SURGICAL & RADIOLOGICAL ENDOVASCULAR SYMPOSIUM
SRES
11-12 SEPT. 2025
• Radiologie Interventionnelle
• Chirurgie Vasculaire
• Chirurgie cardio-vasculaire et thoracique
• Médecine vasculaire
PALAIS DU PHARO
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Sténoses Carotidiennes Asymptomatiques

Quels pays les opèrent encore ?

Elixène JEAN-BAPTISTE (Nice)

Two landmark RCTs compared CEA plus BMT with BMT alone in patients with aCAS (≥ 60% stenoses)

Original Contributions

Endarterectomy for Asymptomatic Carotid Artery Stenosis

Executive Committee for the Asymptomatic Carotid Atherosclerosis Study JAMA, May 10, 1995—Vol 273, No. 18

- ***ACAS found a 5-year risk of ipsilateral stroke, perioperative stroke, or death of 5.1% vs 11.0% in the CEA vs BMT arm (p<0.004)***
- ***ACST-1 found a 5- year risk of stroke and perioperative events of 6.4% vs 11.8% in the CEA vs BMT arm (p<0.0001)***

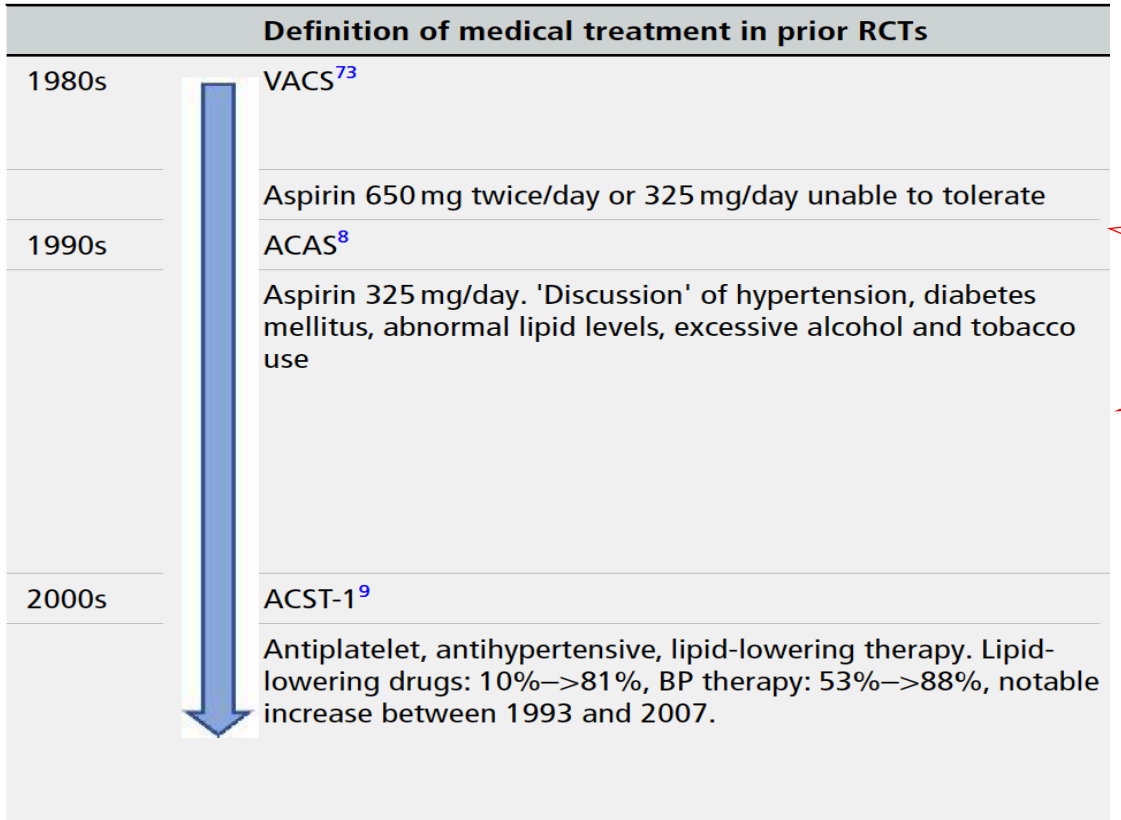
endarterectomy in patients without recent neurological symptoms: randomised controlled trial

Lancet 2004; **363:** 1491–502
See Commentary page 1486

*MRC Asymptomatic Carotid Surgery Trial (ACST) Collaborative Group**

2 essais contrôlés randomisés

	Recruitment period	N° Patients	TCNM	NNT
ACAS	1987-1993	1662	2.3%★	17
ACST-1	1993-2003	3120	3.1%	19



Old level 1 evidence

★*Half were Angiogram related*

World Stroke Organization

What should we d

Anne L. Abbott[1,2,3,4]*, Chris
Brian R. Chambers[1,2,4]

Abstract The benefit of prophylactic car
(CEA) for patients with asymptomatic se
in the major randomised surgical studies
and may now be absorbed by improvem
medical intervention. Strategies to identi
stroke risk are needed. If surgical in
considered the complication rates of
should be available. Clinicians will diffe

nosis of at least moderate severity (>40–
to the attention of clinicians from dive
prevalence gradually rises from about 0·4

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Curr Cardiol Rep (2011) 13:265–2
DOI 10.1007/s11886-011-0187-0

LETTER TO THE EDITO

Letter to the Ed
Misunderstandi

Anne Abbott

Published online: 27 April 2011

To the Editor:

I would like to point out erro
in the paper by Walkup a
authors recommend surgery
disease for stenoses >80%

12% of the sample [3]. Ne
intervention alone. Patie
mediate" or "deferred" s
little randomised data w
carotid stenosis and med
4. The 5-year risks in A
projected using Kaplan
measured or observed o

A. Abbott (✉)
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VIEWPOINT

www.nature.com/clinicalpractice/n

A Abbott is an Honorary Senior Research Fellow at the National Stroke Research Institute in Melbourne, Victoria, Australia.

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Eur J Vasc Endovasc Surg (2009) 37, 625–632

ELSEVIER

LEADING ARTICLE

Who Benefits Most from Intervention for Asymptomatic Carotid Stenosis: Patients or Professionals?

