EDITORIAL

Screening for Asymptomatic Carotid Artery Stenosis in Adult Patients
Unclear Benefit but Downstream Risks

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Carotid artery stenosis is a risk factor for stroke, but a relatively small proportion of strokes (approximately 11%) can be attributed to atherosclerosis of the internal carotid arteries. There is no evidence that screening for carotid artery stenosis in the asymptomatic adult population (ie, no history or symptoms of stroke or transient ischemic attack) will reduce the risk of stroke, but there are downstream risks from identifying patients with carotid stenosis. Thus, in a recommendation statement[1] and updated evidence report and systematic review,[2] the US Preventive Services Task Force (USPSTF) has reaffirmed its 2014 recommendation[3] against screening for asymptomatic carotid artery stenosis in the general adult population (D recommendation) based on an assessment of no benefit and possible harm.

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Patients identified with carotid artery stenosis are referred to surgeons or other specialists who must make the decision to revascularize based on outdated trial data.[4] Carotid revascularization involves the up-front perioperative risks of stroke and death. Stroke risk from carotid artery stenosis has been declining since the original asymptomatic carotid trials were completed.[5] The National Institute of Neurological Disease and Stroke funded the Carotid Revascularization and Medical Management for Asymptomatic Carotid Stenosis Trial (CREST-2) to determine if revascularization offers any benefit beyond cardiovascular risk factor control.[6] CREST-2 was launched in 2014 and is an ongoing trial that involves 2 parallel randomized clinical trials: (1) carotid endarterectomy (CEA) plus intensive medical therapy vs intensive medical therapy alone and, similarly, (2) carotid artery stenting (CAS) plus intensive medical therapy vs intensive medical therapy alone. Results are expected in 2025.

A Multitude of Recommendations Against Carotid Imaging

The USPSTF first published its recommendation against screening for carotid artery stenosis in the general population in 2007.[7] Additional evidence reviews reaffirmed this guidance in 2014[8] and again in 2021.[2] Guidelines from other medical societies also recommend against screening healthy adults, and some specialty societies rely on expert opinion to endorse screening for select high-risk populations (eg, those with coronary artery disease) in guidelines published 10 years ago.[9,10] Many specialty societies participating in Choosing Wisely have included carotid imaging on their "do not do" list.[11] The American Academy of Family Physicians recommends against screening for asymptomatic carotid artery stenosis in adult patients. The Society of Vascular Surgery recommends against routine surveillance of carotid arteries in the asymptomatic healthy population. The Society of Thoracic Surgeons recommends against routine evaluation of carotid artery disease prior to cardiac surgery in the absence of symptoms or other high-risk criteria. The American Academy of Neurology recommends against imaging of the carotid arteries for simple syncope without other neurologic symptoms. There is no national data available on how the USPSTF and other recommendations against use of screening for carotid artery stenosis have affected practice. The billing codes for screening are nonspecific, and obtaining national estimates is challenging. However, Medicare data suggest that the number of patients who underwent CEA for asymptomatic carotid stenosis declined from 1999 through 2000 to 2013 through 2014, and CAS declined from 2005 through 2006 to 2013 through 2014, although this drop may be related to decreased reimbursement.[12]

Identifying Patients With Carotid Artery Stenosis

Patients may receive head and neck imaging for other indications in which carotid artery stenosis is also identified. Patients may still receive carotid imaging as part of a syncope evaluation, for a carotid bruit, or because of direct-to-consumer advertising. None of these reasons is supported by evidence.[13,14]

Declining Risk of Stroke and Declining Benefit of Revascularization

Carotid revascularization among asymptomatic patients is a primary prevention surgery/procedure. Revascularization with CEA or CAS is a trade-off between higher perioperative short-term risks (stroke and death) in exchange for a lower long-term risk of stroke. The evidence against screening for carotid disease outlined in the USPSTF recommendations are largely based on 2 pillars of evidence regarding treatment: (1) the benefit of revascularization in asymptomatic patients is unclear, and (2) there are significant risks associated with revascularization. The stroke risk from carotid arteries appears to be declining, which fundamentally alters the risk-benefit ratio of revascularization. Improved medical therapy such as statins, improved antiplatelet regimens, and improved treatment of hypertension and diabetes may have resulted in a reduced stroke risk among patients with asymptomatic carotid stenosis.[15] Stroke has dropped from

the third to the fifth leading cause of mortality.[16] Existing data support a declining stroke risk from carotid artery stenosis. The Asymptomatic Carotid Surgery Trial,[17] which was initiated in 1993, reported a 5-year stroke risk of 11% in the medical therapy arm (2.2% annually), and the Endarterectomy for Asymptomatic Carotid Artery Stenosis trial,[18] initiated in 1987, reported a 2.3% annual stroke risk in the medical therapy arm. However, later studies reported an annual stroke risk as low as 0.6% for medically treated asymptomatic carotid stenosis, which over 5 years is close to the perioperative complication risk reported for CEA in community settings.[5] Furthermore, the unexpectedly lower risk of stroke in the medical therapy arm of the Stenting vs Aggressive Medical Therapy for Intracranial Stenosis trial,[19] published in 2011, provided further support that advances in medical therapy have had a considerable effect on stroke risk reduction. The ongoing CREST-2 trial[6] will inform our understanding of contemporary stroke risk from asymptomatic carotid artery stenosis.

Perioperative Risks of Revascularization

Surgery in asymptomatic persons should offer a clear chance that benefits will outweigh the known surgical risks. Perioperative complications of CEA (stroke and death) in community settings range from 1.7% to 3.2%,[20] which is consistent with stroke and death rates from 2 large randomized clinical trials.[4] Perioperative stroke and/or death rates as high as 4.0% among asymptomatic patients undergoing CAS have been reported outside of trials.[21] These up-front risks are serious and dwarf the possible small long-term benefits associated with revascularization, especially given the declining stroke risk from asymptomatic carotid artery stenosis.

Do Carotid Trials Extend to Community Practice?

Trials are necessary to inform our understanding of the risks and benefits of screening. The new USPSTF recommendation[1] notes there have been no trials specifically looking at the benefits of carotid screening in the general population or in high-risk groups. The trials have all been focused on revascularization. Benefits observed in carotid trials may not extend to practice given the rigorous patient and surgeon selection instituted in trials but not required in practice.[22] Surgeons and interventionalists are recruited into trials from leading academic medical centers. Trials typically have a training, or run-in, phase to ensure a low perioperative complication rate. Patients with considerable comorbidities are excluded from trials; however, in practice, many patients who are revascularized do not live long enough to benefit from stroke reduction.[23] This concern about the generalizability of trials is supported empirically by recent comparative effectiveness research, which demonstrated no benefit to CEA in community settings.[23] Similarly CREST-2 differs from real-world practice in patient selection, surgeon selection, and rigorous participant monitoring.[24,25]

Conclusions

Carotid artery screening among asymptomatic patients makes it more likely for carotid artery revascularization to occur, even though the benefits in stroke risk reduction are not established and the up-front risks are clear (stroke and death). The USPSTF has once again reaffirmed its message that the evidence does not support screening in the general adult population. In addition, if a patient with carotid artery stenosis is identified through imaging for other reasons, a focus on cardiovascular risk factor control is the best treatment strategy.

ARTICLE INFORMATION

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