



# Angioplastia Carotidea Optima

Dr. Alejandro Cherro.

Colegio Argentino de Cardioangiólogos intervencionistas.

Director Carrera CACI-UBA



# Angioplastia Carotidea Optima

## Introducción:

Por que es importante prevenir?

Incidencia global de STROKE

- EEUU 795.000 Stroke. 140.000 mueren cada año.
- Europa 1.100.000 muertes por Stroke.
- China 1.200.000 muertes por Stroke.  
(3 veces mayor al número de muertes por enf coronaria)



## Angioplastia Carotidea Optima

Anual mundial 12.2 millones de ACV

Muertes x ACV 6.6 millones

10-15% son ACV isquémicos debido a lesiones asintomáticas >50%.



# Angioplastia Carotidea Optima

Objetivo de reducir el riesgo de ACV y muerte.

Angioplastia ~~VS~~ Endarterectomía vs Tratamiento Médico

Angioplastia + Endarterectomía VS Tratamiento Médico.





# Angioplastia Carotidea Optima

Angioplastia o Endarterectomía

Pacientes **sintomáticos** = estenosis mayores del 50%

Pacientes **asintomáticos** = lesiones mayores del 70%-80%, con características clínicas e imagenológicas de alto riesgo.



## Angioplastia Carotidea Optima

### Carotid endarterectomy or stenting or best medical treatment alone for moderate-to-severe asymptomatic carotid artery stenosis: 5-year results

Conclusiones: Endarterectomia + BMT o Angioplastia + BMT no fue superior a BMT respecto a cualquier stroke dentro de 30 días o ipsilateral stroke en el seguimiento a 5 años

Thomas Zeller<sup>16</sup>, Wolf-Dirk Niesen<sup>17</sup>, Kristian Barliin<sup>18</sup>, Andreas Binder<sup>19</sup>, Jörg Glahn<sup>20</sup>, Werner Hacke<sup>21</sup>, Peter Arthur Ringleb<sup>21</sup>; SPACE-2 Investigators

Collaborators, Affiliations + expand

PMID: 36115360 DOI: 10.1016/S1474-4422(22)00290-3

#### Abstract

**Background:** The optimal treatment for patients with asymptomatic carotid artery stenosis is under debate. Since best medical treatment (BMT) has improved over time, the benefit of carotid endarterectomy (CEA) or carotid artery stenting (CAS) is unclear. Randomised data comparing the effect of CEA and CAS versus BMT alone are absent. We aimed to directly compare CEA plus BMT with CAS plus BMT and both with BMT only.

## Angioplastia Carotídea Óptima

- CREST Lesiones > 70%
- SAPPHIRE Lesiones >50% y 80%

### Asintomaticos

- ACST 1 Lesiones > 70%
- ACST2 Lesiones > 60%
- **SPACE 2 Lesiones >50%**
- CREST 2. Lesiones > 70%





CLINICAL AND POPULATION SCIENCES

Carotid Stenting Versus Endarterectomy for Asymptomatic Carotid Artery Stenosis: A Systematic Review and Meta-

**CONCLUSIONS:** When treating asymptomatic carotid artery stenosis, CAS has comparable perioperative and long-term composite outcomes compared with CEA. However, CAS may have a higher risk of any stroke and nondisabling stroke in the perioperative period.

carotid endarterectomy (CEA) in treating asymptomatic carotid artery stenosis based on results from randomized controlled trials.

**METHODS:** Randomized controlled trials comparing CAS and CEA in treating asymptomatic carotid artery stenosis were searched from databases of the EMBASE, PubMed, MEDLINE, and Cochrane libraries. Two independent reviewers identified eligible studies, extracted relevant data, and used the Cochrane risk of bias tool to assess quality. Mantel-Haenszel method random-effects models were used to estimate odds ratio (OR) regarding perioperative risks between CAS and CEA. Kaplan-Meier curve data were extracted and analyzed through  $\text{Exp}[(O-E)/\text{Var}]$  fixed-effect models to calculate the Peto odds ratio (OR) regarding long-term outcomes.





