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Is Carotid Endarterectomy Appropriate for Asymptomatic Carotid Artery Stenosis?

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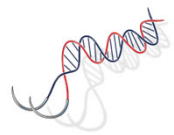
Temerty Medicine



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Disclosures

I have no current relationships with commercial entities

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Outline

1. Background
2. Evidence – Landmark Clinical Trials
3. Current Guidelines
4. Recent Evidence – CREST 2
5. Conclusions

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Background

1. Extracranial carotid artery atherosclerotic disease is a **substantial stroke risk factor** associated with 20% of ischemic strokes.

2. Significant variability in practice exists in the management of asymptomatic carotid stenosis.

3. **75-80%** of patients who undergo carotid revascularization in the USA are asymptomatic.

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Poll

In 2026, does carotid endarterectomy still have a meaningful role in severe asymptomatic carotid artery stenosis?

A. Yes, a clear role in many patients
B. Yes, but only in highly selected patients
C. Limited, most patients are better managed with modern best medical therapy alone
D. No meaningful role

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Evidence

Carotid Endarterectomy Trials for Asymptomatic Carotid Artery Stenosis

Trial	Recruitment Period	Number of Patients	Population	Periop. risk of any stroke and death	Risk of any stroke or death	NNT*
ACAS	1987-1993	1662	Asymptomatic (never symptomatic)	2.3%	5 year: 5.1% (CEA) vs. 11.0% (BMT)	17
ACST-1	1993-2003	3120	Asymptomatic (6 months or longer)	3.1%	5 year: 6.4% (CEA) vs. 11.8% (BMT)	19

CAS/CEA Trials for Asymptomatic Carotid Artery Stenosis

Trial	Recruitment Period	Population (N)	Perioperative risk of any stroke and death	Risk of any stroke (including perioperative and death)*	Relative Risk
SAPPHIRE	2000-2002	Symptomatic (97) Asymptomatic (237)	5.5% (CAS) vs. 8.4% (CEA) p=0.36	3 year: 21.4% (CAS) vs. 29.2% (CEA)	0.74 (95% CI: 0.47-1.14)
CREST-1	2005-2008	Symptomatic (1321) Asymptomatic (1181)	2.5% (CAS) vs. 1.4% (CEA) p=0.15	10 year: 11.8% (CAS) vs. 9.9% (CEA)	1.10 (95% CI 0.83 -1.44)
ACT-1	2005-2013	Asymptomatic (1453)	2.9% (CAS) vs. 1.7% (CEA) p=0.33	5 year: 3.8% (CAS) vs. 3.3% (CEA)	1.14 (95% CI: 0.61-2.15)
ACST-2	2008-3625	Asymptomatic (3625)	3.7% (CAS) vs. 2.7% (CEA) p=0.12	5 year: 5.3% (CAS) vs. 4.5% (CEA)	1.11 (95% CI: 0.91-1.32)

* SAPPHIRE, CREST-1, ACT-1: Perioperative outcomes included MI

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Guidelines

SVS 2021	ESVS 2023 & ESO 2021	AHA 2020
• ≥ 70% stenosis • Low surgical risk • Good life expectancy • <3.% periop. stroke and death rate	• 60-99% Stenosis **AND** high-risk features for stroke	• 60-99% Stenosis: Consider CEA in highly selected patients • Life expectancy > 5 years • Acceptable risk of surgical complications • <3% periop. morbidity and death rate

All guidelines advocate for **CEA in selected patients** with high-grade carotid stenosis

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High Risk

High Surgical Risk (Defined by SAPPHIRE Trial)	High Stroke Risk
1. Major cardiac disease (CHF, abnormal stress test, awaiting cardiac surgery) 2. Severe COPD 3. Contralateral occlusion 4. Contralateral RLN palsy 5. Previous radical neck surgery 6. Cervical irradiation 7. Restenosis after CEA 8. Age >80	1. Progression of stenosis over time 2. Ipsilateral covert brain infarcts on imaging 3. Ipsilateral intracranial embolization detected on transcranial doppler 4. Plaque morphology on non-invasive imaging (ex. Volume, echolucency, intraplaque hemorrhage) 5. Reduced Cerebrovascular Reserve

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Limitations

Guidelines are based on evidence from historic trials which may not apply to contemporary populations.

Improved Medical Therapy

Decreased Baseline Stroke Risk

ORIGINAL ARTICLE

Medical Management and Revascularization for Asymptomatic Carotid Stenosis

Authors: Thomas G. Brott, M.D., George Howard, Dr.P.H., Brajesh K. Lal, M.D., Jenifer H. Voeks, Ph.D., Tanya N. Turan, M.D., Gary S. Roubin, M.D., Ph.D., Ronald M. Lazar, Ph.D., +37 , for the CREST-2 Investigators* Author Info & Affiliations

Published November 21, 2025 | N Engl J Med 2026;394:219-231 | DOI: 10.1056/NEJMoa2508800

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Poll

Have the results of the CREST-2 trial changed your CEA practice?

