Gold Standard Surgical Treatment



Left image: High grade internal carotid artery stenosis, digital subtraction image, suggestive of ulceration.
Right image: pathologic specimen of carotid artery plaque with thrombus.

©2010 American Heart Association, Inc. All rights reserved.

Estenosis sintomática 70 %–99 %

Dentro de las 2 semanas

American Heart Association. | American Stroke Association.
Learn and Live.

Prospective Trials Comparing Carotid Endarterectomy and Medical Therapy

Trial	Mean Follow-up	Surgical Arm*	Medical Arm*
ECST 1998	3 y	2.8%	16.8%
NASCET 1999	2.7 y	9%	26%
VACS 1993	11.9 mo	7.9%	25.6%

ECST indicates European Carotid Surgery Trial; NASCET, North American Symptomatic Carotid Endarterectomy Trial; and VACS, Veterans Affairs Cooperative Study Program.
*Risk of fatal or nonfatal ipsilateral stroke.

Toma de decisiones

- Mujer: NNT 36
- Varones: NNT 9

- Esperanza de vida

- Estenosis de la ACI < 50%: no beneficio.
- Estenosis de la ACI del 70% al 99%: beneficio 16% durante 5 años.
- Estenosis de la ACI del 50% al 69%: beneficio 4,6% durante 5 años.

American Heart Association. | American Stroke Association.
Learn and Live.

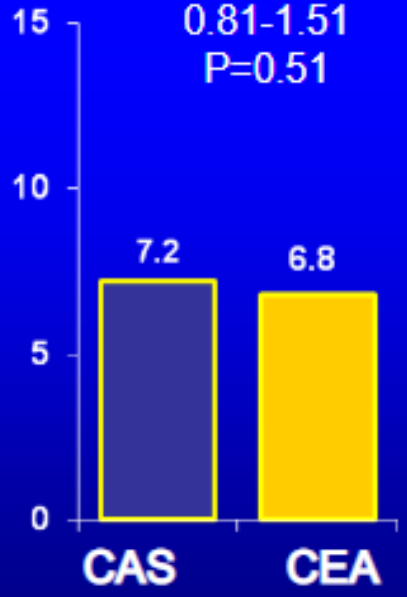
Carotid Revascularization Endarterectomy vs. Stenting Trial (CREST)

Trial Design: Prospective, multicenter, randomized, controlled trial with blinded endpoint adjudication. Comparing carotid endarterectomy (CEA) and carotid artery stenting (CAS) in participants with symptomatic and asymptomatic stenosis. N = 2502. 108 US sites and 9 Canadian sites. Multidisciplinary research team: surgeon, research coordinator, interventionalist, and neurologist. **Primary Endpoint:** Any clinical stroke, myocardial infarction or death within the peri-procedural period plus occurrence of ipsilateral stroke going forward.

Primary Endpoint

HR = 1.11; 95% CI: 0.81-1.51

P=0.51



Other Results

- . No difference in treatment effect according to symptomatic status (P=0.84) or sex (P=0.34).
- The 4 yr rate of stroke or death was 6.4% with CAS and 4.7% with CEA (HR, 1.50; P= 0.03).
- Rates in the symptomatic group, 8.0% for CAS and 6.4% for CEA (HR 1.37; P=0.14.
- Rates in the asymptomatic group, 4.5% for CAS and 2.7% for CEA (HR= 1.86; P=0.07).
- Components of the periprocedural rates were different:
  - Death – CAS = 0.7% vs. CEA 0.3%, P=0.18
  - Stroke – CAS = 4.1% vs. CEA 2.3% , P= 0.01
  - Myocardial infarction – CAS = 1.1% vs. CEA= 2.3%, P=0.03

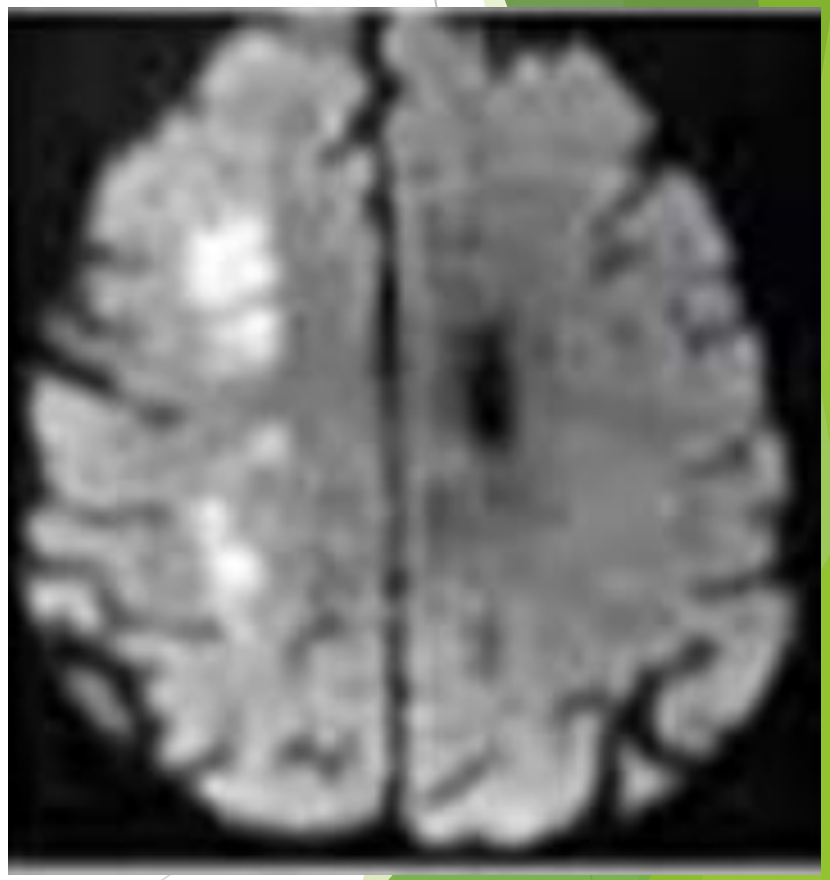
Brott TG, Hobson RW et al. Stenting vs. Endarterectomy for Treatment of Carotid-Artery Stenosis.. N Engl J Med 363;1, July 2010

Caso 1

- Hombre
- 75 años
- Fumador
- Dislipémico

Caso 1

- Desde hace unos meses cuadros de desorientación y mareos.