Trial	Publication year	Recruitment year	Population	Follow-up	Total	Asymptomatic		Rank
ACST-2 <sup>5</sup>	2021	2008–2020	Asymptomatic with $\geq 60\%$ stenosis	5 y	3625	3625	CAS	1811
							CEA	1814
ACT-1 <sup>11</sup>	2016	2005–2013	Asymptomatic with $>70\%$ stenosis	5 y	1453	1453	CAS	1089
							CEA	364
Brooks <sup>14,21,23</sup>	2001	1998–2002	Symptomatic with $>70\%$ stenosis or asymptomatic with $>80\%$ stenosis	10 y	189	85	CAS	43
							CEA	42
CREST <sup>13,15,16,18</sup>	2016	2005–2008	Asymptomatic with $>70\%$ stenosis	10 y	2502	1181	CAS	594
							CEA	587
M2017 <sup>10</sup>	2017	NR	Asymptomatic with $>70\%$ stenosis	2 y	136	136	CAS	68
							CEA	68
SAPPHIRE <sup>19,20</sup>	2004	2000–2002	Symptomatic with $>50\%$ stenosis or asymptomatic with $>80\%$ stenosis	3 y	334	237	CAS	117
							CEA	120
SPACE-2 <sup>9,12,24</sup>	2019	2009–2014	Asymptomatic with $>50\%$ stenosis	1 y	513	400	CAS	197
							CEA	203



## Examen clínico-neurológico completo

### Pacientes **sintomáticos** o **asintomáticos**

- **Presentación clásica:**

Debilidad de cara y brazo contralateral que en ocasiones puede afectar la pierna

Alteraciones mono oculares transitorias.

**Síntomas no asociados:**

Síncope, mareo, vértigo.

