



CLINICAL GUIDELINES

PVD Imaging Policy

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eviCore healthcare Clinical Decision Support Tool Diagnostic Strategies: This tool addresses common symptoms and symptom complexes. Imaging requests for individuals with atypical symptoms or clinical presentations that are not specifically addressed will require physician review. Consultation with the referring physician, specialist and/or individual's Primary Care Physician (PCP) may provide additional insight.

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PERIPHERAL VASCULAR DISEASE (PVD) IMAGING GUIDELINES

<u>PVD IMAGING GUIDELINES</u>	
ABBREVIATIONS AND GLOSSARY	3
PVD-1~GENERAL GUIDELINES	4
PVD-2~SCREENING ASYMPTOMATIC INDIVIDUALS	8
PVD-3~CEREBROVASCULAR AND CAROTID DISEASE	9
PVD-4~UPPER EXTREMITY PERIPHERAL VASCULAR DISEASE	12
PVD-5~PULMONARY ARTERY HYPERTENSION	13
PVD-6~AORTIC DISORDERS AND RENAL VASCULAR DISORDERS	14
PVD-7~LOWER EXTREMITY PERIPHERAL VASCULAR DISEASE	16
PVD-8~IMAGING FOR HEMODIALYSIS ACCESS	21
PVD-9~ARTERIOVENOUS MAFORMATIONS (AVMS)	22
PVD-10~NUCLEAR MEDICINE	23

ABBREVIATIONS and GLOSSARY for the PVD IMAGING GUIDELINES

(Also see: [Cardiac Imaging Guidelines Glossary](#))

AAA	abdominal aortic aneurysm
ABI - ankle brachial index:	a noninvasive, non-imaging test for arterial insufficiency – see toe-brachial index below. This testing can also be done after exercise if resting results are normal.
Claudication or Intermittent claudication:	usually a painful cramping sensation of the legs with walking or severe leg fatigue
CTA	computed tomography angiography
CTV	computed tomography venography
DLCO	diffusion capacity: defined as the volume of carbon monoxide transferred into the blood per minute per mmHg of carbon monoxide partial pressure
DVT	deep venous thrombosis
ECG	electrocardiogram
ENT	Ears, Nose, Throat
HbA1C	hemoglobin A1C: test used to determine blood sugar control for patients with diabetes
MRA	magnetic resonance angiography
MRV	magnetic resonance venography
PAD	peripheral artery disease
PAH	pulmonary artery hypertension
PFT	pulmonary function tests
PVD	peripheral vascular disease
SVC	superior vena cava
TIA	transient ischemic attack
TTE	transthoracic echocardiogram
Toe-Brachial Index:	useful in patients with ABI above the normal range due to non-compressible posterior tibial or dorsalis pedis arteries
V/Q Scan	ventilation and perfusion scan

PVD-1~GENERAL GUIDELINES

- ✓ A current clinical evaluation (within 60 days), including medical treatments, are required prior to considering advanced imaging, which includes:
 - Relevant history and physical examination and appropriate laboratory studies and non advanced imaging modalities, such as recent ABIs (within 60 days) after symptoms started or worsened.
 - Unless there is documented need for routine imaging that is supported by the guidelines.
 - Other meaningful contact (telephone call, electronic mail or messaging) by an established patient can substitute for a face-to-face clinical evaluation.
 - The same general risk factors for as coronary disease also apply to vascular disease.
 - Diabetes is a particularly high risk factor.
 - Age <50, with at least one risk factor, are considered “at risk” for vascular disease.
 - Erectile dysfunction can be associated with vascular disease*
 - See: **PV-17~Impotence/Erectile Dysfunction** in the Pelvis Imaging Guidelines.
 - Simultaneous venous and arterial systems evaluation are unusual but are occasionally needed.
 - **Post angioplasty/reconstruction:** Follow-up imaging is principally guided by symptoms. Also see:
 - **AB-17~Abdominal Aortic Aneurysm (AAA) Follow Up and Pre-Operative Evaluation** in the Abdomen Imaging Guidelines
 - **AB-18~Abdominal Aortic Aneurysm (AAA)-Post Endovascular or Open Aortic Repair** in the Abdomen Imaging Guidelines
 - **CH-30~Thoracic Aorta** in the Chest Imaging Guidelines
 - **PVD-7.3 Post-Procedure Surveillance Studies**

PVD-1.2 Procedure Coding

Non-Invasive Physiologic Studies of Extremity Arteries	CPT®
Limited bilateral noninvasive physiologic studies of upper or lower extremity arteries	93922
Complete bilateral noninvasive physiologic studies of upper or lower extremity arteries, 3 or more levels	93923

- CPT® 93922 and CPT® 93923 can be requested and reported only once for the upper extremities and once for the lower extremities.
- CPT® 93922 and CPT® 93923 should not be ordered on the same request nor billed together for the same date of service.