Caso 1

- AngioTC: estenosis del 80-90% de la carótida derecha.

Profilaxis secundaria de ateromatosis de gran vaso

- Mejor tratamiento médico: AAS 125mg + Atorvastatina 80mg + Clopidogrel 75mg (por 3 meses) + control de factores de riesgo
- Angioplastia
- Endarterectomía

Caso 1

- Profilaxis secundaria: Angioplastia

Caso 2

- Femenino
- 85 años
- HTA con mal control
- DM2 con buen control
- Debilidad del hemicuerpo derecho + afasia + hemianopsia H derecha

Caso 2

Caso 2

- Ecocardiograma: atrio izq: 45mm, FE: 42%, septum y PP: 12mm, contractibilidad: hipoquinesia global. Valv aortica insuficiencia moderada
- Holter 24h: FA paroxística
- Ecodoppler de vasos del cuello: normal
- HBA1C: 6%
- Colesterol total: 154, LDL: 73

Caso 2

- Dx: ACV isquémico en territorio de la ACM y ACP izquierda de etiología: cardioembólica

- Prevención secundaria: Dabigatran

FA

- **DOACs:** No inferioridad (Warfarina): Edoxaban, Ribaroxaban. Superioridad: Apixaban, Dabigatran.

- Menos complicaciones hemorrágicas.

- **Anti Vitamina K:**

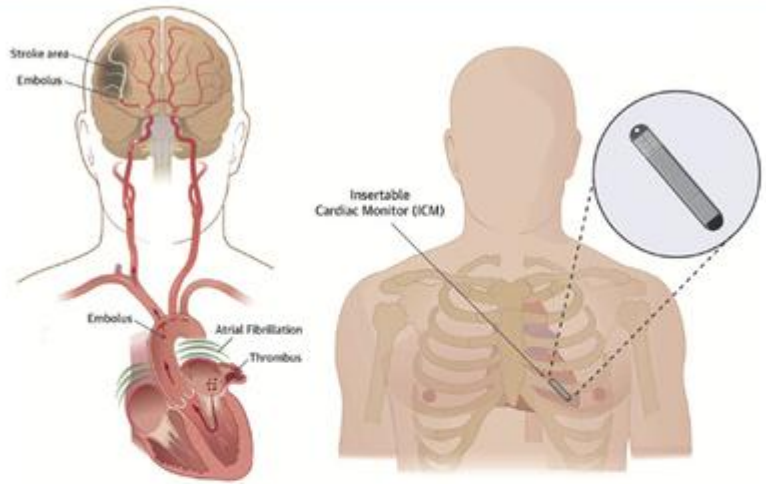
- Estenosis mitral moderada a severa.
- Valvula mecánica.
- IRC moderada a severa

- **Contraindicaciones a la ACO:** doble AA + cierre de la orejuela

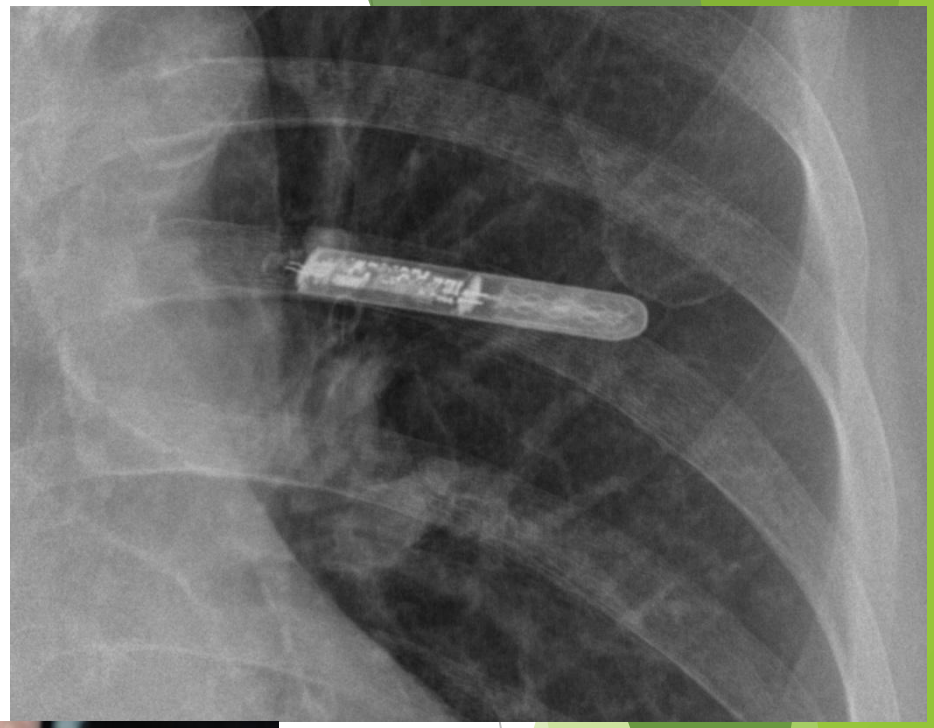
Table Type of monitoring and detection of paroxysmal atrial fibrillation in patients with cryptogenic stroke