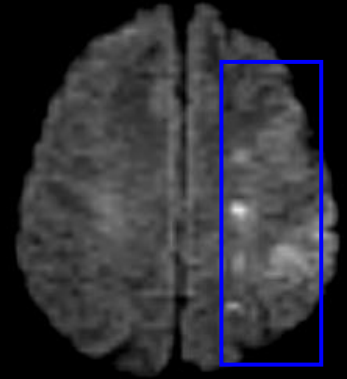
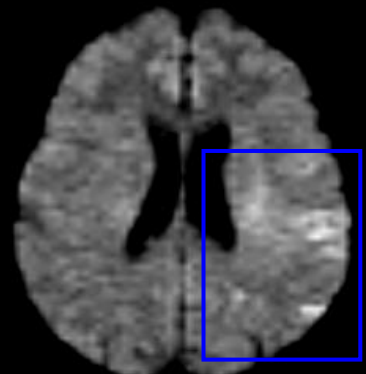
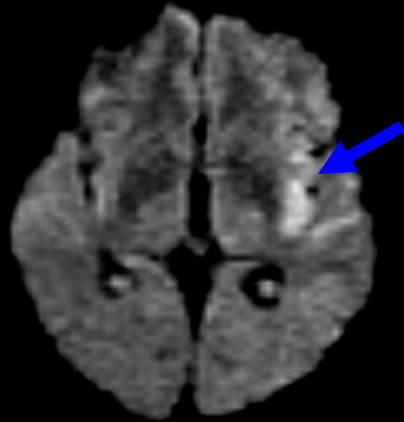
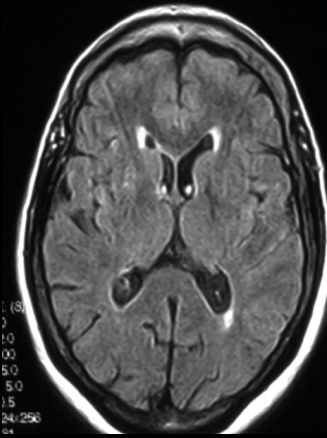
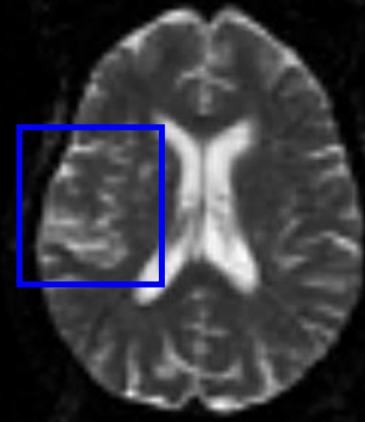
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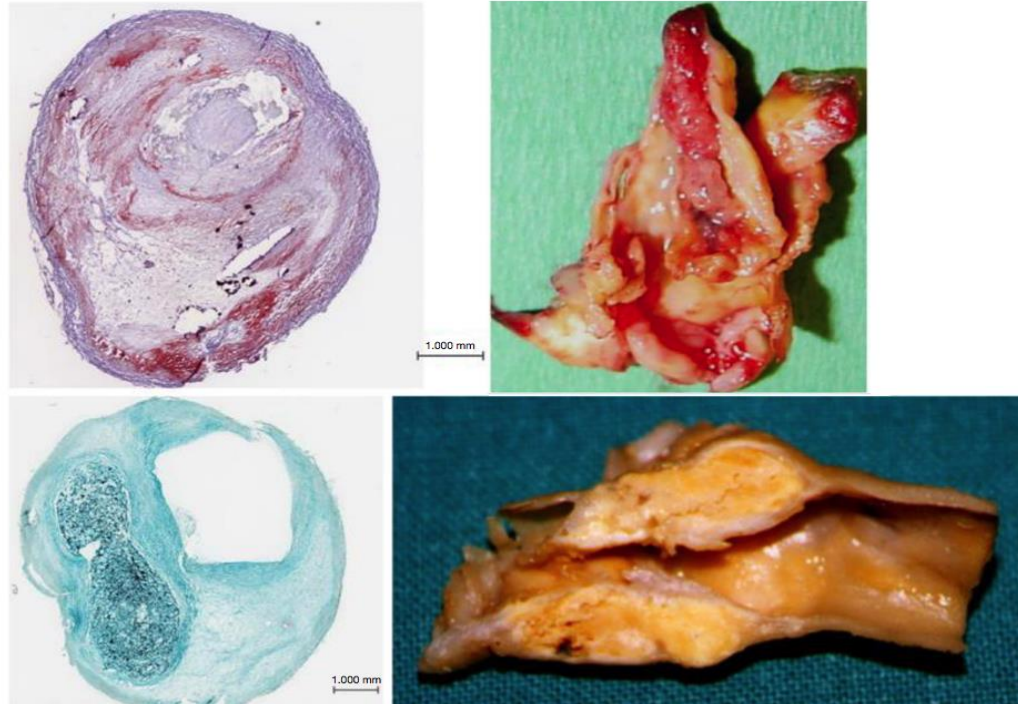
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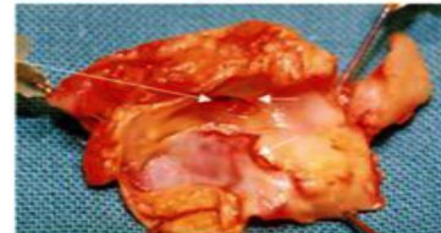
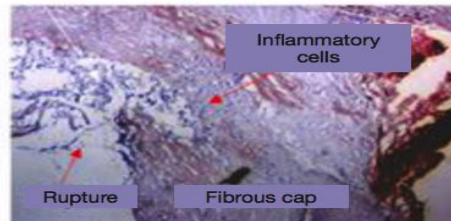
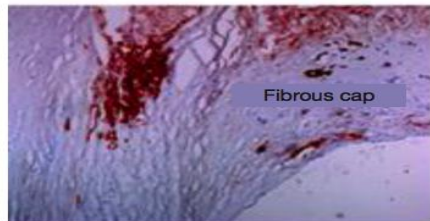




**Figure 1** Macroscopic and histologic aspects of plaques with different phenotypes. On top a plaque with atherothrombosis and bottom a stable plaque.

# Placas Vulnerables

- ❖ THIN FIBROUS CAP
- ❖ JUXTA-LUMINAL LIPID-NECROTIC CENTRE
- ❖ HIGH LIPID CONTENT
- ❖ SURFACE THROMBOSIS
- ❖ INTRA-PLAQUE HEMORRHAGE
- ❖ INCREASED LEVELS OF INFLAMMATION
- ❖ EROSION/RUPTURE





# Pacientes vulnerables

Lesion de 80-99% de estenosis.

Fumador de mas de 10 paquetes año  
Hipertensión no controlada

Placa ecolúcida

Hemorragia intraplaca

Placas ulceradas

Placas heterogéneas

**Tasa de stroke hasta 5%asintomáticos**

TIA o Stroke contralateral

Progresión de placa.