- CPT® 93924 and CPT® 93922 and/or CPT® 93923 should not be ordered on the same request and should not be billed together for the same date of service.

PVD-1.2 Procedure Coding Continued . . .

Non-Invasive Physiologic Studies of Extremity Arteries	CPT®
Non-invasive physiologic studies of lower extremity arteries, at rest and following treadmill stress testing, complete bilateral study	93924

Arterial Duplex – Upper and Lower Extremities	CPT®
Duplex scan of lower extremity arteries or arterial bypass grafts; complete bilateral.	93925
<ul style="list-style-type: none"> • A complete duplex scan of the lower extremity arteries includes examination of the full length of the common femoral, superficial femoral and popliteal arteries. • The iliac, deep femoral, and tibioperoneal arteries may also be examined. 	
Duplex scan of lower extremity arteries or arterial bypass grafts; unilateral or limited study	93926
<ul style="list-style-type: none"> • The limited study is reported when only one extremity is examined or when less than a full examination is performed (e.g., only one or two vessels or follow-up) 	
Duplex scan of upper extremity arteries or arterial bypass grafts; complete bilateral	93930
<ul style="list-style-type: none"> • A complete duplex of the upper extremity arteries includes examination of the subclavian, axillary, and brachial arteries. • The radial and ulnar arteries may also be included. 	
Duplex scan of upper extremity arteries or arterial bypass grafts; unilateral or limited study	93931
<ul style="list-style-type: none"> • The limited study is reported when only one extremity is examined or when less than a full examination is performed (e.g., only one or two vessels or follow-up) 	

Cerebrovascular Artery Studies	CPT®
Duplex scan of extracranial arteries; complete bilateral study	93880
Duplex scan of extracranial arteries; unilateral or limited study	93882
<ul style="list-style-type: none"> • This study is often referred to as a “carotid ultrasound” or “carotid duplex”. • Typically, it includes evaluation of the common, internal, and external carotid arteries. 	

PVD-1.2 Procedure Coding Continued . . .

Venous Studies - Extremities	CPT®
Non-invasive physiologic studies of extremity veins, complete bilateral study (e.g. Doppler waveform analysis with responses to compression and other maneuvers, phleborheography, impedance plethysmography) <i>This study is rarely performed.</i>	93965
Duplex scan of extremity veins, including responses to compression and other maneuvers; complete bilateral study	93970
Duplex scan of extremity veins, including responses to compression and other maneuvers; unilateral or limited study	93971
<ul style="list-style-type: none"> • These codes are used to report studies of lower or upper extremity veins. • A complete bilateral study of the lower extremity veins includes examination of the common femoral, proximal deep femoral, great saphenous and popliteal veins. Calf veins may also be included. • A complete bilateral study of upper extremity veins includes examination of the subclavian, jugular, axillary, brachial, basilica, and cephalic veins. Forearm veins may also be included. 	

Duplex for Hemodialysis Access	CPT®
Duplex scan of hemodialysis access (including arterial inflow, body of access and venous outflow)	93990

PVD-1.3 General Guidelines - Imaging

- ✓ Ankle-brachial index (ABI) is included as part of the physical exam, has no CPT® code and does not support separate billing unless performed with simultaneous Doppler waveform recording and analysis, volume plethysmography or with transcutaneous oxygen tension measurements.
 - ABI should be measured first:
 - **If normal, then further vascular studies are generally not indicated.**
 - **If abnormal**, arterial duplex scans (CPT® 93925 and CPT® 93926) and (CPT® 93930 and CPT® 93931) are usually performed as the next study.
- ✓ Imaging Studies:
 - Carotid studies (neck MRA or CTA) capture the area from the top of the aortic arch (includes the origin of the innominate artery, common carotid artery, and subclavian artery, which gives off the vertebral artery) to the base of the skull.
 - CTA/ MRA abdomen (CPT® 74175/74185) images from the diaphragm to the umbilicus or iliac crest.
 - CTA/MRA chest (CPT® 71275/71555) images from the base of the neck to the dome of the liver.
 - Runoff studies (CPT® 75635 for CTA or CPT® 74185, CPT® 73725, and CPT® 73725 for MRA) image from the umbilicus to the feet.
 - CTA of the abdomen and lower extremities should be reported as CPT® 75635 rather than using the individual CPT® codes for the abdomen, pelvis, and legs.
 - MRA of the abdomen, pelvis and lower extremities should be reported as CPT® 74185, CPT® 73725, and CPT® 73725. The CPT® code for MRA pelvis (CPT® 72198) should not be included in this circumstance.
 - If a prior imaging study (ultrasound, MRA, CTA, catheter angiogram, etc.) has been completed for a condition, a follow-up, additional, or repeat study for the same condition is generally not indicated unless there has been a change in the patient's condition, previous imaging showed an indeterminate finding, or eviCore healthcare guidelines support routine follow-up imaging.
- ✓ Equivocal findings
 - CTA may be indicated to evaluate equivocal findings on angiography or MRA if the results will affect patient management decisions.
 - MRA may be indicated to evaluate equivocal findings on angiography or CTA if the results will affect patient management decisions.
- ✓ External Counterpulsation (ECP), see: **CD-1.9 External Counterpulsation** in the Cardiac Imaging Guidelines.
 - The usual procedure code for ECP is G0166, which is an all-inclusive code.

