



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

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Abbreviations and Glossary for the PVD Imaging Guidelines

(See also: 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

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PVD-1.1: General Information

- A current clinical evaluation (within 60 days), including medical treatments, are required prior to considering advanced imaging, which includes:
 - ◆ Relevant history and physical examination including:
 - The palpation of pulses
 - Evaluation for the presence of arterial bruits
 - Appropriate laboratory studies
 - 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 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 also: **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. See also:
 - ◆ **PVD-6: Aortic Disorders, Renal Vascular Disorders, and Visceral Artery Aneurysms**
 - ◆ **CH-29: 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. ➤ Non-invasive physiologic studies of upper or lower extremity arteries, single level, bilateral (e.g., ankle/brachial indices, Doppler waveform analysis, volume plethysmography, transcutaneous oxygen tension measurement).	93922
➤ Complete bilateral noninvasive physiologic studies of upper or lower extremity arteries, 3 or more levels. ➤ Non-invasive physiologic studies of upper or lower extremity arteries, multiple levels or with provocative functional maneuvers, complete bilateral study (e.g., segmental blood pressure measurements, segmental Doppler waveform analysis, segmental volume plethysmography, segmental transcutaneous oxygen tension measurements, measurements with postural provocative tests, measurements with reactive hyperemia).	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.
- ABI studies performed with handheld dopplers, where there is no hard copy output for evaluation of bidirectional blood flow, are not reportable by these codes.

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
➤ 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
◆ 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
➤ 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
➤ 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
➤ 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.	

Transcranial Doppler Studies	CPT®
Transcranial Doppler study of the intracranial arteries; complete study	93886
Transcranial Doppler study of the intracranial arteries; limited study	93888
Transcranial Doppler vasoreactivity study	93890
Transcranial Doppler study of the intracranial arteries; emboli detection without intravenous microbubble injection	93892
Transcranial Doppler study of the intracranial arteries; emboli detection with intravenous microbubble injection	93893

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, phleboreography, impedance plethysmography). This study is rarely performed.	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
➤ 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.	

Visceral Vascular Studies	CPT®
Duplex scan of arterial inflow and venous outflow of abdominal, pelvic, scrotal contents and/or retroperitoneal organs; complete study.	93975
Duplex scan of arterial inflow and venous outflow of abdominal, pelvic, scrotal contents and/or retroperitoneal organs; limited study	93976
Duplex scan of aorta, inferior vena cava, iliac vasculature, or bypass grafts; complete study	93978
Duplex scan of aorta, inferior vena cava, iliac vasculature, or bypass grafts; unilateral or limited study	93979

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

- ABI should be measured first:
 - ◆ If normal, then further vascular studies are generally not indicated.
- Imaging Studies:
 - ◆ Carotid studies (MRA Neck or CTA Neck) 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/ CPT® 74185) images from the diaphragm to the umbilicus or iliac crest.
 - ◆ CTA/MRA Chest (CPT® 71275/ CPT® 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 Abdomen and lower extremities should be reported as CPT® 75635, rather than using the individual CPT® codes for the abdomen, pelvis, and legs
 - MRA Abdomen, MRA Pelvis and MRA 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.

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PVD-2: Screening for Suspected Peripheral Artery Disease

PVD-2.1: Asymptomatic Screening

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PVD-2.1: Asymptomatic Screening

- The incidence of PAD increases with age. Screening for PAD is important especially for patients with diabetes and smokers, and is generally done as part of a good history and physical examination. Asymptomatic patients with normal pulses generally do not need further testing to assess for PAD. Resting ABI (CPT® 93922) may be appropriate in an asymptomatic patient if the physical exam is consistent with significant PAD.