A. Yes, I am more likely to offer CEA
B. Yes, I am less likely to offer CEA
C. No, my practice has not changed

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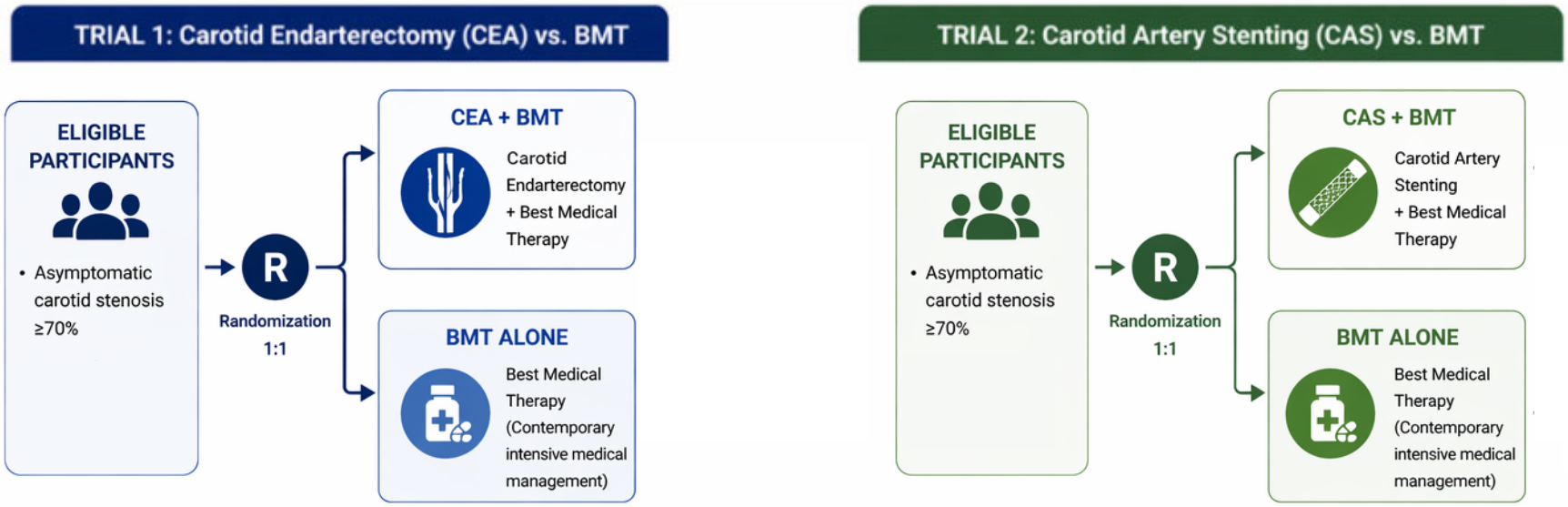
New Evidence



Primary Outcome: Composite of any stroke or death from 0-44 days after randomization and ipsilateral ischemic stroke from 44 days – 4 years

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New Evidence

Medical Management	Interventions
1. sBP less than 130 mm Hg 2. LDL < 1.8 mmol/L 3. Antiplatelet (ASA 325mg daily) 4. Smoking cessation 5. Controlled HbA1c 6. Physical activity and weight management 7. Lifestyle coaching provided by phone	CEA - Surgeons submitted preceding 50 consecutive cases (min 100 cases as primary operator) - Required to have periprocedural stroke and death rate of less than 3% CAS - Submitted carotid-artery stenting cases from the preceding 12 months. - Submitted procedural reports and angiograms for 3 to 25 cases

Medical management was **strict –** 70-80% of the cohort achieved these targets

Interventionalists chosen we highly credentialled

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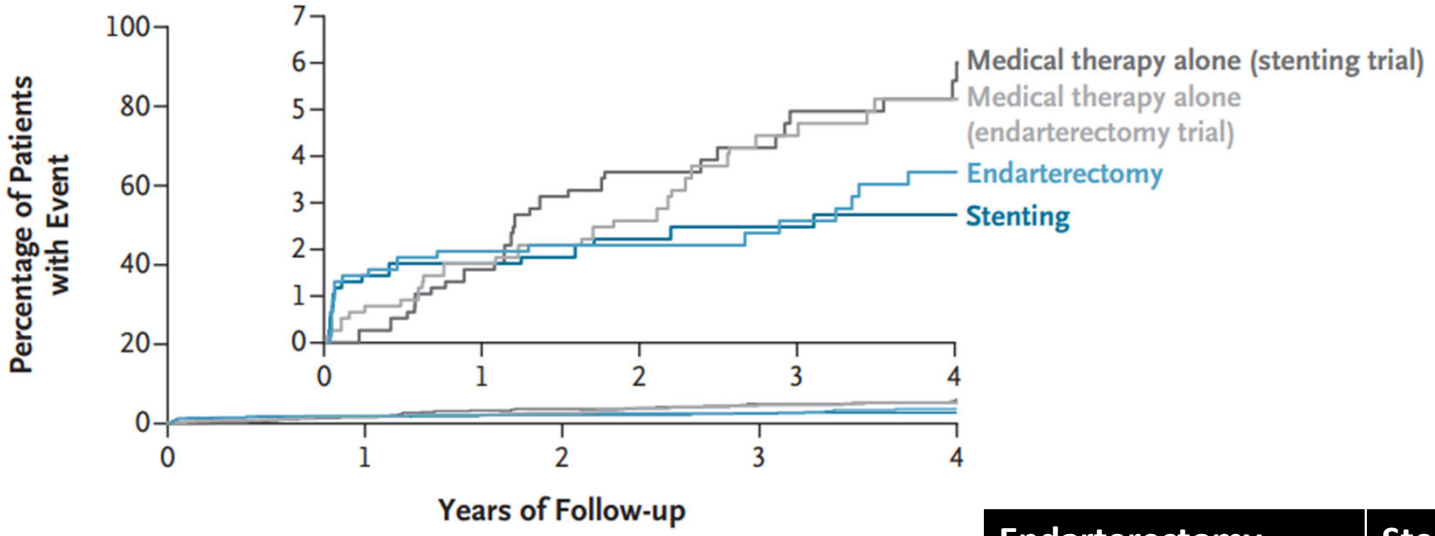
New Evidence

