

# CIGNA MEDICAL COVERAGE POLICIES

## Peripheral Vascular Intervention

Effective Date: June 01, 2026



### Instructions for use

The following coverage policy applies to health benefit plans administered by Cigna. Coverage policies are intended to provide guidance in interpreting certain standard Cigna benefit plans and are used by medical directors and other health care professionals in making medical necessity and other coverage determinations. Please note the terms of a customer's particular benefit plan document may differ significantly from the standard benefit plans upon which these coverage policies are based. For example, a customer's benefit plan document may contain a specific exclusion related to a topic addressed in a coverage policy.

In the event of a conflict, a customer's benefit plan document always supersedes the information in the coverage policy. In the absence of federal or state coverage mandates, benefits are ultimately determined by the terms of the applicable benefit plan document. Coverage determinations in each specific instance require consideration of:

1. The terms of the applicable benefit plan document in effect on the date of service
2. Any applicable laws and regulations
3. Any relevant collateral source materials including coverage policies
4. The specific facts of the particular situation

Coverage policies relate exclusively to the administration of health benefit plans. Coverage policies are not recommendations for treatment and should never be used as treatment guidelines.

This evidence-based medical coverage policy has been developed by EviCore, Inc. Some information in this coverage policy may not apply to all benefit plans administered by Cigna.

These guidelines include procedures EviCore does not review for Cigna. Please refer to the [Cigna CPT code list](#) for the current list of high-tech imaging procedures that EviCore reviews for Cigna.

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# General Information

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# General Information for Vascular Intervention Requests

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## Glossary

### Terms and abbreviations

<b>Aneurysm</b>	Defined as a diameter 1.5x the normal arterial diameter.
<b>Angioplasty</b>	A procedure that utilizes a catheter with a balloon that is inflated to enlarge a stenotic area.
<b>Ankle-Brachial Index (ABI)</b>	Ratio of the systolic blood pressure (SBP) measured at the ankle to the brachial (arm) SBP.
<b>Atherectomy</b>	A procedure that utilizes a catheter with a sharp blade or laser on the end of the catheter to remove plaque from a blood vessel.
<b>CTO</b>	Chronic total occlusion
<b>Crescendo TIA</b>	Multiple recurrent episodes of TIA over hours to days.
<b>Critical limb ischemia</b>	Severe stenosis or occlusion in the vessels supplying the lower extremity such that limb loss will result without treatment. Symptoms of critical limb ischemia in the lower extremities include but are not limited to non-healing wounds, gangrene and ischemic rest pain.
<b>Dissection</b>	Disruption of the media layer of the aorta with bleeding within and along the wall of the aorta.
<b>Graft</b>	Synthetic material used to replace or repair a segment of an artery or bypass an occluded segment of artery.

<b>High-grade stenosis</b>	A high-grade stenosis is defined as at least a 50% narrowing of an artery.
<b>IIH</b>	Idiopathic intracranial hypertension
<b>Ischemic rest pain</b>	Pain arises from severe arterial occlusive disease in the lower extremities such that the patient experiences pain in the distal aspect of the foot and toes while the limb is in the supine position as would occur with sleep. The pain is relieved with the limb in the dependent position or "dangling from the bed" as the limb is depending on gravity to assist with perfusion.
<b>MMAE</b>	Middle Meningeal Artery Embolization
<b>NASCET</b>	North American Symptomatic Carotid Endarterectomy Trial
<b>Occlusion</b>	Blockage of a blood vessel, typically due to atherosclerotic plaque buildup, resulting in absence of blood flow through at least a portion of the vessel that can lead to ischemic symptoms depending on the location, length and chronicity
<b>Pseudo-aneurysm</b>	Outpouching of blood resulting from disruption of the arterial wall with extravasation of blood contained by periarterial connective tissue and not by the arterial wall layers.
<b>PTA</b>	Percutaneous transluminal angioplasty.
<b>Spider veins</b>	Enlarged, tortuous veins that are usually distributed in a web like cluster. These veins are typically <3mm in diameter.
<b>Stent</b>	A metal scaffold placed inside the artery to maintain patency.
<b>Stenosis</b>	Narrowing or constriction of a blood vessel, typically due to atherosclerotic plaque buildup, that reduces blood flow and can lead to ischemic symptoms depending on the location and severity.
<b>Stent-graft</b>	A metal scaffold covered by fabric material placed inside an artery.

<b>Symptomatic carotid stenosis</b>	Characterized by either a transient ischemic attack or cerebrovascular accident that is in the distribution of known severe carotid stenosis, e.g., transient right sided upper and lower extremity paralysis in the setting of 70% left internal carotid artery stenosis.
<b>Symptomatic aneurysm</b>	Unrelenting non-positional back pain in the setting of a known abdominal or thoracic aortic aneurysm. Individuals with a symptomatic aneurysm may or may not have evidence of a free or contained rupture. The presence of symptoms indicate impending rupture.
<b>Varicose veins</b>	Enlarged, tortuous veins often caused by incompetent valves. Veins are typically $\geq 3$ mm in diameter.
<b>Velocity ratio (V1/V2)</b>	Ratio of peak systolic velocity in the diseased segment of blood vessel demonstrating elevated flow velocities to the peak systolic velocity of blood flow in normal vessel just proximal to area of concern in arteries, or just distal in veins.
<b>Venous reflux</b>	Characterized by incompetent or "leaky" valves that no longer function as one-way valves facilitating the flow of blood from the lower extremities to the heart. This results in pooling of blood in the lower extremities leading to distended engorged veins when the lower extremities are in the dependent position as in sitting or standing.

## Documentation Requirements for Vascular Intervention Requests

Documentation needed to complete a prior authorization request for vascular intervention include **all** of the following:

- Procedure proposed matching the clinical need
- Condition being treated by the requested procedure
- Detailed documentation of provider-directed conservative treatment, duration and frequency of treatment, and the response to such treatments, if applicable
- Detailed documentation of any previous intervention and the response
- Detailed documentation of location and size of aneurysmal disease, if present
- Detailed documentation regarding nature of the critical limb ischemia: non-healing wound or ischemic rest pain, if applicable

- Recent (within 6 months) written reports of any of the following diagnostic imaging modalities and studies acceptable for purposes of the peripheral vascular intervention guidelines:
  - Ankle-brachial indices, segmental pressures and pulse volume recordings as applicable
  - Duplex ultrasound including carotid, lower extremity and abdominal
  - CTA or CTV abdomen/pelvis with or without lower extremity run-off
  - MRA or MRV abdomen/pelvis with or without lower extremity run-off
  - Arteriogram or venogram
  - IVUS – intravascular ultrasound
- Recent (within 6 months) clinical evaluation documenting:
  - Symptoms (if lifestyle-limiting, detailed documentation regarding quality-of-life parameters that are affected)
  - Physical exam findings to include location and size of ulcers

## Emergent and Urgent Requests

Individuals being evaluated for vascular/endovascular surgery should be screened for the presence of a medical condition that warrants urgent/emergent definitive surgical treatment. Provider directed non-surgical management is **not** required when there is documentation, supported by imaging studies or clinical assessment, of any of the following urgent/emergent conditions:

- Critical limb ischemia
- Symptomatic carotid stenosis
- Crescendo TIAs (multiple recurrent episodes of TIA over hours to days)
- Symptomatic or ruptured aneurysms

An urgent/emergent request based on 2018 NCQA standards for utilization management occurs when the time frame for making routine or non-life-threatening determinations on care **either**:

- Could seriously jeopardize the life, health, or safety of the member or others, due to the member's psychological state
- In the opinion of a practitioner with knowledge of the member's medical or behavioral condition, would subject the member to adverse health consequences without the care or treatment that is the subject of the request.

Procedures to treat arterial disease may be medically necessary on an intra-operative basis

## Background and Supporting Information

Prior-authorization requests should be submitted at least two weeks prior to the anticipated date of an elective surgery.

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Peripheral Vascular Intervention

# Carotid and Vertebral Revascularization

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## Coding

### Procedures indicated for carotid revascularization

Procedure	CPT®
<b>Carotid Angioplasty/Stent</b>	
Transcatheter placement of intravascular stent(s), cervical carotid artery, open or percutaneous, including angioplasty, when performed, and radiological S&I; with distal embolic protection	37215
Transcatheter placement of intravascular stent(s), cervical carotid artery, open or percutaneous, including angioplasty, when performed, and radiological supervision and interpretation; without distal embolic protection	37216
Transcatheter placement of intravascular stent(s), intrathoracic common carotid artery or innominate artery, open or percutaneous antegrade approach, including angioplasty, when performed, and radiological supervision and interpretation	37218
Transcatheter placement of extracranial vertebral artery stent(s), including radiologic supervision and interpretation, open or percutaneous; initial vessel	0075T
<b>Transcarotid Stenting with Dynamic Flow Reversal (TCAR)</b>	
Transcatheter placement cervical carotid open or percutaneous with embolic protection	37215

## Carotid Revascularization - General Information

The determination of medical necessity for the performance of carotid revascularization is always made on a case-by-case basis based on the following information:

- The presence of urgent/emergent indications/conditions warrants definitive surgical/ endovascular treatment in lieu of provider-directed non-surgical management. Urgent/emergent conditions for carotid revascularization include **any** of the following:
  - Crescendo TIA's
  - Transient monocular blindness, amaurosis fugax

- Free-floating thrombus
- Enlarging carotid pseudoaneurysm
- Infection of carotid patch placed during prior carotid endarterectomy
- Recent CVA or TIA
- Confirmatory imaging studies and clinical notes are required

### Procedures included

- Carotid endarterectomy (CEA)
- Transfemoral carotid artery stenting (TFCAS)
- Transcarotid artery revascularization (TCAR)

### Carotid Revascularization - Criteria

#### Symptomatic carotid stenosis

##### Carotid endarterectomy (CEA)

CEA is the preferred treatment for symptomatic carotid artery stenosis

- Carotid revascularization with Carotid endarterectomy (CEA) is medically necessary for symptomatic carotid stenosis when **both** of the following conditions are present:
  - Carotid stenosis is demonstrated by  $\geq 50\%$  stenosis documented by angiogram, CTA, carotid duplex, or MRA
  - Presence of **any** of the following conditions corresponding anatomically to the distribution of the carotid lesion to be treated:
    - Transient ischemic attack (TIA)
    - Focal cerebral ischemia producing a non-disabling stroke
    - Transient monocular blindness (amaurosis fugax)

#### Asymptomatic carotid stenosis

##### Carotid endarterectomy (CEA)

CEA is the preferred treatment for asymptomatic carotid stenosis (as documented by clinical notes) when the carotid stenosis is  $\geq 70\%$  based on NASCET criteria on carotid duplex, CTA, MRA, or angiogram within last 6 months.

#### Carotid artery stenting (CAS) and Transcarotid artery revascularization (TCAR)

- CAS or TCAR is indicated when an individual meets criteria for carotid revascularization and is considered to be **high-risk** for CEA due to a documented history of **any** of the following significant comorbidities or anatomic risk factors for CEA:
  - Congestive heart failure (CHF) class III/IV

- Left ventricular ejection fraction (LVEF) <30%
- Unstable angina
- Angina with known >2 vessel CAD
- Severe COPD
- ESRD
- Age 75 or older
- Recent (within the last six months) myocardial infarction (MI)
- Recurrent stenosis in the setting of a previous CEA at any time
- Prior radiation treatment to the neck
- Previous radical neck dissection at any time
- Permanent contralateral cranial nerve injury
- Contralateral carotid occlusion
- Tandem high-grade stenosis on the same side
- High cervical carotid stenosis above C2 vertebral body
- Takayasu arteritis with stenosis
- Carotid pseudoaneurysm
- Carotid dissection with stenosis
- Fibromuscular dysplasia with stenosis

Intervention for recurrent stenosis after prior carotid stent is indicated for the following patients:

- Symptomatic recurrent stenosis with **either**:
  - Duplex: PSV  $\geq$  240 cm/sec
  - CTA, MRA or angiogram evidence of  $\geq$ 50% stenosis
- Asymptomatic recurrent stenosis with **either**:
  - Duplex PSV  $\geq$  370 cm/sec
  - CTA, MRA or angiogram evidence of  $\geq$ 70% stenosis

### Carotid Revascularization Non-indications

Carotid revascularization (CEA or CAS) is not medically necessary in individuals who have had a disabling stroke (modified Rankin scale  $\geq$ 3)

Asymptomatic carotid individuals should have an adequate life expectancy to benefit from a carotid intervention.

## Extracranial Vertebral Artery Stenosis

### Treatment of extracranial vertebral artery stenosis

Extracranial vertebral artery angioplasty with stent placement is considered medically necessary when **all** of the following criteria are met:

- Failure of antiplatelet therapy or anticoagulation therapy
- Non-vascular etiologies have been excluded or treated
- Clinical history documents one of the following ongoing symptoms:
  - Dizziness
  - Unilateral limb weakness
  - Dysarthria
  - Recurrent headache
  - Recurrent nausea/vomiting
  - Recurrent posterior circulation embolic stroke
- One of the following criteria are met:
  - 60-99% bilateral extracranial vertebral artery stenosis
  - 60-99% unilateral extracranial vertebral artery stenosis in the setting of **any** of the following:
    - A dominant vertebral and hypoplastic contralateral vertebral artery
    - Contralateral vertebral artery ends in posteroinferior cerebellar
    - Contralateral vertebral artery is occluded

### Non-indications

- Extracranial vertebral artery angioplasty with stent placement is considered experimental, investigational, or unproven for treatment of **any** other indication, including asymptomatic vertebral artery stenosis

## Evidence Discussion

### Carotid Endarterectomy

Symptoms of carotid stenosis include transient ischemic attack (distinct focal neurological dysfunction persisting less than 24 hours), focal cerebral ischemia producing a non-disabling stroke (modified Rankin scale <3 with symptoms for 24 hours or more), and transient monocular blindness (amaurosis fugax).

Carotid endarterectomy is a procedure that involves making an incision into the internal carotid artery with surgical removal of atherosclerotic plaque and subsequent closure of the artery primarily or with a patch. The procedure can involve the use of

measures supportive of intracranial circulation during clamp time including placement of an intra-arterial shunt or neuromonitoring such as electroencephalogram (EEG) or somatosensory evoked potentials (SEPS). In some individuals who are noted to be at high risk for CEA secondary to medical co-morbidities or anatomic risk factors such as prior radiation or redo operation, carotid stenting can be considered.

### **Carotid Angioplasty and Stenting and TCAR**

Carotid angioplasty/stenting form of carotid revascularization for atherosclerotic disease in which a stent and more often than not a balloon prior to that are placed over a wire through the lesion of interest to dilate and resolve a stenosis. Since threading a wire through plaque can potentially lead to fracturing and embolization of the plaque into the distal intracranial circulation, an embolic protection device is generally employed during carotid stenting. Carotid stenting is also indicated to treat aneurysmal disease involving the carotid artery. Carotid stenting is an option for individuals who are considered high risk for CEA and is offered as an alternative to CEA.

CMS has determined that CAS with embolic protection is reasonable and necessary only if performed in facilities that have been determined to be competent in performing the evaluation, procedure and follow-up necessary to ensure optimal individual outcomes. Standards to determine competency include specific physician training standards, facility support requirements and data collection to evaluate outcomes during a required re-evaluation.

TCAR is a method of deploying a transcarotid stent under reverse carotid flow to reduce the incidence of cerebral embolization. This offers low procedural stroke rates in individuals who are considered high risk.