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PVD-3: Cerebrovascular and Carotid Disease

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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 or Hollenhorst plaque
 - ◆ Suspected carotid dissection
 - ◆ Pulsatile neck masses
 - ◆ Carotid or cervical 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 also: **CH-27: Subclavian Steal Syndrome** in the Chest Imaging Guidelines
 - ◆ Blunt neck trauma
 - ◆ Vasculitis potentially involving carotid arteries
- Carotid ultrasound screening in asymptomatic individuals due only to risk factors is not indicated
- 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 cervical vessels (regardless of when the previous carotid imaging was performed) using any of the following:
 - ◆ Duplex ultrasound (CPT® 93880 bilateral study or CPT® 93882 unilateral study),
 - ◆ MRA Neck with contrast (CPT® 70548)
 - ◆ CTA Neck (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® 70548) 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 also: **PVD-3.2: Surveillance Imaging with NO History of Carotid Surgery or Intervention.**

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

For Typical Symptoms of TIA/Stroke or Carotid Dissection:

- See also: **HD-21: Stroke/TIA**

For Suspected Vertebrobasilar Pathology:

- Initial Imaging see also: **HD-21: Stroke/TIA**
- Surveillance Imaging
 - ◆ Asymptomatic or unchanged symptoms and known vertebrobasilar disease or post-stenting interval determined by Vascular Specialist.

For Suspected Subclavian Steal Syndrome:

- Initial Imaging see also: **CH-27: Subclavian Steal Syndrome**

After Intracranial Hemorrhage:

- Initial Imaging see also: **HD-13.1: Head Trauma**
- Surveillance Imaging
 - ◆ Interval determined by neurosurgeon or neurologist.

Surveillance Imaging

- Surveillance of Asymptomatic Individuals with Carotid Artery Disease that have NOT had Carotid Surgery or Intervention
- < 70% Carotid Stenosis
 - ◆ Duplex ultrasound (CPT® 93880 bilateral or CPT® 93882 unilateral) can be performed at the following intervals:
 - 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.
- ≥70% Carotid Stenosis
 - ◆ Duplex ultrasound (CPT® 93880 bilateral or CPT® 93882 unilateral) **or** MRA Neck with contrast (CPT® 70548) **or** CTA Neck (CPT® 70498) can be performed at the following intervals:
 - Every 6 months until intervention is performed or a decision is made to not intervene.

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

- < 70% residual carotid stenosis after intervention
 - ◆ Duplex ultrasound (CPT® 93880 bilateral or CPT® 93882 unilateral) can be performed at the following intervals:
 - At 1 month after procedure
 - Every 6 months for 2 years after procedure
 - Then annually until stability has been established.
- ≥ 70% residual carotid stenosis or aggressive restenosis pattern
 - ◆ Duplex ultrasound (CPT® 93880 bilateral or CPT® 93882 unilateral) can be performed at the following intervals:
 - At 1 month after procedure.
 - Every 6 months after procedure until stable
 - Annually after stability has been established.

Practice Notes

- Carotid intima-media thickness using duplex ultrasound imaging (Category III code 0126T) is not recommended in clinical practice for risk assessment for a first ASCVD event. Although outcomes data are lacking, Texas has adopted this method in Texas Heart Attack Preventive Screening Bill (HR 1290)
- Texas Heart Attack Preventive Screening Law (HR 1290) mandates that insurers in Texas cover either a calcium scoring study (CPT® 75571 or HCPCS S8092) or a carotid intima-media thickness study (ultrasound—Category III code 0126T) every five years for certain populations. To qualify, the following must apply:
 - ◆ Must be a Texas resident.
 - ◆ Must be a member of a fully-insured Texas health plan.
 - ◆ Must be a man age 45 to 75 or a woman age 55 to 75.
 - ◆ Must have either diabetes or a Framingham cardiac risk score of intermediate or higher.
 - ◆ Must not have had a calcium scoring study or a carotid intima-media thickness study within the past 5 years
- If ultrasound is technically difficult or confirmation of the degree of stenosis on ultrasound is needed because an interventional procedure is being considered, then MRA Neck (CPT® 70548) or CTA Neck (CPT® 70498) may be performed.