Oclusión contralateral

infartos en areas no elocuentes

I  
HITS en doppler transcraneanos

# Revascularization Decision CEA or CAS?

## *High-risk patients for CEA*

- Congestive heart failure
- Co-existent CAD requiring bypass surgery
- Contralateral carotid occlusion
- Prior CEA and recurrent stenosis
- Surgically inaccessible lesions
- Contralateral laryngeal nerve paralysis
- Spinal immobility
- Neck radiation therapy, radical neck surgery, etc

## *High-risk patients for CAS*

***Age >80 years***

***Complex arch and carotid anatomy***

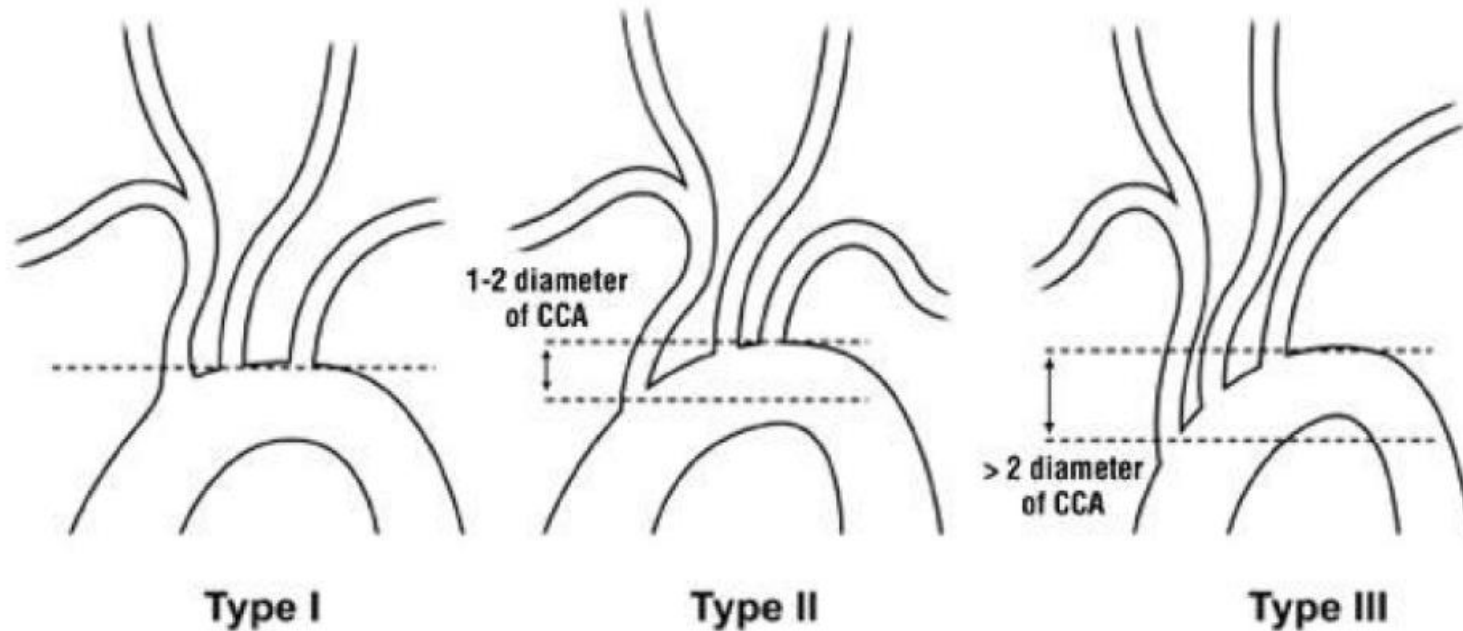
***Heavy Calcification.***

***Much Thrombus.***

***Cognitive dysfunction.***



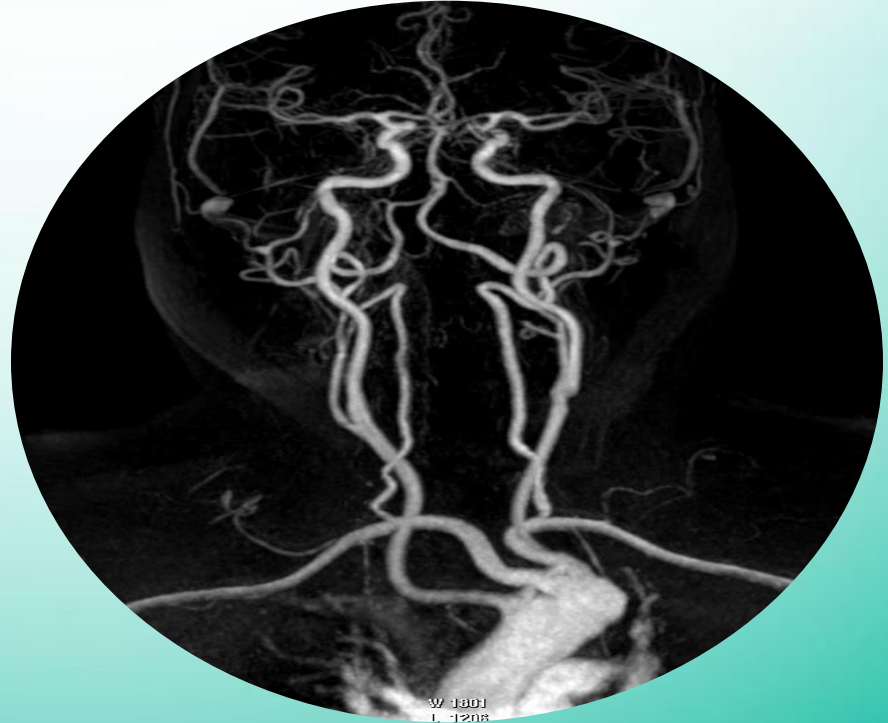
# TIPOS DE ARCO AÓRTICO







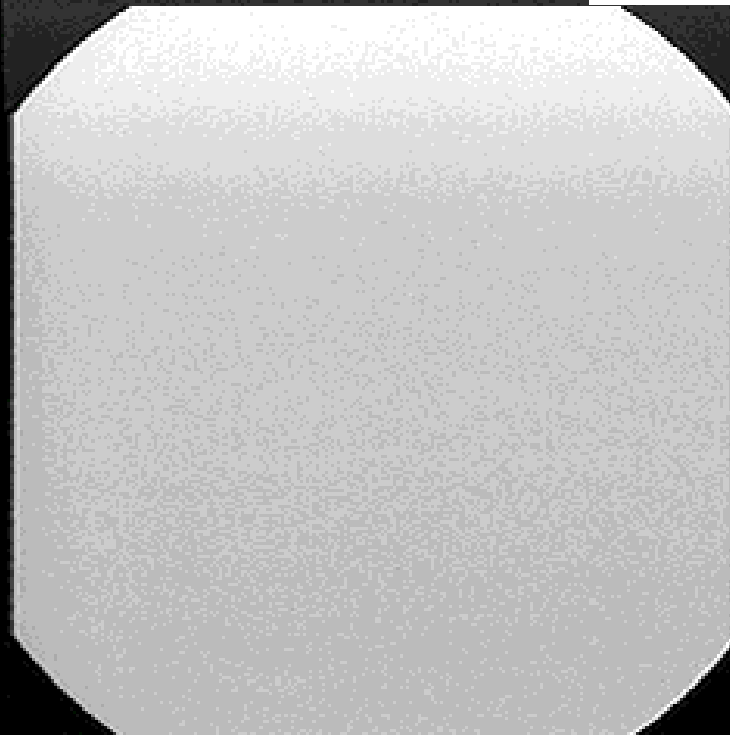
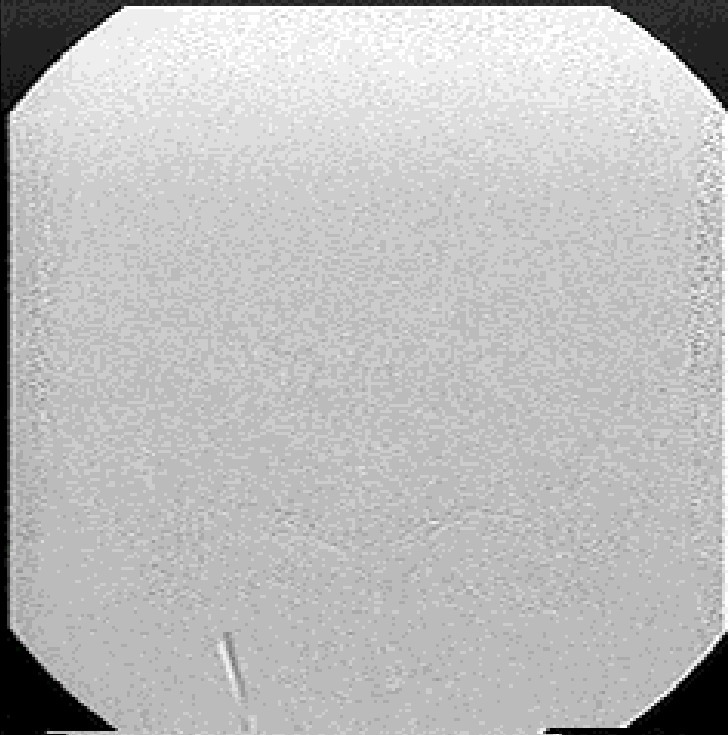
# Angiografía Digital