- External cardiac assistance (CPT[®] 92971), ECG rhythm strip and report (CPT[®] 93040 or CPT[®] 93041), pulse oximetry (CPT[®] 94760 or CPT[®] 94761), and plethysmography (CPT[®] 93922 or CPT[®] 93923) should not be separately requested or billed with G0166.
- eviCore healthcare does not currently prior authorize the G0166 code.

References

1. Min JK, Williams KA, Okwuosa TM, et al. Prediction of coronary heart disease by erectile dysfunction in men referred for nuclear stress testing. *Arch Intern Med* 2006; 166:201-206.
2. *CPT[®] Assistant* , June 2012
3. *CPT[®] Assistant* , September 2012

PVD-2~Screening Asymptomatic Individuals

PVD-2.1 Screening

- ✓ Patients without diabetes, SHOULD NOT undergo routine screening. The U.S. Preventive Services Task Force concludes that the harms of routine screening for exceed the benefits.
- ✓ Patients with diabetes SHOULD undergo screening initially with ABI and with limited Doppler US (CPT[®] 93922). PAD is more than twice as common among diabetics, and many are asymptomatic and should undergo screening.

References

1. Perlstein TS, Creager MA. The Ankle-Brachial Index as a Biomarker of Cardiovascular Risk: It's Not Just About the Legs. *Circulation*, 2009; 120: 2033-2035.
2. Beckman JA, Creager MA, Libby P. Diabetes and atherosclerosis: Epidemiology, pathophysiology, and management. *JAMA*, 2002; 287: 2570-2581.
3. Saydah SH, Fradkin J, Cowie C. Poor control of risk factors for vascular disease among adults with previously diagnosed diabetes. *JAMA*, 2004; 291: 335-342.
4. Hennion DR, Siano KA. Diagnosis and treatment of peripheral arterial disease. *American Family Physician*, 2013; 88: 306-310.
5. Hirsh AT, Criqui MH, Treat-Jacobson D, Regensteiner JG et al. Peripheral arterial disease detection, awareness, and treatment in primary care. *JAMA*, 2001; 286: 1317-1324.

PVD-3~CEREBROVASCULAR and CAROTID DISEASE

PVD-3.1 Initial Imaging

- ✓ Prior to considering advanced imaging, duplex ultrasound (CPT[®] 93880 bilateral or CPT[®] 93882 unilateral) can be used to evaluate possible carotid artery disease when any of the following apply:
 - Hemispheric neurologic symptoms, including stroke, TIA, or amaurosis fugax
 - Non-hemispheric or unexplained neurologic symptoms
 - Known or suspected retinal arterial emboli
 - Suspected dissection
 - Pulsatile neck masses
 - Carotid bruit
 - Abnormal findings on physical exam of the carotid arteries (e.g. aneurysm or absent carotid pulses)
 - Preoperative evaluation of patients with evidence of severe diffuse atherosclerosis, scheduled for major cardiovascular surgical procedures
 - Preoperative evaluation of patients prior to elective coronary artery bypass graft (CABG) surgery in patients older than 65 years of age and in those with peripheral artery disease, history of cigarette smoking, history of stroke or TIA, or carotid bruit.
 - Suspected Subclavian Steal Syndrome
 - (See: **CH-28~Subclavian Steal Syndrome** in the Chest Imaging Guidelines)
 - Blunt neck trauma
 - Vasculitis involving carotid arteries
- ✓ New signs and symptoms consistent with carotid artery disease (e.g. TIA, amaurosis fugax, change in nature of a carotid bruit) are an indication to re-image the neck vessels (regardless of when the previous carotid imaging was performed) with any of the following:
 - Duplex ultrasound (CPT[®] 93880 bilateral study or CPT[®] 93882 unilateral study) **or**
 - Neck MRA with contrast (CPT[®] 70548) **or**
 - Neck CTA (CPT[®] 70498)
- ✓ If duplex Ultrasound shows \geq 70% occlusion/stenosis of the internal carotid artery, then MRA neck with contrast (CPT[®] 70548) or CTA neck (CPT[®] 70498) can be performed.
 - MRA head (CPT[®] 70544) or CTA head (CPT[®] 70496) can be added if carotid intervention is planned.