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PVD-4: Upper Extremity Peripheral Vascular Disease

PVD-4.1: Upper Extremity PVD – Imaging

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PVD-4.1: Upper Extremity PVD – Imaging

- One or more of the following imaging studies may be required when clinical evidence points to arterial insufficiency (arm or hand claudication, discoloration, unilateral cold painful hand) or venous insufficiency (swelling, etc.), which may also include emboli from aortic arch plaque rupture:
 - ◆ Arterial ultrasound of the upper extremities (CPT® 93930 or CPT® 93931), **or**
 - ◆ CTA/CTV of Upper extremity (CPT® 73206) or MRA/MRV of Upper extremity (CPT® 73225), **and/or**
 - ◆ CTA/CTV Chest (CPT® 71275) or MRA/MRV Chest (CPT® 71555)
- For Superior Vena Cava Syndrome (upper extremity and facial symptoms):
 - ◆ CT Chest with contrast (CPT® 71260)
 - ◆ MRV (CPT® 71555) or CTV (CPT® 71275) Chest may be considered when stenting of the SVC is being considered
- For Upper Extremity DVT:
 - ◆ Venous 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)
- After Upper Extremity Arterial Revascularization, Arterial Duplex (CPT® 93931) can be obtained using the following schedule:
 - ◆ Baseline (within one month)
 - ◆ At 6 months, then annually if stable
 - ◆ Anytime for new or worsening symptoms

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PVD-5: Pulmonary Artery Hypertension

PVD-5.1: Pulmonary Artery Hypertension – Imaging

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PVD-5.1: Pulmonary Artery Hypertension – Imaging

- Pulmonary artery hypertension (PAH) comprises a spectrum of diseases which will need 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) should be performed initially and may be accompanied by:
 - ◆ Pulmonary venous hypertension - Stress echocardiogram (CPT® 93350 or CPT® 93351) or left and/or right heart catheterization
 - ◆ Pulmonary hypertension associated with hypoxemia - High-resolution CT Chest (CPT® 71250) to rule out restrictive lung disorders such as idiopathic pulmonary fibrosis
- Acute or chronic pulmonary embolism – CTA Chest (CPT® 71275); see also: **CH-25: Pulmonary Embolism (PE)** in the Chest Imaging Guidelines.
- See also **CD-2.2: Transthoracic Echocardiogram (TTE)-Indications** and **PEDCD 2.3: Congenital Heart Disease Modality Considerations**

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PVD-6: Aortic Disorders, Renal Vascular Disorders and Visceral Artery Aneurysms

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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.
- 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 or to evaluate an abdominal bruit or a pulsatile abdominal mass).
- Thoracic Aortic Disease
 - ◆ See also **CH-29: Thoracic Aorta** in the Chest Imaging Guidelines.
- Mesenteric Ischemia
 - ◆ See also: **AB-6: Mesenteric/Colonic Ischemia** in the Abdomen Imaging Guidelines.

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PVD-6.2: Abdominal Aortic Aneurysm (AAA)