## Equipo multidisciplinario

- Neurólogo
- Cardiólogo Clínico
- Cardiólogo Intervencionista
- Neurocirujano
- Cirujano Vascular
- NeuroRadiólogo
- Hematólogo



# Carotid angioplasty. Update 2019

## Options for Diagnostic

### Editor's Choice — Management of Atherosclerotic Carotid and Vertebral Artery Disease: 2017 Clinical Practice Guidelines of the European Society for Vascular Surgery (ESVS)

Writing Group <sup>a</sup>, A.R. Naylor, J.-B. Ricco, G.J. de Borst, S. Debus, J. de Haro, A. Halliday, G. Hamilton, J. Kakisis, S. Kakkos, S. Lepidi, H.S. Markus, D.J. McCabe, J. Roy, H. Sillesen, J.C. van den Berg, F. Vermassen, ESVS Guidelines Committee <sup>b</sup>, P. Kolh, N. Chakfe, R.J. Hinchliffe, I. Koncar, J.S. Lindholt, M. Vega de Ceniga, F. Verzini, ESVS Guideline Reviewers <sup>c</sup>, J. Archie, S. Bellmunt, A. Chaudhuri, M. Koelemay, A.-K. Lindahl, F. Padberg, M. Venermo

Recommendation 1	Class	Level
Duplex ultrasound (as first-line), computed tomographic angiography and/or magnetic resonance angiography are recommended for evaluating the extent and severity of extracranial carotid stenoses	I	A
Recommendation 5		
Intra-arterial digital subtraction angiography should not be performed in patients being considered for revascularisation, unless there are significant discrepancies on non-invasive imaging	III	A

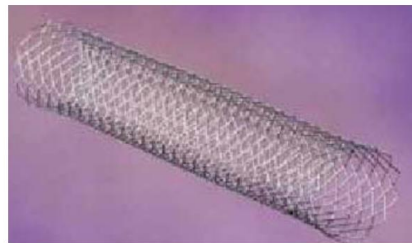
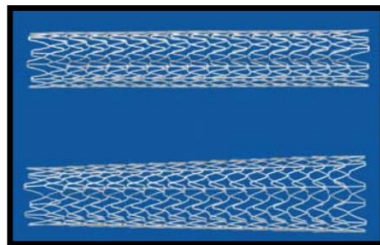
*Pilar*

XXXIII CONGRESO NACIONAL

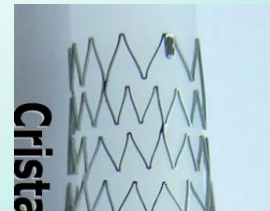
# Que stent usar?



Xact®, Abbott Vascular Devices



Carotid WALLSTENT

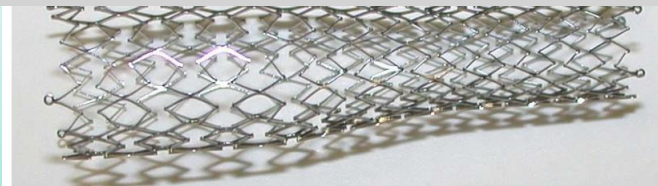


Crista

Elegir el de celdas mas cerradas!!