- ✓ MRA neck (CPT®) or CTA neck (CPT® 70498) can be performed if ultrasound findings suggest ulcerated plaque.
- ✓ Surveillance imaging once a year for patients with fibromuscular dysplasia of the extracranial carotid arteries.
- ✓ For follow-up imaging of known carotid disease (See **PVD-3.2**)

PVD-3.2 Surveillance Imaging with NO History of Carotid Surgery or Intervention

For Typical Symptoms of TIA/Stroke or Carotid Dissection:
See <u>HD-21~General Stroke/TIA</u>

For Suspected Vertebrobasilar Pathology:	
<u>Initial Imaging</u>	<u>Surveillance Imaging</u>
See: <u>HD-21~General Stroke/TIA</u>	Asymptomatic or unchanged symptoms and known vertebrobasilar disease or post-stenting interval determined by Vascular Specialist

For Suspected Subclavian Steal:	
<u>Initial Imaging</u>	
See: <u>CH-28~Subclavian Steal Syndrome</u>	

After Intracranial Hemorrhage:	
<u>Initial Imaging</u>	<u>Surveillance Imaging</u>
See: <u>HD-13.1 Head Trauma</u>	Interval determined by neurosurgeon or neurologist

Surveillance of Asymptomatic Individuals with Carotid Artery Disease that have NOT had Carotid Surgery or Intervention	
<70% Carotid Stenosis	=/> 70% Carotid Stenosis
Duplex ultrasound (CPT® 93880 bilateral or CPT® 93882 unilateral) can be performed at the following intervals: <ul style="list-style-type: none"> • Annually for the first 3 years • Every 2 years thereafter if stable **If increased stenosis is seen on imaging, may image annually until stable for 3 years	Duplex ultrasound (CPT® 93880 bilateral or CPT® 93882 unilateral) <u>or</u> MRA Neck with contrast (CPT® 70548) <u>or</u> CTA Neck (CPT® 70498) can be performed at the following intervals: <ul style="list-style-type: none"> • Annually for the first 3 years • Every 2 years thereafter if stable **If increased stenosis is seen on imaging, may image annually until stable for 3 years

PVD-3.3: Surveillance Imaging WITH History of Carotid Surgery or Intervention

<70% Carotid Stenosis	=/> 70% Carotid Stenosis
Duplex ultrasound (CPT® 93880 bilateral or CPT® 93882 unilateral) can be performed at the following intervals: <ul style="list-style-type: none"> • At 1 month after procedure • At 6 months after procedure • Annually until stability has been established 	Duplex ultrasound (CPT® 93880 bilateral or CPT® 93882 unilateral) <u>or</u> MRA Neck with contrast (CPT® 70548) <u>or</u> CTA Neck (CPT® 70498) can be performed at the following intervals: <ul style="list-style-type: none"> • At 1 month after procedure • At 6 months after procedure

Practice Notes

- Carotid intima-media thickness using duplex ultrasound imaging (Category III code 0126T)
- Although outcomes data are lacking, Texas has adopted this method in Texas Heart Attack Preventive Screening Bill (HR 1290).
- If ultrasound is technically difficult or confirmation of the degree of stenosis on ultrasound is needed because an interventional procedure is being considered, then neck MRA (CPT[®] 70548) or neck CTA (CPT[®] 70498) may be performed.

References

1. Brott TG, Halperin JL, Abbara S, Bacharach JM, et al. 2011 ASA/ACCF/AANN/AANS/ACR/ASNR/CNS/SAIP/SCAI/SIR/SNIS/SVM/SVS Guideline on the management of patients with extracranial carotid and vertebral artery disease. *Circulation*, 2011; 124:e54-e130.
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3. American Society of Echocardiography and the Society of Vascular Medicine and Biology. *Journal of the American Society of Echocardiography*, 2006; 19:960.
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<http://www.acr.org/~media/5D63A45F7A54417C93CD58F109F0FDD2.pdf>, accessed August 6, 2013.
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7. LCD for Medicine: Noninvasive cerebrovascular arterial studies (L30039). Cahaba Government Benefit Administrators, LLC. Revised October 1, 2009.
<http://www.medarm.com/mrpepriv/L30039.htm>. Accessed June 17, 2011.
8. Post PN, Kievit J, van Baalen JM, van den Hout WB, van Bockel JH. Routine Duplex Surveillance Does Not Improve the Outcome After Carotid Endarterectomy: A Decision and Cost Utility Analysis. *Stroke*. 2002; 33: 749-755.