# References

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1. Müller MD, Lyrer P, Brown MM, Bonati LH. Carotid artery stenting versus endarterectomy for treatment of carotid artery stenosis. *Cochrane Database of Systematic Reviews*. 2020. doi:10.1002/14651858.cd000515.pub5.
2. Müller MD, Lyrer PA, Brown MM, Bonati LH. Carotid Artery Stenting Versus Endarterectomy for Treatment of Carotid Artery Stenosis. *Stroke*. 2021;52(1). doi:10.1161/strokeaha.120.030521.
3. Brooks WH, Jones MR, Gisler P, et al. Carotid Angioplasty with Stenting Versus Endarterectomy. *JACC Cardiovasc Interv*. 2014;7(2):163-168. doi:10.1016/j.jcin.2013.09.010.
4. Mas JL, Arquizan C, Calvet D. Long-Term Follow-Up Study of Endarterectomy Versus Angioplasty in Patients with Symptomatic Severe Carotid Stenosis Trial. *J Vas Surg*. 2015;61(2):568-569. doi:10.1016/j.jvs.2014.12.036.
5. Mas JL, Arquizan C, Calvet D, Viguier A, Albucher JF, Piquet P, EVA-3S Investigators. Long-term follow-up study of endarterectomy versus angioplasty in patients with symptomatic severe carotid stenosis trial. *Stroke*. 2014; 45:2750–2756.
6. Eckstein HH, Ringleb P, Allenberg JR, et al. Results of the Stent-Protected Angioplasty versus Carotid Endarterectomy (SPACE) study to treat symptomatic stenoses at 2 years: a multinational, prospective, randomised trial. *Lancet Neuro*. 2008;7(10):893-902. doi:10.1016/s1474-4422(08)70196-0.
7. Bonati LH, Dobson J, Featherstone RL. Long-Term Outcomes After Stenting Versus Endarterectomy for Treatment of Symptomatic Carotid Stenosis: The International Carotid Stenting Study (ICSS) Randomised Trial. *J Vasc Surg*. 2015;62(5):1368. doi:10.1016/j.jvs.2015.09.007.
8. Brott TG, Howard G, Roubin GS, et al. Long-Term Results of Stenting versus Endarterectomy for Carotid-Artery Stenosis. *N Engl J Med*. 2016;374(11):1021-1031. doi:10.1056/nejmoa1505215.
9. Alfson DB, Ham SW. Type B Aortic Dissections. *Cardiol Clin*. 2017;35(3):387-410. doi:10.1016/j.ccl.2017.03.007.
10. Kwolek CJ, Jaff MR, Leal JI, et al. Results of the ROADSTER multicenter trial of transcrotid stenting with dynamic flow reversal. *J Vasc Surg*. 2015;62(5):1227-1234. doi:10.1016/j.jvs.2015.04.460.
11. Silver FL, Mackey A, Clark WM, et al. Safety of stenting and endarterectomy by symptomatic status in the Carotid Revascularization Endarterectomy Versus Stenting Trial (CREST). *Stroke*. 2011;42(3):675-680. doi:10.1161/STROKEAHA.110.610212.
12. Mayberg MR, Winn HR. Endarterectomy for asymptomatic carotid artery stenosis. Resolving the controversy. *JAMA*. 1995;273(18):1459-1461.
13. AbuRahma AF, Avgerinos ED, Chang RW, et al. Society for Vascular Surgery clinical practice guidelines for management of extracranial cerebrovascular disease. *J Vasc Surg*. 2022;75(1S):4S-22S. doi:10.1016/j.jvs.2021.04.073.
14. Naylor R, Rantner B, Ancetti S, et al. Editor's Choice - European Society for Vascular Surgery (ESVS) 2023 Clinical Practice Guidelines on the Management of Atherosclerotic Carotid and Vertebral Artery Disease. *Eur J Vasc Endovasc Surg*. 2023;65(1):7-111. doi:10.1016/j.ejvs.2022.04.011
15. Brott TG, Halperin JL, Abbara S, et al. 2011 ASA/ACCF/AHA/AANN/AANS/ACR/ASNR/CNS/SAIP/SCAI/SIR/SNIS/SVM/SVS guideline on the management of patients with extracranial carotid and vertebral artery disease: executive summary. A report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, and the American Stroke Association, American Association of Neuroscience Nurses, American Association of Neurological Surgeons, American College of Radiology, American Society of Neuroradiology, Congress of Neurological Surgeons, Society of Atherosclerosis Imaging and Prevention, Society for Cardiovascular Angiography and Interventions, Society of Interventional Radiology, Society of NeuroInterventional Surgery, Society for Vascular Medicine, and Society for Vascular Surgery [published correction appears in *Circulation*. 2011 Jul 26;124(4):e145. Dosage error in article text]. *Circulation*. 2011;124(4):489-532. doi:10.1161/CIR.0b013e31820d8d78.

16. Hasan B, Farah M, Nayfeh T, et al. A systematic review supporting the Society for Vascular Surgery Guidelines on the management of carotid artery disease. *J Vasc Surg.* 2022;75(1S):99S-108S.e42. doi:10.1016/j.jvs.2021.06.001.
17. Howard G, Roubin GS, Jansen O, et al. Association between age and risk of stroke or death from carotid endarterectomy and carotid stenting: a meta-analysis of pooled patient data from four randomised trials [published correction appears in *Lancet.* 2016 Mar 26;387(10025):1276. doi: 10.1016/S0140-6736(16)00623-1.]. *Lancet.* 2016;387(10025):1305-1311. doi:10.1016/S0140-6736(15)01309-4.
18. Spiliopoulos S, Blanc R, Gandini R, et al. CIRSE Standards of Practice on Carotid Artery Stenting. *Cardiovasc Intervent Radiol.* 2024 Jun;47(6):705-716. doi: 10.1007/s00270-024-03707-y.
19. Paraskevas KI, Zeebregts CJ, AbuRahma AF, Perler BA. Implications of the Centers for Medicare and Medicaid Services decision to expand indications for carotid artery stenting. *J Vasc Surg.* 2024 Sep;80(3):599-603. doi: 10.1016/j.jvs.2024.03.008. Epub 2024 Mar 8. PMID: 38462061.
20. AbuRahma A. An analysis of the recommendations of the 2022 Society for Vascular Surgery clinical practice guidelines for patients with asymptomatic carotid stenosis. *J Vasc Surg.* 2024 May;79(5):1235-1239. doi: 10.1016/j.jvs.2023.12.041. Epub 2023 Dec 27. PMID: 38157995.
21. Ghannam M, AlMajali M, Khasiyev F, et al. Transcarotid Arterial Revascularization of Symptomatic Internal Carotid Artery Disease: A Systematic Review and Study-Level Meta-Analysis. *Stroke.* 2024;55(4):921-930. doi:10.1161/STROKEAHA.123.04424.
22. Bitsko LJ, Ryer EJ, Penn EP, et al. Defining duplex ultrasound criteria for in-stent restenosis of the carotid artery using computed tomographic angiography. *Cureus.* 2022;14(7):e26700. doi:10.7759/cureus.26700.
23. Stanziale SF, Wholey MH, Boules TN, et al. Determining in-stent stenosis of carotid arteries by duplex ultrasound criteria. *J Endovasc Ther.* 2005;12(3):346-353. doi:10.1583/04-1527.1.
24. Hrbáč T, Fiedler J, Procházka V, et al. Comparison of carotid endarterectomy and repeated carotid angioplasty and stenting for in-stent restenosis (CERCAS trial): a randomised study. *Stroke Vasc Neurol.* 2023;8(5):399-404. doi:10.1136/svn-2022-002075.

# Iliac Artery Aneurysm

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## Coding - Iliac Artery Aneurysm Repair

### General Information

Types of aortoiliac pathology include

- Aneurysm formation, including pseudoaneurysm
- Dissection of the aorta, acute and chronic, including intramural hematoma
- Penetrating aortic ulcer
- Atherosclerotic occlusive disease

Aortic dissection affecting the abdominal aorta if symptomatic presents with ischemia of the visceral organs including the bowels and solid organs. Treatment can include repair of the intimal tear in the descending thoracic aorta or direct revascularization of the end organ with either stent placement or bypass graft.

### Coding

Treatment of abdominal aortic and iliac artery pathology

Procedure codes	CPT®
Endovascular repair of iliac artery at the time of aorto-iliac artery endograft placement by deployment of an iliac branched endograft including pre-procedure sizing and device selection, all ipsilateral selective iliac artery catheterization(s), all associated radiological supervision and interpretation, and all endograft extension(s) proximally to the aortic bifurcation and distally in the internal iliac, external iliac, and common femoral artery(ies), and treatment zone angioplasty/stenting, when performed, for rupture or other than rupture (eg, for aneurysm, pseudoaneurysm, dissection, arteriovenous malformation, penetrating ulcer, traumatic disruption), unilateral (List separately in addition to code for primary procedure)	34717

Procedure codes	CPT®
Endovascular repair of iliac artery, not associated with placement of an aorto-iliac artery endograft at the same session, by deployment of an iliac branched endograft, including pre-procedure sizing and device selection, all ipsilateral selective iliac artery catheterization(s), all associated radiological supervision and interpretation, and all endograft extension(s) proximally to the aortic bifurcation and distally in the internal iliac, external iliac, and common femoral artery(ies), and treatment zone angioplasty/stenting, when performed, for other than rupture (eg, for aneurysm, pseudoaneurysm, dissection, arteriovenous malformation, penetrating ulcer), unilateral	34718
Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; straightforward lesion, initial vessel	37254
Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; complex lesion, initial vessel	37256
Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; straightforward lesion, initial vessel	37258
Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; complex lesion, initial vessel	37260

Procedure codes	CPT®
Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)	37255
Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)	37257
Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)	37259
Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)	37261

## Indications - Iliac Artery Aneurysm Repair

### Criteria

Endovascular repair of iliac artery by deployment of an iliac branched endograft (CPT® 34717) is medically necessary when clinical history documents of **all** of the following criteria:

- Endovascular abdominal aortic aneurysm (AAA) repair is planned to be performed at the same time as the internal iliac artery (IIA) procedure
- The ipsilateral common iliac artery demonstrates an aneurysm greater than 3.5cm in diameter
- There is contralateral internal iliac artery occlusion

### **Bifurcated-bifurcated aneurysm repair**

Bifurcated-bifurcated aneurysm repair of aorto-iliac aneurysms (CPT® 34718) is considered experimental, investigational, and unproven because the effectiveness of this approach has not been established.

### **Endovascular repair of isolated internal iliac artery aneurysm**

Endovascular intervention with arterial stenting, embolization or embolization and stenting is medically necessary in individuals with any of the following:

- Symptomatic aneurysm of any size
- Asymptomatic internal iliac aneurysm measuring greater than or equal to 3.0cm
- Evidence of bleeding from aneurysm such as active extravasation from the vessel or hematoma along side of vessel.

# References

**PVI.103.C****v1.0.2026**

1. Buck, DB, Bensely RP, Darling J et al. The Impact of Endovascular Treatment on Isolated Iliac Artery Aneurysm Treatment and Mortality. *J Vasc Surg.* 2015; 62(2): 331–335.
2. Joviliano EE, Vieira D, Moreira LDS, et al. Endovascular treatment of bilateral isolated aneurysm of the internal iliac artery. *J Vasc Bras.* 2019;18:e20180115. doi:10.1590/1677-5449.180115.
3. Perini P, Mariani E, Fanelli M, et al. Surgical and endovascular management of isolated internal iliac artery aneurysms: a systematic review and meta-analysis. *Vasc Endovascular Surg.* 2021;55(3):254-264. doi:10.1177/1538574420981812.
4. Chen RJ, Vaes RHD, Qi SD, et al. Modalities of endovascular management for internal iliac artery aneurysms. *ANZ J Surg.* 2021;91(11):2397-2403. doi:10.1111/ans.17253

# Visceral and Popliteal Aneurysms

PVI.106.A  
v1.0.2026

## Coding for Treatment of Visceral and Popliteal Aneurysms

Procedure	CPT®
<b>Lower extremity - femoral/popliteal, non-atherectomy</b>	
Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; straightforward lesion, initial vessel	37267
Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)	37268
Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; complex lesion, initial vessel	37269

<b>Procedure</b>	<b>CPT®</b>
Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)	37270
<b>Non-lower extremity intervention</b>	
Transcatheter placement of an intravascular stent(s) (except lower extremity artery(s) for occlusive disease, cervical carotid, extracranial vertebral or intrathoracic carotid, intracranial, or coronary), open or percutaneous, including radiological supervision and interpretation and including all angioplasty within the same vessel, when performed; initial artery	37236
Transcatheter placement of an intravascular stent(s) (except lower extremity artery(s) for occlusive disease, cervical carotid, extracranial vertebral or intrathoracic carotid, intracranial, or coronary), open or percutaneous, including radiological supervision and interpretation and including all angioplasty within the same vessel, when performed; each additional artery (List separately in addition to code for primary procedure)	37237
<b>Embolization</b>	
Vascular embolization or occlusion, inclusive of all radiological supervision and interpretation, intraprocedural roadmapping, and imaging guidance necessary to complete the intervention; arterial, other than hemorrhage or tumor (e.g., congenital or acquired arterial malformations, arteriovenous malformations, arteriovenous fistulas, aneurysms, pseudoaneurysms)	37242
Vascular embolization or occlusion, inclusive of all radiological supervision and interpretation, intraprocedural roadmapping, and imaging guidance necessary to complete the intervention; for arterial or venous hemorrhage or lymphatic extravasation	37244

## Popliteal Aneurysm

### Indications

Endovascular repair of popliteal artery aneurysms is indicated under the following conditions:

- Asymptomatic-popliteal artery aneurysm diameter  $\geq 2.0$  cm on ultrasound, CT or MRI.
- Symptomatic-popliteal artery aneurysms with diameter  $\geq 1.5$  cm on US, CT or MRI and documentation of **both** of the following:
  - Mural thrombus within the aneurysm
  - Evidence of new onset claudication, critical limb threatening ischemia or blue toe syndrome

### Evidence Discussion

Popliteal artery aneurysms are defined as the popliteal artery measuring  $> 1.5$  cm or 1.5x larger than its normal size (5-9 mm). Most popliteal artery aneurysms are asymptomatic and may be associated with other aneurysms including AAA, iliac and contralateral popliteal artery aneurysms. Symptoms usually result from acute or chronic limb ischemia caused by distal embolization to the tibial runoff vessels with or without associated aneurysm thrombosis. The risk of complications increases with aneurysm size and development of thrombus.

## Visceral Artery Aneurysm or Pseudoaneurysm (PSA)

- Coil embolization is medically necessary to treat visceral artery aneurysm or pseudoaneurysm (PSA) when diagnostic imaging (CTA, MRA, US, angiogram) documents **any** of the following:
  - hepatic artery aneurysm  $\geq 2.0$ cm
  - celiac artery aneurysm  $\geq 2.0$ cm and any size celiac artery PSA
  - colic artery aneurysm any size
  - gastric and gastroepiploic artery aneurysm of any size
  - jejunal and ileal artery aneurysm  $\geq 2.0$ cm
  - superior mesenteric artery (SMA) aneurysm of any size
  - pancreaticoduodenal and gastroduodenal artery aneurysm of any size
  - splenic artery aneurysm  $\geq 3.0$ cm and any size splenic artery PSA
  - renal artery aneurysm  $\geq 3.0$ cm

## References

**PVI.106.A**

**v1.0.2026**

1. Farber A, Angle N, Avgerinos E, et al. The Society for Vascular Surgery clinical practice guidelines on popliteal artery aneurysms. *J Vasc Surg.* 2022 Jan;75(1S):109S-120S. doi: 10.1016/j.jvs.2021.04.040.
2. Chaer RA, Abularrage CJ, Coleman DM, et al. The Society for Vascular Surgery clinical practice guidelines on the management of visceral aneurysms. *J Vasc Surg.* 2020;72(1S):3S-39S. doi:10.1016/j.jvs.2020.01.039.

# Peripheral Vascular, Non-coronary Stents

PVI.104.C

v1.0.2026

## General Information

Atherosclerosis is a systemic disease, and individuals will often present with multi-level disease. Intraoperative decision making may lead to changes in the original procedure requested.

