



Evaluation and Management of a Patient with Claudication

Description of the Activity	<p>Vascular surgeons evaluate and treat patients with claudication in the outpatient setting. These surgeons should have a comprehensive understanding of the evaluation and management of peripheral arterial disease as manifested by claudication, including diagnostic techniques, risk factor modification, medical management, and open and endovascular surgical interventions and indications. Additionally, vascular surgeons should understand perioperative management, including recognition of complications of intervention, needed follow-up, and surveillance strategies.</p>
Functions	<ul style="list-style-type: none">❖ Nonoperative/Preoperative<ul style="list-style-type: none">➤ Synthesize essential information from a patient’s referring providers, medical records, history (including relevant risk factors), physical examination, and initial diagnostic evaluation to establish a diagnosis.➤ Perform an evidence-based, cost-effective diagnostic evaluation.➤ Synthesize and implement an optimal risk factor modification and medical management plan, including:<ul style="list-style-type: none">▪ Antiplatelet therapy▪ Exercise therapy▪ Smoking cessation▪ Statin therapy➤ Determine whether intervention is indicated.➤ Select a surgical approach consistent with a patient’s anatomy, comorbidities, and acuity of presentation.➤ Obtain informed consent. Describe the indications, risks, benefits, alternatives, and potential complications of the planned operation, and ensure patient/caregiver understanding.➤ Synthesize an operative plan that demonstrates understanding of the operative anatomy, physiology, indications, contraindications, risks, benefits, alternatives, and potential complications of:<ul style="list-style-type: none">▪ Lower extremity endovascular revascularization▪ Lower extremity open revascularization❖ Intraoperative<ul style="list-style-type: none">➤ Perform the procedures required to manage lower extremity peripheral arterial occlusive disease in the setting of claudication.<ul style="list-style-type: none">▪ Execute endovascular revascularization of the lower extremity.▪ Execute open surgical operative revascularization of the lower extremity.➤ Integrate new information discovered intraoperatively that requires modification of the surgical plan or technique, such as:<ul style="list-style-type: none">▪ Emboli▪ Technical issues (failure to cross the lesion)➤ Work with anesthesia staff, nursing staff, and other perioperative health care professionals to create and maintain an intraoperative environment that promotes patient-centered care.❖ Postoperative



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	<ul style="list-style-type: none">➤ Initiate and oversee postoperative care, including monitoring lower extremity pulses, prescribing evidence-based medical therapy, and determining follow-up imaging and care.➤ Communicate with the patient/caregiver(s) and members of the health care team to ensure understanding of Postprocedure instructions and the patient's ability to carry out the resultant plan within the context of their life (e.g., transportation, living situation, insurance, access to a pharmacy).➤ Recognize, evaluate, and manage early and late complications following lower extremity intervention.<ul style="list-style-type: none">▪ Access site complications or other bleeding complications▪ Early and late bypass graft failure▪ Target lesion restenosis or occlusion with the potential need for reintervention and surveillance▪ Infectious complication (access/surgical site and prosthetic material) or anastomotic pseudoaneurysm➤ Identify a surveillance plan and indications for reintervention
Scope	<ul style="list-style-type: none">❖ In scope<ul style="list-style-type: none">➤ Aortoiliac stenosis or occlusion➤ Infrainguinal arterial stenosis or occlusion➤ Recurrent stenosis or failed endoscopic or prior open procedures❖ Out of scope<ul style="list-style-type: none">➤ Chronic critical limb ischemia➤ Acute limb ischemia➤ Upper extremity➤ Venous❖ Special Population<ul style="list-style-type: none">➤ Patients with:<ul style="list-style-type: none">▪ Diabetes▪ End-stage renal disease▪ Entrapment syndrome