A.R. Naylor [a,*], P.A. Gaines [b], P.M. Rothwell [c]

[a] *The Department of Vascular Surgery at Leicester Royal Infirmary, Leicester, UK*
[b] *The Sheffield Vascular Institute, Northern General Hospital, Sheffield, UK*
[c] *The Stroke Prevention Research Unit, University Department of Clinical Neurology, the John Radcliffe Hospital, Oxford, UK*

At a time when evidence suggests that up to 94% of interventions may not benefit the patient, the authors urge that at least one of the randomised trials comparing CEA with CAS in asymptomatic patients includes an adequately powered third limb for BMT. Timely investment now could optimise patient care and resource utilisation for all of us in the future.

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''All professions are a conspiracy against the laity''

George Bernard Shaw (1856–1950)

Two randomised controlled trials (RCTs), the Asymptomatic Carotid Atherosclerosis Study (ACAS)[1] and the Asymptomatic Carotid Surgery Trial (ACST)[2], concluded that carotid

« Improvements in what now constitutes 'best medical therapy' may have significantly reduced the risk of stroke compared to that observed in ACAS and ACST »

Medical (Nonsurgical) Intervention Alone Is Now Best for Prevention of Stroke Associated With Asymptomatic Severe Carotid Stenosis

Results of a Systematic Review and Analysis

The risk dilution effect:

Disproportionate numbers of patients with moderate stenosis (extremely low stroke risk) vs NASCET criteria defined severe stenosis (higher risk of stroke with « BMT »)

ECST, 1995[77]	127	2.3	1.9	. . .	. . .	. . .	. . .	. . .	. . .
ACBS, 1997[78]	357	1.2	1.4	3.4	4.2	2.1	2.5	5.8	. . .
CHS, 1998[82]	185	1.3	1.0	. . .	. . .	2.6	2.3	. . .	. . .
NASCET, 2000[3]	216	. . .	3.2	. . .	. . .	. . .	. . .	. . .	. . .
ACSRS, 2005[79]	1115	1.3	1.7	3.1	3.4	. . .	2.1	. . .	4.1
ASED, 2005[80]	202	1.2	1.0	3.2	3.1	2.4	2.2	5.6	5.1
SMART, 2007[81]	221	0.6	. . .	. . .	. . .	0.7	. . .	. . .	. . .

*ACAS indicates Asymptomatic Carotid Atherosclerosis Study; ECST, European Carotid Surgery Trial; ACBS, Asymptomatic Cervical Bruit Study; NASCET, North American Symptomatic Carotid Endarterectomy Trial; ACSRS, Asymptomatic Carotid Stenosis and Risk of Stroke Study; ASED, Asymptomatic Stenosis Embolus Detection Study; SMART, Second Manifestations of ARTerial disease Study.

(*Stroke*. 2009;40:e573-e583.)

Asymptomatic Carotid Artery Stenosis and the Risk of New Vascular Events in Patients With Manifest Arterial Disease

The SMART Study

Bertine M.B. Goessens, MSc; Frank L.J. Visseren, MD, PhD; L. Jaap Kappelle, MD, PhD; Ale Algra, MD, PhD; Yolanda van der Graaf, MD, PhD; for the SMART Study Group

Background and Purpose—The frequency of asymptomatic carotid artery stenosis (CAS) increases with age from 0.5% in individuals below 50 years of age to 5% to 10% in individuals over 65 years of age in the general population. Its prognostic value has been examined in the general population but less often in patients with clinical manifestations of arterial disease other than retinal or cerebral ischemia. We examined the relationship between asymptomatic CAS and

- ***Monitoring with questionnaires of 221 patients***
- ***3% stroke rate at 2.6-yr f-up (1%/yr)***
- ***ECST defined grade of stenosis ≥50% by duplex scan only***
- ***Only 96 patients had a 70%-99% stenosis (PSV>210 cm/s)***

Results—Asymptomatic CAS of 50% or greater was present in 221 (8%) patients. During a mean follow up of 3.6 years (SD=2.3), a first vascular event occurred in 253 patients (9%). The cumulative incidence rate for the composite of subsequent vascular events after 5 years was 12.3% (95% CI=10.7 to 13.9), for cerebral infarction 2.2% (95% CI=1.4 to 2.8), and for myocardial infarction 8.0% (95% CI=6.6 to 9.4). Adjusted for age and gender, asymptomatic CAS of 50% or greater was related to a higher risk of subsequent vascular events (hazard ratio=1.5, 95% CI=1.1 to 2.1), in particular of vascular death (hazard ratio=1.8, 95% CI=1.2 to 2.6). After additional adjustment for vascular risk factors, the hazard ratios remained essentially the same.

Conclusion—Asymptomatic carotid artery stenosis is an independent predictor of vascular events, especially vascular death, in patients with clinical manifestations of arterial disease or type 2 diabetes but without a history of cerebral ischemia. (***Stroke*. 2007;38:1470-1475.)**

Medical (Nonsurgical) Intervention Alone Is Now Best for Prevention of Stroke Associated With Asymptomatic Severe Carotid Stenosis

Results of a Systematic Review and Analysis

A systematic review of 11 studies with a total of 3724 patients with aCAS receiving BMT found a dramatic decline in annual ipsilateral stroke risk from 2.8% to 1.4% between 1985 and 2007.

VACS, 1993[10]	233	2.4	. . .	5.2	. . .	3.0	. . .	6.1	. . .
ACAS, 1995[11]	834	2.3	2.2	4.5	3.8	3.8	3.5	. . .	. . .
ECST, 1995[77]	127	2.3	1.9	. . .	. . .	. . .	. . .	. . .	. . .
ACBS, 1997[78]	357	1.2	1.4	3.4	4.2	2.1	2.5	5.8	. . .
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(*Stroke*. 2009;40:e573-e583.)

Low Risk of Ipsilateral Stroke in Patients With Asymptomatic Carotid Stenosis on Best Medical Treatment

A Prospective, Population-Based Study

Lars Marquardt, MD; Olivia C. Geraghty, MRCP; Ziyah Mehta, PhD; Peter M. Rothwell, PhD

Background and Purpose—The annual risk of ischemic stroke distal to ≥50% asymptomatic carotid stenoses was ≈2% to 3% in early cohort studies and subsequent randomized trials of endarterectomy. This risk might have fallen in recent