## Coding

### Procedures

Peripheral vascular non-coronary stent procedures

Procedure description	CPT®
<b>Non-lower extremity intervention</b>	
Transcatheter placement of an intravascular stent(s) (except lower extremity artery(s) for occlusive disease, cervical carotid, extracranial vertebral or intrathoracic carotid, intracranial, or coronary), open or percutaneous, including radiological supervision and interpretation and including all angioplasty within the same vessel, when performed; initial artery	37236
Transcatheter placement of an intravascular stent(s) (except lower extremity artery(s) for occlusive disease, cervical carotid, extracranial vertebral or intrathoracic carotid, intracranial, or coronary), open or percutaneous, including radiological supervision and interpretation and including all angioplasty within the same vessel, when performed; each additional artery (List separately in addition to code for primary procedure)	37237
Transluminal balloon angioplasty (except lower extremity artery(ies) for occlusive disease, intracranial, coronary, pulmonary, or dialysis circuit), open or percutaneous, including all imaging and radiological supervision and interpretation necessary to perform the angioplasty within the same artery; initial artery	37246

Procedure description	CPT®
Transluminal balloon angioplasty (except lower extremity artery(ies) for occlusive disease, intracranial, coronary, pulmonary, or dialysis circuit), open or percutaneous, including all imaging and radiological supervision and interpretation necessary to perform the angioplasty within the same artery; each additional artery (List separately in addition to code for primary procedure)	37247
<b>Lower extremity - iliac</b>	
Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; straightforward lesion, initial vessel	37254
Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)	37255
Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; complex lesion, initial vessel	37256
Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)	37257

Procedure description	CPT®
Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; straightforward lesion, initial vessel	37258
Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)	37259
Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; complex lesion, initial vessel	37260
Revascularization, endovascular, open or percutaneous, iliac vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)	37261
Intravascular lithotripsy(ies), iliac vascular territory, including all imaging guidance and radiological supervision and interpretation necessary to perform the intravascular lithotripsy(ies) within the same artery (List separately in addition to code for primary procedure)	37262
<b>Lower extremity - femoral/popliteal</b>	

Procedure description	CPT®
Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; straightforward lesion, initial vessel	37263
Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)	37264
Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; complex lesion, initial vessel	37265
Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)	37266
Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; straightforward lesion, initial vessel	37267

Procedure description	CPT®
Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)	37268
Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; complex lesion, initial vessel	37269
Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)	37270
Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the atherectomy and angioplasty when performed, within the same artery, unilateral; straightforward lesion, initial vessel	37271
Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the atherectomy and angioplasty when performed, within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)	37272

Procedure description	CPT®
Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the atherectomy and angioplasty when performed, within the same artery, unilateral; complex lesion, initial vessel	37273
Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the atherectomy and angioplasty when performed, within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)	37274
Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal stent placement, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement, atherectomy, and angioplasty when performed, within the same artery, unilateral; straightforward lesion, initial vessel	37275
Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal stent placement, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement, atherectomy, and angioplasty when performed, within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)	37276

Procedure description	CPT®
Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal stent placement, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement, atherectomy, and angioplasty when performed, within the same artery, unilateral; complex lesion, initial vessel	37277
Revascularization, endovascular, open or percutaneous, femoral and popliteal vascular territory, with transluminal stent placement, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement, atherectomy, and angioplasty when performed, within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)	37278
Intravascular lithotripsy(ies), femoral and popliteal vascular territory, including all imaging guidance and radiological supervision and interpretation necessary to perform the intravascular lithotripsy(ies) within the same artery (List separately in addition to code for primary procedure)	37279
<b>Lower extremity - tibial</b>	
Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; straightforward lesion, initial vessel	37280
Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)	37281

Procedure description	CPT®
Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; complex lesion, initial vessel	37282
Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; complex lesion, complex lesion, each additional vessel (List separately in addition to code for primary procedure)	37283
Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; straightforward lesion, initial vessel	37284
Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)	37285
Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; complex lesion, initial vessel	37286

Procedure description	CPT®
Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal stent placement, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement and angioplasty when performed, within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)	37287
Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the atherectomy and angioplasty when performed, within the same artery, unilateral; straightforward lesion, initial vessel	37288
Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the atherectomy and angioplasty when performed, within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)	37289
Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the atherectomy and angioplasty when performed, within the same artery, unilateral; complex lesion, initial vessel	37290
Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the atherectomy and angioplasty when performed, within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)	37291

Procedure description	CPT®
Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal stent placement, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement, atherectomy, and angioplasty when performed, within the same artery, unilateral; straightforward lesion, initial vessel	37292
Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal stent placement, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement, atherectomy, and angioplasty when performed, within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)	37293
Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal stent placement, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement, atherectomy, and angioplasty when performed, within the same artery, unilateral; complex lesion, initial vessel	37294
Revascularization, endovascular, open or percutaneous, tibial and peroneal vascular territory, with transluminal stent placement, with transluminal atherectomy, including transluminal angioplasty when performed, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the stent placement, atherectomy, and angioplasty when performed, within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)	37295
<b>Inframalleolar</b>	

Procedure description	CPT®
Revascularization, endovascular, open or percutaneous, inframalleolar vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; straightforward lesion, initial vessel	37296
Revascularization, endovascular, open or percutaneous, inframalleolar vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; straightforward lesion, each additional vessel (List separately in addition to code for primary procedure)	37297
Revascularization, endovascular, open or percutaneous, inframalleolar vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; complex lesion, initial vessel	37298
Revascularization, endovascular, open or percutaneous, inframalleolar vascular territory, with transluminal angioplasty, including all maneuvers necessary for accessing and selectively catheterizing the artery and crossing the lesion, including all imaging guidance and radiological supervision and interpretation necessary to perform the angioplasty within the same artery, unilateral; complex lesion, each additional vessel (List separately in addition to code for primary procedure)	37299

## Coding

Intravascular lithotripsy c-codes

Description	HCPCS
Revascularization, endovascular, open or percutaneous, lower extremity artery(ies), except tibial/peroneal; with intravascular lithotripsy, includes angioplasty within the same vessel(s)	C9764
Revascularization, endovascular, open or percutaneous, lower extremity artery(ies), except tibial/peroneal; with intravascular lithotripsy, and transluminal stent placement(s), includes angioplasty within the same vessel	C9765

Description	HCPCS
Revascularization, endovascular, open or percutaneous, lower extremity artery(ies), except tibial/peroneal; with intravascular lithotripsy and atherectomy, includes angioplasty within the same vessel(s)	C9766
Revascularization, endovascular, open or percutaneous, lower extremity artery(ies), except tibial/peroneal; with intravascular lithotripsy and transluminal stent placement(s), and atherectomy, includes angioplasty within the same vessel(s)	C9767
Revascularization, endovascular, open or percutaneous, tibial/peroneal artery(ies), with intravascular lithotripsy, includes angioplasty within the same vessel (s), when performed	C9772
Revascularization, endovascular, open or percutaneous, tibial/peroneal artery(ies); with intravascular lithotripsy, and transluminal stent placement(s), includes angioplasty within the same vessel(s) when performed	C9773
Revascularization, endovascular, open or percutaneous, tibial/peroneal artery(ies); with intravascular lithotripsy and atherectomy, includes angioplasty within the same vessel (s), when performed	C9774
Revascularization, endovascular, open or percutaneous, tibial/peroneal artery(ies); with intravascular lithotripsy and transluminal stent placement(s), and atherectomy, includes angioplasty within the same vessel (s), when performed	C9775

## Peripheral Vascular, Non-coronary Stent - Criteria

### General Guidelines

It is expected that all lesions needing treatment will be addressed in one procedure. Staging of interventions is **not** medically necessary unless there is justification in the medical record. Valid reasons include any of the following:

- Patient instability
- Fluoroscopy use in excess of what is widely considered a safe radiation dosage
- A need to convert to general anesthesia but resources are not available
- Full dose contrast volume given is greater than 200 ml

## Upper Extremity

### Brachiocephalic arteries

PTA and stenting are medically necessary for treatment of **any** of the following documented conditions:

- Symptomatic subclavian steal syndrome documented by **all** of the following:
  - Episodic dizziness
  - high-grade stenosis or occlusion of the proximal subclavian artery demonstrated on advanced imaging
  - Presence of reversal of flow in the left vertebral artery on carotid/subclavian duplex ultrasound
- Upper extremity claudication when there is documentation of fatigue with exertion of the arm and **both** of the following:
  - Symptoms are relieved with rest
  - Symptoms recur with activity at predictable intervals
- Ischemic rest pain of the arm and hand when **one** of the following criteria is met:
  - Objective measurements demonstrate severe ischemia on noninvasive studies
  - High-grade stenosis seen on advanced imaging
- Non-healing tissue ulceration or focal gangrene of the digits.
- Stenotic inflow arteries of an arteriovenous fistula when the inflow arteries, such as the innominate or brachiocephalic arteries demonstrate high-grade stenosis on advanced imaging

### Lower Extremity Arterial Indications

#### Treatment of Claudication

##### Initial Treatment

Treatment of stenotic or occluded arteries perfusing the lower extremities (aorto-iliac, superficial femoral, popliteal) is considered medical necessary when **all** of the following are met:

- Treatment of target lesion will allow in-line flow to the foot, with at least one run-off vessel
- Lifestyle-limiting claudication for aorto-iliac, superficial femoral, or popliteal arteries when there is documentation of **all** of the following:
  - A failed trial of three months of provider directed conservative therapy which includes structured exercise walking program with documented follow-up during the trial if no structured program is available in the individual's home area.
  - Functional limitations that significantly impact the quality of life and/or occupation of the individual

- Risk factor modification including smoking cessation, optimization of lipids, and glycemic control are part of the medical evaluation and management
- Symptoms correspond with the location of arterial insufficiency
  - aorto-iliac - lower back, hip, buttock, or thigh
  - superficial femoral - claudication in the calf muscle area
  - popliteal - calf
- Imaging performed prior to the planned procedure confirms location and degree of stenosis ( $\geq 50\%$ ) by objective criteria

### Repeat intervention

- In an individual with recurrent claudication who has previously undergone endovascular intervention (angioplasty or stent) or bypass in the lower extremity arteries (aorto-iliac, superficial femoral) for claudication is considered medically necessary for any **one** of the following:
  - Previous Endovascular Intervention in the setting of **any** of the following findings:
    - Drop in ABI of  $\geq 0.15$  on routine surveillance
    - Duplex ultrasound finding of peak systolic velocity (PSV)  $\geq 190$  cm/s
    - Velocity ratio  $\geq 1.5$
    - $\geq 50\%$  stenosis on CTA, MRA or angiogram
  - Previous Lower Extremity Bypass in the setting of **any** of the following findings:
    - Drop in ABI of  $\geq 0.15$  on routine surveillance
    - Vein bypass: PSV  $\geq 180$  cm/s
    - Velocity ratio  $\geq 2$
    - End diastolic velocity (EDV)  $< 45$  cm/s
    - $\geq 50\%$  stenosis on CTA, MRA or angiogram
- In asymptomatic individuals re-intervention is medically necessary for **either** of the following:
  - Previous endovascular intervention with high-grade stenosis with **any** of the following:
    - PSV  $\geq 275$  cm/s
    - Velocity ratio  $\geq 3.5$
  - Previous lower extremity vein bypass with **any** of the following:
    - PSV  $\geq 180$  cm/s
    - Velocity ratio  $\geq 2$
    - EDV  $< 45$  cm/s

- Low graft velocity <45 cm/s

### Lesion descriptors

- Straightforward lesions are lesions identified on preoperative imaging as a stenosis
- Complex lesions are lesions identified on preoperative imaging as an occlusion.

### Atherectomy - claudication

Atherectomy, with or without angioplasty and stenting, is medically necessary for claudication when **all** of the following are met:

- Criteria for intervention have been met as described above in Initial treatment and Repeat intervention
- Lesions result in  $\geq 70\%$  stenosis caused by a highly calcified eccentric plaque

Repeat atherectomy for recurrent infrapopliteal stenosis/occlusion without evidence of critical limb ischemia is not supported by medical evidence and is not considered medically necessary.

### Peripheral vascular, non-coronary stents non-indications

Stent placement in infrapopliteal vessels is not medically necessary except in rare cases where it is deemed necessary intraoperatively.

PTA or stent for any indication is **not** considered medically necessary in **either**:

- Individuals who are asymptomatic
- Lesions that are not high-grade or critical ( $\geq 50\%$ )
- Routine stent placement, atherectomy, or lithotripsy, in infra-popliteal and infra-malleolar vessels is **not** considered medically necessary due to the lack of evidence of the benefit.
- Intervention for below knee vessels is **not** considered medically necessary for the routine treatment of claudication due to lack of evidence of the benefit.

## Treatment of Critical Limb Ischemia

### Initial Treatment

- The presence of critical limb ischemia must be documented in the clinical note by **any** of the following:
  - Non-healing ischemic and mixed arterial/venous wounds present for >two weeks despite ongoing provider directed wound care.
  - Gangrene of any duration when revascularization is felt to be needed to allow for minor amputation
  - Ischemic rest pain of the foot demonstrated by symptoms suggestive of rest pain (e.g. pain in the foot while recumbent and relieved when foot is in a dependent position) with **any** of the following:

- Ankle Brachial Index (ABI) <0.5 in non diabetics
- Toe brachial index (TBI) <0.6
- Monophasic waveforms at the feet on noninvasive studies in individuals noted to have non compressible vessels on ABI such as diabetics or individuals with end stage renal disease
- Documented infrapopliteal disease of greater than or equal to 50% stenosis

### Repeat Intervention

- Re-intervention in a individual who presents with critical limb ischemia who has previously undergone endovascular intervention for critical limb ischemia or claudication in the aortoiliac, femoralpopliteal, or infrapopliteal areas is considered medically necessary in the presence of **both** of the following:
  - Symptoms of critical limb ischemia defined as **one** of the following:
    - Progression of wound as defined by any increase in size of the wound
    - Lack of 50% area reduction in four weeks.
    - Recurrence of rest pain
  - Presence of any of the following objective findings:
    - Previous endovascular intervention with **any** of the following:
      - Drop in ABI of  $\geq 0.15$  on routine surveillance
      - duplex ultrasound finding of peak systolic velocity (PSV)  $\geq 190$  cm/s
      - Velocity ratio  $\geq 1.5$
      - $\geq 50\%$  stenosis on CTA, MRA or angiogram
    - Previous lower extremity bypass with **any** of the following:
      - Drop in ABI of  $\geq 0.15$  on routine surveillance
      - Vein bypass: PSV  $\geq 180$  cm/s
      - Velocity ratio  $\geq 2$
      - end diastolic velocity (EDV) <45 cm/s
      - low graft velocity <45 cm/s, or  $\geq 50\%$  stenosis on CTA, MRA or angiogram
- In asymptomatic individuals re-intervention if one of the following: If Vein bypass: PSV  $\geq 180$  cm/s or Velocity ratio  $\geq 2$ , or EDV <45 cm/s If Prosthetic bypass: low graft velocity <45 cm/s Previous endovascular intervention with high-grade stenosis defined as PSV  $\geq 275$  cm/s or Velocity ratio  $\geq 3.5$

### Lesion descriptors

- Straightforward lesions are lesions identified on preoperative imaging as a stenosis

- Complex lesions are lesions identified on preoperative imaging as an occlusion.

### **Inframalleolar Angioplasty**

Inframalleolar angioplasty is indicated for patients with active tissue loss and lack of arterial flow distal to the ankle (GLASS descriptor P2).

Imaging Findings to support Inframalleolar intervention:

- CTA/MRA/Angiogram: Occluded distal ATA/DP at ankle or occluded PTA/Tarsal branches at ankle.
- Duplex: lack of flow in the ATA/DP or PTA/Tarsal branches at the ankle.
- Pedal acceleration time (PAT) >225ms

### **Atherectomy-Critical limb ischemia**

Atherectomy is medically necessary when the clinical history documents critical limb ischemia, including tissue loss and ischemic rest pain, when the individual would otherwise satisfy criteria for intervention as described above in **Initial Intervention** and **Repeat intervention**

### **Intravascular Lithotripsy**

Intravascular lithotripsy is medically necessary when the clinical history documents critical limb ischemia, including tissue loss and ischemic rest pain, when the individual would otherwise satisfy criteria for intervention as described above in **Initial Intervention** and **Repeat intervention** and evidence of 50% stenosis or occlusion due to moderate or severely calcified plaque in the iliac or femoralpopliteal on duplex, CTA, MRA or prior angiogram.

### **Glass Criteria Inframalleolar Vessels**

<b>Classification</b>	<b>Inframalleolar/pedal descriptors</b>
P0	<ul style="list-style-type: none"> <li>• Target artery crosses ankle into the foot</li> <li>• Pedal arch is intact</li> </ul>
P1	<ul style="list-style-type: none"> <li>• Target artery crosses ankle into the foot</li> <li>• Pedal arch is absent or severely disease</li> </ul>
P2	<ul style="list-style-type: none"> <li>• No target artery crossing ankle into the foot</li> </ul>

### **Evidence Discussion**

Atherosclerotic plaque can lead to stenosis and even occlusion of the peripheral vasculature. High-grade stenosis can lead to chronic ischemia of the end tissue, with resultant symptoms of arterial insufficiency. In the lower extremities, this can lead to claudication and/or critical limb ischemia. Treatment of stenotic or occlusive lesions can

be performed with angioplasty alone which involves placing a balloon through a wire across the lesion and dilating the lesion to residual stenosis of <30%. Stenting involves placing a metal stent permanent implant across a lesion dilating it with a balloon and leaving it in place effectively crushing and fixing the plaque against the arterial wall. Angioplasty can be performed alone or in conjunction with stenting. A stent may be placed as a planned adjunct to PTA rather than in response to a sub-optimal or failed PTA (so-called primary stent deployment).

Coverage for non-coronary vascular stents depends on the use of an FDA-approved stent for an FDA approved indication

### **Upper/lower extremity intervention Peripheral arterial disease (PAD)**

Peripheral arterial disease (PAD) is defined as chronic, atherosclerotic occlusive disease of the lower extremities. The vast majority of patients with PAD are asymptomatic. A much smaller group has symptomatic PAD, consisting of intermittent claudication(IC), rest pain or tissue loss.

The natural history of PAD for asymptomatic and IC patients is relatively benign. It is estimated that 7% (4%–11%) of asymptomatic patients deteriorate to IC over a 5-year period. Multiple studies have established that patients with IC are at very low risk of major amputation (<1% per year).

For these reasons, the first line of treatment for patient with IC is risk factor reduction/modification and exercise therapy. A meta-analysis of 1200 patients determined that exercise therapy, compared with placebo or usual care, provides an overall improvement in walking ability of 50% to 200%, with improvements maintained for up to 2 years. Additionally, with intensive medical management, <5% of patients will develop symptoms of advanced ischemia, such as ischemic rest pain, tissue loss, or require amputation.

Symptomatic peripheral artery disease of the lower extremities due to calcified plaque remains difficult to treat endovascularly with increased risks of flow-limiting dissection, embolization and under expansion of stents compared to non-calcified plaque. Intravascular lithotripsy balloons have been studied in both the coronary and peripheral arteries as a way to modify stenoses due to moderately-to-severely calcified plaque.

A pooled analysis of the initial 5 studies for Intravascular Lithotripsy (IVL) in peripheral artery disease was published by Madhavan et al in 2020. This included 336 patients with moderate to severe calcified stenosis in the iliac, common femoral, femoralpopliteal or tibial arteries. The results showed an average percent reduction in stenosis by 55.1% with a combined complication rate of 1.2%.<sup>1</sup>

<sup>1</sup> Madhavan MV, Shahim B, Mena-Hurtado C, et al. Efficacy and safety of intravascular lithotripsy for the treatment of peripheral arterial disease: an individual patient-level pooled data analysis. *Catheter Cardiovasc Interv.* 2020;95(5):959-968. doi:10.1002/ccd.28729.