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<p style="text-align: center;">1</p> <p>Limited Participation</p> <p style="text-align: center;">Demonstrates understanding of information and has very basic skills</p> <p>Framework: What a learner directly out of medical school should know</p> <p style="text-align: center;">The attending can show and tell.</p>	<ul style="list-style-type: none"> Elicits a history and performs a vascular exam (peripheral pulses) Identifies risk factors for developing claudication (smoking, cholesterol, DM) Prepares a patient for intervention (CBC, tests for renal function and coagulation) and identifies the need to evaluate for coronary disease Identifies options for diagnostic imaging (arterial Doppler, duplex, CTA) Identifies the need for intervention in a patient with claudication and recognizes the limits of conservative measures (exercise, smoking cessation, risk management) Identifies the need for intervention over conservative therapy Identifies clinical practice guidelines for management, including indications for possible intervention for a routine patient <p>Communicates basic facts about claudication to a</p>	<ul style="list-style-type: none"> Sutures and knot-ties with security Demonstrates understanding of sharps safety, safe use of devices, and surgical field sterility Demonstrates basic surgical skills, including making an incision and closure Identifies available intraop imaging modalities Identifies the procedure to be performed, alternative options (endo or open), and the indications for intervention relative to medical management Identifies potential crises (bleeding, dissection, venous injury) that could occur during an open approach to claudication 	<ul style="list-style-type: none"> Uses US to visualize access vessels Recognizes the importance of maintaining wire access Lists the types of available procedures (PTA, stenting, atherectomy) Identifies the procedure to be performed, alternative options (endo or open), and the indications for intervention relative to medical management Identifies potential crises (loss of access, ruptured artery, dissection) that could occur during endo treatment of claudication Identifies basic ALARA principles; wears lead and a dosimeter at all times; performs basic "driving" maneuvers 	<ul style="list-style-type: none"> Identifies a basic postop problem (hematoma, change in pulse exam) and initiates management with supervision Recognizes the need for long-term surveillance and risk factor modification Respectfully communicates a multimodal pain management strategy to a patient/caregiver(s) with recognition of the potential for bias



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	patient/caregiver(s) in a respectful way; provides anticipatory guidance regarding the natural history of this condition			
<p>2</p> <p>Direct Supervision</p> <p>Demonstrates understanding of the steps of the operation but requires direction through principles and does not know the nuances of a basic case</p> <p>Framework: The learner can use the tools but may not know exactly what, where, or how to do it.</p> <p>The attending gives active help throughout the case to maintain forward progression.</p>	<ul style="list-style-type: none"> Orders imaging studies (ABI, duplex, axial) and interprets findings to verify arterial disease leading to claudication Communicates the risks and benefits of nonoperative management and risk factor modification, including smoking cessation, statin use, and a monitored exercise program Demonstrates understanding of cath lab setup for basic claudication interventions; positions the patient and selects the appropriate basic wires and catheters; drapes the patient and equipment appropriately Demonstrates understanding of the setup for basic operative intervention for claudication; positions and drapes the patient appropriately 	<ul style="list-style-type: none"> Demonstrates respect for tissues (gentle handling of vessels) and developing skill in instrument handling (using a Castroviejo needle driver) Performs parts of an anastomosis with frequent prompting and assistance Selects intraop imaging based on patient factors Identifies most steps of the procedure (inflow/outflow control) and the equipment required (clamps, patch, conduit); requires prompting to advance the procedure Describes most potential operative errors and intraop findings, needing assistance to demonstrate how to avoid them Describes findings with arterial and venous injury and dissection that can be encountered during open treatment for claudication 	<ul style="list-style-type: none"> Uses US to obtain vascular access; demonstrates basic catheter and wire-handling techniques Identifies most steps of the procedure (access, selective catheterization) and the equipment required (sheath, wires, catheters); requires prompting to advance the procedure Describes radiographic and clinical findings with arterial rupture and dissection that can occur during endo treatment of claudication Uses fluoroscopy techniques and shielding to decrease radiation exposure to the patient and operator with guidance 	<ul style="list-style-type: none"> Identifies an appropriate medical therapy (clopidogrel, ASA, statins) in the postprocedural time frame Manages a common postop problem (eg, access site complication) and orders and interprets additional testing (duplex of access site) Describes long-term surveillance and risk factor modification Leads a discussion about multimodal pain management strategies Communicates standard postop instructions and updates to a patient/caregiver(s)