- Ultrasound Abdominal aorta (CPT® 76706) is the preferred **initial** imaging study to screen and retroperitoneal ultrasound (CPT® 76775) to surveil for AAA or to evaluate a pulsatile abdominal mass.
- **Obese Individual (≥ 35):** CT Abdomen and Pelvis with contrast (CPT® 74177) can be substituted for US using the same timeline as a non-obese individual. Ultrasound of the abdominal aorta should ideally first be attempted to see if the image quality is adequate
- Screening
 - ◆ One-time screening recommendations for AAA (Ultrasound CPT® 76706)
 - Men and women 65 to 75 years of age with a history of tobacco use
 - Men and women older than 75 years with a history of tobacco use and in otherwise good health who have not previously received a screening ultrasound examination
 - All first-degree relatives of individuals who present with an AAA and are between 65 and 75, or in those older than 75 in good health
 - ◆ Medicare covers a one-time AAA screening ultrasound (CPT® 76706) if there are at least one of the following risk factors
 - Family history of AAA
 - The individual is a male age 65 to 75 who has smoked at least 100 cigarettes in his lifetime
 - ◆ If there is a documented thoracic aortic aneurysm, AAA screening is reasonable with ultrasound (CPT® 76706); however, there is insufficient evidence to support the use of advanced imaging to screen for a thoracic aortic aneurysm in individuals with known abdominal aortic aneurysm.
- Surveillance recommendations for AAA (CPT® 76775)
 - ◆ > 2.5 cm but < 3.0 cm: 10 years
 - ◆ 3.0 cm to 3.9 cm: 3 year intervals
 - ◆ 4.0 cm to 4.9 cm: every 12 months
 - ◆ 5.0 cm to 5.4 cm: every 6 months
 - ◆ > 5.4 cm or aortic diameter has increased in size by 0.7 cm in six months, or at least 1 cm in a year may undergo more frequent monitoring and should be evaluated by a Vascular Specialist.
- Additional Imaging
 - ◆ CT of the Abdomen and Pelvis with contrast (CPT® 74177), CT of the Abdomen and Pelvis without and with contrast (CPT® 74178), or CTA (Abdomen and Pelvis CPT® 74174, Abdomen CPT® 74175, and Pelvis CPT® 72191).
 - Individuals suspected to have AAA presenting with recent-onset abdominal or back pain, particularly in the presence of a pulsatile epigastric mass or significant risk factors for AAA
 - Pre-operative imaging for AAA repair

PVD-6.3: Iliac Artery Aneurysm (IAA)

- Evaluation of a suspected IAA should begin with ultrasound (CPT® 76882 or CPT® 93925)
 - ◆ If ultrasound is equivocal, CT Pelvis with contrast (CPT® 72193) may be performed.
 - ◆ Follow-up imaging studies can be performed annually if an aneurysm is > 2cm
- Additional Imaging
 - ◆ CT of the Abdomen and Pelvis with contrast (CPT® 74177), CT of the Abdomen and Pelvis without and with contrast (CPT® 74178), or CTA Abdomen and Pelvis (CPT® 74174).
 - ◆ Preoperative imaging if endovascular or open repair is being considered

Practice Notes

- Isolated IAA's are rare and are typically associated with AAA
- Approximately one third to one half of isolated IAA's are bilateral at time of presentation.
- Aneurysm rupture usually occurs at a diameter of 5 cm or larger, whereas common iliac aneurysms that are less than 3 cm in diameter almost never rupture.

PVD-6.4: Visceral Artery Aneurysm

- 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 is without guidelines and therefore reasonable to follow the same timetable as for endovascular aortic repair. CTA Abdomen (CPT® 74175), MRA Abdomen (CPT® 74185), or CT Abdomen (CPT® 74160) are indicated following stent placement at:
 - ◆ 1 month
 - An additional study can be done at 3 months if there was evidence of endoleak on the 1-month study
 - ◆ 6 months
 - ◆ 12 months
 - ◆ Then every year

Visceral Artery Aneurysms - Practice Notes

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

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PVD-6.5: Renovascular Hypertension

- Because renal artery revascularization has not been shown to be more effective than medical therapy in most situations, this should not be pursued except in extreme cases, or if there is concern for Takayasu arteritis or fibromuscular dysplasia
 - ◆ MRA without or with contrast (CPT® 74185) or CTA with contrast (CPT® 74175) of the Abdomen if
 - The individual is adherent to full doses of three blood pressure medications (including a diuretic) yet has still not achieved goal.
 - Sudden and persistent worsening of previously controlled hypertension
 - Onset of hypertension younger than 30 years of age.
 - Malignant hypertension with coexistent evidence of acute end-organ damage (acute renal failure, new visual or neurological disturbance and/or advanced retinopathy) or flash pulmonary edema.
 - Women who develop hypertension ($\geq 140/90$) within the first 20 weeks of pregnancy, if hypertension persists > 12 weeks post-partum.
 - New or worsening renal function/increasing creatinine (especially after the administration of an ACE inhibitor or with angiotensin receptor blocking agent).
 - Unexplained atrophic kidney or discrepancy in size between kidneys of greater than 1.5 cm.
 - ◆ Gadolinium agents may be contraindicated in patients with severe renal disease or on dialysis due to the risk of developing nephrogenic systemic sclerosis
 - ◆ US kidney retroperitoneal (CPT® 76775) and/or Doppler (CPT® 93975 or CPT® 93976) if expertise is available
- In individuals with documented or highly suspicious renal artery stenosis due to fibromuscular dysplasia (mostly women between 15 and 50 years of age), a screening carotid duplex (CPT® 93880) is reasonable to assess for carotid involvement. Hypertensive patient with documented cervicocephalic fibromuscular dysplasia should be screened for renovascular fibromuscular dysplasia with CTA (CPT® 74175) or MRA (CPT® 74185). The assessment of other vascular beds should be considered if supported by suggestive symptoms or medical history.