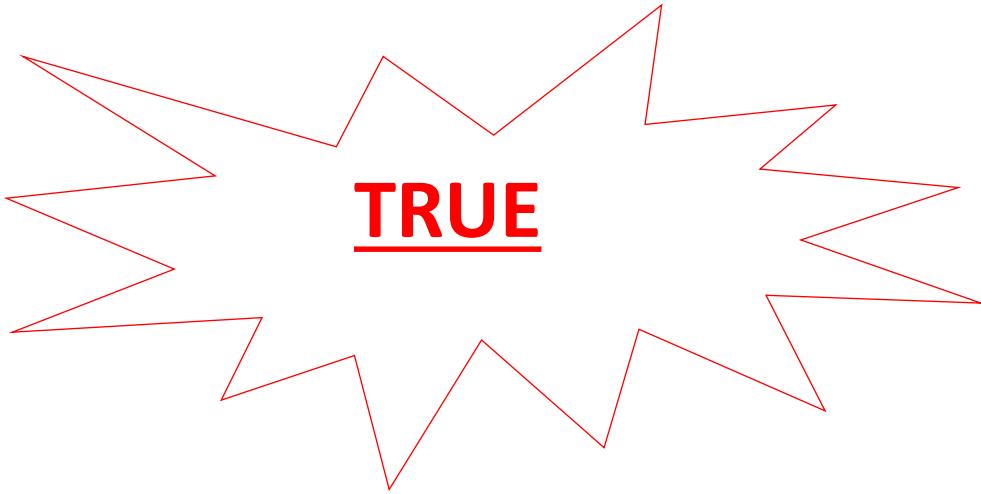
- *Annual stroke rate of 0.34% in BMT patients*
  - *Only 32 of the 1152 (2.8%) patients had a degree of carotid stenosis for which CEA would have been recommended*
    - *3 of them (10%) had a stroke*

the risk of stroke on intensive contemporary medical treatment was low. Larger studies are required to determine whether this apparent improvement in prognosis is generalizable. (***Stroke*. 2010;41:e11-e17.)**

(Stroke 2010; 41: e11-e17)

BMT has dramatically evolved in comparison with its loose definition from early aCAS trials

	Definition of medical treatment in prior RCTs
1980s	VACS[73]
	Aspirin 650 mg twice/day or 325 mg/day unable to tolerate
1990s	ACAS[8]
	Aspirin 325 mg/day. 'Discussion' of hypertension, diabetes mellitus, abnormal lipid levels, excessive alcohol and tobacco use
2000s	ACST-1[9]
	Antiplatelet, antihypertensive, lipid-lowering therapy. Lipid-lowering drugs: 10%–>81%, BP therapy: 53%–>88%, notable increase between 1993 and 2007.



BMT has dramatically evolved in comparison with its loose definition from early aCAS trials

	Modern BMT
2008	Lipid-lowering[74 75]: atorvastatin 40–80 mg or rosuvastatin 20–40 mg (SPARCL)±ezetimibe with target LDL<70 mg/dL. Despite maximal statin and ezetimibe therapy and LDL>70 mg/dL, PCSK9 inhibitor can be used
2011	Blood pressure.[75] Target BP <130/80 mm Hg or <140/90 mm Hg (previously <140/90 mm Hg alone)
2018 2020	Antiplatelet: 2018[76] - POINT trial showed the reduction in recurrent ischemic events at 90 days when patients with minor stroke or high-risk TIA were treated with aspirin 50–325 mg and clopidogrel 75 mg followed by initial loading dose of aspirin 50–325 mg and clopidogrel 600 mg 2020[77] -THALEz trial showed the reduction in recurrent ischemic events at 90 days when patients with a mild–moderate acute non-cardioembolic stroke or with a high-risk of a TIA were treated with aspirin 75–100 mg and ticagrelor 90 mg twice per day followed by initial loading dose of aspirin 300–325 mg and ticagrelor 180 mg
2021	Rest as per 2021 AHA guideline[75]: Diabetes mellitus: HbA1c ≤7 (multidimensional care: nutritional education, lifestyle counseling, medication) Smoking cessation: counseling with or without drug therapy (nicotine replacement, bupropion, or varenicline) Obesity: behavioral lifestyle-modification program Diet: Mediterranean diet Obstructive sleep apnea: Treatment with positive airway pressure

Potential limitation: Compliance

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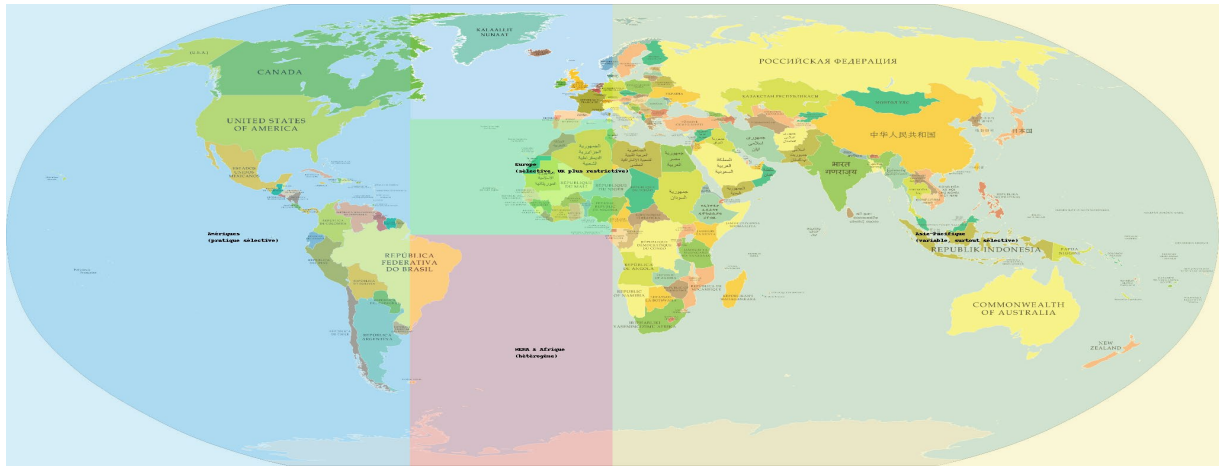
Sténose carotidienne asymptomatique (ACS) : pratique opératoire en 2025



■ Amériques (pratique sélective)
■ Europe (sélective, UK plus restrictive)
■ MENA & Afrique (pratique hétérogène)
■ Asie-Pacifique (variable, surtout sélective)

Amériques

• États-Unis & Canada : chirurgie/stenting encore pratiqués
• Toujours sélectif (sténose ≥70%, faible risque opératoire, espérance de vie suffisante)

Europe

• UE/EEE (France, Allemagne, Italie, Espagne…) : pratique sélective (ESVS/ESO)
• Royaume-Uni : plus restrictive (NICE, sélection très stricte)
-Danemark (ultra restrictive)

◆ Prise en charge médicale optimale (antiagrégant, statine, contrôle tensionnel, sevrage tabagique)