PVD-4~Upper Extremity Peripheral Vascular Disease

PVD-4.1 Upper Extremity PVD – Imaging

- ✓ One or more of the following imaging studies may be required when clinical evidence points to arterial or venous insufficiency (e.g. arm fatigue upon exercise, pain, digital ischemia or gangrene, swelling, etc.), which may include emboli from aortic arch plaque rupture:
 - Ultrasound of the upper extremities (CPT[®] 93923), or
 - CTA/CTV of upper extremity (CPT[®] 73206) or MRA/MRV of upper extremity (CPT[®] 73225), and/or
 - Chest CTA/CTV (CPT[®] 71275) or Chest MRA/MRV (CPT[®] 71555)
- ✓ For Superior Vena Cava Syndrome (upper extremity and facial symptoms):
 - CT of the chest with contrast (CPT[®] 71260).
 - MRV (CPT[®] 71555) or CTV (CPT[®] 71275) of the chest may be considered when stenting of the SVC is being considered.*
- ✓ For Upper Extremity DVT:
 - Duplex ultrasound (CPT[®] 93970 bilateral or CPT[®] 93971 unilateral).
 - If duplex ultrasound is nondiagnostic:
 - MRV Upper Extremity (CPT[®] 73225) and/or MRV Chest (CPT[®] 71555) **or**
 - CTV Upper Extremity (CPT[®] 73206) and/or CTV Chest (CPT[®] 71275)
- ✓ For suspected Fibromuscular Dysplasia of the brachial artery, appropriate studies include:
 - MRA of upper extremity (CPT[®] 73225)
 - CTA of upper extremity (CPT[®] 73206)
 - Arterial Ultrasound (CPT[®] 93930 bilateral study or CPT[®] 93931 unilateral study)

References

1. ACR Appropriateness Criteria[®], Suspected upper extremity deep vein thrombosis, last reviewed 2011.
http://gm.acr.org/SecondaryMainMenuCategories/quality_safety/app_criteria/pdf/Vascular/SuspectedUpperExtremityDeepVeinThrombosisDoc20.aspx. Accessed August 6, 2013.
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PVD-5~PULMONARY ARTERY HYPERTENSION

PVD-5.1 Pulmonary Artery Hypertension – Imaging

Pulmonary artery hypertension (PAH) comprises a spectrum of diseases which will direct evaluation, including ECG (right ventricular hypertrophy with/ without strain, right atrial dilatation); chest x-ray; arterial blood gas, PFT's or V/Q scan. Imaging is based on suspected etiology.

- ✓ Transthoracic echocardiogram (TTE) (CPT[®] 93306) initially, accompanied by:
 - Pulmonary venous hypertension - Stress echocardiogram (CPT[®] 93350 or CPT[®] 93351) or left heart catheterization.
 - Pulmonary hypertension associated with hypoxemia - High resolution chest CT (CPT[®] 71250) to rule out restrictive lung disorders such as idiopathic pulmonary fibrosis.
- ✓ Acute or chronic pulmonary embolism – Chest CTA (CPT[®] 71275); see: **CH-27**

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1. Barbosa EJM, Gupta NK, Torigian DA, Gefer WB. Current role of imaging in the diagnosis and management of pulmonary hypertension. *AJR*, 2012; 198: 1320-1331.
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**PVD-6~Aortic Disorders and Renal Vascular Disorders
and Visceral Artery Aneurysms**

PVD-6.1 Aortic Disorders/Renal Disorders/Visceral Artery Aneurysms

- ✓ Duplex ultrasound for visceral vascular studies
 - **CPT[®] 93975:** Duplex scan of arterial inflow and venous outflow of abdominal, pelvic, scrotal contents and/or retroperitoneal organs; complete study.
 - **CPT[®] 93976:** Duplex scan of arterial inflow and venous outflow of abdominal, pelvic, scrotal contents and/or retroperitoneal organs; limited study.
 - **CPT[®] 93978:** Duplex scan of aorta, inferior vena cava, iliac vasculature, or bypass grafts; complete study.
 - **CPT[®] 93979:** Duplex scan of aorta, inferior vena cava, iliac vasculature, or bypass grafts; unilateral or limited study.

Duplex Ultrasound - Practice Note

In clinical practice, CT, CTA, MRA are usually preferred to evaluate for stenosis of these vessels rather than ultrasound which can be difficult to perform (**Exception:** Duplex ultrasound is appropriate to rule out testicular or ovarian torsion).

- ✓ Thoracic Aortic Disease
 - See also **CH-30~Thoracic Aorta** in the Chest Imaging Guidelines
- ✓ Renal Artery Disease
 - See **AB-37~Renovascular Hypertension** in the Abdomen Imaging Guidelines
- ✓ Abdominal Aortic Abnormality
 - See: **AB-17.1 Abdominal Aortic Aneurysm** and **AB-18~Abdominal Aortic Aneurysm-Post Endovascular or Open Aortic Repair** in the Abdomen Imaging Guidelines.
- ✓ Mesenteric Ischemia
 - Also see: **AB-6~Mesenteric/Colonic Ischemia** in the Abdomen Imaging Guidelines
- ✓ Suspected/Screening for Visceral Artery Aneurysm (spleen, kidney, liver or intestines) imaging can include:
 - Ultrasound (CPT[®] 76700 or CPT[®] 76705) **or**
 - CTA abdomen (CPT[®] 74175) **or**
 - CT abdomen with contrast (CPT[®] 74160)
 - Further monitoring can be with Ultrasound (CPT[®] 76700 or CPT[®] 76705) **or** CTA abdomen (CPT[®] 74175) **or** CT abdomen with contrast (CPT[®] 74160) based on the intervals below or as determined by a vascular specialist:
 - Initial evaluation with six month follow-up is reasonable

- Further follow-up annually if no significant enlargement is seen
- Post-stent placement are without guidelines and therefore reasonable to follow the same time table as for endovascular aortic repair: CTA of abdomen (CPT[®] 74175), MRA of abdomen (CPT[®] 74185), or CT abdomen (CPT[®] 74160) at 1 month, 6 months, and 12 months following stent placement, then every year. An additional study can be done at 3 months if there was evidence of endoleak on the 1 month study.