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PVD 6.6: AAA IAA, Post Endovascular or Open Aortic Repair

- Any **one** of the following studies can be used after aortic intervention:
 - ◆ CT of the Abdomen and/or Pelvis with contrast (CPT® 74160 or CPT® 72193 or CPT® 74177), **or**
 - ◆ CT of the Abdomen and/or Pelvis without and with contrast (CPT® 74170 or CPT® 72194 or CPT® 74178) **or**
 - ◆ CTA of the Abdomen and/or Pelvis (CPT® 74175 or CPT® 72191 or CPT® 74174), **or**
 - ◆ MRA of the Abdomen and/or Pelvis (CPT® 74185 and CPT® 72198)
- Post-operative surveillance
 - ◆ Endovascular Aortic Repair (EVAR)
 - CT as per above coding as requested and color duplex ultrasound (CPT® 93975 or CPT® 93976) one month after EVAR
 - If no endoleak, or sac enlargement, repeat either preferred CT or duplex ultrasound (but not both) at 12 months
 - If a type II endoleak is observed 1 month after EVAR, CT with contrast and color duplex US at 6 months
 - If no endoleak or AAA enlargement is detected at 1 year after EVAR, continue surveillance with color duplex US (CT can be performed if DUS is not available), for annual surveillance.
 - If a type II endoleak is associated with an aneurysm sac that is shrinking or stable in size, continue surveillance with color duplex US every 6 months for 2 years, and then annually thereafter.
 - If US detects a new endoleak, graft migration, or aneurysm sac growth > 5mm, CT scan as requested.
 - Non-contrast CT of the entire aorta at 5-year intervals (CPT® 74176)

- ◆ Open Aortic Aneurysm Repair
 - Non-contrast enhanced CT of the entire aorta at 5-year intervals (CPT®74176).
 - Imaging as requested to assess for suspected infection of the graft
- Any **one** of the following studies can be used after endovascular iliac repair (stent):
 - ◆ CT Pelvis (CPT® 72193 or CPT® 72194), or
 - ◆ CTA Pelvis (CPT® 72191), or
 - ◆ MRA Pelvis (CPT® 72198)
- **Endovascular (Stent) Iliac Repair** - 1 week, 1 month, 3 months, and 6 months after endovascular treatment, and then every 6 months thereafter.³

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PVD-6.7: Aortic Dissection and Other Aortic Conditions

- **Any** of the following studies can be used if acute dissection is suspected:
 - ◆ CT Chest (CPT® 71260 or CPT® 71270) **and/or**
 - ◆ CT Abdomen (CPT® 74160 or CPT® 74170) **and/or**
 - ◆ CT Pelvis (CPT® 72193 or CPT® 72194) **or**
 - If CT Abdomen and Pelvis with or with and without is requested, codes: (CPT® 74177 or CPT® 74178) are appropriate.
 - ◆ CTA Chest (CPT® 71275) and/or CTA Abdomen and/or Pelvis (CPT® 74175 or CPT® 72191 or CPT® 74174), **or**
 - ◆ MRA Chest and/or Abdomen and/or Pelvis (CPT® 71555 and/or CPT® 74185 and/or CPT® 72198)
 - ◆ See **CH-29: Thoracic Aortic** in the Chest Imaging Guidelines.