A Primary-Outcome Analysis



No. of Patients					
Stenting trial					
Medical therapy alone	629	537	428	360	276
Stenting	616	543	431	375	289
Endarterectomy trial					
Medical therapy alone	623	550	461	381	304
Endarterectomy	617	561	482	411	319

Endarterectomy Trial	Stenting Trial
CEA + IMT - 3.7% IMT - 5.3%	CAS + IMT - 2.8% IMT – 6.0%
P=0.24	P=0.02

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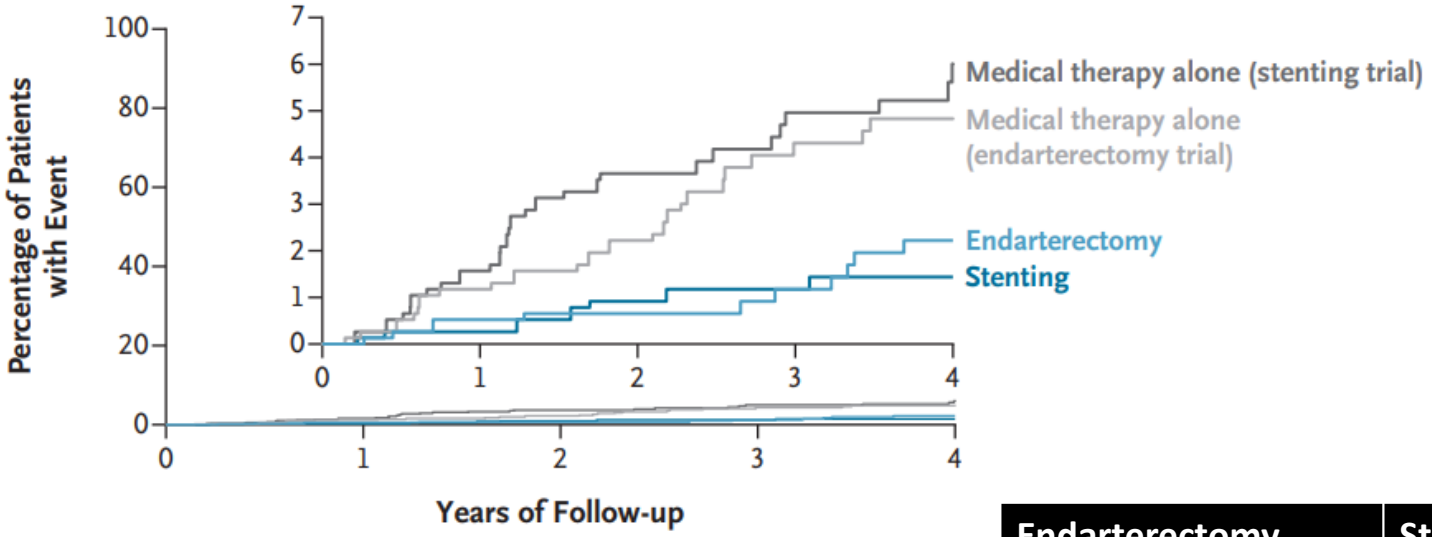
New Evidence

C Postprocedural Component of Primary-Outcome Analysis (after 44 days)



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Endarterectomy trial					
Medical therapy alone	600	550	461	381	304
Endarterectomy	596	559	480	409	317

Endarterectomy Trial	Stenting Trial
CEA + IMT- 0.5% IMT - 1.3%	CAS + IMT- 0.4% IMT - 1.7%
RR: 2.38 (95% CI, 1.13 - 5.00)	RR: 4.07 (95% CI, 1.78 - 9.31)

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Conclusions

1. Current evidence does not support routine CEA for asymptomatic carotid artery stenosis

2. CREST-2: One piece of evidence in a shared decision-making conversation. The added benefit of CEA over IMM alone is smaller than previously believed.

3. CEA remains a reasonable option for select patients with high-grade carotid stenosis and features suggesting higher stroke risk.

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Thank you