Visceral Artery Aneurysms - Practice Notes

- Visceral Artery Aneurysms are defined by an increase of more than 50% of the original arterial diameter.
- Vascular specialist consultation is beneficial in order to determine the time-frame to intervention.

- ✓ For May-Thurner Syndrome (Iliac Vein Compression Syndrome), imaging can include:
 - MRI Pelvis without contrast (CPT[®] 72195) **or** MRI Pelvis without and with contrast (CPT[®] 72197) **or**
 - MRA/MRV Pelvis (CPT[®] 72198) **or**
 - CTA/CTV Pelvis (CPT[®] 72191) **or**
 - Duplex ultrasound (CPT[®] 93975 or CPT[®] 93976) **or**
 - Traditional venography

May-Thurner Syndrome - Practice Notes

- This is a rare condition caused by compression of the left common iliac vein by the overlying right common iliac artery.
- It may cause discomfort and edema of the lower extremity, DVT in the iliofemoral vein or lower extremity DVT which may be recurrent.

Reference

1. Hirsch AT, Haskal ZJ, Hertzner NR, Bakal CW, et al. **ACC/AHA Practice Guidelines: ACC/AHA 2005 Practice Guidelines for the Management of Patients With Peripheral Arterial Disease (Lower Extremity, Renal, Mesenteric, and Abdominal Aortic): A Collaborative Report from the American Association for Vascular Surgery/Society for Vascular Surgery,* Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine and Biology, Society of Interventional Radiology, and the ACC/AHA Task Force on Practice Guidelines.** *Circulation*.2006; 113:e463-e654,doi:10.1161/CIRCULATIONAHA.106.174526.

PVD-7~Lower Extremity Peripheral Vascular Disease

PVD-7.1 Claudication

- ✓ If resting ABI (CPT[®] 93922) is normal (0.9 – 1.3) and disease is still suspected:
 - Differentiate from “pseudoclaudication” (See: **SP-9~Lumbar Spinal Stenosis** in the Spine Imaging Guidelines)
 - Re-measured after exercise (CPT[®] 93924).¹
 - A toe-brachial index may be used as further screening in patients with ABI’s greater than 1.3
 - Otherwise, advanced imaging is necessary only if there is consideration for invasive therapy²⁻⁵
- ✓ Duplex ultrasound (CPT[®] 93925 bilateral study or CPT[®] 93926 unilateral study) and Doppler studies are adjuncts to abnormal ABI that may be used: ^{6,7}
 - To identify location and extent of disease, and
 - Prior to considering advanced imaging.
- ✓ MRA of the aorta, pelvic vessels, and lower extremities (CPT[®] 74185, CPT[®] 73725 and CPT[®] 73725), OR CTA with run off (CPT[®] 75635) to further evaluate the lower extremity arteries for the following: ^{2,8}
 - ABI < 0.5
 - Intermittent claudication (i.e. non-limb threatening ischemia) and all of the following:
 - Failed 3 months conservative medical therapy (physician supervised walking /exercise program)
 - Functional disability (e.g. exercise impairment sufficient to threaten the patient’s employment or to require significant alterations in the patient’s lifestyle) or
 - Potentially limb-threatening vascular disease (such as skin breakdown, non-healing ischemic ulcers, resting leg pain, or gangrene) or
 - Blue Toe Syndrome (emboli from aortic plaque or mural thrombus, hyperviscosity syndrome, hypercoagulable states, and vasculitis)
 - Preoperative planning for an invasive procedure (endovascular or open surgery)
 - **NOTE:** MRA of the pelvis should not be requested/billed with CPT[®] 74185, CPT[®] 73725 and CPT[®] 73725

Claudication - Practice Notes

Claudication symptoms usually remain stable (70%-80% of patients) and do not worsen or improve at rapid rates.⁹

PVD-7.2 Popliteal Artery Entrapment Syndrome

- ✓ Diagnosis of popliteal artery stenosis or occlusion due to compression by adjacent muscle and tendons seen in young men (ages 20-40)¹⁰.
 - Ultrasound (CPT[®] 93926 unilateral study), lower extremity CTA (CPT[®] 73706), or lower extremity MRA (CPT[®] 73725).
 - CT or MRI of the lower extremity (contrast as requested) if requested by the operating surgeon.