Type of monitoring	Setting	Invasive vs noninvasive	Duration	Rate of detection of atrial fibrillation, %[20,21,23,27,28]
Admission ECG	Inpatient	Noninvasive	N/A	2.7
Inpatient continuous telemetry	Inpatient	Noninvasive	3-5 d	5.5-7.6
Holter monitor	Outpatient	Noninvasive	24 h	3.2-4.8
Holter monitor	Outpatient	Noninvasive	48 h	6.4
Holter monitor	Outpatient	Noninvasive	7 d	12.5
Mobile continuous outpatient telemetry	Outpatient	Noninvasive	21-30 d	16-25
Implantable loop recorders	Outpatient	Invasive	6 mo	9
			36 mo	30

CENTRAL ILLUSTRATION: An Insertable Cardiac Monitor Detects Subclinical Atrial Fibrillation Following Cryogenic Stroke



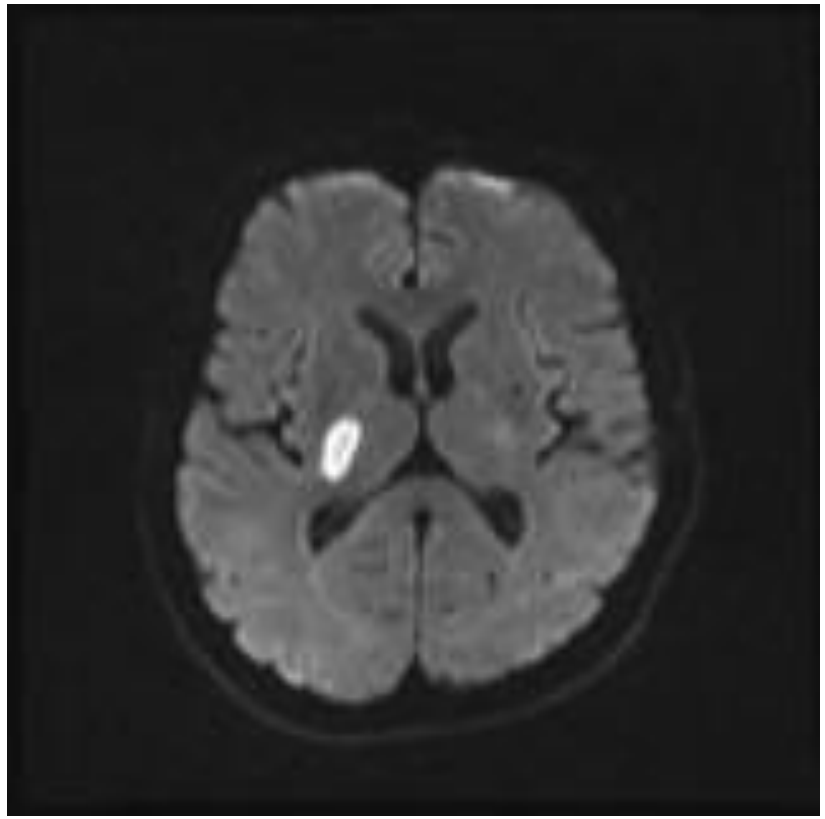
Giancaterino, S. et al. J Am Coll Cardiol EP. 2018;4(11):1383-96.



Caso 3

- Masculino
- 58 años
- HTA con mal control
- Debilidad del hemicuerpo izquierdo + disartria

