

Editors' Choice

The Society for Vascular Surgery practice guidelines on follow-up after vascular surgery arterial procedures



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ABSTRACT

Although follow-up after open surgical and endovascular procedures is generally regarded as an important part of the care provided by vascular surgeons, there are no detailed or comprehensive guidelines that specify the optimal approaches with regard to testing methods, indications for reintervention, and follow-up intervals. To provide guidance to the vascular surgeon, the Clinical Practice Council of the Society for Vascular Surgery appointed an expert panel and a methodologist to review the current clinical evidence and to develop recommendations for follow-up after vascular surgery procedures. For those procedures for which high-quality evidence was not available, recommendations were based on observational studies, committee consensus, and indirect evidence. Recognizing that there are numerous published reports on the role of duplex ultrasound for surveillance of infrainguinal vein bypass grafts, the Society commissioned a systematic review and meta-analysis on this topic.

The panel classified the strength of each recommendation and the corresponding quality of evidence on the basis of the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) system: recommendations were graded either *strong* or *weak*, and the quality of evidence was graded *high*, *moderate*, or *low*. The resulting recommendations represent a wide variety of open surgical and endovascular procedures involving the extracranial carotid artery, thoracic and abdominal aorta, mesenteric and renal arteries, and lower extremity arterial revascularization. The panel also identified many areas in which there was a lack of high-quality evidence to support their recommendations. This suggests that there are opportunities for further clinical research on testing methods, threshold criteria, and the role of surveillance as well as on the modes of failure and indications for reintervention after vascular surgery procedures. (J Vasc Surg 2018;68:256-84.)

Keywords: Surveillance; Duplex imaging; Postoperative follow-up; Clinical guidelines

SCOPE OF THE PROBLEM

Open surgical and endovascular interventions for the treatment of vascular disease span a wide variety of vessels and techniques. Whereas much is known about

the durability of well-established procedures such as infrainguinal vein bypass grafts, the clinical outcomes of the newer endovascular approaches are less well documented.¹⁻⁴ All vascular procedures have modes of failure that must be identified and managed appropriately to provide the best possible long-term results. Follow-up of patients after vascular surgery procedures is generally regarded as the key to detection of recurrent disease and other complications that can lead to morbidity and mortality. The primary goal of follow-up in this setting is to detect significant problems at an early stage when they can be managed most safely and effectively, even before clinical signs and symptoms are evident. However, for most vascular surgery procedures, the optimal methods and frequency for follow-up are not clear. The challenge to the vascular surgeon is to develop a follow-up plan for each patient that will achieve this goal while minimizing costs, risks, and disruption of the patient's lifestyle.

The simplest approach to follow-up is *clinical monitoring* with a periodic vascular history and physical examination. The term *surveillance* describes the routine, planned use of serial objective testing to evaluate the status of a vascular procedure. Surveillance is generally performed in patients with no current evidence of a problem related

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Author conflict of interest: none.

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Independent peer-review and oversight has been provided by the members of the SVS Document Oversight Committee: Thomas L. Forbes, MD (Chair), Ali AbuRahma, MD, Kwame Amankwah, MD, Neal Barshes, MD, Ruth Bush, MD, Ronald L. Dalman, MD, Hans Henning Eckstein, MD, Anil Hingorani, MD, Eva Rzcudlo, MD, Marc Schermerhorn, MD.