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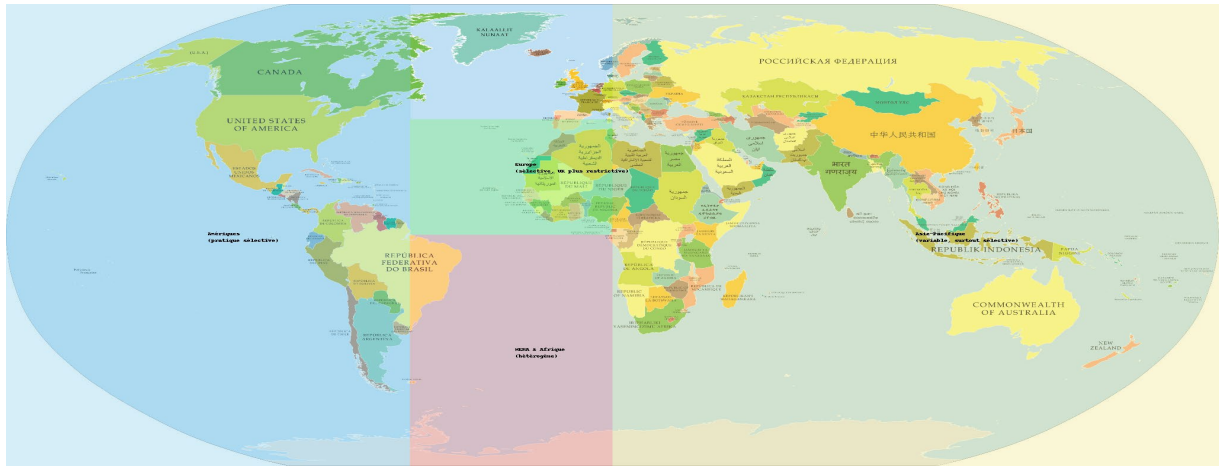

- Amériques (pratique sélective)
- Europe (sélective, UK plus restrictive)
- MENA & Afrique (pratique hétérogène)
- Asie-Pacifique (variable, surtout sélective)

Asie-Pacifique

- Australie & Nouvelle-Zélande : alignés sur SVS/ESVS, pratique sélective
- Japon & Corée : pratique variable, le plus souvent sélective

MENA & Afrique

- Pratique hétérogène selon les pays et ressources
- Sélection des cas et expertise chirurgicale
- Souvent calquée sur les recommandations ESVS/SVS

Editor's Choice – Stroke and Death Following Carotid Endarterectomy or Carotid Artery Stenting: A Ten Year Nationwide Study in France

Eric Steinmetz [a,b,*], Jonathan Cottenet [c], Anne-Sophie Mariet [c,d], Lucas Morin [e], Alain Bernard [a,b], Yannick Béjot [b,f], Catherine Quantin [c,d,g]

Procédures carotidiennes en France (2010–2019)

📊 **Nombre total : 164 248 patients opérés**

- Endartériectomies carotidiennes (CEA) : 156 561
- Angioplasties/stenting carotidiens (CAS) : 7 687
- Dont ≈ 40% de patients à haut risque

⚠️ **Taux de complications à 30 jours (PPSD30)**

- Global : 1,5% (n = 2 514)
  → 1,5% après CEA
  → 2,4% après CAS
- Patients asymptomatiques : 1,3%
  → 1,2% après CEA
  → 1,8% après CAS

Eur J Vasc Endovasc Surg (2025) 69, 359—370

Editor's Choice – Stroke and Death Following Carotid Endarterectomy or Carotid Artery Stenting: A Ten Year Nationwide Study in France

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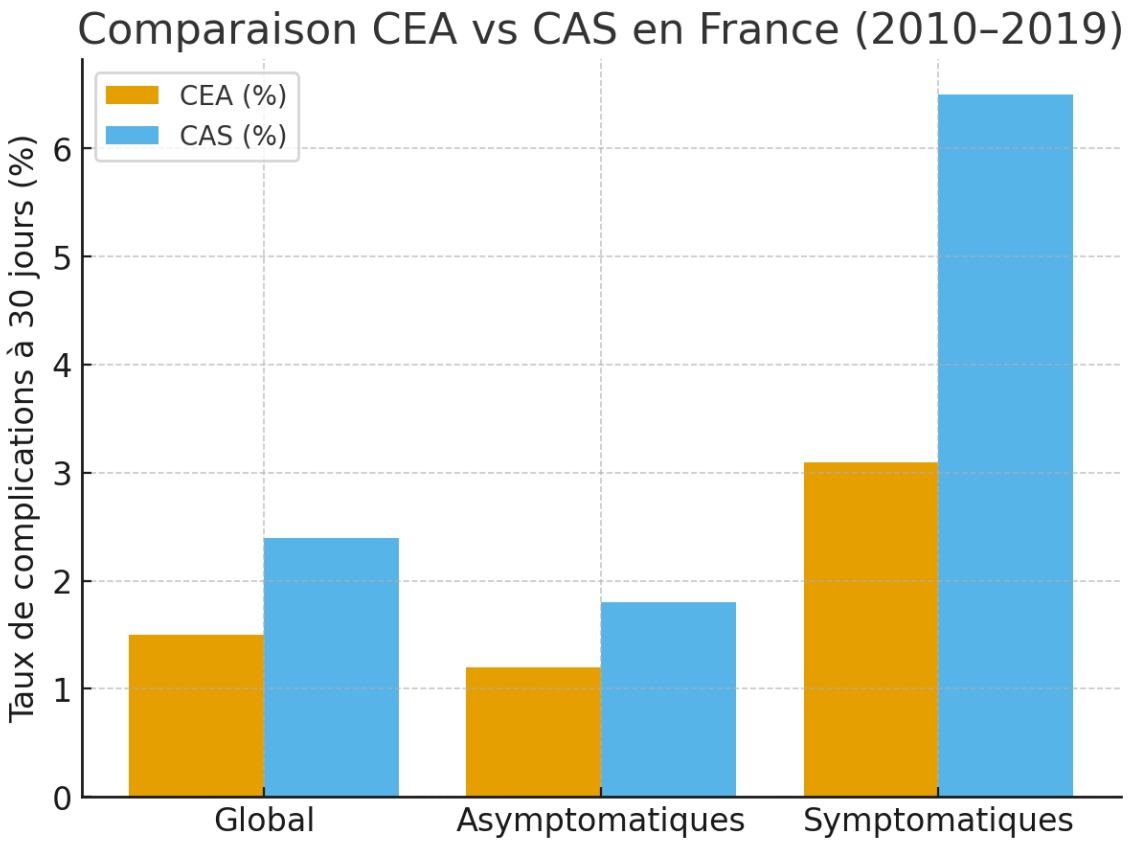
164 248 procédures carotidiennes en France (2010–2019)