PVD-7.3 Post-Procedure Surveillance Studies

Intervals Determined by a Vascular Specialist		
Angioplasty, aortoiliac and infrainguinal	Resting (CPT [®] 93922), and post-exercise ABI (CPT [®] 93924)	Intervals determined by vascular specialist
Synthetic graft (e.g. PTFE), lower extremity bypass graft	Resting (CPT [®] 93922), and postexercise ABI (CPT [®] 93924) -	Intervals determined by vascular specialist
Scheduled Interval		
Venous conduit, lower extremity bypass graft	ABI (CPT [®] 93922), or Duplex ultrasound (CPT [®] 93926 unilateral study). Further imaging studies such as CTA or MRA can be considered based on the evaluation by the vascular specialist. VASCULAR SURGEON PREFERENCE	But not both annually
Endovascular stenting	Duplex ultrasound (CPT [®] 93926 unilateral study) at 1 month, 6 months, and every year	

PVD-7.4 Lower Extremity Artery Aneurysms

For Iliac artery aneurysm,

See: **AB-17.2~Iliac Artery Aneurysm-Follow-up Aneurysms and Pre-op Evaluation** in the Abdomen Imaging Guidelines

Aneurysm	Initial Imaging	Surveillance Imaging	Other Imaging
Femoral artery	Ultrasound (CPT [®] 93925 bilateral study or CPT [®] 93926 unilateral study)	Ultrasound (CPT [®] 93926 unilateral study) annually with asymptomatic true femoral aneurysms smaller than 2.5 cm in diameter; if larger than 2.5 cm, go to intervention	CTA [CPT [®] 73706] or MRA [CPT [®] 73725] is generally reserved as a preoperative study for patients with no plans for invasive angiography and/or technically limited or abnormal ultrasound results
Popliteal artery	Ultrasound (CPT [®] 93925 bilateral study or CPT [®] 93926 unilateral study and CPT [®] 76770 or CPT [®] 76775) and to assess for other aneurysms (especially aortic aneurysm).	Ultrasound (CPT [®] 93926 unilateral study) annually. Post interventional functional testing (ABI) (CPT [®] 93922) may be useful	CTA [CPT [®] 73706] or MRA [CPT [®] 73725] is generally reserved as a preoperative study for patients with no plans for invasive angiography and/or technically limited or abnormal ultrasound results

PVD-7.5 Lower Extremity Deep Venous Thrombosis (DVT) and/or Lower Extremity Edema

Deep venous thrombosis can present with swelling, pain, warmth, erythema, and pain with dorsiflexion of the foot (Homan's Sign) or with progression, such as phlegmasia cerulea dolens. However, 1/3 of all cases are asymptomatic. Symptoms are often not apparent until there is involvement above the knee.

Risk factors for DVT include inactivity, posture, obstruction as well as those outlines outlined in **CH-27~Pulmonary Embolism**.

- ✓ Venous duplex study (CPT[®] 93970 bilateral or CPT[®] 93971 unilateral) is the initial imaging study to evaluate for deep venous thrombosis (DVT)
- ✓ For concomitant arterial disease
 - ABI (CPT[®] 93922) (see: **PVD-7.1 Claudication**)
- ✓ Duplex ultrasound (CPT[®] 93970 bilateral study or CPT[®] 93971 unilateral study) is the initial imaging study for any suspected DVT
 - If Duplex ultrasound is normal, repeat Duplex ultrasound testing is not supported
- ✓ Unilateral or bilateral calf edema with negative or indeterminate venous duplex study
 - Abdomen and Pelvic Ultrasound (CPT[®] 76700 and/or CPT[®] 76856 and/or CPT[®] 76830 [transvaginal]), and if still negative:
 - Pelvis CT with contrast (CPT[®] 72193) or Abdomen and Pelvis CT with contrast (CPT[®] 74177), or
 - MRV or CTV of the pelvis or abdomen and pelvis (CPT[®] 74185 and CPT[®] 72198 or CPT[®] 74175 and CPT[®] 72191) and if the extent of thrombosis needs more detailed assessment and
 - CT or MRI of the lower extremity without contrast (CPT[®] 73700 or CPT[®] 73718)
 - May-Thurner Syndrome (Iliac Vein Compression Syndrome) suspected - is a rare condition of left common iliac vein compression by the overlying right common iliac artery best diagnosed with Pelvis MRI, Pelvis MRA(V) or Pelvis CTA(V) and traditional venography
 - Popliteal (Baker's) Cyst suspected - dedicated ultrasound of the popliteal fossa (CPT[®] 76882)
 - Diabetic muscle necrosis suspected - MRI of the extremity (contrast as requested)
 - Chronic venous insufficiency - advanced imaging is not routinely indicated, unless suspected thigh or abdominal/pelvic clot(s) or masses
 - Phlegmasia cerulea dolens can be evaluated by MRV, CTV or CTA with run off to assess the arterial system. MRA (CPT[®] 74185, CPT[®] 73725, and CPT[®] 73725) may also be required for this problem, which can reflect both arterial and venous compromise and produce substantial lower extremity edema.

