Comparison of the five 2011 guidelines for the treatment of carotid stenosis

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In 2011, five independent, international guideline committees reported their recommendations for the management of symptomatic and asymptomatic carotid artery stenosis. These included the American College of Cardiology/American Heart Association, the Society for Vascular Surgery, the European Society of Cardiology, the Australasian, and the UK National Institute of Health and Clinical Excellence. As the recommendations of these five guideline committees were based on the same published literature, it would be expected that they are similar, at least to a large extent. Surprisingly, there were considerable differences between the five guidelines regarding the management of both symptomatic and asymptomatic carotid patients. The differences in the recommendations between the five Guideline Committees are analyzed and discussed. (J Vasc Surg 2012;55:1504-8.)

With the introduction and widespread use of carotid artery stenting (CAS), there is an ongoing debate regarding the treatment of choice for symptomatic and asymptomatic carotid artery stenosis. Possibly because of this controversy, three different guideline committees reported their recommendations for the management of symptomatic and asymptomatic carotid stenosis in 2011, namely, the American College of Cardiology/American Heart Association (ACC/AHA) Guidelines,[1] the Updated Society for Vascular Surgery (SVS) Guidelines,[2] and the European Society of Cardiology (ESC) Guidelines.[3] Two other guidelines committees also reported their recommendations in 2011 for the indications for CAS[4] and the role of CAS in the management of asymptomatic carotid stenosis.[5]

It would seem reasonable that these guidelines should be similar because they were all based on the same published literature. However, they differ substantially in several regards. This article discusses the differences between the recommendations of the five guideline committees[1-5] and will also attempt to explain these differences and, where possible, reconcile them.

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Author conflict of interest: none.

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The editors and reviewers of this article have no relevant financial relationships to disclose per the JVS policy that requires reviewers to decline review of any manuscript for which they may have a competition of interest.

0741-5214/$36.00

doi:10.1016/j.jvs.2012.01.084

PATIENTS WITH SYMPTOMATIC CAROTID ARTERY STENOSIS

The UK National Institute for Health and Clinical Excellence (NICE) guidelines included recommendations only for asymptomatic patients.[5] Therefore, the recommendations of the remaining four guideline committees for symptomatic carotid artery stenosis appear in Table I.[1-4]

The ACC/AHA Guidelines recommend CAS as an "alternative" to carotid endarterectomy (CEA) for the management of symptomatic carotid artery stenosis.[1] This implies that CAS is an "equivalent" therapeutic option to CEA for symptomatic patients and has been interpreted in this way by CAS enthusiasts.[6-8] In symptomatic patients, however, CEA is associated with lower stroke and death rates compared with CAS in all randomized trials to date.[6,7] Therefore, CAS should not be viewed at present as an equivalent therapeutic option to CEA in most symptomatic patients.[6,7] Admittedly, with better patient selection and improved CAS technology (eg, use of flow-reversal or cessation techniques,[9,10] and better stents), CAS may prove to be equal or superior to CEA in certain patient subgroups.[6,7] However, currently this is not the case based on the results of published randomized trials.

The updated SVS[2] and the Australasian[3] guidelines make this point and specifically recommend CAS only for symptomatic patients with tracheal stoma, scarred necks, external beam radiotherapy, previous cranial nerve injury, and other specific conditions, as well as for patients with comorbidities considered to be high-risk candidates for CEA.[2,3] The 2011 SVS Guidelines[2] for the management of carotid stenosis are an update of the 2008 SVS Guidelines[11] and were produced in response to new trial data that have emerged since then. The recommendations of the ESC Guidelines[4] approximate the updated SVS[2] and the Aus-

Table I. Recommendations of the 2011 carotid guidelines for patients with symptomatic carotid artery stenosis