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	<ul style="list-style-type: none"> • Uses imaging to support operative planning for claudication • Synthesizes clinical data (anatomy, level of disease, runoff, medical comorbidities) to recommend open vs endo intervention • Synthesizes clinical data to guide a decision between open, endo, or hybrid techniques • Demonstrates limited familiarity with literature regarding the management of claudication and can discuss this information clearly with a patient • Customizes communication about the condition to a patient/caregiver(s) in a respectful way; answers patient questions about claudication management, including patency rates and risk of limb loss; conducts an informed consent discussion for a straightforward, elective revascularization 			
3	<ul style="list-style-type: none"> • Interprets an H&P, US results, and patient risk 	<ul style="list-style-type: none"> • Demonstrates efficient instrument handling and 	<ul style="list-style-type: none"> • Performs a diagnostic angiogram, efficiently 	

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<p><u>Indirect Supervision</u></p> <p>Can do a basic operation but will not recognize abnormalities and does not understand the nuances of an advanced case</p> <p><u>Framework:</u> The learner can perform the operation in straightforward circumstances.</p> <p>The attending gives passive help. This help may be given while scrubbed for more complex cases or during a check-in for more routine cases.</p>	<p>factors to formulate a plan for endo or open intervention for claudication</p> <ul style="list-style-type: none"> Recognizes that despite maximal conservative efforts (exercise, medical management, smoking cessation) a patient may be appropriate for intervention; identifies potential adverse effects of some therapy (DAPT, cilostazol) Recognizes when the plan for intervention in a claudicated patient must change, including from endo to open, based on information gained during the preprocedural workup (worsening ABI, development of wound) Identifies and manages comorbidities, anticoagulation reversal, and cardiac optimization Demonstrates understanding of cath lab setup for an intermediate claudication intervention; positions the patient and selects the appropriate wires and catheters; drapes 	<p>safe exposure, dissection, and control of vessels</p> <ul style="list-style-type: none"> Performs a complete endarterectomy, anastomosis, or patch with minimal prompting and passive assistance Interprets intraop imaging to guide alterations in the operative plan Identifies all critical steps of the procedure and the equipment required; advances the procedure with minimal prompting Describes the appropriate response to bleeding, venous injury, and dissection during open intervention for claudication 	<p>traverses a stenosis, and delivers a stent/balloon to the appropriate location</p> <ul style="list-style-type: none"> Identifies all critical steps of the procedure (access, selective cath, crossing lesion) and the equipment required (stents, atherectomy, lithotripsy); advances the procedure with minimal prompting Describes the appropriate response to loss of arterial access, dissection, or arterial rupture during an endo intervention for claudication Accesses resources to determine exam-specific radiation dose information; independently manages the fluoroscopy system; uses radiation protection devices and techniques 	<ul style="list-style-type: none"> Communicates postop instructions to a patient/caregiver(s) in a caring and sensitive way, including surveillance and anticipatory guidance for signs of failing intervention Recognizes and manages a complex postop complication (target lesion/graft occlusion, bleeding), including identifying the need to return to the OR Recognizes abnormal surveillance imaging findings and their impact on the longitudinal care plan Uses a multimodal opioid-sparing pain management strategy



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	<p>the patient and equipment appropriately</p> <ul style="list-style-type: none">• Demonstrates understanding of the setup for intermediate operative intervention for a claudication case; positions and drapes the patient appropriately• Develops a specific open surgical plan for the clinical situation and demonstrates understanding of alternative treatment options• Develops an endo treatment plan for the current clinical situation and recognizes device limitations based on patient anatomy• Demonstrates familiarity with literature regarding management and outcomes of intervention for claudication and applies this information independently• Customizes communication about a condition to a patient/caregiver(s) based on individual characteristics and anticipates the efficacy of nonoperative management; in the case of			