0741-5214

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Table I. Criteria for grading strength of a recommendation and quality of evidence

Strength of recommendation	
1 (Strong)	
	Benefits > Risks
	Risks > Benefits
2 (Weak)	
	Benefits ≈ risks
	Quality of evidence precludes accurate assessment of risks and benefits.
Quality of evidence	
A (High)	
	Additional research is considered very unlikely to change confidence in the estimate of the effect.
B (Moderate)	
	Further research is likely to have an important impact on the estimate of the effect.
C (Low)	
	Further research is very likely to change the estimate of the effect.
Adapted from Guyatt G, Gutterman D, Baumann MH, Addrizzo-Harris D, Hylek EM, Phillips B, et al. Grading strength of recommendations and quality of evidence in clinical guidelines. <i>Chest</i> 2006;129:174-81.	

to the procedure and is based on the assumption that significant abnormalities may not be detected by clinical monitoring alone. *Diagnostic testing* refers to the use of various physiologic or imaging methods in a patient who has signs or symptoms suggestive of a problem with a previous vascular procedure, including an abnormal finding on surveillance evaluation. Such testing may include limb blood pressure measurements, duplex ultrasound (DUS), computed tomography (CT) or magnetic resonance (MR) imaging with and without contrast enhancement, and catheter-directed angiography.

METHODS AND EVIDENCE

To provide guidance to the vascular surgery community, the Clinical Practice Council of the Society for Vascular Surgery appointed an expert panel of vascular surgeons and a methodologist to develop recommendations for follow-up after vascular surgery procedures. A review of the available clinical evidence was completed to serve as the basis for these recommendations. Because of the extensive literature on the role of DUS for surveillance of infrainguinal vein bypass grafts, a dedicated de novo systematic review and meta-analysis were carried out on that topic by the Evidence-based Practice Center of the Mayo Clinic College of Medicine, Rochester, Minnesota. For those procedures for which high-quality evidence could not be found, recommendations are based on observational studies, committee consensus, and indirect evidence.

The strength of each recommendation and the corresponding quality of evidence were graded separately on

the basis of the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) system (Table I).^{5,6} A recommendation was considered *strong* (grade 1) when benefits clearly outweighed risks (or risks outweighed benefits); a *weak* (grade 2) recommendation was made when risks and benefits were closely balanced or low-quality evidence precluded a definitive evaluation of risks and benefits. The quality of evidence was graded *high* (A), *moderate* (B), or *low* (C) according to an estimate of whether additional research would be unlikely, likely, or very likely to change the effect. The quality of evidence from randomized trials and observational studies was initially considered *high* or *low*, respectively; the quality of evidence could then be adjusted up or down on the basis of GRADE domains (eg, consistency, precision). In these guidelines, the panel denoted *strong* and *weak* recommendations by the terms *we recommend* and *we suggest*, respectively. Some strong recommendations for surveillance were made despite low-quality evidence. This was done when the costs and risks of surveillance were considered to be relatively low and the early detection of complications was deemed critical from a patient's perspective.

The panel's recommendations for follow-up after vascular surgery procedures are presented in the following sections. The included procedures involve the extracranial carotid artery, thoracic and abdominal aorta, mesenteric and renal arteries, and lower extremity arterial revascularization. Where appropriate, recommendations for both open surgical and endovascular interventions are included. Considering the large number of arterial procedures that needed to be covered, and recognizing the highly specialized nature of procedures for venous disease, the panel chose not to include recommendations for follow-up after superficial and deep venous interventions. Surveillance after arteriovenous hemodialysis access procedures is also not covered because that topic has been discussed in a separate clinical practice guideline document.⁷

These guidelines for follow-up after vascular surgery arterial procedures emphasize vascular laboratory testing and vascular imaging. Other aspects of follow-up, such as medical management and risk factor modification, are not specifically addressed. It is essential that vascular laboratory testing be performed by qualified personnel using appropriate instrumentation, as demonstrated by individual credentialing and facility accreditation. Whereas the panel has aimed to make specific recommendations that are generalizable and applicable to most patients, it is impossible to account for every clinical eventuality, and surgeons should use their best clinical judgment along with these guidelines in the management of the individual patient.

EXTRACRANIAL CAROTID ARTERY

Carotid endarterectomy (CEA) is the preferred treatment for symptomatic^{8,9} and asymptomatic^{10,11} patients with high-grade extracranial carotid stenosis compared

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