PVD-6.8: Imaging for Other Aortic Conditions

- Chest CTA (CPT® 71275) prior to minimally invasive or robotic surgery.
 - ◆ See: **CD-2.2: Transthoracic Echocardiography (TTE) – Indications**; **CD-5.4: Cardiac MRI – Aortic Root and Proximal Ascending Aorta** in the Cardiac Imaging Guidelines
 - ◆ For diverticulitis, see: **AB-2.2: Abdominal Pain**
 - ◆ For mesenteric/colonic ischemia, see: **AB-6: Mesenteric/Colonic Ischemia**

PVD-7: Lower Extremity Peripheral Vascular Disease

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PVD-7.1: Claudication

- Initial evaluation for suspected PAD should be with a resting ABI. This can be accomplished at the bedside as part of the physical examination or requested as CPT® 93922 (limited Doppler ultrasound) or CPT® 93923 (multi-level complete Doppler ultrasound). CPT® 93923 may be performed once. Follow-up studies may be performed with CPT® 93922.
- If the resting ABI is > 0.89 and PAD is still highly suspected clinically then a post-exercise ABI (CPT® 93924) can be performed.
- History and physical suggestive of PAD including:
 - ◆ History
 - Claudication
 - Other non-joint-related exertional lower extremity symptoms (not typical of claudication)
 - Impaired ability to walk
 - Rest pain suggestive of ischemia
 - ◆ Physical Examination
 - Abnormal lower extremity pulse examination
 - Vascular bruit
 - Non-healing lower extremity wound
 - Lower extremity gangrene
 - Other suggestive lower extremity physical findings (e.g., elevation pallor/dependent rubor)
- If resting ABI (CPT® 93922) is normal (0.9 to 1.3) and disease is still suspected:
 - ◆ Differentiate from “pseudoclaudication”. See also: **SP-9: Lumbar Spinal Stenosis** in the Spine Imaging Guidelines.
 - ◆ Re-measure ABI 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 therapy.^{2,3,4,5}
- Duplex ultrasound (CPT® 93925 bilateral study or CPT® 93926 unilateral study) and Doppler studies are adjuncts to abnormal ABI that may be used to identify location and extent of disease once there has been a decision for revascularization.^{6,7}
- MRA 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 any of the following:^{2,8}
 - ◆ ABI < 0.5
 - ◆ Intermittent claudication (i.e. non-limb threatening ischemia) and either:
 - Failed 3 months conservative medical therapy (physician supervised walking / exercise program plus medical therapy), **or**

- Functional disability (e.g. exercise impairment sufficient to threaten the patient's employment or to require significant alterations in the patient's lifestyle)
- ◆ Potentially limb-threatening vascular disease evidenced by:
 - Skin breakdown
 - Non-healing ischemic ulcers
 - Resting leg pain
 - Gangrene
- ◆ Blue Toe Syndrome:
 - Emboli from aortic plaque or mural thrombus
 - Hyperviscosity syndrome
 - Hypercoagulable states
 - Vasculitis
- ◆ Preoperative planning for an invasive procedure (endovascular or open surgery)
- ◆ **Note:** MRA Pelvis should not be requested/billed with CPT® 74185, CPT® 73725 and CPT® 73725

Practice Notes

Claudication symptoms usually remain stable (70% to 80% of patients) and do not worsen or improve at rapid rates.⁹ Repeat studies to assess the efficacy of medical therapy are not indicated unless there is a negative change in clinical status.

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 to 40).¹⁰
 - ◆ Ultrasound (CPT® 93926 unilateral study), CTA Lower extremity (CPT® 73706), or MRA Lower extremity (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
 - ◆ Resting (CPT® 93922), and post-exercise ABI (CPT® 93924)
 - Angioplasty, aortoiliac and infrainguinal
 - Synthetic graft (e.g. PTFE), lower extremity bypass graft
- Scheduled Interval
 - ◆ ABI (CPT® 93922) is generally appropriate following any revascularization procedure.
 - ◆ Venous conduit, lower extremity bypass graft
 - ABI (CPT® 93922) or Duplex ultrasound (CPT® 93926 unilateral study) at each routine follow up is appropriate.
 - Further imaging studies such as CTA or MRA can be considered based on the evaluation by the vascular specialist, but not both annually.
 - ◆ Endovascular stenting

- Duplex ultrasound (CPT® 93926 unilateral study) at 1 month, 6 months, and every year on routine follow up after complex lesion intervention.