The DISRUPT PAD III randomized controlled trial studied 306 patients with moderately-to-severely calcified femoralpopliteal plaque. It compared IVL to PTA for vessel preparation prior to drug coated balloon (DCB).<sup>3</sup> Primary patency was significantly higher in the IVL group than PTA at 1 year (80.5 % vs 68%,  $P < 0.0001$ ) and 2 years (70.3% vs 51.3%,  $P < 0.03$ ). The requirement for provisional stenting was significantly lower in the IVL group (4.6% vs 18.3%,  $P < 0.0001$ ). Freedom from target lesion revascularization and restenosis rates were similar between the groups. The DISRUPT PAD III Observation Study expanded on this with a worldwide registry that enrolled 1373 patients with 1677 lesions with core lab adjudication of real-world patients to assess safety and performance with moderate-to-severe calcified lesions.<sup>2,1</sup> Patient characteristics included diabetes in 56%, smoking in 78%, renal insufficiency in 27% with 29.7% of those patients on active dialysis. Target vessel distribution include femoralpopliteal (61%), iliac (15.8%), common femoral artery (10.7%) and infrapopliteal arteries (12.8%). Lesion characteristics included 31.1% chronic total occlusions (CTOs) and 19.3% had lesion lengths  $\geq 15$  cm. Treatment after IVL use was decided by the individual provider. Average stenosis prior to IVL was 81% and this was reduced to 33% stenosis after IVL and 24% after adjunct intervention. These results were consistent across all the vessels from iliac to infrapopliteal arteries. This was consistent to the PAD III RCT where pre-intervention average stenosis was 85% and reduced to 27% after IVL. Rates of flow-limiting dissection was 0.9%, perforation was 0.8% and distal embolization was 0.2%.

Based on the available data, IVL is safe and effective in treating moderately-to-severely calcified stenosis across all lower extremity artery beds. Studies confirm a decreased need for provisional stenting and less complications compared to PTA.

Progression of distal peripheral artery disease into the inframalleolar vessels in patients with active ulcers or tissue loss is associated with poorer outcomes than patients without inframalleolar disease.<sup>1-4</sup> Intervention on the inframalleolar/pedal arteries may increase outflow and potentially allow salvage of limbs in patients with active wounds.<sup>2-4</sup> There is limited data reported for patients with ischemic rest pain and no reported studies on inframalleolar interventions for claudication. Given the lack of durability and proven outcomes, inframalleolar and pedal intervention should be limited to patients with active ulcers or tissue loss and is not indicated in patients with rest pain or claudication.

### Renal/visceral

Failure of medical therapy to control hypertension in addition to duplex or CT/MR imaging that confirms renal artery stenosis is an indication for intervention. Some additional scenarios including fibromuscular dysplasia, renal artery dissection, acute renal failure due to flow-limiting lesions or renal artery stenosis associated with a transplanted kidney may also warrant intervention and are generally considered on

<sup>2</sup> Armstrong EJ, Adams G, Soukas PA, et al. Intravascular lithotripsy for peripheral artery calcification: 30-day outcomes from the Disrupt PAD III observational study. *J Endovasc Ther.* 2024; Published online Oct 18. doi:10.1177/15266028241283716.

a case-by-case basis. Endovascular techniques are the most common approach for treatment of renal artery stenosis. Intervention is not indicated in the absence of uncontrolled hypertension. Additionally, findings consistent with advanced renal disease including hemodialysis and chronic renal artery occlusion are not recommended for intervention.

Primary stenting is medically necessary when Percutaneous Transluminal Angioplasty (PTA) alone is not expected to provide a durable result for individuals with either of the following: Arterial occlusions that carry a high risk for distal embolization or rapid recurrence Occlusive lesions such as significantly calcified lesions, eccentric lesions, lesions related to external compression, and ostial lesions.

# References

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## Upper/Lower Extremity References

1. Almasri J, Adusumalli J, Asi N, et al. A systematic review and meta-analysis of revascularization outcomes of infrainguinal chronic limb-threatening ischemia. *J Vasc Surg*. 2018 Aug;68(2):624-633. doi:10.1016/j.jvs.2018.01.066.
2. Copelan AZ, Kapoor BS, AbuRahma AF, et al. ACR Appropriateness Criteria® Iliac Artery Occlusive Disease. *J Am Coll Radiol*. 2017;14(11). doi:10.1016/j.jacr.2017.08.039.
3. Frans FA, Bipat S, Reekers JA, Legemate DA, Koelemay MJ; SUPER Study Collaborators. SUPERvised exercise therapy or immediate PTA for intermittent claudication in patients with an iliac artery obstruction-- a multicentre randomised controlled trial; SUPER study design and rationale. *Eur J Vasc Endovasc Surg*. 2012 Apr;43(4):466-71. doi:10.1016/j.ejvs.2012.01.014.
4. Jaff MR, White CJ, Hiatt WR, et al. An update on methods for revascularization and expansion of the TASC lesion classification to include below-the-knee arteries: A supplement to the inter-society consensus for the management of peripheral arterial disease (TASC II): The TASC steering committee. *Catheter Cardiovasc Interv*. 2015 Oct;86(4):611-25. doi:10.1002/ccd.26122.
5. Patel MR, Conte MS, Cutlip DE, et al. Evaluation and Treatment of Patients With Lower Extremity Peripheral Artery Disease. *J Am Coll Cardiol*. 2015;65(9):931-941. doi:10.1016/j.jacc.2014.12.036.
6. R. Eugene Zierler, MD et al. The Society for Vascular Surgery practice guidelines on follow-up after vascular surgery arterial procedures. *J Vasc Surg* 2018;68:256-84.
7. McKinsey JF, Zeller T, Rocha-Singh KJ, Jaff MR, Garcia LA. Lower extremity revascularization using directional atherectomy: 12-month prospective results of the DEFINITIVE LE study. *JACC Cardiovasc Interv* 2014;7:923-33
8. Dattilo R, Himmelstein SI, Cuff RF. The COMPLIANCE 360° Trial: a randomized, prospective, multicenter, pilot study comparing acute and long-term results of orbital atherectomy to balloon angioplasty for calcified femoropopliteal disease. *J Invasive Cardiol* 2014;26:355-60.
9. Tepe G, Brodmann M, Werner M, et al. Intravascular Lithotripsy for Peripheral Artery Calcification: 30-Day Outcomes From the Randomized Disrupt PAD III Trial. *JACC Cardiovasc Interv*. 2021;14(12):1352-1361. doi:10.1016/j.jcin.2021.04.010.
10. Tepe G, Brodmann M, Bachinsky W, et al. Intravascular Lithotripsy for Peripheral Artery Calcification: Mid-term Outcomes From the Randomized Disrupt PAD III Trial. *J Soc Cardiovasc Angiogr Interv*. Published online May 2022:100341. doi:10.1016/j.jscai.2022.100341.
11. Madhavan MV, Shahim B, Mena-Hurtado C, et al. Efficacy and safety of intravascular lithotripsy for the treatment of peripheral arterial disease: An individual patient-level pooled data analysis. *Catheter Cardiovasc Interv*. 2020;95(5):959-968. doi:10.1002/ccd.28729.
12. Adams G, Shammam N, Mangalmurti S, et al. Intravascular Lithotripsy for Treatment of Calcified Lower Extremity Arterial Stenosis: Initial Analysis of the Disrupt PAD III Study. *J Endovasc Ther*. 2020;27(3):473-480. doi:10.1177/1526602820914598.
13. Secemsky E, Mosarla RC, Rosenfield K, et al. Appropriate Use of Intravascular Ultrasound During Arterial and Venous Lower Extremity Interventions. *JACC Cardiovasc Interv*. 2022 Aug 8;15(15):1558-1568.
14. Kawaji Q, Dun C, Walsh C, et al. Index atherectomy peripheral vascular interventions performed for claudication are associated with more reinterventions than nonatherectomy interventions. *J Vasc Surg*. 2022;76(2):489-498.e4. doi:10.1016/j.jvs.2022.02.034.
15. Chowdhury M, Secemsky EA. Atherectomy vs Other Modalities for Treatment During Peripheral Vascular Intervention. *Curr Cardiol Rep*. 2022;24(7):869-877. doi:10.1007/s11886-022-01709-1.
16. Quevedo HC, Arain SA, Ali G, Abi Rafeh N. A critical view of the peripheral atherectomy data in the treatment of infrainguinal arterial disease. *J Invasive Cardiol*. 2014;26(1):22-29.

17. Neves PJ, Malgor EA, Kabeil M, Sobreira ML, Malgor RD. Atherectomy to treat femoropopliteal atherosclerotic disease. *J Cardiovasc Surg (Torino)*. 2023;64(2):184-198. doi:10.23736/S0021-9509.23.12544-4.
18. Benfor B, Sinha K, Lumsden AB, Roy TL. Scoping review of atherectomy and intravascular lithotripsy with or without balloon angioplasty in below-the-knee lesions. *J Vasc Surg Cases Innov Tech*. 2023;9(2):101185. Published 2023 May 3. doi:10.1016/j.jvscit.2023.101185.
19. Cho S, Han A, Ahn S, et al. Directional Atherectomy for Treating In-Stent Restenosis of the Superficial Femoral Artery. *Vasc Specialist Int*. 2020;36(3):136-143. doi:10.5758/vsi.200017.
20. Bailey SR, Beckman JA, Dao TD, et al. ACC/AHA/SCAI/SIR/SVM 2018 Appropriate Use Criteria for Peripheral Artery Intervention: A Report of the American College of Cardiology Appropriate Use Criteria Task Force, American Heart Association, Society for Cardiovascular Angiography and Interventions, Society of Interventional Radiology, and Society for Vascular Medicine. *J Am Coll Cardiol*. 2019;73(2):214-237. doi:10.1016/j.jacc.2018.10.002.
21. Feldman DN, Armstrong EJ, Aronow HD, et al. SCAI consensus guidelines for device selection in femoral-popliteal arterial interventions. *Catheter Cardiovasc Interv*. 2018;92(1):124-140. doi:10.1002/ccd.27635.
22. Belkin N, Jackson BM, Foley PJ, et al. The use of intravascular ultrasound in the treatment of type B aortic dissection with thoracic endovascular aneurysm repair is associated with improved long-term survival. *J Vasc Surg*. 2020;72(2):490-497. doi:10.1016/j.jvs.2019.10.073.
23. Singhanian P, Das TC, Bose C, et al. Toe brachial index and not ankle brachial index is appropriate in initial evaluation of peripheral arterial disease in type 2 diabetes. *Diabetol Metab Syndr*. 2024;16(1):52. Published 2024 Feb 27. doi:10.1186/s13098-024-01291-2.
24. Gerhard-Herman MD, Gornik HL, Barrett C, et al. 2016 AHA/ACC Guideline on the Management of Patients With Lower Extremity Peripheral Artery Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines [published correction appears in *Circulation*. 2017 Mar 21;135(12):e791-e792. doi: 10.1161/CIR.0000000000000502].
25. Sigvant B, Lundin F, Wahlberg E. The Risk of Disease Progression in Peripheral Arterial Disease is Higher than Expected: A Meta-Analysis of Mortality and Disease Progression in Peripheral Arterial Disease. *Eur J Vasc Endovasc Surg*. 2016;51(3):395-403. doi:10.1016/j.ejvs.2015.10.022.
26. Conte MS, Pomposelli FB, Clair DG, et al. Society for Vascular Surgery practice guidelines for atherosclerotic occlusive disease of the lower extremities: management of asymptomatic disease and claudication [published correction appears in *J Vasc Surg*. 2015 May;61(5):1382]. *J Vasc Surg*. 2015;61(3 Suppl):2S-41S. doi:10.1016/j.jvs.2014.12.009.
27. Zierler RE, Jordan WD, Lal BK, et al. The Society for Vascular Surgery practice guidelines on follow-up after vascular surgery arterial procedures [published correction appears in *J Vasc Surg*. 2018 Nov;68(5):1623. doi: 10.1016/j.jvs.2018.09.019]. *J Vasc Surg*. 2018;68(1):256-284. doi:10.1016/j.jvs.2018.04.018.
28. Conte MS, Aboyans V, et al. Global vascular guidelines on the management of chronic limb-threatening ischemia. *J Vasc Surg*. 2019;69(6 Suppl):3S-125S.e40. doi:10.1016/j.jvs.2019.02.016

### Visceral/Renal References

1. Boateng FK, Greco BA. Renal artery stenosis: prevalence of, risk factors for, and management of in-stent stenosis. *Am J Kidney Dis*. 2013 Jan;61(1):147-60. doi: 10.1053/j.ajkd.2012.07.025.
2. Sorour AA, Dehaini H, Alnahhal KI, Khalifeh A, Rowse JW, Quatromoni JG, Caputo FJ, Lyden SP, Kirksey L. Natural history of superior mesenteric artery in-stent restenosis. *J Vasc Surg*. 2024 Apr;79(4):818-825.e2. doi: 10.1016/j.jvs.2023.11.035.
3. Barnes JA, Columbo JA, Ponukumati AS, Zwolak RM, Olive FT, Goodney PP, Powell RJ, Zacharias N. Long-Term Outcomes of Mesenteric Stenting and Analysis of In-Stent Restenosis Duplex Velocity Criteria. *Ann Vasc Surg*. 2020 Oct;68:226-233. doi: 10.1016/j.avsg.2020.04.064.
4. Del Conde I, Galin ID, Trost B, Kang J, Lookstein R, Woodward M, Gustavson S, Cambria RP, Jaff MR, Olin JW. Renal artery duplex ultrasound criteria for the detection of significant in-stent restenosis. *Catheter Cardiovasc Interv*. 2014 Mar 1;83(4):612-8. doi: 10.1002/ccd.25270.
5. Schäberle W, Leyerer L, Schierling W, Pfister K. Ultrasound diagnostics of renal artery stenosis: Stenosis criteria, CEUS and recurrent in-stent stenosis. *Gefasschirurgie*. 2016;21:4-13. doi: 10.1007/s00772-015-0060-3. Epub 2015 Aug 28.

6. Drelich-Zbroja A, Kuczyńska M, Światłowski Ł, Szymańska A, Elwertowski M, Marianowska A. Recommendations for ultrasonographic assessment of renal arteries. *J Ultrason*. 2018;18(75):338-343. doi: 10.15557/JoU.2018.0049.
7. Fleming SH, Ross PD, Timothy EC. Accuracy of duplex sonography scans after renal artery stenting. *J Vasc Surg*. 2010;52:953–958. doi: 10.1016/j.jvs.2010.04.055.
8. Huber TS, Björck M, Chandra A, et al. Chronic mesenteric ischemia: Clinical practice guidelines from the Society for Vascular Surgery. *J Vasc Surg*. 2021;73(1). doi:10.1016/j.jvs.2020.10.029.
9. Parikh SA, Shishehbor MH, Gray BH, White CJ, Jaff MR. SCAI expert consensus statement for renal artery stenting appropriate use. *Catheter Cardiovasc Interv*. 2014 Dec 1;84(7):1163-71. doi:10.1002/ccd.25559.
10. Prince M, Tafur JD, White CJ. When and How Should We Revascularize Patients With Atherosclerotic Renal Artery Stenosis? *JACC Cardiovasc Interv*. 2019 Mar 25;12(6):505-517. doi:10.1016/j.jcin.2018.10.023.