Precise



PROTEGE



vatec



Sinus Carotid® RX,  
Optimed



Smart Cordis



Medtronic

# Event rates related to the different stents



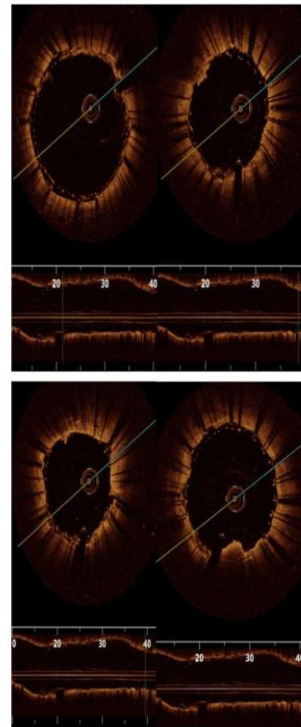
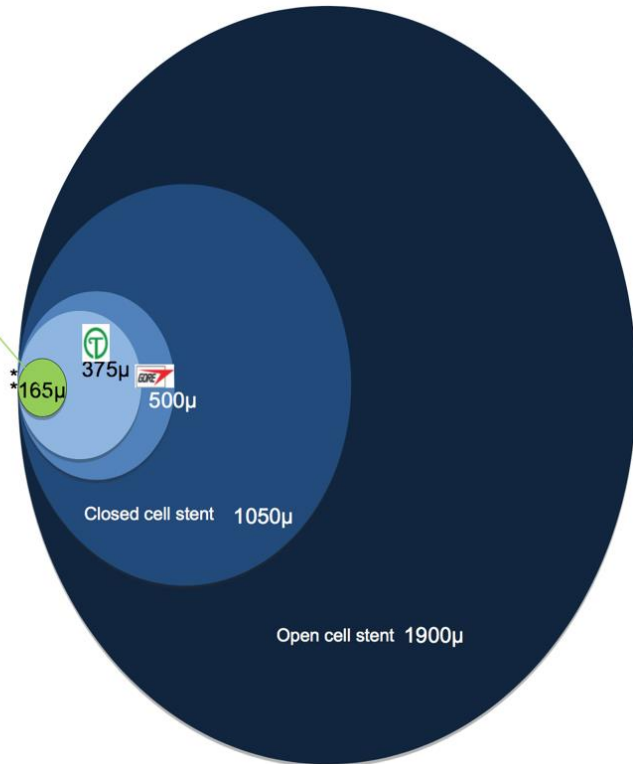
Table 4. Overview of event rates related to the different stents

Stent name	Total population			Symptomatic population			Asymptomatic population		
	Patients	All events	Post-procedural events	Patients	All events	Post-procedural events	Patients	All events	Post-procedural events
X-act		1.9%	1.9%		2.2%	2.2%		1.7%	1.7%
Nexstent		3.3%	3.3%		0.0%	0.0%		4.2%	4.2%
Wallstent		2.3%	1.2%		2.3%	1.2%		2.3%	1.2%
Precise		4.1%	3.1%		6.3%	4.9%		2.0%	1.3%
Protégé		3.0%	3.0%		6.7%	6.7%		1.4%	1.4%
Acculink		4.2%	3.7%		7.7%	7.1%		1.7%	1.2%
Exponent		11.8%	5.9%		9.1%	9.1%		13.0%	4.3%
Total	3179	2.83%	1.9%	1317	3.6%	2.73%	1862	2.25%	1.3%

2/3







**CAS neuro events (stroke, TIA) are POST-procedural**

# Que stent usar?



- No significant prolapse of plaque and
- Good wall apposition

# Mesh-covered carotid stents

	Device name		Free cell area (mm <sup>2</sup> )		Cell size (μm)	Delivery system
Terumo Interventional Systems	Roadsaver		0.38		375-500	5Fr
Inspire MD	CGuard		0.15		150-180	6 Fr
W.L. Gore & Associates	Gore Carotid Stent		0.44		500	5 Fr



**CLINICAL PRACTICE GUIDELINE DOCUMENT****European Society for Vascular Surgery (ESVS) 2023 Clinical Practice Guidelines on the Management of Atherosclerotic Carotid and Vertebral Artery Disease** ☆

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 peri-procedural stroke or transient ischaemic attack.

For patients with acute ischaemic stroke due to a symptomatic 50–99% carotid stenosis who have received intravenous thrombolysis, delaying carotid endarterectomy or carotid stenting by six days following completion of thrombolysis should be considered.

For patients presenting with recent carotid territory symptoms and evidence of free floating thrombus within the carotid artery, therapeutic anticoagulation is recommended.

For patients selected to undergo carotid artery stenting, transradial or transcarotid artery revascularisation should be considered as an alternative to transfemoral carotid artery stenting, especially where transfemoral access may confer a higher risk of complications.