Caso 3



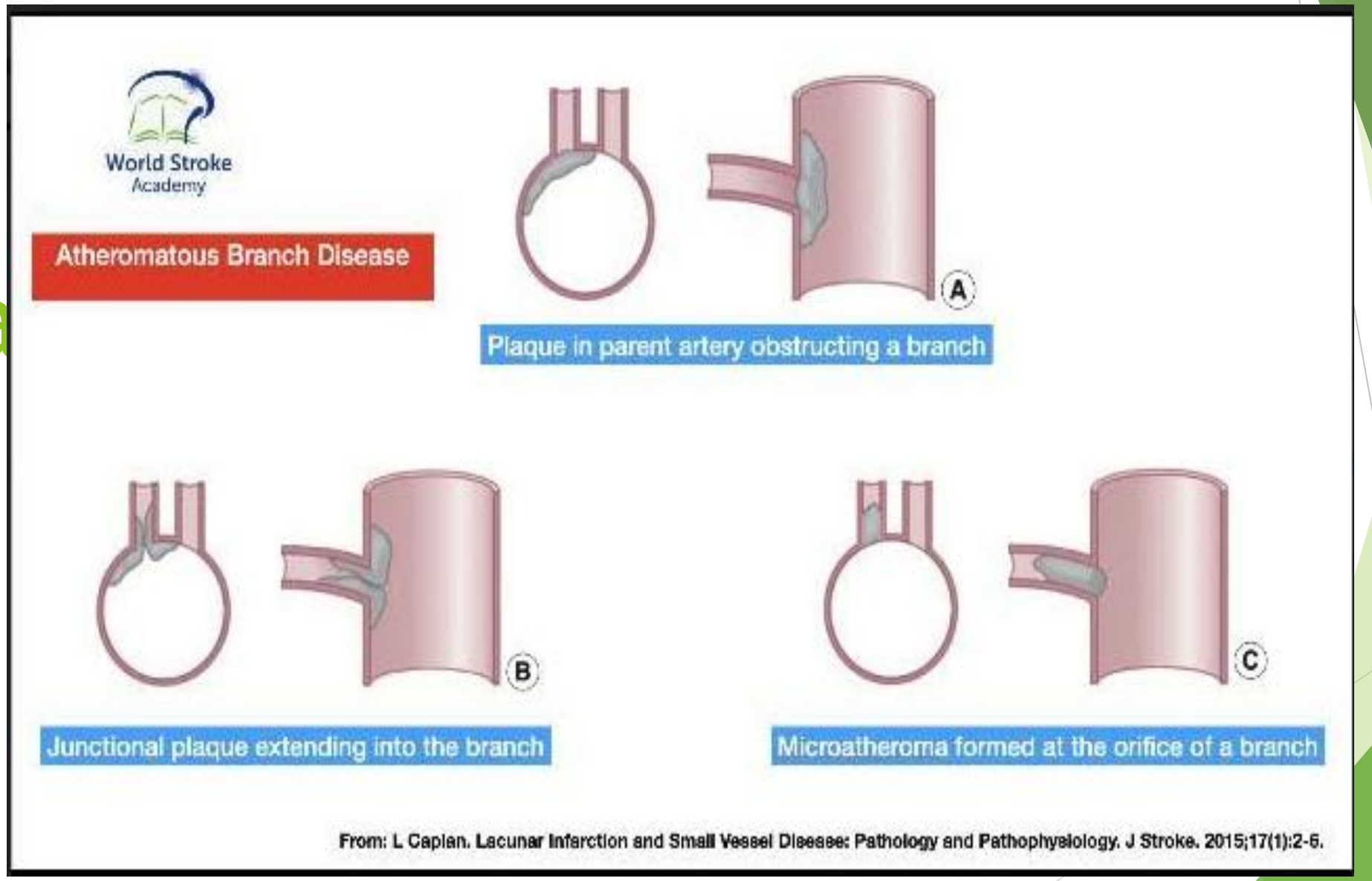
Caso 3

- Ecocardiograma: normal
- Holter 24h: normal
- Ecodoppler de vasos del cuello: normal
- HBA1C: 6.4%
- Colesterol total: 189, LDL: 128

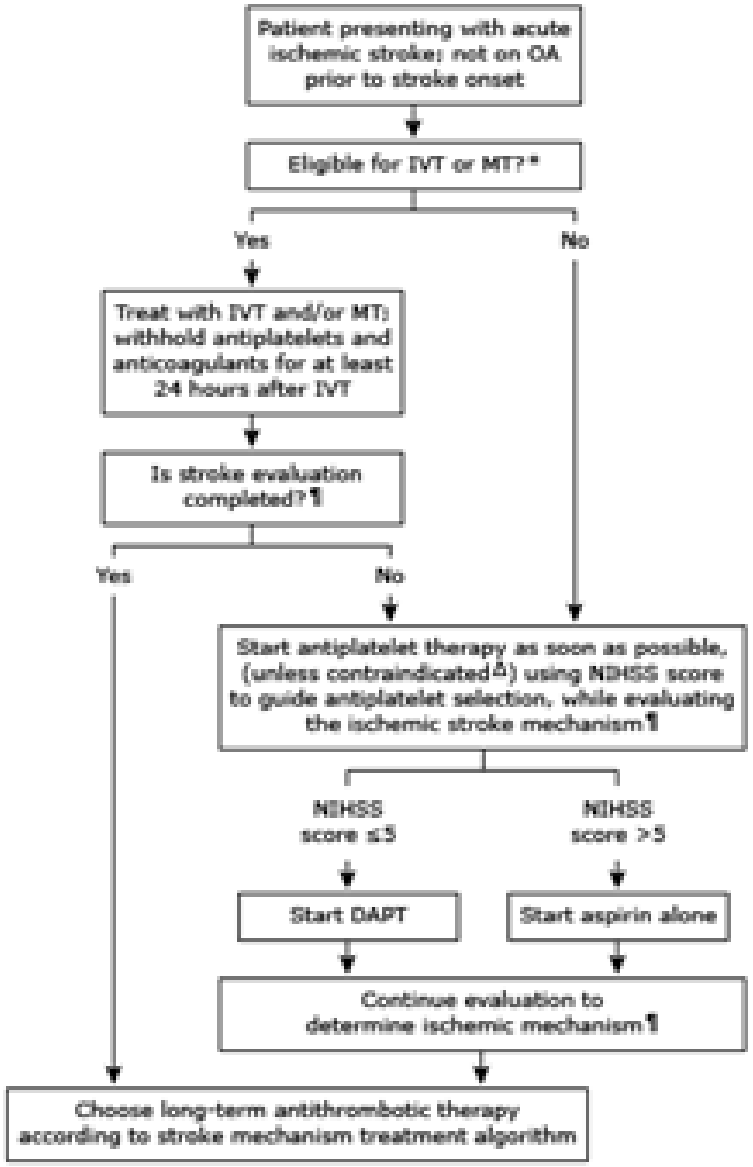
Caso 3

- Dx: ACV isquémico en territorio profundo de la ACM derecha de etiología: ateromatosis de pequeño vaso
- Prevención secundaria: AAS 125mg/día (indefinido)
- Atorvastatina 80mg/día (indefinido: target LDL menor a 70)
- Clopidogrel 75mg/día por 3 semanas y luego suspender
- Dieta, controle estricto de PA, glicemia, colesterol, actividad física

La


World Stroke Academy
Atheromatous Branch Disease
A
Plaque in parent artery obstructing a branch
B
Junctional plaque extending into the branch
C
Microatheroma formed at the orifice of a branch
From: L Caplan. Lacunar Infarction and Small Vessel Disease: Pathology and Pathophysiology. J Stroke. 2015;17(1):2-6.