# Venous Intervention Guidelines

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Peripheral Vascular Intervention

# Endovenous Ablation

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## General information

This section applies to the indications for endovenous ablation (thermal and non-thermal methods) treatment of the following veins

- Great saphenous vein (GSV)
- Small saphenous vein (SSV)
- Anterior Saphenous Vein (AAGSV)
- Posterior Accessory Great Saphenous Vein (PAGSV)
- Perforator veins

## Coding

### Treatment options for saphenous vein ablation

Procedure	CPT®
<b>Venous ablation - thermal options</b>	
Endovenous ablation therapy of incompetent vein, extremity, inclusive of all imaging guidance and monitoring, percutaneous, radiofrequency; first vein treated	36475
Endovenous ablation therapy of incompetent vein, extremity, inclusive of all imaging guidance and monitoring, percutaneous, radiofrequency; subsequent vein(s) treated in a single extremity, each through separate access sites (List separately in addition to code for primary procedure)	36476
Endovenous ablation therapy of incompetent vein, extremity, inclusive of all imaging guidance and monitoring, percutaneous, laser; first vein treated	36478
Endovenous ablation therapy of incompetent vein, extremity, inclusive of all imaging guidance and monitoring, percutaneous, laser; subsequent vein(s) treated in a single extremity, each through separate access sites (List separately in addition to code for primary procedure)	36479
<b>Venous ablation - non-thermal options</b>	

<b>Procedure</b>	<b>CPT®</b>
Endovenous ablation therapy of incompetent vein, extremity, by transcatheter delivery of a chemical adhesive (eg, cyanoacrylate) remote from the access site, inclusive of all imaging guidance and monitoring, percutaneous; first vein treated	36482
Endovenous ablation therapy of incompetent vein, extremity, by transcatheter delivery of a chemical adhesive (eg, cyanoacrylate) remote from the access site, inclusive of all imaging guidance and monitoring, percutaneous; subsequent vein(s) treated in a single extremity, each through separate access sites (List separately in addition to code for primary procedure)	36483
Endovenous ablation therapy of incompetent vein, extremity, inclusive of all imaging guidance and monitoring, percutaneous, mechanochemical; first vein treated	36473
Endovenous ablation therapy of incompetent vein, extremity, inclusive of all imaging guidance and monitoring, percutaneous, mechanochemical; subsequent vein(s) treated in a single extremity, each through separate access sites (List separately in addition to code for primary procedure)	36474
<b>Sclerotherapy - truncal veins</b>	
Injection of non-compounded foam sclerosant with ultrasound compression maneuvers to guide dispersion of the injectate, inclusive of all imaging guidance and monitoring; single incompetent extremity truncal vein (eg, great saphenous vein, accessory saphenous vein)	36465
Injection of non-compounded foam sclerosant with ultrasound compression maneuvers to guide dispersion of the injectate, inclusive of all imaging guidance and monitoring; multiple incompetent truncal veins (eg, great saphenous vein, accessory saphenous vein), same leg	36466
Injection of sclerosant; single incompetent vein (other than telangiectasia)	36470
Injection of sclerosant; multiple incompetent veins (other than telangiectasia), same leg	36471
<b>High ligation and stripping of the saphenous vein</b>	
Ligation and division great saphenous vein at saphenofemoral junction, or distal interruptions	37700
Ligation, division, and stripping, small saphenous vein	37718
Ligation, division, and stripping, great saphenous veins from saphenofemoral junction to knee or below	37722

Procedure	CPT®
Ligation and division and complete stripping of great or small saphenous veins with radical excision of ulcer and skin graft and/or interruption of communicating veins of lower leg with excision of deep fascia	37735
Ligation and division of small saphenous vein at saphenopopliteal junction (separate procedure)	37780

## Endovenous Ablation - Criteria

Endovenous ablation is the preferred treatment for saphenovenous reflux of the following truncal veins:

- Greater saphenous vein
- Small saphenous vein
- Anterior saphenous vein - above knee
- Posterior accessory saphenous vein - above knee

Treatment of saphenovenous reflux is medically necessary when individuals have symptoms attributable to their incompetent veins and not for the purposes of cosmesis.

Treatment of saphenovenous reflux is medically necessary when **both** of the following apply:

- Symptoms of venous reflux as documented by a CEAP score of at least 2 or greater OR a VCSS score of 6 or greater.
- Results of a recent venous duplex (within 6 months before planned procedure) demonstrating **all** of the following:
  - Presence of significant pathologic reflux measuring at least 500ms:
    - In at least two segments within any of the following veins to be treated
      - great saphenous vein above the knee (i.e. saphenofemoral junction, thigh, knee and calf)
      - small saphenous vein (i.e. saphenopopliteal junction and midcalf)
    - In at least one segment within any of the following veins to be treated:
      - Anterior saphenous vein
      - Posterior accessory saphenous vein
      - Greater saphenous vein (below the knee)
  - Absence of ipsilateral acute DVT or chronic multisegmental femoralpopliteal occlusion

With the exception of active venous ulcers, treatment of up to two truncal veins per extremity can be included in a single request. Further requests will be considered if symptoms fail to improve after 12 weeks

Saphenous vein treatment using different modalities (endovenous ablation, phlebectomy, and sclerotherapy) may be considered if the following are met:

- Small saphenous vein may be treated with one modality in a single episode of care. Repeat request for treatment of the saphenous vein in the absence of recurrent reflux or recurrent symptoms does not meet for medical necessity based on clinical evidence.
- The thigh extension of the small saphenous vein (vein of Giacomini) can be treated in the same episode of care as the small saphenous vein or 12 weeks from prior intervention.
- Greater saphenous vein may be treated as follows:
  - Above and below knee segments of the vein with a single modality in one episode of care
  - Two different modalities to treat the above knee and below knee segments of the greater saphenous vein concurrently in one episode of care
  - Subsequent treatment of the below-knee saphenous vein with a different modality following treatment of the above-knee saphenous vein may be considered if symptoms fail to improve after a minimum of 12 weeks from the previous intervention.
  - The above knee or below knee segment of the greater saphenous is expected to be treated with one modality in one episode of care. Repeat treatment of the above knee or below knee segment of the greater saphenous vein is not supported.
- Above knee and below knee anterior/posterior accessory saphenous veins may be treated in one episode of care by any modality
  - Infrapopliteal accessory branches should follow recommendations for tributary veins if not treated during the same episode of care as the above knee accessory branches

Treatment of pathologic perforators is medically necessary when there is documentation of **all** of the following:

- Active venous stasis ulcer
- A recent duplex US performed within the past 6 months demonstrating signs of perforator vein incompetence with both:
  - Reflux  $\geq 500$ ms
  - Vein diameter  $\geq 3.5$  mm
- Perforator vein is located in the vicinity of an active ulcer
- Saphenous veins draining the ulcer area have been previously eliminated or do not exhibit pathologic reflux

## Evidence Discussion

### Endovenous Ablation

Duplex ultrasound can identify lower extremity superficial venous truncal reflux as a reverse flow lasting  $\geq 500$  ms within one or more vein segments which often includes a valve. Truncal vein reflux affecting the Great Saphenous Vein (GSV), Small Saphenous Vein (SSV), Anterior Saphenous Vein (ASV) or thigh Posterior Accessory Saphenous Vein (PAGSV) can lead to significant lower extremity discomfort, edema and potentially ulceration. Reflux within varicose veins as well as saphenous tributaries can also be the cause of significant symptoms. Medical management including leg elevation, exercise, weight loss and compression stockings can lead to significant improvement in symptoms and decrease the risk of skin ulceration in many patients but is not effective for all patients and does not address the underlying anatomic disease process.

For patients with symptomatic venous reflux on duplex imaging, endovenous therapy can ameliorate symptoms, provides improved quality of life, and may decrease the risk of future ulceration. For patients with active ulceration, significant leg symptoms, and/or significant leg edema and superficial venous reflux on venous duplex, intervention to ablate the associated incompetent superficial and contributing perforator veins can facilitate healing. GSV reflux can be present in the above- or below-knee segments, or both (axial reflux). The saphenous nerve lies adjacent to the the below-knee GSV; similarly, the sural nerve lies close to the SSV in its mid-distal calf portion. Thermal ablation and stripping of the distal portion of the truncal saphenous veins (GSV below-knee and SSV below the midcalf) may carry a risk of saphenous and/or sural nerve injury. It has been reported that limiting RFA treatment to the above-knee GSV markedly decreases the risk of paresthesia by over 50% (Merchant, 2002). Furthermore, the GSV below-knee lies in a more superficial location, making it more susceptible to skin burns if adequate tumescent anesthesia cannot be achieved (Puggioni 2024). As non-thermal ablation options became available (cyanoacrylate, mechanochemical and foam sclerotherapy), when the below-knee and GSV and distal SSV segments are incompetent, treatment can be carried out and is the preferred method to prevent nerve injury (Gloviczki 2023).

Endovenous ablation is designed to damage the wall of the vein, resulting in fibrosis and subsequent obliteration of the lumen of a segment of the vessel thus eliminating reflux. Laser or radiofrequency ablation is performed by means of a specially designed catheter inserted through a small incision in the distal vein directed under ultrasound guidance to within 2 cm of the saphenofemoral junction. Laser or radiofrequency fibers on the tip of the catheter cause direct heating of the vessel wall, causing the vein to close as the catheter is slowly withdrawn.

As non-thermal ablation options became available (cyanoacrylate, mechanochemical and foam sclerotherapy), when the below-knee and GSV and distal SSV segments are incompetent, treatment can be carried out and is the preferred method to prevent nerve injury (Gloviczki 2023). Cyanoacrylate (VenaSeal™) closure is performed in a similar fashion, with small aliquots of glue placed along the course of the vein under ultrasound guidance, occluding the vein. Mechanochemical ablation is performed with the use of an oscillating catheter to disrupt the intima in conjunction with a sclerosant. Ablation with Varithena™ (polidocanol injectable foam) 1% is performed of a non-compounded sclerosant microfoam into the vein via injection through a sheath or butterfly needle. The benefit of these procedure is that the lack of thermal energy needed reduces the risk of nerve injury substantially.

Treatment of segmental venous reflux within the greater saphenous vein has not been well studied. There is limited evidence that endovenous ablation of segmental reflux, particularly isolated venous reflux in the thigh, versus axial reflux is impactful in relieving symptomatology related to varicose veins. Ablation of the GSV is seldom indicated for isolated SFJ reflux or for isolated segmental reflux when the vein is competent vein proximally and distally, as this is mostly due to an incompetent tributary (Lurie 2020). In addition, the number of saphenous veins to be treated in one episode of care is also not well studied. The appropriate use criteria for treating saphenovenous reflux and varicose veins notes that the average number of saphenous veins treated is 1.3 to 1.9.

Perforating veins extend in a horizontal fashion and are located at numerous locations throughout the lower extremity and directly connect the superficial system to the deep system. Pathologic perforators located directly under the wound bed of a non-healing ulcer can cause delays in wound healing and treatment can expedite closure of the wound and decrease the risk of recurrent ulceration. Intervention is indicated for active venous ulceration in which the perforator is located near the ulcer and demonstrates reflux on duplex imaging. Treatment of pathologic perforators is not medically necessary for any other pathology other than a venous stasis ulcer. Treatment of any saphenovenous reflux should be performed prior to treatment of pathologic perforators. Appropriate treatment options include endovenous ablation and surgical phlebectomy. Either of these are acceptable options for management of pathologic perforators.

# References

**PVI.201.C**  
**v1.0.2026**

1. Biemans AAM, Kockaert M, Akkersdijk GP, et al. Comparing endovenous laser ablation, foam sclerotherapy, and conventional surgery for great saphenous varicose veins. *J Vasc Surg.* 2013; 58: 727-734.
2. Brittenden J, Cotton SC, Elders A, et al. A randomized trial comparing treatments for varicose veins. *N Engl J Med.* 2014; 371(13): 1218-1227. doi:10. 1056/NEJMoa1400781.
3. Brittenden J, Cotton SC, Elders A, et al. Clinical effectiveness and cost-effectiveness of foam sclerotherapy, endovenous laser ablation and surgery for varicose veins: results from the Comparison of LAser, Surgery and foam Sclerotherapy (CLASS) randomised controlled trial. *Health Technol Assess.* 2015; 19(27): 1-342.
4. Gibson K, Kabnick L; Varithena® 013 Investigator Group. Gibson K, et al. A multicenter, randomized, placebo-controlled study to evaluate the efficacy and safety of Varithena® (polidocanol endovenous microfoam 1%) for symptomatic, visible varicose veins with saphenofemoral junction incompetence. *Phlebology.* 2017 Apr;32(3):185-193.
5. Harlander-Locke M, Lawrence PF, Alktaifi A, et.al. The impact of ablation of incompetent superficial and perforator veins on ulcer healing rates. *J Vasc Surg.* 2012 February.
6. King JT, O'Byrne M, Vasquez M, for the VANISH-1 Investigator Group. Treatment of Truncal Incompetence and Varicose Veins with a Single Administration of a New Polidocanol Endovenous Microfoam Preparation Improves Symptoms and Appearance. *Eur J Vasc Endovasc Surg.* 2015; 50(6): 784-793.
7. Kugler NW and Brown KR. An update on the currently available nonthermal ablative options in the management of superficial venous disease. *J Vasc Surg: Venous and Lym Dis.* 2017; 5:422-429.
8. Myers KA, Jolley D, Clough A, et al. Outcome of ultrasound-guided sclerotherapy for varicose veins: medium-term results assessed by ultrasound surveillance. *Eur J Vasc Endovasc Surg.* 2007; 33: 116-121.
9. Nayak L, Vedantham S. Multifaceted Management of the Post Thrombotic Syndrome. *Seminars in Interventional Radiology.* 2012: 29:1.
10. Nesbitt C, Bedenis R, Bhattacharya V, et al. Endovenous ablation (radiofrequency and laser) and foam sclerotherapy versus open surgery for great saphenous vein varices (Review). *Cochrane Database of Systematic Reviews.* 2014; Issue 7. Art. No.CD005624.
11. Proebstle TM, Alm BJ, Göckeritz, et al. Five-year results from the prospective European multicenter cohort study on radiofrequency segmental thermal ablation for incompetent great saphenous veins. *BJS.* 2015; 102: 212-218.
12. Rasmussen L, Lawaetz M, Serup J, et al. Randomized clinical trial comparing endovenous laser ablation, radiofrequency ablation, foam sclerotherapy and surgical stripping for great saphenous varicose veins with 3-year follow-up. *J Vasc Surg: Venous and Lym Dis.* 2013; 1:349-356.
13. Star P, Connor DE, Parsi K. Star P, et al. Novel developments in foam sclerotherapy: Focus on Varithena® (polidocanol endovenous microfoam) in the management of varicose veins. *Phlebology.* 2018 Apr;33(3):150-162.
14. Washington State Health Care Authority. Selected Treatments for Varicose Veins, A Health Technology Assessment. Prepared by Hayes, Inc. Final Report: April 2017.
15. van der Velden SK, Biemans AA, De Maeseneer MG, et al. Five-year results of a randomized clinical trial of conventional surgery, endovenous laser ablation and ultrasound-guided foam sclerotherapy in patients with great saphenous varicose veins. *Br J Surg.* 2015; 102(10): 1184-1194.
16. Weiss RA, Weiss MA, Eimpunth S, et al. Comparative Outcomes of Different Endovenous Thermal Ablation Systems on Great and Small Saphenous Vein Insufficiency: Long-Term Results. *Lasers in Surgery and Medicine.* 2015; 47: 156-160.
17. Van Eekeren RRJP, Boersma D, Elias S, et al. Endovenous Mechanochemical Ablation of Great Saphenous Vein Incompetence Using the ClariVein Device: A Safety Study. *J Endovasc Ther.* 2011; 18: 328-3334.
18. Van Eekeren RRJP, Boersma D, Holewijn S, et al. Mechanochemical endovenous ablation for the treatment of great saphenous vein insufficiency. *J Vasc Surg: Venous and Lym Dis.*, Volume 2; 3, 282-288.

19. Van Eekeren RRJP, Boersma D, Konijn V, et al. Postoperative pain and early quality of life after radiofrequency ablation and mechanochemical endovenous ablation of incompetent great saphenous veins. *J VascSurg*, February 2013, Volume 57; 2, 445-450
20. Venermo M, Saarinen J, Eskelinen E, et al. Randomized clinical trial comparing surgery, endovenous laser ablation and ultrasound-guided foam sclerotherapy for the treatment of great saphenous varicose veins. *BJS*. 2016; 103:1438-1444.
21. Vun SV, Rashid ST, Blest NC, Spark JI. Lower pain and faster treatment with mechanico-chemical endovenous ablation using ClariVein®. *Phlebology*. 2015;30(10):688-692.doi:10.1177/0268355514553693.
22. Gloviczki P, Lawrence PF, Wasan SM, et al. The 2022 Society for Vascular Surgery, American Venous Forum, and American Vein and Lymphatic Society clinical practice guidelines for the management of varicose veins of the lower extremities. Part I. Duplex Scanning and Treatment of Superficial Truncal Reflux: Endorsed by the Society for Vascular Medicine and the International Union of Phlebology. *J Vasc Surg Venous Lymphat Disord*. 2023;11(2):231-261.e6. doi:10.1016/j.jvsv.2022.09.004.
23. Gloviczki P, Lawrence PF, Wasan SM, et al. The 2023 Society for Vascular Surgery, American Venous Forum, and American Vein and Lymphatic Society clinical practice guidelines for the management of varicose veins of the lower extremities. Part II: Endorsed by the Society of Interventional Radiology and the Society for Vascular Medicine. *J Vasc Surg Venous Lymphat Disord*. 2024 Jan;12(1):101670.doi:10.1016/j.jvsv. 2023.08.011.
24. Lurie F. Anatomical Extent of Venous Reflux. *Cardiol Ther*. 2020 Dec;9(2):215-218.doi:10.1007/s40119-020-00182-7.
25. Caggiati A, Labropoulos N, Boyle EM, et.al. The Anterior Saphenous Vein. Part 2. Anatomic considerations in normal and refluxing patients. Endorsed by the American Vein and Lymphatic Society, the American Venous Forum and the International Union of Phlebology. *Phlebology*.2024 Jun;39(5):313-324.doi:10.1177/02683555231223055.
26. [www.bostonscientific.com/content/dam/varithena/hcp/Varithena-Full-Prescribing-Information.pdf](http://www.bostonscientific.com/content/dam/varithena/hcp/Varithena-Full-Prescribing-Information.pdf)
27. Hong KP. Prognosis of reflux of the below-knee great saphenous vein after surgical or endovenous treatment of reflux of the above-knee great saphenous vein. *J Vasc Surg Venous Lymphat Disord*. 2020;8(4):629-633.
28. Puggioni A. Endovenous laser treatment of superficial truncal veins. In: Gloviczki P, ed. *Handbook of Venous and Lymphatic Disorders: Guidelines of the American Venous Forum*. 5th ed. CRC Press; 2024:Chapter 43. doi.10.1201/9781003328971.
29. Merchant RF, DePalma RG, Kabnick LS. Endovascular obliteration of saphenous reflux: a multicenter study. *J Vasc Surg*. 2002 Jun;35(6):1190-6. doi: 10.1067/mva.2002.124231.