PVD-7.4: Lower Extremity Artery Aneurysms

- For Iliac artery aneurysm see also: **PVD-6.3: Iliac Artery Aneurysm (IAA)**
- Femoral artery aneurysm
 - ◆ Initial imaging
 - Ultrasound (CPT® 93925 bilateral study or CPT® 93926 unilateral study).
 - ◆ Surveillance imaging
 - Symptomatic true femoral aneurysms smaller than 2.5 cm in diameter
 - Ultrasound (CPT® 93926 unilateral study) annually
 - Symptomatic true femoral aneurysms larger than 2.5 cm
 - Ultrasound (CPT® 93926 unilateral study) every 6 months
 - ◆ Other imaging
 - CTA Lower extremity [CPT® 73706] or MRA Lower extremity without or with contrast [CPT® 73725] can be performed when:
 - Preoperative study for patients with no plans for invasive angiography.
 - Technically limited or abnormal ultrasound results.
- Popliteal artery aneurysm
 - ◆ Initial imaging
 - Ultrasound (CPT® 93925 bilateral study or CPT® 93926 unilateral study) and Ultrasound to assess for other aneurysms especially aortic aneurysm (CPT® 76770 or CPT® 76775).
 - ◆ Surveillance imaging
 - Ultrasound (CPT® 93926 unilateral study) annually.
 - Post-interventional functional testing (ABI) (CPT® 93922) may be useful as clinically indicated.
 - ◆ Other imaging
 - CTA (CPT® 73706) or MRA (CPT® 73725) can be performed for:
 - Preoperative study for patients with no plans for invasive angiography.
 - Technically limited or abnormal ultrasound results.

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

- Duplex ultrasound (CPT® 93970 bilateral study or CPT® 93971 unilateral study) is the initial imaging study for any suspected DVT
 - ◆ Deep venous thrombosis can present as
 - Symptomatic
 - Swelling
 - Pain
 - Warmth
 - Erythema
 - Pain with dorsiflexion of the foot (Homan's Sign)
 - Or with progression, such as phlegmasia cerulea dolens

- ◆ 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-25: Pulmonary Embolism (PE)** in Chest Imaging Guidelines.
- If Duplex ultrasound is normal, repeat Duplex ultrasound testing is not supported For suspected concomitant arterial disease consider
 - ◆ ABI (CPT® 93922) see also: **PVD-7.1: Claudication**
- Unilateral or bilateral calf edema with negative or indeterminate venous duplex study
 - ◆ Abdomen and Pelvic Ultrasound (CPT® 76700 and/or CPT® 76856 or CPT® 93975 or CPT® 93976 and/or CPT® 76830 [transvaginal]), and if not previously performed:
 - 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). If the extent of thrombosis needs a more detailed assessment, then
 - CT or MRI Lower extremity without contrast (CPT® 73700 or CPT® 73718)
- May-Thurner Syndrome (Iliac Vein Compression Syndrome) suspected—is an uncommon condition of left common iliac vein compression by the overlying right common iliac artery. It may cause discomfort and unilateral edema of the left lower extremity or DVT in the left iliofemoral vein, which may be recurrent.
 - ◆ 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.
 - ◆ 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 also: **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-phlebitic) 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 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, or CPT® 76970 US study follow up).

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PVD-8: Imaging for Hemodialysis Access

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

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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.
- In some instances, MRA may be needed (CPT® 73225) if duplex imaging is equivocal
- 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.

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PVD-9: Arteriovenous Malformations (AVMs)

See: **PEDPVD-2.5: Arteriovenous Malformations (AVMs) and Fistulas**

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) or Gallium-67 citrate 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.