Immediate antithrombotic treatment of acute ischemic stroke



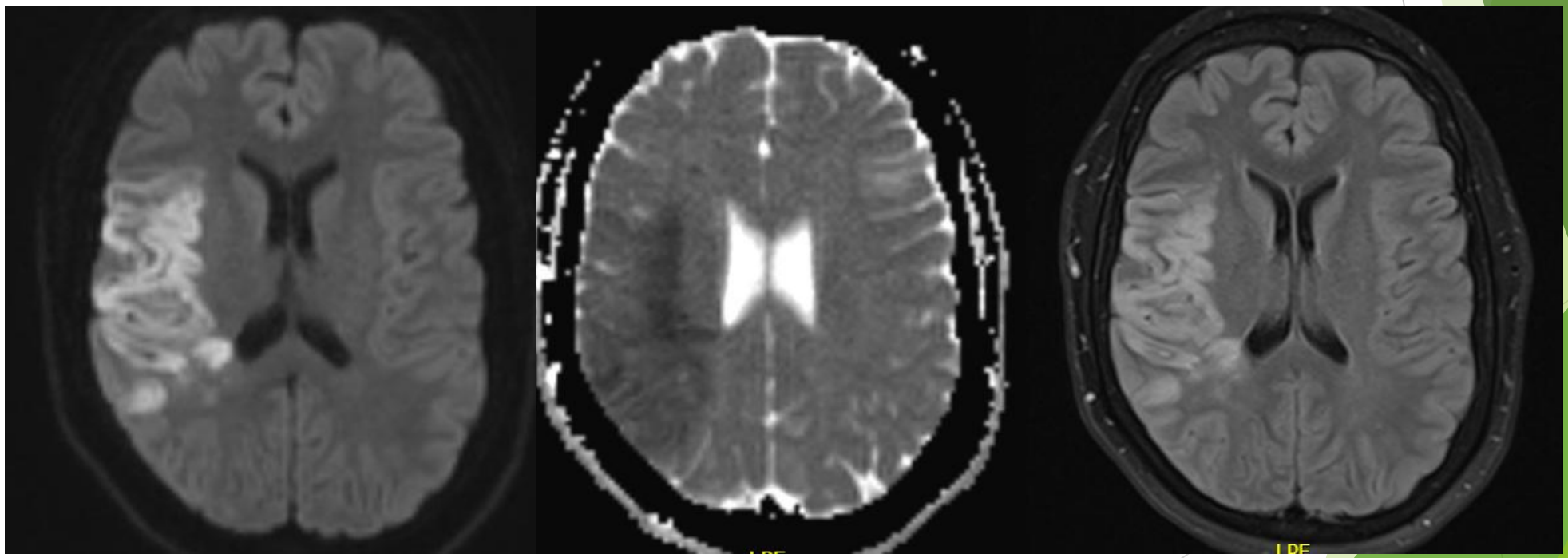
Caso 4

- Femenino
- 34 años
- Gestante 17 semanas
- HTA
- Obesa
- Hipotiroidismo
- 1 ABO

Caso 4

- Cuadro de instalación brusca de debilidad del hemicuerpo izquierdo, disartri, acompañado de somnolencia e hipoactividad.
- NIHSS: 4

Caso 4



Caso 4

- Ecocardiograma: normal
- Holter 24h: normal
- Ecodoppler de vasos del cuello: normal
- HBA1C: 5.2%
- Colesterol total: 180, LDL: 98
- Perfil SAF: anticoagulante lúpico positivo, déficit de proteína S
- Perfil colagénico: ANA + 1/360, C4 consumido
- Serologías virales: -

Dx final

- ACV isquémico extenso en territorio de la ACM derecha de etiología SAF secundario a LES.

- Prevención secundaria: HBPM 1U/K c/12h
- AAS 125mg/día

Síndrome Antifosfolipídico

- Warfarina
- Adición de AAS?
- DOAC?