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4	<ul style="list-style-type: none"> surgery, anticipates logistical problems in optimizing the patient 			
<p>Practice Ready</p> <p>Can manage more complex patient presentations and operations and take care of most cases</p> <p>Framework: The learner can treat all straightforward appendicitis cases and has a strong understanding of surgical options and techniques for less common scenarios.</p> <p>The attending is available at the request of the learner but is not routinely needed for common presentations, though</p>	<ul style="list-style-type: none"> Synthesizes patient data, including imaging, to formulate a plan for conservative management or endo or open intervention for claudication, including a rationale and approach Formulates a plan that includes all aspects of risk management, a monitored exercise program, and ongoing surveillance needs for a patient being treated conservatively Demonstrates understanding of cath lab setup for an advanced claudication intervention; positions the patient and selects the appropriate wires and catheters; drapes the patient and equipment appropriately Demonstrates understanding of the setup for advanced operative intervention for claudication; positions and 	<ul style="list-style-type: none"> Proficiently handles instruments and equipment, uses assistants, and guides the conduct of the operation; makes independent intraop decisions; anticipates when assistance is needed Optimizes the management plan based on intraop imaging Adapts the management plan based on a change in the patient's anatomy or clinical situation (conversion to CTO or acute ischemia), including from endo to open Identifies all critical steps of the procedure and the equipment required; advances the procedure without prompting in a complex case Describes potential errors at a critical portion of the procedure and the steps to avoid them 	<ul style="list-style-type: none"> Plans and performs an intervention to treat a stenosis or CTO, including appropriate endo device sizing and selection Optimizes the management plan based on intraop imaging Adapts the management plan based on a change in the patient's anatomy or clinical situation (conversion to CTO or acute ischemia), including from endo to open Identifies all critical steps of the procedure and the equipment required; advances the procedure without prompting in a complex case Describes potential errors at a critical portion of the procedure and the steps to avoid them 	<ul style="list-style-type: none"> Customizes communication with a patient/caregiver(s) in a caring and nonjudgmental way in the case of a complication or intervention failure; provides anticipatory guidance regarding the risks/likelihood of limb loss and the implications of amputation Leads the team and provides supervision in the management of a complex complication (target lesion/graft occlusion, bleeding) Independently alters longitudinal care based on a complication (early rethrombosis, bleeding) Uses a multimodal opioid-sparing pain strategy that includes the use of a regional and systemic adjunct to a pain control regimen

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input may be needed for more complex presentations.	<ul style="list-style-type: none">drapes the patient appropriatelyChanges the plan for intervention in a complex claudication case based on an evolving clinical situationIndependently initiates cross-sectional and duplex imaging and 3D reformatting to identify abnormal findings and plan an interventionAdapts the management plan for a changing clinical situation (decision to intervene for worsening claudication, development of wounds)Adapts the management plan based on a change in a patient's anatomy, including from endo to openDemonstrates familiarity with the most current literature and guidelines regarding the management of claudicationIndependently initiates and interprets an expected cost-effective workup for an advanced or equivocal claudication presentation and determines the optimal	<ul style="list-style-type: none">Anticipates patient-specific complications during an open intervention (potential arterial or venous injury, difficulty establishing inflow control due to calcification) and describes appropriate management, including incorporation of an endo technique	<ul style="list-style-type: none">Anticipates patient-specific complications during an endo intervention (potential arterial injury from small access, heavily calcified lesions, difficult iliac bifurcations, long lesions); describes appropriate management, including conversion to an open procedure	



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	<p>personalized operative approach</p> <ul style="list-style-type: none">• Conducts an informed consent discussion for complex revascularization, individualizing the risks and benefits for the patient• Customizes communication about the condition to a patient/caregiver(s) based on individual characteristics and anticipates logistical problems in optimizing the patient for surgery			