Guidelines	*Recommendation*
ACC/AHA[1]	• CAS is indicated as an alternative to CEA for symptomatic patients at average or low risk of complications associated with endovascular intervention when the diameter of the lumen of the internal carotid artery is reduced by more than 70% as documented by noninvasive imaging or more than 50% as documented by catheter angiography and the anticipated rate of periprocedural stroke or mortality is less than 6% [class I; level of evidence, B]. • Among patients with symptomatic severe stenosis (≥70%) in whom the stenosis is difficult to access surgically, medical conditions are present that greatly increase the risk for surgery, or when other specific circumstances exist, such as radiation-induced stenosis or restenosis after CEA, CAS may be considered [class IIb; level of evidence, B]. • CAS in the above setting is reasonable when performed by operators with established periprocedural morbidity and mortality rates of 4%-6%, similar to those observed in trials of CEA and CAS [class IIa; level of evidence, B].
Revised SVS[2]	• In most patients with carotid stenosis who are candidates for intervention, CEA is preferred to CAS for reduction of all-cause and periprocedural death [grade I; level of evidence, B]. • CAS is preferred over CEA in symptomatic patients with ≥50% stenosis and tracheal stoma, situations where local tissues are scarred and fibrotic from prior ipsilateral surgery or external beam radiotherapy, prior cranial nerve injury, and lesions that extend proximal to the clavicle or distal to the C2 vertebral body [grade II; level of evidence: B]. • CAS is preferred over CEA in symptomatic patients with ≥50% stenosis and severe uncorrectable coronary artery disease, congestive heart failure, or chronic obstructive pulmonary disease [grade II; level of evidence, C].
ESC[3]	• In patients with symptomatic 70% to 99% stenosis of the internal carotid artery, CEA is recommended for the prevention of recurrent stroke [class I; level of evidence, A]. • In symptomatic patients at high surgical risk requiring revascularization, CAS should be considered as an alternative to CEA [class IIa; level of evidence, B]. • In symptomatic patients requiring carotid revascularization, CAS may be considered as an alternative to CEA in high-volume centers with documented death or stroke rate <6% [class IIb; level of evidence, B].
Australasian[4]	• CAS may be considered as a treatment option for patients with symptomatic severe carotid stenosis who are at high risk of stroke, but are surgically unsuitable for CEA, namely postradiation therapy, block dissection of the neck, in situ tracheostomy, recurrent stenosis following previous CEA, severe cervical spine arthritis, surgically inaccessible carotid stenosis (eg, obesity, high carotid bifurcation), contralateral recurrent laryngeal nerve injury, and contralateral internal carotid occlusion. • The overall results of randomized controlled trials indicate that CAS is not as safe as CEA for treatment of symptomatic carotid stenosis for prevention of ipsilateral stroke.

ACC/AHA, American College of Cardiology/American Heart Association; *CAS,* carotid artery stenting; *CEA,* carotid endarterectomy; *ESC,* European Society of Cardiology; *SVS,* Society for Vascular Surgery.

Table II. Recommendations of the 2011 carotid guidelines for patients with asymptomatic carotid artery stenosis

Guidelines	*Recommendation*
ACC/AHA[1]	• Prophylactic CAS might be considered in highly selected patients with asymptomatic carotid stenosis (minimum 60% by angiography, 70% by validated Doppler ultrasound), but its effectiveness compared with medical therapy alone in this situation is not well established [class IIb; level of evidence, B].
Revised SVS[2]	• Neurologically asymptomatic patients with ≥60% diameter stenosis should be considered for CEA for reduction of long-term risk of stroke, provided the patient has a 3- to 5-year life expectancy and perioperative stroke/death rates can be ≤3% [grade I; level of evidence, A]. • There are insufficient data to recommend CAS as primary therapy for neurologically asymptomatic patients with 70% to 99% diameter stenosis. In properly selected asymptomatic patients, CAS is equivalent to CEA in the hands of experienced interventionalists with a combined stroke and death rate <3% [grade II; level of evidence, B].
ESC[3]	• In asymptomatic patients with carotid artery stenosis ≥60%, CEA should be considered as long as the perioperative stroke and death rate for procedures performed by the surgical team is <3% and the patient's life expectancy exceeds 5 years [class IIa; level of evidence, A]. • In asymptomatic patients with an indication for carotid revascularization, CAS may be considered as an alternative to CEA in high-volume centers with documented death or stroke rate <3% [class IIb; level of evidence, B].
Australasian[4]	• There is currently no evidence to support CAS as a treatment for asymptomatic carotid stenosis.
NICE[5]	• Current evidence on the safety of CAS placement for asymptomatic extracranial carotid stenosis shows well-documented risks, in particular, the risk of stroke. The evidence on efficacy is inadequate in quantity. Therefore, this procedure should only be used with special arrangements for clinical governance, consent, and audit or research.

ACC/AHA, American College of Cardiology/American Heart Association; *CAS,* carotid artery stenting; *CEA,* carotid endarterectomy; *ESC,* European Society of Cardiology; *NICE,* UK National Institute for Health and Clinical Excellence; *SVS,* Society for Vascular Surgery.