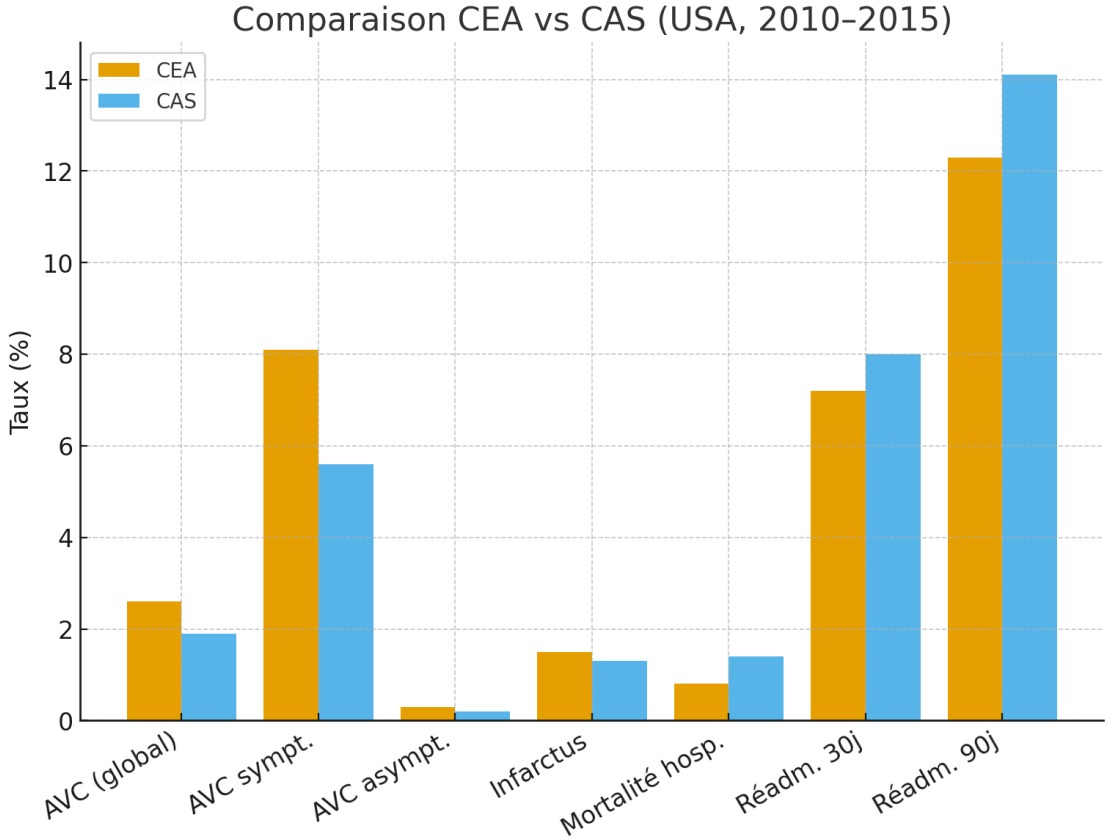


En France (2010–2019), la TEA est associée à des taux de complications plus faibles que le stenting, notamment chez les patients symptomatiques.

Eur J Vasc Endovasc Surg (2025) 69, 359—370

Nationwide Trends in Carotid Endarterectomy and Carotid Artery Stenting in the Post-CREST Era

Tyler S. Cole, MD; Andrew W. Mezher, BS; Joshua S. Catapano, MD; Jakub Godzik, MD; Jacob F. Baranoski, MD; Peter Nakaji, MD; Felipe C. Albuquerque, MD; Michael T. Lawton, MD; Andrew S. Little, MD; Andrew F. Ducruet, MD



Procédures carotidiennes aux USA (2010–2015)

📊 Volumes

- 378 354 endartériectomies carotidiennes (CEA)
- 57 273 stenting carotidiens (CAS)
- Tendance : baisse annuelle du CEA, CAS stable

👥 Profil des patients

- CAS : 30% symptomatiques (vs 21% CEA)
- CAS : davantage de comorbidités et haut risque opératoire

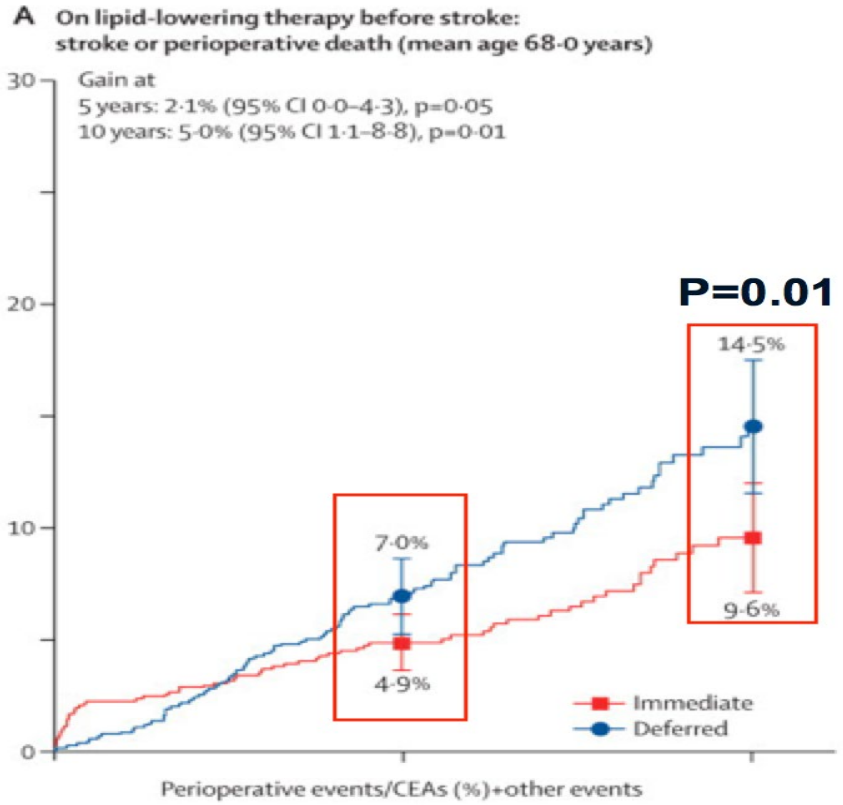
Stroke. 2020;51:579-587. DOI: 10.1161/STROKEAHA.119.027388.