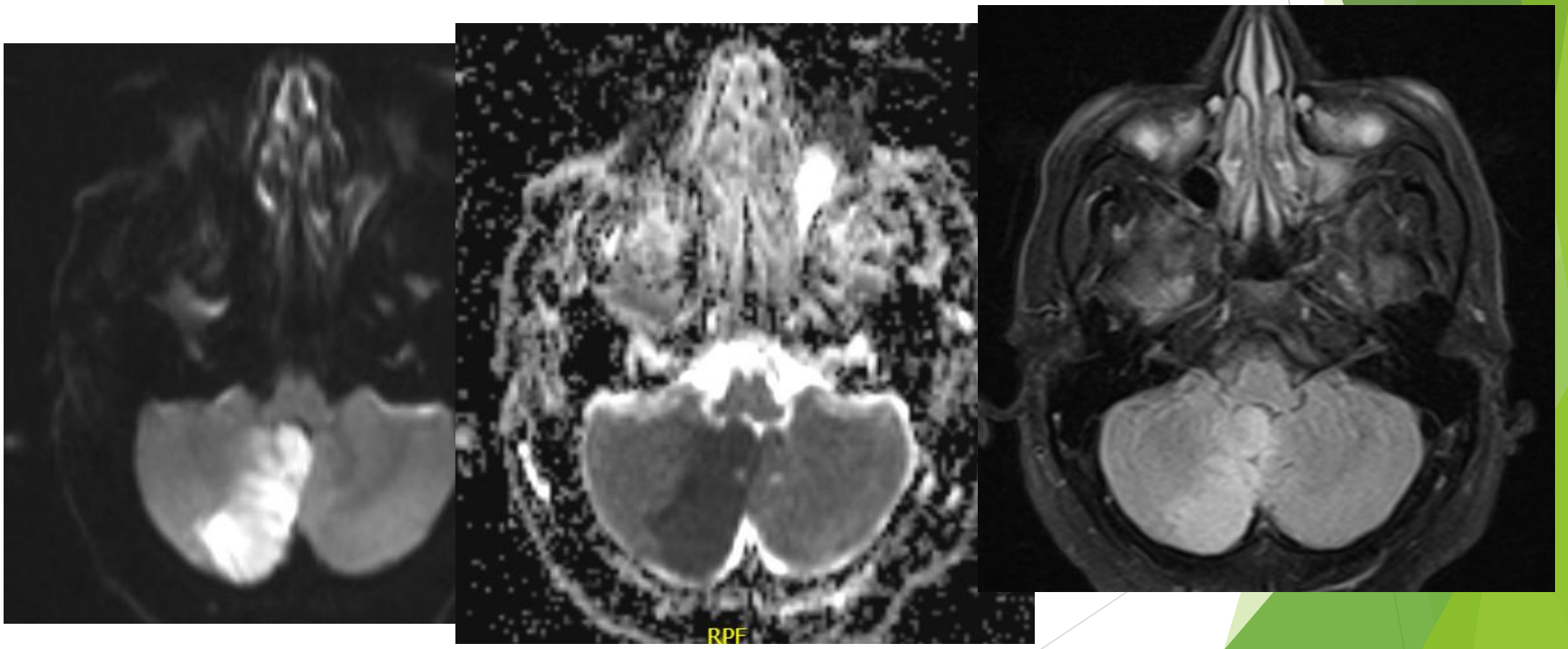
Caso 5

- Masculino
- 38 años

Caso 5

- 24h antes del inicio del cuadro el pcte fue a jugar futbol.
- Cuadro de cervicalgia de inicio insidioso que irradia a hemicraneana derecha, se realizó masajes en el cuello. 48h posterior al inicio del dolor se agregó trastornos del equilibrio y vómitos.
- NIHSS: 2
- Rankin: 0

MRI

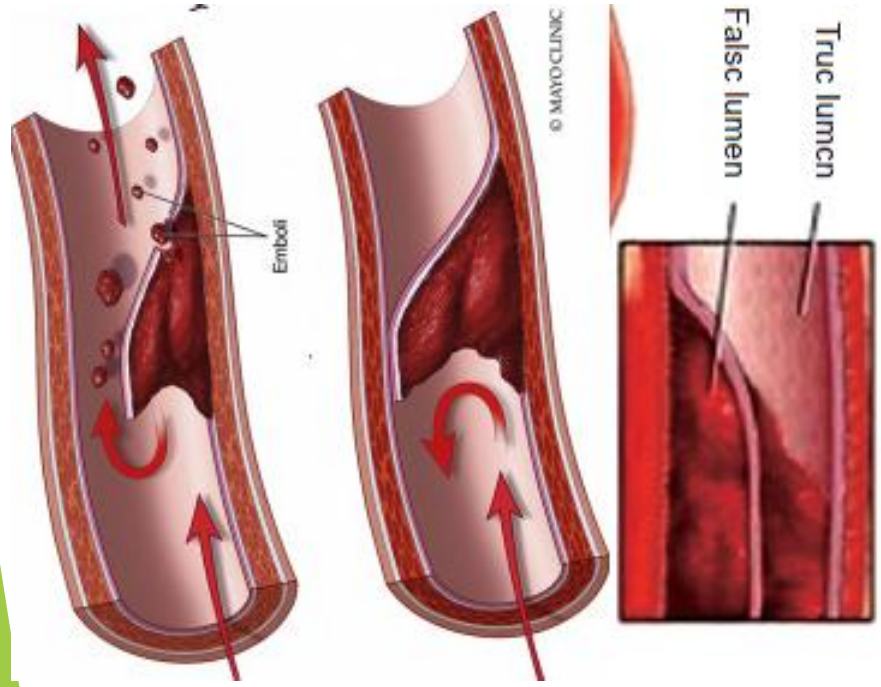


Dx final

- ACV isquémico en territorio de la AVD en el segmento V3 de etiología: disección arterial.

- Prevención secundaria:

5.7. Dissection



Recommendations for Dissection
Referenced studies that support recommendations are summarized in online Data Supplements 43 and 44.

COR	LOE	Recommendations
1	C-EO	1. In patients with ischemic stroke or TIA after an extracranial carotid or vertebral arterial dissection, treatment with antithrombotic therapy for at least 3 months is indicated to prevent recurrent stroke or TIA.
2a	B-R	2. In patients with ischemic stroke or TIA who are <3 months after an extracranial carotid or vertebral arterial dissection, it is reasonable to use either aspirin or warfarin to prevent recurrent stroke or TIA.[593,594]
2b	C-LD	3. In patients with stroke or TIA and extracranial carotid or vertebral artery dissection who have recurrent events despite antithrombotic therapy, endovascular therapy may be considered to prevent recurrent stroke or TIA.[595,596]

?

Disección arterial

- ANTIAGREGACIÓN
- AIT ABCD2<4 o NIHSS >5: AAS 160 a 325 mg/día.
- AIT $ABCD^2$ ≥4 o NIHSS ≤5: AAS 160 a 325 mg/día luego AAS 125 mg/día + clopidogrel 300 a 600 mg dosis de carga, luego 75 mg/día.

- ANTICOAGULACIÓN
- Tamaño del infarto pequeño a mediano: HPBM dentro de las 24h y por 48h y luego warfarina o DOAC.
- Tamaño del infarto grande, con transformación hemorrágica, HTA no controlada: iniciar AAS y expectar anticoagulación por 2 semanas.