# Non-Compounded Foam Sclerotherapy

PVI.202.A  
v1.0.2026

## General Information

### Coding

Procedures	CPT®
Injection of non-compounded foam sclerosant with ultrasound compression maneuvers to guide dispersion of the injectate, inclusive of all imaging guidance and monitoring; single incompetent extremity truncal vein (e.g., great saphenous vein, accessory saphenous vein)	36465
Injection of non-compounded foam sclerosant with ultrasound compression maneuvers to guide dispersion of the injectate, inclusive of all imaging guidance and monitoring; multiple incompetent truncal veins (e.g., great saphenous vein, accessory saphenous vein), same leg	36466

## Non compounded foam sclerotherapy - Criteria

Treatment of saphenovenous reflux by non-compounded microfoam is considered medically necessary when symptoms are reported that are attributable to the venous disease and all other criteria with regard to symptoms, imaging requirements and time intervals have been met. **All** of the following criteria must be met:

- Symptoms of venous reflux as documented by a CEAP score of at least 2 or greater OR a VCSS score of 6 or greater.
- Duplex results should demonstrate both of the following:
  - Presence of significant pathologic truncal vein reflux measuring  $\geq 500$ ms by either of the following:
    - in at least 2 segments within any of the following veins to be treated:
      - great saphenous vein above-knee (i.e., saphenofemoral junction, thigh, knee, and calf)
      - small saphenous vein (saphenopopliteal junction, mid-calf)
    - in at least 1 segment within any of the following veins to be treated:
      - anterior saphenous vein in the thigh
      - posterior accessory saphenous vein in the thigh
      - great saphenous vein below-knee

- Absence of ipsilateral acute lower extremity DVT or chronic multisegmental femoralpopliteal occlusion.

No more than two saphenous veins should be treated within one 12 week period, except for venous ulcers.

Treatment of varicose vein tributaries and the below-knee GSV segment can be performed concurrently in the same procedure as the saphenous vein ablation

Infrapopliteal accessory branches should follow recommendations for tributary veins if not treated during the same episode of care as the above knee accessory branches.

Varithena is not FDA indicated for the treatment of perforator veins.

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**Note:** Use of non-compounded microfoam sclerotherapy (Varithena®) as the method of treating incompetent tributaries or varicose veins is appropriate only when using leftover product during the same session as saphenous vein treatments using the same agent, as it is not considered safer or more effective than physician-compounded foam.

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## Evidence Discussion

### Non compounded microfoam

Sclerotherapy treatment destroys the lining of the affected vein by injecting a solution (either a detergent, osmotic solution, or a chemical irritant) directly into the vessel resulting in obliteration of the vessel. Types of sclerotherapy include liquid sclerotherapy with hypertonic saline, polidocanol, sodium morrhuate or sotradecol or non- compounded foam sclerotherapy (Varithena®). Varithena® is a commercially manufactured microfoam composed of 1% injectable polidocanol solution composed by oxygen-carbon dioxide with low nitrogen concentration in a uniform small bubble size, which can also treat larger diameter veins. The vein is accessed by a cannula or butterfly needle under ultrasound guidance, and the solution is then injected directly under ultrasound guidance. This results in vasospasm and damage to the endothelium, which leads to occlusion of the venous lumen. One or multiple veins can be treated in one session with up to 15 mL of foam per manufacturer's literature, and for treatment of multiple tributaries individual position can be changed as needed to complete all necessary procedures. Scheduling treatment on different days for reasons other than clinical reasons and safety is not considered generally acceptable. Varithena is currently not FDA indicated for treatment of perforators. While Varithena treatment has had satisfactory results, it is important to note that Physician-compounded sclerofoam, prepared using the Tessari method, has not been shown to be less safe or effective than Varithena® in the treatment of varicose veins and tributaries.

# References

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1. Biemans AAM, Kockaert M, Akkersdijk GP, et al. Comparing endovenous laser ablation, foam sclerotherapy, and conventional surgery for great saphenous varicose veins. *J Vasc Surg.* 2013; 58: 727-734.
2. Brittenden J, Cotton SC, Elders A, et al. A randomized trial comparing treatments for varicose veins. *N Engl J Med.* 2014; 371(13): 1218-1227. doi:10. 1056/NEJMoa1400781.
3. Brittenden J, Cotton SC, Elders A, et al. Clinical effectiveness and cost-effectiveness of foam sclerotherapy, endovenous laser ablation and surgery for varicose veins: results from the Comparison of LAser, Surgery and foam Sclerotherapy (CLASS) randomised controlled trial. *Health Technol Assess.* 2015; 19(27): 1-342.
4. Gibson K, Kabnick L; Varithena® 013 Investigator Group. Gibson K, et al. A multicenter, randomized, placebo-controlled study to evaluate the efficacy and safety of Varithena® (polidocanol endovenous microfoam 1%) for symptomatic, visible varicose veins with saphenofemoral junction incompetence. *Phlebology.* 2017 Apr;32(3):185-193.
5. Harlander-Locke M, Lawrence PF, Alktaifi A, et.al. The impact of ablation of incompetent superficial and perforator veins on ulcer healing rates. *J Vasc Surg.* 2012 February.
6. King JT, O'Byrne M, Vasquez M, for the VANISH-1 Investigator Group. Treatment of Truncal Incompetence and Varicose Veins with a Single Administration of a New Polidocanol Endovenous Microfoam Preparation Improves Symptoms and Appearance. *Eur J Vasc Endovasc Surg.* 2015; 50(6): 784-793.
7. Kugler NW and Brown KR. An update on the currently available nonthermal ablative options in the management of superficial venous disease. *J Vasc Surg: Venous and Lym Dis.* 2017; 5:422-429.
8. Myers KA, Jolley D, Clough A, et al. Outcome of ultrasound-guided sclerotherapy for varicose veins: medium-term results assessed by ultrasound surveillance. *Eur J Vasc Endovasc Surg.* 2007; 33: 116-121.
9. Nayak L, Vedantham S. Multifaceted Management of the Post Thrombotic Syndrome. *Seminars in Interventional Radiology.* 2012: 29:1.
10. Nesbitt C, Bedenis R, Bhattacharya V, et al. Endovenous ablation (radiofrequency and laser) and foam sclerotherapy versus open surgery for great saphenous vein varices (Review). *Cochrane Database of Systematic Reviews.* 2014; Issue 7. Art. No.CD005624.
11. Proebstle TM, Alm BJ, Göckeritz, et al. Five-year results from the prospective European multicenter cohort study on radiofrequency segmental thermal ablation for incompetent great saphenous veins. *BJS.* 2015; 102: 212-218.
12. Rasmussen L, Lawaetz M, Serup J, et al. Randomized clinical trial comparing endovenous laser ablation, radiofrequency ablation, foam sclerotherapy and surgical stripping for great saphenous varicose veins with 3-year follow-up. *J Vasc Surg: Venous and Lym Dis.* 2013; 1:349-356.
13. Star P, Connor DE, Parsi K. Star P, et al. Novel developments in foam sclerotherapy: Focus on Varithena® (polidocanol endovenous microfoam) in the management of varicose veins. *Phlebology.* 2018 Apr;33(3):150-162.
14. Washington State Health Care Authority. Selected Treatments for Varicose Veins, A Health Technology Assessment. Prepared by Hayes, Inc. Final Report: April 2017.
15. van der Velden SK, Biemans AA, De Maeseneer MG, et al. Five-year results of a randomized clinical trial of conventional surgery, endovenous laser ablation and ultrasound-guided foam sclerotherapy in patients with great saphenous varicose veins. *Br J Surg.* 2015; 102(10): 1184-1194.
16. Weiss RA, Weiss MA, Eimpunth S, et al. Comparative Outcomes of Different Endovenous Thermal Ablation Systems on Great and Small Saphenous Vein Insufficiency: Long-Term Results. *Lasers in Surgery and Medicine.* 2015; 47: 156-160.
17. Van Eekeren RRJP, Boersma D, Elias S, et al. Endovenous Mechanochemical Ablation of Great Saphenous Vein Incompetence Using the ClariVein Device: A Safety Study. *J Endovasc Ther.* 2011; 18: 328-3334.
18. Van Eekeren RRJP, Boersma D, Holewijn S, et al. Mechanochemical endovenous ablation for the treatment of great saphenous vein insufficiency. *J Vasc Surg: Venous and Lym Dis.*, Volume 2; 3, 282-288.

19. Van Eekeren RRJP, Boersma D, Konijn V, et al. Postoperative pain and early quality of life after radiofrequency ablation and mechanochemical endovenous ablation of incompetent great saphenous veins. *J VascSurg*, February 2013, Volume 57; 2, 445-450
20. Venermo M, Saarinen J, Eskelinen E, et al. Randomized clinical trial comparing surgery, endovenous laser ablation and ultrasound-guided foam sclerotherapy for the treatment of great saphenous varicose veins. *BJS*. 2016; 103:1438-1444.
21. Vun SV, Rashid ST, Blest NC, Spark JI. Lower pain and faster treatment with mechanico-chemical endovenous ablation using ClariVein®. *Phlebology*. 2015;30(10):688-692.doi:10.1177/0268355514553693.
22. Gloviczki P, Lawrence PF, Wasan SM, et al. The 2022 Society for Vascular Surgery, American Venous Forum, and American Vein and Lymphatic Society clinical practice guidelines for the management of varicose veins of the lower extremities. Part I. Duplex Scanning and Treatment of Superficial Truncal Reflux: Endorsed by the Society for Vascular Medicine and the International Union of Phlebology. *J Vasc Surg Venous Lymphat Disord*. 2023;11(2):231-261.e6. doi:10.1016/j.jvsv.2022.09.004.
23. Gloviczki P, Lawrence PF, Wasan SM, et al. The 2023 Society for Vascular Surgery, American Venous Forum, and American Vein and Lymphatic Society clinical practice guidelines for the management of varicose veins of the lower extremities. Part II: Endorsed by the Society of Interventional Radiology and the Society for Vascular Medicine. *J Vasc Surg Venous Lymphat Disord*. 2024 Jan;12(1):101670.doi:10.1016/j.jvsv. 2023.08.011.
24. Lurie F. Anatomical Extent of Venous Reflux. *Cardiol Ther*. 2020 Dec;9(2):215-218.doi:10.1007/s40119-020-00182-7.
25. Caggiati A, Labropoulos N, Boyle EM, et.al. The Anterior Saphenous Vein. Part 2. Anatomic considerations in normal and refluxing patients. Endorsed by the American Vein and Lymphatic Society, the American Venous Forum and the International Union of Phlebology. *Phlebology*.2024 Jun;39(5):313-324.doi:10.1177/02683555231223055.
26. [www.bostonscientific.com/content/dam/varithena/hcp/Varithena-Full-Prescribing-Information.pdf](http://www.bostonscientific.com/content/dam/varithena/hcp/Varithena-Full-Prescribing-Information.pdf)
27. Hong KP. Prognosis of reflux of the below-knee great saphenous vein after surgical or endovenous treatment of reflux of the above-knee great saphenous vein. *J Vasc Surg Venous Lymphat Disord*. 2020;8(4):629-633.
28. Puggioni A. Endovenous laser treatment of superficial truncal veins. In: Gloviczki P, ed. *Handbook of Venous and Lymphatic Disorders: Guidelines of the American Venous Forum*. 5th ed. CRC Press; 2024:Chapter 43. doi.10.1201/9781003328971.
29. Merchant RF, DePalma RG, Kabnick LS. Endovascular obliteration of saphenous reflux: a multicenter study. *J Vasc Surg*. 2002 Jun;35(6):1190-6. doi: 10.1067/mva.2002.124231.

# Phlebectomy/High Ligation and stripping

PVI.203.A

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## General Information

- Endovenous ablation is the preferred treatment for saphenovenous reflux. High ligation and stripping can be considered when prior imaging demonstrates a contraindication to endovenous ablation including any of the following:
  - Very tortuous saphenous vein
  - Aneurysmal saphenous vein (>30mm)
  - Presence of intraluminal scarring, webbing precluding placement of catheter

## Coding

Open Procedures to remove indicated for treatment of saphenous vein tributaries and unnamed varicose veins	CPT®
<b>Phlebectomy</b>	
Stab phlebectomy of varicose veins, one extremity; 10-20 stab incisions	37765
Stab phlebectomy of varicose veins, one extremity; more than 20 incisions	37766
Ligation, division, and/or excision of varicose vein cluster(s), 1 leg	37785
Unlisted procedure code, arteries and veins, less than 10 incisions	37799
<b>High ligation and/or stripping</b>	
Ligation and division long saphenous vein at saphenofemoral junction, or distal interruptions	37700
Ligation, division, and stripping, short saphenous vein	37718
Ligation, division, and stripping, long (greater) saphenous veins from saphenofemoral junction to knee or below	37722
Ligation and division and complete stripping of long or short saphenous veins with radical excision of ulcer and skin graft and/or interruption of communicating veins of lower leg with excision of deep fascia	37735
Ligation and division of short saphenous vein at saphenopopliteal junction (separate procedure) Phlebectomy	37780

Open Procedures to remove indicated for treatment of saphenous vein tributaries and unnamed varicose veins	CPT®
<b>Sub-fascial endoscopic perforator surgery (SEPS)</b>	
Unlisted vascular endoscopy procedure	37501
<b>Ligation of perforator veins</b>	
Ligation of perforator veins, subfascial, radical (Linton type), including skin graft, when performed, open, 1 leg	37760
Ligation of perforator vein(s), subfascial, open, including ultrasound guidance, when performed, 1 leg	37761

## High Ligation and Stripping/Phlebectomy

High ligation and stripping to treat saphenovenous reflux is medically necessary when **all** of the following apply:

- Symptoms of venous reflux as documented by a CEAP score of at least 2 or greater OR a VCSS score of 6 or greater.
- Results of a venous duplex should demonstrate the following:
  - Presence of significant pathologic truncal vein reflux measuring  $\geq 500$ ms in either:
    - in at least 2 segments within any of the following veins to be treated:
      - great saphenous vein above-knee (i.e., saphenofemoral junction, thigh, knee, and calf)
      - small saphenous vein (saphenopopliteal junction, midcalf)
    - in at least 1 segment within any of the following veins to be treated:
      - anterior saphenous vein
      - posterior accessory saphenous vein
      - great saphenous vein below-knee
    - Absence of ipsilateral acute lower extremity DVT or chronic multisegmental femoralpopliteal occlusion.

Phlebectomy of saphenovenous tributaries is medically necessary when all of the following criteria are met:

- Symptoms of venous reflux as documented by a CEAP score of at least 2 or greater or VCSS score of 6 or greater.

- Results of a recent venous duplex ultrasound or objective measurement by a ruler/ tape (completed within 6 months prior to date of scheduled procedure) demonstrate varicosities and tributaries to be **either**:
  - $\geq 6$ mm in size
  - $\geq 3$ mm in size with  $\geq 500$ ms of reflux
- There is documentation of one of the following:
  - symptoms have failed to resolve after 12 weeks of observation after prior endovenous ablation therapy (with the exceptions of venous ulcer cases for which the observation period does not apply)
  - tributaries will be treated concurrently as the saphenous vein ablation procedure
  - existing saphenous veins do not exhibit pathologic reflux

Treatment of pathologic perforators is medically necessary when there is documentation of **all** of the following:

- Active venous stasis ulcer
- A recent duplex US performed within past 6 months demonstrates signs of perforator vein incompetence with **both**:
  - Reflux  $\geq 500$ ms
  - Vein diameter  $\geq 3.5$  mm
- Perforator vein is located in the vicinity of an active ulcer
- Superficial refluxing saphenous veins have been previously eliminated or do not exhibit pathologic reflux

## Evidence Discussion

According to the 2023 SVS consensus guidelines, phlebectomy or ultrasound-guided foam sclerotherapy may be performed concomitantly with endovenous ablation for patients with symptomatic reflux and associated varicosities. Staged treatment is suggested only when anatomical or medical considerations warrant it. Shared decision-making is emphasized regarding timing. If ablation is performed alone, follow-up beyond three months is recommended to assess the need for additional intervention for persistent or recurrent symptoms. This approach supports individualized care while optimizing outcomes and minimizing unnecessary procedures.