10-year stroke prevention after successful carotid endarterectomy for asymptomatic stenosis (ACST-1): a multicentre randomised trial

*Alison Halliday, Michael Harrison, Elizabeth Hayter, Xiangling Kong, Averil Mansfield, Joanna Marro, Hongchao Pan, Richard Peto, John Potter, Kazem Rahimi, Angela Rau, Steven Robertson, Jonathan Streifler, Dafydd Thomas, on behalf of the Asymptomatic Carotid Surgery Trial (ACST) Collaborative Group**

Lancet 2010; 376: 1074–84

- ***Declining stroke risk in patients with aCAS treated with BMT (NNT: 19 → 22)***
- ***Lipid lowering drugs: 10 → 81%***
- ***BP therapy: 53 → 88%***



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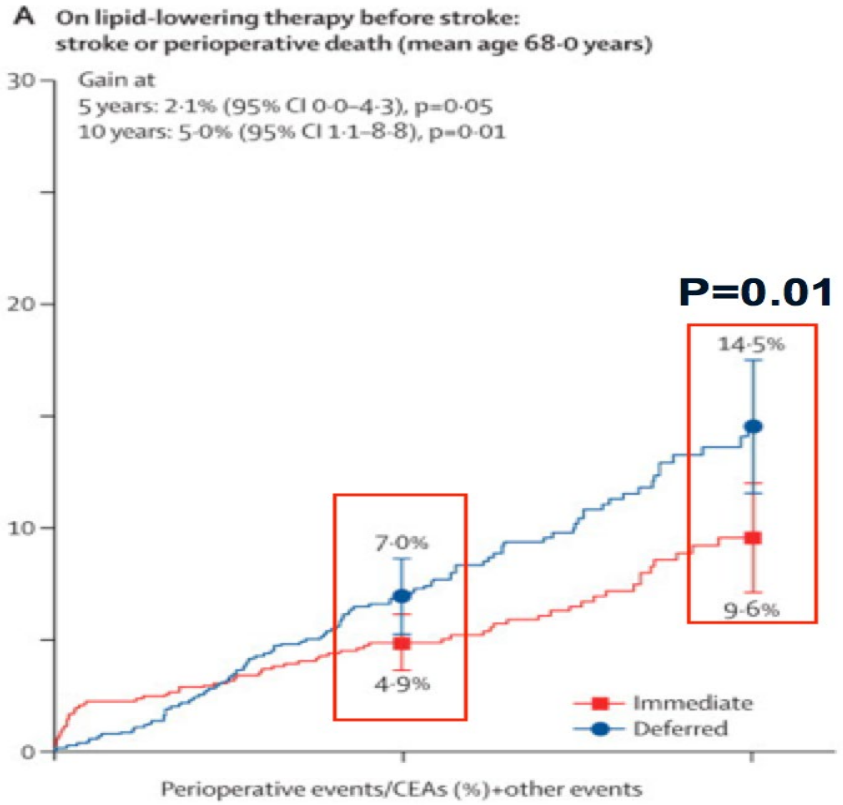
Lancet 2010; 376: 1074–84

- ***Ten-year follow-up data in the ACST trial demonstrated sustained benefitS for CEA over OMT***

- ***Despite 80% of patients were taking OMT on the later years***



LAPALISSADE

« Un quart d'heure avant sa mort, il était encore en vie ».

Emerging imaging risk factors

	Ipsilateral strokes with	Ipsilateral strokes without	**HR / OR (Ë Ã% CI)**
Microembolic detection	2802: 6" (9/8&)	240 5: " (2/5%)	6.63 (2.85 to 15.44)
Plaque echolucency	21102852" (6/8&)	25206979" (3/5&)	2.48 (1.90 to 3.22)
Progression of stenosis	6605 95" (22/5&)	: 502648" (7/2&)	1.86 (1.35 to 2.55)
Reduced cerebrovascular reserve (CVR)	50 2" (5/5&) normal	27093" (2: /6&) impaired	5.27 (1.68 to 16.51)
Intraplaque hemorrhage (IPH)	905 1" (31/1&)	30 7" (3/2&)	14.5 (2.9 to 7.25)
Ipsilateral silent brain infarction	3.6%	1.0%	3.0 (1.46 to 6.29)

Adapted from Kim HW, et al. J NeuroIntervent Surg 2023;15:717–722

Risk of stroke in relation to degree of asymptomatic carotid stenosis: a population-based cohort study, systematic review, and meta-analysis

Dominic P J Howard, Liam Gaziano, Peter M Rothwell, on behalf of the Oxford Vascular Study

Findings Between April 1, 2002, and April 1, 2017, 2354 patients were consecutively enrolled in OxVasc and 2178 patients underwent carotid imaging, of whom 207 had 50–99% asymptomatic stenosis of at least one carotid bifurcation (mean age at imaging: 77·5 years [SD 10·3]; 88 [43%] women). The 5-year ipsilateral stroke risk increased with the degree of stenosis; patients with 70–99% stenosis had a significantly greater 5-year ipsilateral stroke risk than did those with 50–69% stenosis (six [14·6%; 95% CI 3·5–25·7] of 53 patients *vs* none of 154; p<0·0001); and patients with 80–99% stenosis had a significantly greater 5-year ipsilateral stroke risk than did those with 50–79% stenosis (five [18·3%; 7·7–29·9] of 34 patients *vs* one [1·0%; 0·0–2·9] of 173; p<0·0001). Of the 56 studies identified in the systematic review (comprising 13 717 patients), 23 provided data on ipsilateral stroke risk fully stratified by degree of asymptomatic stenosis (in 8419 patients). Stroke risk was linearly associated with degree of ipsilateral stenosis (p<0·0001); there was a higher risk in patients with 70–99% stenosis than in those with 50–69% stenosis (386 of 3778 patients *vs* 181 of 3806 patients; odds ratio [OR] 2·1 [95% CI 1·7–2·5], p<0·0001; 15 cohort studies, three trials) and a higher risk in patients with 80–99% stenosis than in those with 50–79% stenosis (77 of 727 patients *vs* 167 of 3272 patients; OR 2·5 [1·8–3·5], p<0·0001; 11 cohort studies). Heterogeneity in stroke risk between studies for patients with severe versus moderate stenosis (p_{het}<0·0001) was accounted for by highly discrepant results (p_{diff}<0·0001) in the randomised controlled trials of endarterectomy compared with cohort studies (trials: pooled OR 0·8 [95% CI 0·6–1·2], p_{het}=0·89; cohorts: 2·9 [2·3–3·7], p_{het}=0·54).