## Protección cerebral siempre?

### Recommendation 87

Unchanged

**For patients undergoing carotid artery stenting, cerebral protection systems should be considered.**

Class	Level	References	ToE
Ila	C	Rosenfield <i>et al.</i> (2016) <sup>224</sup> , Brott <i>et al.</i> (2010) <sup>316</sup> , Touze <i>et al.</i> (2009) <sup>490</sup>	



# Angioplastia carotidea Optima

Evaluación de Pacientes al momento de tratar

- Tipo de Placa- grado de estenosis y anatomía
- Riesgo de Endarterectomía
- Riesgo de Angioplastia
- Riesgo de stroke con tto médico
- Habilidad de operadores
- Esperanza de vida del enfermo



# Angioplastia Carotidea Optima

Los **estudios publicados** muestran resultados de la angioplastia carotidea; comparándose con endarterectomía carotidea y/o con tratamiento médico incluyendo procedimientos realizados con **operadores con escasa experiencia, bajo uso de sistemas de protección cerebral, angioplastias sin stent** e inadecuado tratamiento farmacológico así también como una **inapropiada selección de los pacientes**

ACOP

Selección correcta del paciente

Utilización rutinaria de stent

Uso de dispositivos de protección cerebral

Realización del procedimiento con operadores experimentados

El mejor tratamiento médico (DAPT, Estatinas, control FRCV, cambio de estilo de vida)



### Resultados:

- Se incluyeron un total de 41 pacientes con una edad media de 67 años (DS 8.62) de los cuales el 75% fueron hombres y el 25% mujeres, con una prevalencia de DBT del 39%, HTA del 75% y TBQ del 14.6%.
- Los pacientes con estenosis carotidea sintomática representaron el 85.4% y los asintomáticos 14.6%.
- En el 100% de los pacientes se hizo una APCO exitosa.
- Durante la internación y en el seguimiento a 30 días la mortalidad y las complicaciones mayores fue del 0%.

**Tabla 1. Procedimiento**

N°	41	
ATP exitosa (%)	41 (100.0%)	
ATP con stent (%)	si	40 (97.6%)
	no	1 (2.4%)
Medida de stent utilizado (%)	7 x 30	18 (45%)/15
	mm/7x40mm/7x50mm	(37.5%)/5(12.5%)
	9x30mm/9x40mm	1(2.5%)/1(2.5%)
Tecnica utilizada (%)	A) Implante directo de stent	13 (31.7%)
	B) Pre o post-dilatacion con balon	28 (68.3%)
Pre o post-dilatacion con balon (%)	A) Post-Dilatacion con balon	23 (82.1%)
	B) Pre y Post-dilatacion con balon	5 (17.9 %)
	C)Predilatacion con balon	0 (0%)
Uso de filtro de proteccion distal (%)	41 (100 %)	
Tipo de cateter utilizado (%)	envoy/ JR/MP	1 (2.4%)/21(51.2%)/19(46.3%)
Tamaño del introductor (%)	7 French/8French	36 (87.8%)/5(12.2%)
DAPT (%)	aas-clop	40 (97.6%)
	aas-prasu	1 (2.4%)
Via de acceso	Femoral 41 ( 100%)	



**Tabla 2. Evolucion peri procedimiento**


N	41
Mortalidad hospitalaria (%)	0%
Mortalidad a 30 dias (%)	0%
Stroke a 30 dias (%)	0%
Complicacion clinica mayor intrahospitalaria (Muerte/ACV/ IAM %)	0%
Complicacion clinica menor IH (%)	1 (2,4%)
Complicacion del acceso mayor (%)	0%
Complicacion del acceso menor (%)	5 (12,2%) hematoma



## Angioplastia Carotidea Optima Conclusión

Realizando una Angioplastia Carotidea óptima, correcta selección del paciente, por características clínicas y anatómicas, con la utilización de protección cerebral, elección adecuada del acceso, stent de celdas cerradas, y el mejor tratamiento médico, asociado a operadores experimentados logramos disminuir la incidencia de eventos mayores en la enfermedad carotidea

Resultados CREST-2, comparando el TM con los abordajes quirúrgicos, estarían disponibles en 2025.



La calidad nunca es un accidente, siempre es el resultado de un esfuerzo de la inteligencia.

**Gracias por su atención!!!!**

CALAFATE - ARGENTINA