5.8. Hypercoagulable States

5.8.1. Hematologic Traits

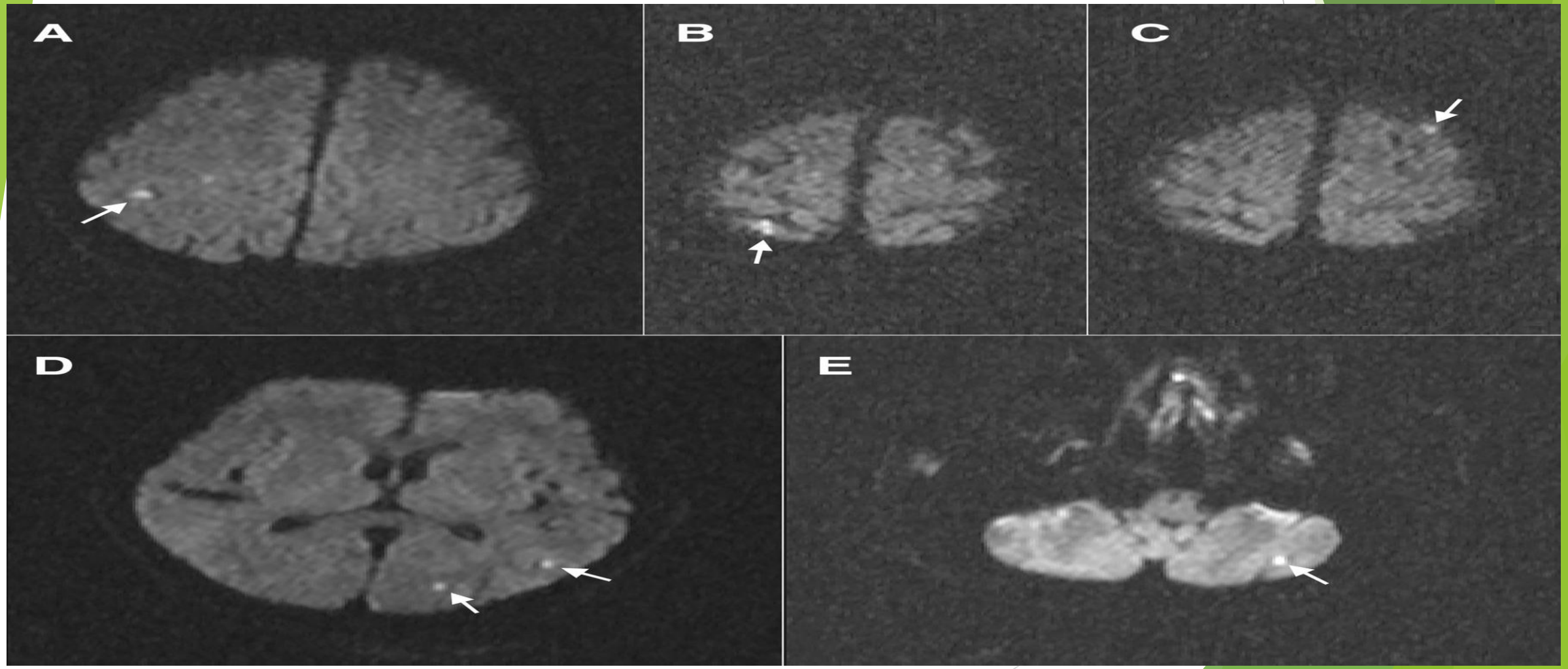
Recommendation for Hematologic Traits
Referenced studies that support the recommendation are summarized in online Data Supplement 45.

COR	LOE	Recommendation
2a	C-LD	1. In patients with ischemic stroke or TIA of unknown source despite thorough diagnostic evaluation and no other thrombotic history who are found to have prothrombin 20210A mutation, activated protein C resistance, elevated factor VIII levels, or deficiencies of protein C, protein S, or antithrombin III, anti-platelet therapy is reasonable to reduce the risk of recurrent stroke or TIA.[600–606]

Inherited thrombophilias – Inherited thrombophilias are hypercoa

- Protein C deficiency
- Protein S deficiency
- Antithrombin III deficiency
- Activated protein C resistance
- Factor V Leiden as a cause of activated protein C resistance
- Prothrombin G20210A mutation

Signo del triple territorio: Sx de Trosseu



Combining Multiple Approaches for the Secondary Prevention of Vascular Events After Stroke

A Quantitative Modeling Study

Daniel G. Hackam, BSc, MD, PhD, FRCPC; J. David Spence, MD, FRCPC, FAHA

- La combinación de 5 estrategias aplicadas a pctes con antecedentes de ACV o AIT (modificación de la dieta, ejercicio, aspirina, una estatina y un agente antihipertensivo) podría resultar en una reducción del riesgo relativo acumulativo del 80 %.

- NNT: 5

Nutrición

-Dieta sureña: ↑39% riesgo ACV

-↓2.5g/D de sal: ↓20% riesgo eventos cardiovasculares

-↓2.5g/d Na: ↓2mmHg

4.1.1. Nutrición

Recommendations for Nutrition
Referenced studies that support recommendations are summarized in online Data Supplements 3 and 4.

COR	LOE	Recommendations
2a	B-R	1. In patients with stroke and TIA, it is reasonable to counsel individuals to follow a Mediterranean-type diet, typically with emphasis on monounsaturated fat, plant-based foods, and fish consumption, with either high extra virgin olive oil or nut supplementation, in preference to a low-fat diet, to reduce risk of recurrent stroke.[95,96]
2a	B-R	2. In patients with stroke or TIA and hypertension who are not currently restricting their dietary sodium intake, it is reasonable to recommend that individuals reduce their sodium intake by at least 1g/d sodium (2.5 g/d salt) to reduce the risk of cardiovascular disease (CVD) events (including stroke).[97,98]

Actividad física

Conducta de riesgo cardiovascular: estar sentado >4 h/día

Ejercicio regular: ↓ 40% riesgo caardiovascular

Recommendations for Physical Activity
Referenced studies that support recommendations are summarized in online Data Supplements 5 and 6.