Perforating veins extend in a horizontal fashion and are located at numerous locations throughout the lower extremity and directly connect the superficial system to the deep system. Pathologic perforators located directly under the wound bed of a non-healing ulcer can cause delays in wound healing and treatment can expedite closure of the wound and decrease the risk of recurrent ulceration. Intervention is indicated for active venous ulceration in which the perforator is located near the ulcer and demonstrates

reflux on duplex imaging. Treatment of pathologic perforators is not medically necessary for any other pathology other than a venous stasis ulcer.

Pathologic perforators located directly under the wound bed of a non-healing ulcer can cause delays in wound healing and treatment can expedite closure of the wound and decrease the risk of recurrent ulceration.

Treatment of any axial saphenovenous reflux should be performed prior to treatment of pathologic perforators. Appropriate treatment options include endovenous ablation and surgical phlebectomy. Either of these of these are acceptable options for management of pathologic perforators.

# References

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v1.0.2026

1. Grover G, Tanase A, Elstone A, Ashley S. Chronic venous leg ulcers: Effects of foam sclerotherapy on healing and recurrence. *Phlebology*. 2016;31(1):34-41. doi:10.1177/0268355514557854.
2. Lawrence PF, Alktaifi A, Rigberg D, DeRubertis B, Gelabert H, Jimenez JC. Endovenous ablation of incompetent perforating veins is effective treatment for recalcitrant venous ulcers. *J Vasc Surg*. 2011;54(3):737-742. doi:10.1016/j.jvs.2011.02.068.
3. de Rijcke PA, Hop WC, Wittens CH. Subfascial endoscopic perforating vein surgery as treatment for lateral perforating vein incompetence and venous ulceration. *J Vasc Surg*. 2003;38(4):799-803. doi:10.1016/s0741-5214(03)00430-0.
4. Giannopoulos S, Rodriguez L, Chau M, et al. A systematic review of the outcomes of percutaneous treatment modalities for pathologic saphenous and perforating veins. *J Vasc Surg Venous Lymphat Disord*. 2022;10(5):1172-1183.e5. doi:10.1016/j.jvsv.2022.03.005.
5. Ho VT, Adkar SS, Harris EJ Jr. Systematic review and meta-analysis of management of incompetent perforators in patients with chronic venous insufficiency. *J Vasc Surg Venous Lymphat Disord*. 2022;10(4):955-964.e5. doi:10.1016/j.jvsv.2021.12.088.
6. Montminy ML, Jayaraj A, Raju S. A systematic review of the efficacy and limitations of venous intervention in stasis ulceration. *J Vasc Surg Venous Lymphat Disord*. 2018;6(3):376-398.e1. doi:10.1016/j.jvsv.2017.11.007.
7. Gloviczki P, Lawrence PF, Wasan SM, et al. The 2022 Society for Vascular Surgery, American Venous Forum, and American Vein and Lymphatic Society clinical practice guidelines for the management of varicose veins of the lower extremities. Part I. Duplex Scanning and Treatment of Superficial Truncal Reflux: Endorsed by the Society for Vascular Medicine and the International Union of Phlebology. *J Vasc Surg Venous Lymphat Disord*. 2023;11(2):231-261.e6. doi:10.1016/j.jvsv.2022.09.004.

# Sclerotherapy

**PVI.205.A**  
v1.0.2026

## General Information

### Coding

**Procedures indicated for treatment of saphenous vein tributaries and unnamed varicose veins**

#### Sclerotherapy

Injection(s) of sclerosant for spider veins (telangiectasia), limb or trunk	36468
Injection of sclerosant; single incompetent vein (other than telangiectasia)	36470
Injection of sclerosant; multiple incompetent veins (other than telangiectasia)	36471

## Sclerotherapy Criteria

Sclerotherapy treatment of varicose veins, and incompetent tributaries, and perforator vein is medically necessary when reported symptoms are attributable to venous disease and all other criteria with regard to symptoms, imaging requirements and time intervals have been met:

- Symptoms of venous reflux as documented by a CEAP score of at least 2 or greater OR a VCSS score of 6 or greater.
- Results of a venous duplex should demonstrate the following:
  - Presence of significant pathologic truncal vein reflux measuring  $\geq 500$ ms in either:
    - in at least 2 segments within any of the following veins to be treated:
      - great saphenous vein above-knee (i.e., saphenofemoral junction, thigh, knee, and calf)
      - small saphenous vein (saphenopopliteal junction, midcalf)
    - in at least 1 segment within any of the following veins to be treated:
      - anterior saphenous vein
      - posterior accessory saphenous vein
      - great saphenous vein below-knee

- Absence of ipsilateral acute lower extremity DVT or chronic multisegmental femoralpopliteal occlusion.

Treatment of varicose veins and tributaries can be performed concurrently in the same procedure as the saphenous vein OR if symptoms as listed above have failed to resolve after 12 weeks of observation (conservative therapy is not required.) The observation period does not apply to venous stasis ulcer cases.

### Treatment of varicose veins and tributaries

Treatment of varicose veins and tributaries is medically necessary for symptomatic veins that meet the following criteria:

- Symptoms of venous reflux as documented by a CEAP score of at least 2 or greater OR a VCCS score of 6 or greater.
- Results of a recent venous duplex ultrasound or objective measurement by a ruler/ tape (completed within 6 months prior to date of scheduled procedure) demonstrate varicosities and tributaries to be **either**:
  - $\geq 6\text{mm}$  in size
  - $\geq 3\text{mm}$  in size with  $\geq 500\text{ms}$  of reflux
- Saphenous veins have been previously eliminated or do not exhibit pathologic reflux

Treatment of the varicose veins in individuals with vein reflux in both the saphenous veins as well as varicose veins or tributary veins is indicated either:

- Concurrently at the same time of the saphenous vein ablation procedure
- When symptoms have failed to resolve after 12 weeks of observation after prior endovenous ablation therapy (conservative therapy is not required). The observation period does not apply to venous ulcer cases

Sclerotherapy of veins  $< 3\text{mm}$  is indicated in the following circumstances:

- Spontaneous bleeding from a varix
- Corona phlebectatica

Treatment of pathologic perforators is medically necessary when there is documentation of **all** of the following:

- Active venous stasis ulcer
- A recent duplex US performed within past 6 months demonstrates signs of perforator vein incompetence with **both**:
  - Reflux  $\geq 500\text{ms}$
  - Vein diameter  $\geq 3.5\text{ mm}$
- Perforator vein is located in the vicinity of an active ulcer
- Superficial refluxing saphenous veins have been previously eliminated or do not exhibit pathologic reflux

## Evidence Discussion

Sclerotherapy treatment destroys the lining of the affected vein by injecting a solution (either a detergent, osmotic solution, or a chemical irritant) directly into the vessel resulting in obliteration of the vessel. Types of sclerotherapy include liquid sclerotherapy with polidocanol, sodium morrhuate, sotradecol or non-compounded polidocanol foam sclerotherapy (Varithena®). Injection results in vasospasm and damage to the endothelium, which leads to occlusion of the venous lumen. One or multiple veins can be treated in one or multiple sessions.

According to the 2023 SVS consensus guidelines, phlebectomy or ultrasound-guided foam sclerotherapy may be performed concomitantly with endovenous ablation for patients with symptomatic reflux and associated varicosities. Staged treatment is suggested only when anatomical or medical considerations warrant it. Shared decision-making is emphasized regarding timing. If ablation is performed alone, follow-up beyond three months is recommended to assess the need for additional intervention for persistent or recurrent symptoms. This approach supports individualized care while optimizing outcomes and minimizing unnecessary procedures.

Perforating veins extend medially to laterally in a horizontal fashion and are located at numerous locations throughout the lower extremity and directly connect the superficial system to the deep system. Perforating veins usually penetrate the musculature to connect the superficial and deep venous systems. Pathologic perforators located directly under the wound bed of a non-healing ulcer can cause delays in wound healing and treatment can expedite closure of the wound. Treatment of pathologic perforators is not medically necessary for any other pathology other than active venous stasis ulcer. Pathologic perforators located directly under the wound bed of a non-healing ulcer can cause delays in wound healing and treatment can expedite closure of the wound and decrease the risk of recurrent ulceration. Intervention is indicated for active venous ulceration in which the perforator is located near the ulcer and demonstrates reflux on duplex imaging. Treatment of any concomitant saphenovenous reflux should be performed prior to treatment of pathologic perforators. Appropriate treatment options for incompetent perforators include endovenous ablation, surgical phlebectomy, ultrasound-guided sclerotherapy and sub-fascial endoscopic perforator surgery (SEPS). Each of these are acceptable options for management of pathologic perforators.

# References

**PVI.205.A**  
**v1.0.2026**

1. Biemans AAM, Kockaert M, Akkersdijk GP, et al. Comparing endovenous laser ablation, foam sclerotherapy, and conventional surgery for great saphenous varicose veins. *J Vasc Surg*. 2013; 58: 727-734.
2. Brittenden J, Cotton SC, Elders A, et al. A randomized trial comparing treatments for varicose veins. *N Engl J Med*. 2014; 371(13): 1218-1227. doi:10.1056/NEJMoa1400781.
3. Brittenden J, Cotton SC, Elders A, et al. Clinical effectiveness and cost-effectiveness of foam sclerotherapy, endovenous laser ablation and surgery for varicose veins: results from the Comparison of LAser, Surgery and foam Sclerotherapy (CLASS) randomised controlled trial. *Health Technol Assess*. 2015; 19(27): 1-342.
4. Kugler NW and Brown KR. An update on the currently available nonthermal ablative options in the management of superficial venous disease. *J Vasc Surg: Venous and Lym Dis*. 2017; 5:422-429.
5. Myers KA, Jolley D, Clough A, et al. Outcome of ultrasound-guided sclerotherapy for varicose veins: medium-term results assessed by ultrasound surveillance. *Eur J Vasc Endovasc Surg*. 2007; 33: 116-121.
6. Nesbitt C, Bedenis R, Bhattacharya V, et al. Endovenous ablation (radiofrequency and laser) and foam sclerotherapy versus open surgery for great saphenous vein varices (Review). *Cochrane Database of Systematic Reviews*. 2014; Issue 7. Art. No.CD005624.
7. Rasmussen L, Lawaetz M, Serup J, et al. Randomized clinical trial comparing endovenous laser ablation, radiofrequency ablation, foam sclerotherapy and surgical stripping for great saphenous varicose veins with 3-year follow-up. *J Vasc Surg: Venous and Lym Dis*. 2013; 1:349-356.
8. Washington State Health Care Authority. Selected Treatments for Varicose Veins, A Health Technology Assessment. Prepared by Hayes, Inc. Final Report: April 2017.
9. van der Velden SK, Biemans AA, De Maeseneer MG, et al. Five-year results of a randomized clinical trial of conventional surgery, endovenous laser ablation and ultrasound-guided foam sclerotherapy in patients with great saphenous varicose veins. *Br J Surg*. 2015; 102(10): 1184-1194.
10. Venermo M, Saarinen J, Eskelinen E, et al. Randomized clinical trial comparing surgery, endovenous laser ablation and ultrasound-guided foam sclerotherapy for the treatment of great saphenous varicose veins. *BJS*. 2016; 103:1438-1444.
11. Hong KP. Prognosis of reflux of the below-knee great saphenous vein after surgical or endovenous treatment of reflux of the above-knee great saphenous vein. *J Vasc Surg Venous Lymphat Disord*. 2020;8(4):629-633.
12. Masuda E, Ozsvath K, Vossler J, et al. The 2020 appropriate use criteria for chronic lower extremity venous disease of the American Venous Forum, the Society for Vascular Surgery, the American Vein and Lymphatic Society, and the Society of Interventional Radiology. *J Vasc Surg Venous Lymphat Disord*. 2020 Jul;8(4):505-525.e4. doi:10.1016/j.jvsv.2020.02.001
13. Gloviczki P, Lawrence PF, Wasan SM, et al. The 2023 Society for Vascular Surgery, American Venous Forum, and American Vein and Lymphatic Society clinical practice guidelines for the management of varicose veins of the lower extremities. Part II: Endorsed by the Society of Interventional Radiology and the Society for Vascular Medicine. *J Vasc Surg Venous Lymphat Disord*. 2024 Jan;12(1):101670. doi:10.1016/j.jvsv.2023.08.011.
14. Gloviczki P, Lawrence PF, Wasan SM, et al. The 2022 Society for Vascular Surgery, American Venous Forum, and American Vein and Lymphatic Society clinical practice guidelines for the management of varicose veins of the lower extremities. Part I. Duplex Scanning and Treatment of Superficial Truncal Reflux: Endorsed by the Society for Vascular Medicine and the International Union of Phlebology. *J Vasc Surg Venous Lymphat Disord*. 2023;11(2):231-261.e6. doi:10.1016/j.jvsv.2022.09.004.
15. Grover G, Tanase A, Elstone A, Ashley S. Chronic venous leg ulcers: Effects of foam sclerotherapy on healing and recurrence. *Phlebology*. 2016;31(1):34-41. doi:10.1177/0268355514557854.
16. Lawrence PF, Alktaifi A, Rigberg D, et al. Endovenous ablation of incompetent perforating veins is effective treatment for recalcitrant venous ulcers. *J Vasc Surg*. 2011;54(3):737-742. doi:10.1016/j.jvs.2011.02.068.
17. de Rijcke PA, Hop WC, Wittens CH. Subfascial endoscopic perforating vein surgery as treatment for lateral perforating vein incompetence and venous ulceration. *J Vasc Surg*. 2003;38(4):799-803. doi:10.1016/s0741-5214(03)00430-0.

18. Giannopoulos S, Rodriguez L, Chau M, et al. A systematic review of the outcomes of percutaneous treatment modalities for pathologic saphenous and perforating veins. *J Vasc Surg Venous Lymphat Disord.* 2022;10(5):1172-1183.e5. doi:10.1016/j.jvsv.2022.03.005.
19. Ho VT, Adkar SS, Harris EJ Jr. Systematic review and meta-analysis of management of incompetent perforators in patients with chronic venous insufficiency. *J Vasc Surg Venous Lymphat Disord.* 2022;10(4):955-964.e5. doi:10.1016/j.jvsv.2021.12.088.
20. Masuda EM, Kessler DM, Lurie F, et al. The effect of ultrasound-guided sclerotherapy of incompetent perforator veins on venous clinical severity and disability scores. *J Vasc Surg.* 2006; Mar;43(3):551-6
21. Montminy ML, Jayaraj A, Raju S. A systematic review of the efficacy and limitations of venous intervention in stasis ulceration. *J Vasc Surg Venous Lymphat Disord.* 2018;6(3):376-398.e1. doi:10.1016/j.jvsv.2017.11.007.
22. Lurie F. Anatomical Extent of Venous Reflux. *Cardiol Ther.* 2020 Dec;9(2):215-218. doi:10.1007/s40119-020-00182-7.
23. Caggiati A, Labropoulos N, Boyle EM, et al. The Anterior Saphenous Vein. Part 2. Anatomic considerations in normal and refluxing patients. Endorsed by the American Vein and Lymphatic Society, the American Venous Forum and the International Union of Phlebology. *Phlebology.* 2024 Jun;39(5):313-324. doi:10.1177/02683555231223055.
24. Mariani F, Carbone L, Sozio G, Massaroni R, Andreucci E, Bianchi V, Bucalossi M. Ultrasound-guided foam sclerotherapy of the saphenous trunks is associated with a low 5-year recurrence rate and improved quality of life in patients with chronic venous disease: A multicenter study. *J Vasc Surg Venous Lymphat Disord.* 2025 Jul;13(4):102212. doi:10.1016/j.jvsv.2025.102212.