Lancet Neurol 2021; 20: 193-202

f asymptomatic carotid
: study, systematic

- Study

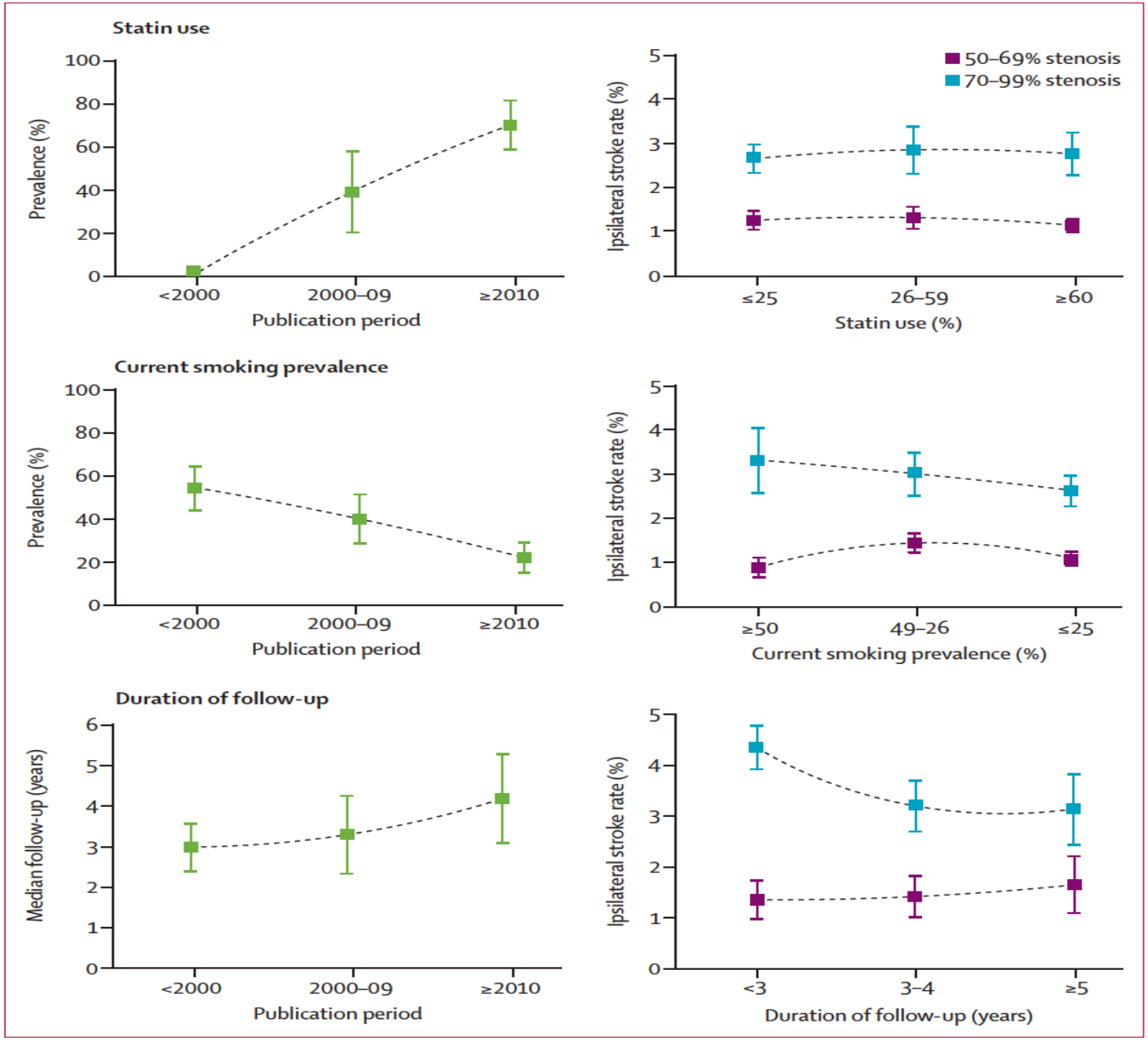


Figure 3: **Time trends in statin use, current smoking prevalence, and duration of follow-up, and ipsilateral stroke rates stratified by confounding factor**

Lancet Neurol 2021; 20: 193-202

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

Ross Naylor [a,*], Barbara Rantner [a], Stefano Ancetti [a], Gert J. de Borst [a], Marco De Carlo [a], Alison Halliday [a], Stavros K. Kakkos [a], Hugh S. Markus [a], Dominick J.H. McCabe [a], Henrik Sillesen [a], Jos C. van den Berg [a], Melina Vega de Ceniga [a], Maarit A. Venermo [a], Frank E.G. Vermassen [a]

The GWC considered the evidence from the two new meta-analyses (section 3.4.3) regarding whether 80—99% ACS should now be included as a higher risk of stroke on BMT criterion in the 2023 guidelines. After reviewing the evidence, the GWC decided (by a vote of 11:3) against including 80—99% ACS for four reasons. Firstly, most patients in the cohort studies had a prior history of contralateral TIA/stroke, which increases stroke rates in ACS patients, and which would already make them candidates for CEA/CAS.[165] Secondly, even though there was statistical significance, four out of five cohort studies that included ACS patients without a history of stroke/TIA were published 25 — 35 years ago, raising questions about generalisability in the modern era of BMT. In addition, there were only 218 patients with 80—99% ACS in these five cohort studies with no prior stroke/TIA. Thirdly, the GWC felt it counterintuitive to simply dismiss RCT data