COR	LOE	Recommendations
1	C-LD	1. In patients with stroke or TIA who are capable of physical activity, engaging in at least moderate-intensity aerobic activity for a minimum of 10 minutes 4 times a week or vigorous-intensity aerobic activity for a minimum of 20 minutes twice a week is indicated to lower the risk of recurrent stroke and the composite cardiovascular end point of recurrent stroke, MI, or vascular death.[110]
2a	B-R	2. In patients with stroke or TIA who are able and willing to increase physical activity, engaging in an exercise class that includes counseling to change physical activity behavior can be beneficial for reducing cardiometabolic risk factors and increasing leisure time physical activity participation.[111–114]
2a	C-EO	3. In patients with deficits after stroke that impair their ability to exercise, supervision of an exercise program by a health care professional such as a physical therapist or cardiac rehabilitation professional, in addition to routine rehabilitation, can be beneficial for secondary stroke prevention.
2b	B-NR	4. In individuals with stroke or TIA who sit for long periods of uninterrupted time during the day, it may be reasonable to recommend breaking up sedentary time with intervals as short as 3 minutes of standing or light exercise every 30 minutes for their cardiovascular health.[115]

Tabaquismo

Hábito post ictus

Persistencia: riesgo ≈2 veces de recurrencia.

Cese: aumenta la expectativa de vida 5 años y retrasa 10 años la aparición de eventos cardiovasculares

Recommendations for Smoking Cessation
Referenced studies that support recommendations are summarized in online Data Supplements 7 and 8.

COR	LOE	Recommendations
1	A	1. In patients with stroke or TIA who smoke tobacco, counseling with or without drug therapy (nicotine replacement, bupropion, or varenicline) is recommended to assist in quitting smoking.[139–142]
1	B-NR	2. Patients with stroke or TIA who continue to smoke tobacco should be advised to stop smoking (and, if unable, to reduce their daily smoking) to lower the risk of recurrent stroke.[143–146]
1	B-NR	3. In patients with stroke or TIA. avoidance of environmental (passive) tobacco smoke is recommended to reduce risk of recurrent stroke.[147–150]

DIABETES

Target HbA1c <7% excepto:
- Expectativa de vida limitada.
- Historia de hipoglicemia.
- Enfermedades crónicas macro o microvasculares avanzadas.

Glucose Control for Secondary Prevention after Acute Ischemic Stroke and TIA

COR	LOE	Recommendations
1	A	1. In patients with an ischemic stroke or TIA who also have diabetes, the goal for glycemic control should be individualized based on the risk for adverse events, patient characteristics and preferences, and, for most patients, especially those <65 years of age and without life-limiting comorbid illness, achieving a goal of HbA1c ≤7% is recommended to reduce risk for microvascular complications.[229,230]

DIABETES

2a	B-R	4. In patients with prediabetes and ischemic stroke or TIA, lifestyle optimization (ie, healthy diet, regular physical activity, and smoking cessation) can be beneficial for the prevention of progression to diabetes.[237,238]
2a	C-EO	5. In patients with TIA or ischemic stroke, it is reasonable to screen for prediabetes/diabetes using HbA1c which, among available methods (HbA1c, fasting plasma glucose, oral glucose tolerance), has the advantage of convenience because it does not require fasting and is measured in a single blood sample.

DIABETES

2b	B-R	6. In patients with an ischemic stroke or TIA who also have diabetes, the usefulness of achieving intensive glucose control (ie, HbA1c ≤7%) beyond the acute phase of the ischemic event for prevention of recurrent stroke is unknown.[239–244]
2b	B-R	7. In patients with prediabetes and ischemic stroke or TIA, particularly those with a body mass index (BMI) ≥35 kg/mP^2, ≥35 kg/m^2 those <60 years of age, or women with a history of gestational diabetes, metformin may be beneficial to control blood sugar and to prevent progression to diabetes.[245–247]
2b	B-R	8. In patients ≤6 months after TIA or ischemic stroke with insulin resistance, HbA1c <7.0%, and without heart failure or bladder cancer, treatment with pioglitazone may be consid-ered to prevent recurrent stroke.[248]

Atención multidisciplinaria

6.1. Health Systems–Based Interventions for Secondary Stroke Prevention

Recommendations for Health Systems–Based Interventions
Referenced studies that support recommendations are summarized in online Data Supplements 90–92.

COR	LOE	Recommendations
1	C-EO	1. In patients with ischemic stroke or TIA, voluntary hospital-based or outpatient-focused quality monitoring and improvement programs are recommended to improve short-term and long-term adherence to nationally accepted, evidence-based guidelines for secondary stroke prevention.
2a	B-R	2. In patients with ischemic stroke or TIA, a multidisciplinary outpatient team-based approach (ie, care provision with active medication adjustment from advanced practice providers, nurses, or pharmacists) can be effective to control BP, lipids, and other vascular risk factors.[810–817]

Intervención multidisciplinaria

Research

International Journal of Stroke WSO

ICARUSS: An effective model for risk factor management in stroke survivors

Jacques Joubert[1], Stephen M Davis[2], Geoffrey A Donnan[1], Christopher Levi[3], Graeme Gonzales[1], Lynette Joubert[4] and Graeme J Hankey[5]

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doi: 10.1186/s12883-018-1158-5.

Long-term, telephone-based follow-up after stroke and TIA improves risk factors: 36-month results from the randomized controlled NAILED stroke risk factor trial

Joachim Ögren [1], Anna-Lotta Irewall [2], Lars Söderström [3], Thomas Mooe [2]