- ✓ Generally not considered:
 - Impedance plethysmography (IPG) — CPT[®] 93965) may be useful but is currently uncommonly utilized
 - Venography is more accurate but carries the risk of phlebitis
 - Superficial venous thrombosis should not require advanced imaging.
 - There is insufficient data at this time to justify routinely performing CTA-CTV, including CTV of the pelvis and lower extremities.
 - Duplex study of the arteries (CPT[®] 93925 bilateral study or CPT[®] 93926 unilateral study) is **not** indicated unless there is evidence of arterial insufficiency
 - (See: **PVD-7.1 Claudication**)

Follow-up imaging of known DVT:

- ✓ Duplex ultrasound (CPT[®] 93970 bilateral study or CPT[®] 93971 unilateral study) can be repeated in order to rule out proximal extension of the clot:
 - One week after the initial diagnosis
 - Serial imaging (up to 3 studies) over the first two weeks if calf DVT is not treated
- ✓ Imaging during or to terminate long term anticoagulation therapy to determine venous recanalization is not supported by evidence.

PVD-7.6 Other Diseases of the Lower Extremity Veins

- ✓ Venous duplex scan (CPT[®] 93970 bilateral study or CPT[®] 93971 unilateral study) can be performed in patients who are candidates for anticoagulation or invasive therapeutic procedures for the following:
 - Post-thrombotic (post-phlebotic) syndrome
 - Confirm the diagnosis of venous insufficiency/valvular incompetence in patients with signs and symptoms of this disease (ulceration, thickening, and skin discoloration).
 - Venous mapping prior to autologous vein graft harvesting (e.g. for cardiac bypass surgery).
 - Following radiofrequency ablation of varicosities when the greater saphenous vein was closed (not indicated if only superficial veins underwent ablation), one venous duplex scan for DVT surveillance can be performed between 3 days to 6 weeks (CPT[®] 93971 unilateral study).

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PVD-8~IMAGING for HEMODIALYSIS ACCESS

PVD-8.1 Preoperative Arterial Evaluation and Venous Mapping Prior to AV Fistula Creation

There is a Level II HCPCS code for vessel mapping prior to AV fistula creation that does not have a CPT[®] Level I equivalent, {HCPCS code G0365 [Vessel mapping of vessels for hemodialysis access (Services for preoperative vessel mapping prior to creation of hemodialysis access using an autogenous hemodialysis conduit, including arterial inflow and venous outflow)]}. Therefore, CPT[®] codes for duplex venous and arterial are used for this purpose.

- ✓ Arterial evaluation to assess arterial suitability (size, degree of stenosis and calcification) prior to AV fistula creation may be appropriate.
 - CPT[®] 93930 or CPT[®] 93931 can be used to report upper extremity arterial evaluation.
 - Venous Mapping to assess venous suitability prior to AV fistula creation may be appropriate.
 - CPT[®] 93970 or CPT[®] 93971 can be used to report venous mapping.
- ✓ Indications for Duplex Ultrasound (CPT[®] 93990) of hemodialysis access include but are not limited to:
 - Patients with decreased flow rates during hemodialysis
 - Development of arm swelling or discomfort after access placement surgery or a hemodialysis session
 - Prolonged immaturity of a surgically created AV fistula
 - Suspected pseudoaneurysm
 - Suspected AV fistula or graft stenosis
 - Known or suspected fluid collection adjacent to an AV fistula or graft
 - Though it is, generally, not needed, one duplex US (CPT[®] 93990) can be performed after a surgically created AV fistula for assessment.

PVD-9~ARTERIOVENOUS MAFORMATIONS (AVMs)

See: PEDPVD-2.4~Arteriovenous Malformations (AVMs)

PVD-10~NUCLEAR MEDICINE

✓ Nuclear Medicine

- Nuclear medicine studies are rarely used in the evaluation of peripheral vascular disorders, but are indicated in the following circumstances:
 - Lymphoscintigraphy (CPT[®] 78195) is indicated for evaluation of lower extremity lymphedema when a recent Doppler ultrasound is negative for valvular insufficiency.
 - Vascular flow imaging (CPT[®] 78445) is an obsolete study that has been replaced by MRA, CTA, or Duplex ultrasonography, and is not supported for any indication at this time.
 - Venous thrombosis imaging (CPT[®] 78456, CPT[®] 78457, and CPT[®] 75458) are obsolete studies that have been replaced by MRA, CTA, or Duplex ultrasonography, and are not supported for any indication at this time.
 - Indium 111 (111In)-labeled white blood cell (WBC) studies (CPT[®] 78805, CPT[®] 78806, or CPT[®] 78807) can be approved for evaluation of the following:
 - Mycotic aneurysms
 - Vascular graft infection
 - Infection of central venous catheter or other indwelling device