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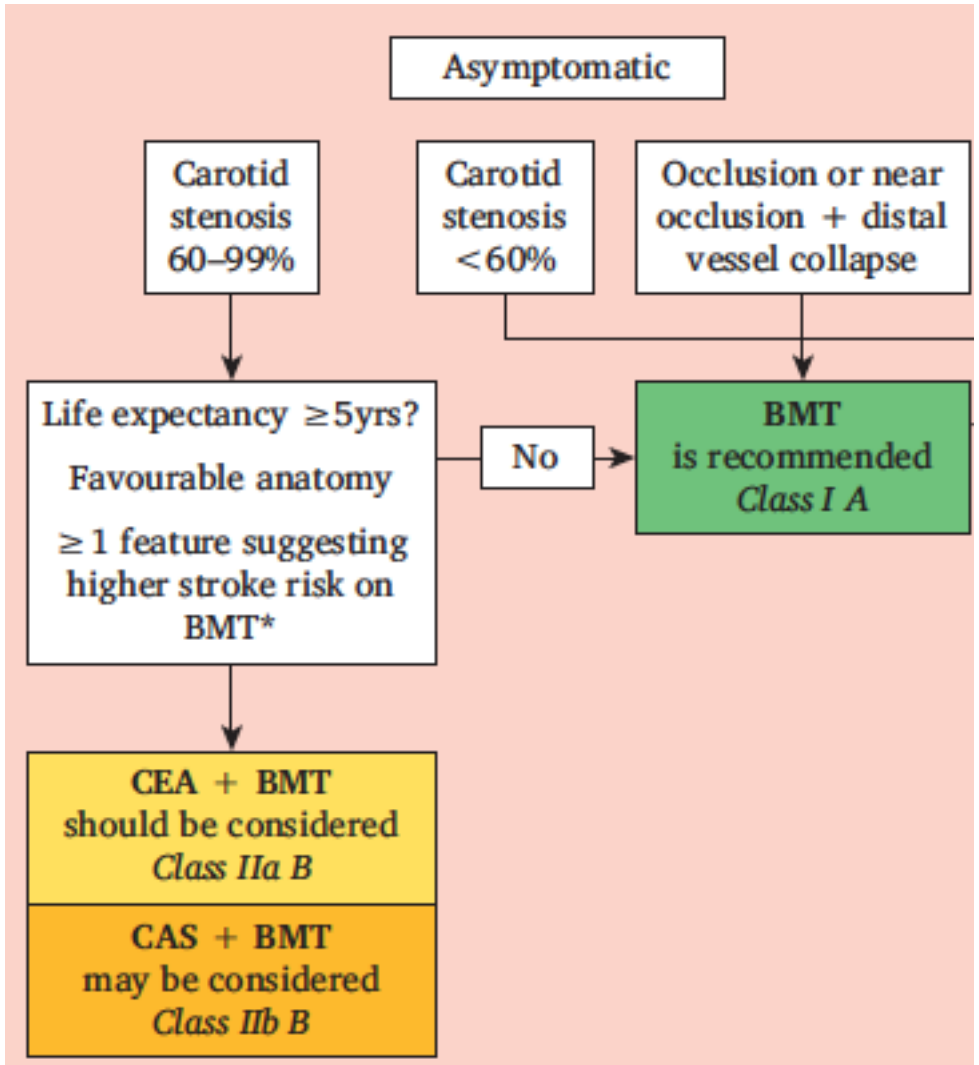
Recommendation 19		Unchanged
For average surgical risk patients with an asymptomatic 60–99% stenosis, carotid endarterectomy should be considered in the presence of one or more imaging or clinical characteristics that may be associated with an increased risk of late stroke*, provided 30 day stroke/death rates are ≤3% and patient life expectancy exceeds five years.		
Class	**Level**	**References** **ToE**
IIa	B	Executive Committee for the Asymptomatic Carotid Atherosclerosis Study (1995)[195], MRC Asymptomatic Carotid Surgery Trial (ACST) Collaborative Group (2004)[204], Halliday *et al.* (2010)[228], Nicolaides *et al.* (2005)[261], Kakkos *et al.* (2013)[264], Kakkos *et al.* (2009)[270], Kakkos *et al.* (2014)[271], Hirt *et al.* (2014)[272], Nicolaides *et al.* (2010)[273], Gupta *et al.* (2013)[274], King *et al.* (2011)[275], Gupta *et al.* (2015)[276], Markus *et al.* (2010)[277], Topakian *et al.* (2011)[278]



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Recommendation 20			Unchanged
For average surgical risk patients with an asymptomatic 60–99% stenosis in the presence of one or more imaging or clinical characteristics that may be associated with an increased risk of late stroke*, carotid stenting may be an alternative to carotid endarterectomy, provided 30 day stroke/death rates are ≤3% and patient life expectancy exceeds five years.			
Class	**Level**	**References**	**ToE**
IIb	B	Mannheim *et al.* (2017)[222], Rosenfield *et al.* (2016)[224], Eckstein *et al.* (2016)[225], Nicolaides *et al.* (2005)[261], Kakkos *et al.* (2013)[264], Kakkos *et al.* (2009)[270], Kakkos *et al.* (2014)[271], Hirt *et al.* (2014)[272], Nicolaides *et al.* (2010)[273], Gupta *et al.* (2013)[274], King *et al.* (2011)[275], Gupta *et al.* (2015)[276], Markus *et al.* (2010)[277], Topakian *et al.* (2011)[278], Silver *et al.* (2011)[280]	

Recommendation 21			Unchanged
For asymptomatic patients deemed by the multidisciplinary team to be 'high risk for surgery' and who have an asymptomatic 60–99% stenosis in the presence of one or more imaging/clinical characteristics that may be associated with an increased risk of late stroke on best medical therapy, carotid stenting may be considered provided anatomy is favourable, 30 day death/stroke rates are ≤3% and patient life expectancy exceeds five years*.			
Class	**Level**	**References**	**ToE**
IIb	B	Gurm *et al.* (2008)[223], Nicolaides *et al.* (2005)[261], Kakkos *et al.* (2013)[264], Kakkos *et al.* (2009)[270], Kakkos *et al.* (2014)[271], Hirt *et al.* (2014)[272], Nicolaides *et al.* (2010)[273], Gupta *et al.* (2013)[274], King *et al.* (2011)[275], Gupta *et al.* (2015)[276], Markus *et al.* (2010)[277], Topakian *et al.* (2011)[278], Yadav *et al.* (2004)[282]	

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➢ Qui est à haut risque d'AVC sous traitement médical ?

🧍 Facteurs cliniques

- Sexe masculin
- Âge avancé
- Progression rapide de la sténose
- Antécédent d'AVC ou d'AIT controlatéral
- Comorbidités (diabète, coronaropathie, etc.)

🧠 Facteurs d'imagerie/biologie

- Sténose sévère (70–99%)
- Plaque instable : ulcérée, hétérogène, écholucente
- Micro-emboles au Doppler transcrânien
- Réserve hémodynamique cérébrale diminuée
- Progression de la plaque ou de la sténose au suivi
- Infarctus silencieux à l'IRM

CONCLUSIONS

- Controverse reste ouverte

- Perspectives: CREST-2 trial

  (adherence to hypertension guideline-based regimens is only 34%)