# Treatment of Venous Compression Syndromes

PVI.204.C

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## General information

### Conditions treated

- Iliac vein stenosis/occlusion secondary to prior DVT, stricture, or compression with May-Thurner
- Thoracic Outlet Syndrome (TOS)
- Catheter or cardiac device related Venous outflow obstruction
- Pulmonary Vein Stenosis
- Superior Vena Cava Syndrome
- Left Renal Vein Compression (Nutcracker Syndrome)
- Hepatic Vein Thrombosis (Budd-Chiari Syndrome)

### Coding

Procedures performed for iliac vein stenosis/occlusion/compression

Iliac vein angioplasty/stenting	CPT®
Transcatheter placement of an intravascular stent(s), open or percutaneous, including radiological supervision and interpretation and including angioplasty within the same vessel, when performed; initial vein	37238
Transcatheter placement of an intravascular stent(s), open or percutaneous, including radiological supervision and interpretation and including angioplasty within the same vessel, when performed; each additional vein (List separately in addition to code for primary procedure)	37239
Transluminal balloon angioplasty (except dialysis circuit), open or percutaneous, including all imaging and radiological supervision and interpretation necessary to perform the angioplasty within the same vein; initial vein	37248

Iliac vein angioplasty/stenting	CPT®
Transluminal balloon angioplasty (except dialysis circuit), open or percutaneous, including all imaging and radiological supervision and interpretation necessary to perform the angioplasty within the same vein; each additional vein (List separately in addition to code for primary procedure)	37249

## Iliac Vein and Inferior Vena Cava (IVC) Angioplasty/stenting (including non-thrombotic iliac vein lesions (NIVL))

### Indications

- Iliac vein angioplasty/stenting is medically necessary when there is documentation of **one** of the following conditions:
  - Acute lower extremity iliofemoral DVT following thrombolysis or mechanical thrombectomy when there is documentation of an underlying iliac vein or inferior vena cava (IVC) compression demonstrating  $\geq 50\%$  residual stenosis
  - Non-thrombotic iliac vein or IVC lesions with  $\geq 50\%$  area reduction or  $>60\%$  diameter stenosis (on US, MRV, CT Venogram, or IVUS) when there is documentation of either of the following conditions:
    - Venous stasis ulceration
    - Advanced stasis dermatitis
  - Venous claudication or lifestyle-limiting asymmetric lower extremity edema or advanced stasis dermatitis or when there is documentation of **all** of the following:
    - No identifiable underlying non-vascular cause
    - At least  $\geq 50\%$  area reduction or  $>60\%$  diameter stenosis with presence of venous collaterals as documented by ultrasound, or MRV/CTV, or venography and/or IVUS
    - Failed 8 weeks trial of conservative therapy including graded compression stockings, weight loss (if applicable) as evidenced by (any) of the following:
      - No improvement
      - Worsening of symptoms
      - Limited improvement with continued lifestyle-limiting symptoms
  - Pelvic Congestion syndrome when **both** of the following:
    - Labial/vaginal varicosities associated with pain, swelling, bleeding and there is documentation of one of the following:
      - At least  $\geq 50\%$  area reduction by IVUS
      - $>60\%$  diameter stenosis with presence of venous collaterals as documented by ultrasound,

- MRV/CTV, or venography and/or IVUS
- Chronic pelvic pain of more than six months duration accompanied by **any** of the following criteria:
    - Pain exacerbated by walking, standing, and fatigue
    - Post coital ache
    - Dysmenorrhea
    - Dyspareunia
    - Bladder irritability and rectal discomfort
    - Recurrent lower extremity varicosities
    - No evidence of inflammatory disease
    - Pelvic congestion syndrome is supported by **either** of the following imaging results:
      - Ultrasound demonstrates **one** of the following:
        - Tortuous pelvic veins diameter of >6mm
        - Slow blood flow <3 cm/sec or reversed caudal flow
        - Dilated arcuate veins in the myometrium communicating between bilateral pelvic varicose veins
        - Polycystic changes in the ovaries
      - CT or MR of the pelvis demonstrates **one** of the following:
        - Four ipsilateral tortuous para-uterine veins with a diameter of >4mm
        - An ovarian vein diameter of >8mm

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**Note:**

Iliac venous stenting can be performed at the same time or a staged procedure with ovarian vein embolization in presence of ovarian vein reflux when criteria for intervention are met

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**Upper extremity venous angioplasty/stenting for venous occlusive disease  
Thoracic Outlet Syndrome (TOS)**

Axillary vein or subclavian vein angioplasty/stenting is medically necessary following thrombolysis and decompression for treatment of associated musculoskeletal abnormality (e.g., first rib resection, cervical rib resection and/or scalenectomy) when there is documentation of **any** of the following conditions:

- Acute axillary and/or subclavian vein DVT with axillary or subclavian vein compression resulting in significant residual stenosis (>30%)

- Non-thrombotic axillary vein or subclavian vein stenosis  $\geq 50\%$  with presence of venous collaterals

### **Hemodialysis Outflow Obstruction**

CPT® 37238 and 37248

Venous angioplasty of upper extremity outflow veins from a puncture site outside of the dialysis circuit is indicated when there is documentation of ANY of the following conditions:

- Presence of Ipsilateral arm edema and/or venous claudication
- Inadequate hemodialysis performance including:
  - Recirculation
  - Aspiration of clot during dialysis
  - Inability to achieve target dialysis blood flow
- Prolonged bleeding after hemodialysis
- Development of large superficial collateral channels
- Loss of thrill in fistula/graft or development of pulsatile fistula/graft

Venous Stenting of upper extremity outflow veins and central veins is indicated when there is documentation of one of the following:

- Symptomatic, Recurrent  $>50\%$  stenosis within 3 months of angioplasty
- Elastic recoil resulting in residual stenosis  $>50\%$
- Coverage of pseudoaneurysm or areas of dissection from prior intervention

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**Note:** These indications apply to procedures performed via punctures outside of the dialysis circuit. (i.e. femoral or brachial artery)

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### **Catheter or cardiac device related venous outflow obstruction**

Venous angioplasty of upper extremity outflow veins is medically necessary when both of these criteria are met:

- $>50\%$  stenosis of the outflow vein or  $>50\%$  ipsilateral central venous stenosis
- Presence of ipsilateral arm edema and/or venous claudication

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**Note:**

Venous stenting should be avoided in cases with an indwelling device present in vein

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### **Superior Vena Cava Syndrome**

Venous angioplasty and stenting is medically necessary when diagnostic testing indicates  $>50\%$  stenosis in the superior vena cava in the setting of **any** of the conditions listed below:

- Palliative care when SVC syndrome is secondary to advanced malignancy

- Non-malignant SVC syndrome when **both** of the following are met:
  - Presence of **any** of the following lifestyle-limiting signs or symptoms:
    - Orthopnea
    - Swelling of head and neck
    - Dizziness
    - Blurring of vision
  - Failure of symptoms to resolve with conservative therapy including **any** of the following:
    - Elevation of head of bed
    - Diuretic therapy
    - Anticoagulation therapy

### Left Renal Vein Compression (Nutcracker Syndrome)

#### Indications

Angioplasty and/or stenting is medically necessary for **re-intervention** when there is documentation of both of these criteria after surgical treatment:

- recurrent left renal vein compression documented by imaging
- symptoms of left renal vein compression (e.g., flank pain, hematuria, proteinuria)

#### Non-indications

Angioplasty or stenting of the left renal vein for primary treatment of nutcracker syndrome is **not** medically necessary.

Initial treatment of left renal vein compression prior to surgical decompression is considered **not** medically necessary.

### Pulmonary vein stenosis

Treatment of obstruction of major pulmonary veins is medically necessary when  $\geq 60\%$  narrowing of the pulmonary vein or an absolute stenosis diameter of 4-6mm on advanced imaging (CTA, MRA, Angiography) is identified.

Treatment of obstruction of major pulmonary veins is medically necessary when  $>50\%$  stenosis is identified on venogram or IVUS  $\geq 60\%$  narrowing of the pulmonary vein or an absolute stenosis diameter of 4-6mm on advanced imaging (CTA, MRA, Angiography) is identified.

### Hepatic vein thrombosis

Thrombotic obstruction of major hepatic veins or Vena Cava (Budd-Chiari Syndrome) is medically necessary when there is a  $>50\%$  stenosis identified on venogram or IVUS.

Post-Transplant arterial or venous intervention is medically necessary for individuals with a history of renal transplant, hepatic transplant, pancreatic transplant, heart transplant, lung transplant or small bowel transplant with one of the following:

- Arterial stenosis of  $\geq 50\%$  involving the anastomosis, transplant artery or donor artery for the transplanted organ on duplex, CT, MRI or angiography.
- Venous stenosis of  $\geq 30\%$  involving the anastomosis, Portal Vein or outflow vein for the transplanted organ on duplex, CT, MRI or angiography.

## Evidence Discussion

### Incompletely lysed DVT

Individuals with incompletely lysed or residual DVT can develop post-thrombotic syndrome that can be characterized as chronic edema, venous stasis changes, pain and, in advanced cases venous stasis ulceration. Incompletely lysed DVT can cause luminal narrowing of the vein restricting venous outflow leading to stenosis or occlusion and /or can lead to valve dysfunction resulting in reflux of venous blood retrograde towards gravity. Both pathologies ultimately lead to chronic edema which can cause chronic pain and venous stasis disease. The mainstay of treatment for chronic deep venous thrombosis is compression stockings. Individuals whose symptoms are not relieved with conservative therapy may be a candidates for iliac vein angioplasty/stenting.

### Nonthrombotic iliac vein lesions (NIVLs)

Nonthrombotic iliac vein lesions (NIVLs) most typically occur as a result of vein compression between abdominopelvic arterial structures and the spine. This compression results in intrinsic venous stenosis, fibrosis, intraluminal webs or spurs. NIVL can lead to chronic edema, varicose veins and venous stasis ulceration. Treatment is with iliac vein angioplasty/stenting for both acute and chronic DVT. Prophylactic treatment of NIVL in the absence of acute or chronic DVT OR chronic left lower extremity edema and its sequelae such as varicose veins or venous stasis ulcers is NOT considered medically necessary.

### Venous thoracic outlet syndrome

Venous thoracic outlet syndrome occurs due to compression of the axillo-subclavian vein secondary to musculoskeletal compression at the thoracic outlet. This may be due to congenital factors such as cervical ribs, secondary to prior trauma or due to hypertrophy of the scalene muscles from repetitive use or weightlifting activities. This may lead to acute thrombosis or chronic pain and edema with use of the extremity. Management consists of treatment for the acute DVT if present followed by surgical correction of the musculoskeletal issue by rib resection and/or scalenectomy. There is often intraluminal scarring within the vein that is treated by balloon angioplasty.

Stenting is rarely medically necessary except for persistent stenosis that is resistant to balloon angioplasty.

### **Catheter or cardiac device related stenosis**

Catheter or cardiac device related stenosis may occur secondary to inflammation within the vein due to the indwelling foreign body. Significant stenosis resulting in arm edema, pain and DVT may occur. Balloon angioplasty may be performed to treat a significant stenosis. Stenting should be avoided as the stent may impede removal or exchange of the catheter or device at a later date.

### **Pulmonary vein stenosis**

Pulmonary vein stenosis may occur as a congenital defect in children or following catheter based interventions such as radiofrequency ablation for cardiac arrhythmia in children or adults. Balloon angioplasty is the initial treatment and often will need to be repeated due to high rates of recurrent stenosis.

### **Superior vena cava syndrome**

Superior vena cava syndrome may occur secondary to compression by an intrathoracic malignancy or secondary to benign causes of compression or stenosis. The subsequent venous hypertension may result in intracranial symptoms and orthopnea with edema of the head, face and upper extremities. Balloon angioplasty is the initial treatment with stenting often being required for palliation in cases of malignancy or recurrent stenosis.

### **Left renal vein compression (Nutcracker Syndrome)**

Left renal vein compression occurs secondary to an anatomical compression of the left renal vein between the superior mesenteric artery and the aorta. This may lead to venous congestion within the left kidney due to the impaired outflow. Symptoms and signs include flank pain, hematuria and proteinuria.

Imaging including duplex ultrasound, CTV/MRV or invasive venography demonstrates a dilated renal vein proximal to the aorta and significant stenosis of the vein as it crossed the aorta. Large left sided retroperitoneal venous collaterals are usually present.

Due to the external compression, significant size differential of the vein and risk of stent migration initial endovascular management is not recommended. Surgical management with Left renal vein translocation or bypass is the preferred initial management for symptomatic left renal vein compression.

Venous angioplasty and/or stenting may be indicated for recurrent stenosis after surgical decompression.

### **Hepatic vein thrombosis (Budd-Chiari Syndrome)**

Hepatic vein thrombosis may occur secondary to malignancies, acquired prothrombotic disorders, infection or inherited thrombophilias. The resulting outflow obstruction from the liver may result in severe portal hypertension or liver failure. Balloon angioplasty is associated with good outcomes and low morbidity in cases with hepatic vein stenosis.

# References

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1. Biemans AAM, Kockaert M, Akkersdijk GP, et al. Comparing endovenous laser ablation, foam sclerotherapy, and conventional surgery for great saphenous varicose veins. *J Vasc Surg.* 2013; 58: 727-734.
2. Brittenden J, Cotton SC, Elders A, et al. A randomized trial comparing treatments for varicose veins. *N Engl J Med.* 2014; 371(13): 1218-1227. doi:10. 1056/NEJMoa1400781.
3. Brittenden J, Cotton SC, Elders A, et al. Clinical effectiveness and cost-effectiveness of foam sclerotherapy, endovenous laser ablation and surgery for varicose veins: results from the Comparison of LAser, Surgery and foam Sclerotherapy (CLASS) randomised controlled trial. *Health Technol Assess.* 2015; 19(27): 1-342.
4. Gibson K, Kabnick L; Varithena® 013 Investigator Group. Gibson K, et al. A multicenter, randomized, placebo-controlled study to evaluate the efficacy and safety of Varithena® (polidocanol endovenous microfoam 1%) for symptomatic, visible varicose veins with saphenofemoral junction incompetence. *Phlebology.* 2017 Apr;32(3):185-193.
5. Harlander-Locke M, Lawrence PF, Alktaifi A, et.al. The impact of ablation of incompetent superficial and perforator veins on ulcer healing rates. *J Vasc Surg.* 2012 February.
6. King JT, O'Byrne M, Vasquez M, for the VANISH-1 Investigator Group. Treatment of Truncal Incompetence and Varicose Veins with a Single Administration of a New Polidocanol Endovenous Microfoam Preparation Improves Symptoms and Appearance. *Eur J Vasc Endovasc Surg.* 2015; 50(6): 784-793.
7. Kugler NW and Brown KR. An update on the currently available nonthermal ablative options in the management of superficial venous disease. *J Vasc Surg: Venous and Lym Dis.* 2017; 5:422-429.
8. Myers KA, Jolley D, Clough A, et al. Outcome of ultrasound-guided sclerotherapy for varicose veins: medium-term results assessed by ultrasound surveillance. *Eur J Vasc Endovasc Surg.* 2007; 33: 116-121.
9. Nayak L, Vedantham S. Multifaceted Management of the Post Thrombotic Syndrome. *Seminars in Interventional Radiology.* 2012: 29:1.
10. Nesbitt C, Bedenis R, Bhattacharya V, et al. Endovenous ablation (radiofrequency and laser) and foam sclerotherapy versus open surgery for great saphenous vein varices (Review). *Cochrane Database of Systematic Reviews.* 2014; Issue 7. Art. No.CD005624.
11. Proebstle TM, Alm BJ, Göckeritz, et al. Five-year results from the prospective European multicenter cohort study on radiofrequency segmental thermal ablation for incompetent great saphenous veins. *BJS.* 2015; 102: 212-218.
12. Rasmussen L, Lawaetz M, Serup J, et al. Randomized clinical trial comparing endovenous laser ablation, radiofrequency ablation, foam sclerotherapy and surgical stripping for great saphenous varicose veins with 3-year follow-up. *J Vasc Surg: Venous and Lym Dis.* 2013; 1:349-356.
13. Star P, Connor DE, Parsi K. Star P, et al. Novel developments in foam sclerotherapy: Focus on Varithena® (polidocanol endovenous microfoam) in the management of varicose veins. *Phlebology.* 2018 Apr;33(3):150-162.
14. Washington State Health Care Authority. Selected Treatments for Varicose Veins, A Health Technology Assessment. Prepared by Hayes, Inc. Final Report: April 2017.
15. van der Velden SK, Biemans AA, De Maeseneer MG, et al. Five-year results of a randomized clinical trial of conventional surgery, endovenous laser ablation and ultrasound-guided foam sclerotherapy in patients with great saphenous varicose veins. *Br J Surg.* 2015; 102(10): 1184-1194.
16. Weiss RA, Weiss MA, Eimpunth S, et al. Comparative Outcomes of Different Endovenous Thermal Ablation Systems on Great and Small Saphenous Vein Insufficiency: Long-Term Results. *Lasers in Surgery and Medicine.* 2015; 47: 156-160.
17. Van Eekeren RRJP, Boersma D, Elias S, et al. Endovenous Mechanochemical Ablation of Great Saphenous Vein Incompetence Using the ClariVein Device: A Safety Study. *J Endovasc Ther.* 2011; 18: 328-3334.
18. Van Eekeren RRJP, Boersma D, Holewijn S, et al. Mechanochemical endovenous ablation for the treatment of great saphenous vein insufficiency. *J Vasc Surg: Venous and Lym Dis.*, Volume 2; 3, 282-288.

19. Van Eekeren RRJP, Boersma D, Konijn V, et al. Postoperative pain and early quality of life after radiofrequency ablation and mechanochemical endovenous ablation of incompetent great saphenous veins. *J VascSurg*, February 2013, Volume 57; 2, 445-450
20. Venermo M, Saarinen J, Eskelinen E, et al. Randomized clinical trial comparing surgery, endovenous laser ablation and ultrasound-guided foam sclerotherapy for the treatment of great saphenous varicose veins. *BJS*. 2016; 103:1438-1444.
21. Vun SV, Rashid ST, Blest NC, Spark JI. Lower pain and faster treatment with mechanico-chemical endovenous ablation using ClariVein®. *Phlebology*. 2015;30(10):688-692.doi:10.1177/0268355514553693.
22. Gloviczki P, Lawrence PF, Wasan SM, et al. The 2022 Society for Vascular Surgery, American Venous Forum, and American Vein and Lymphatic Society clinical practice guidelines for the management of varicose veins of the lower extremities. Part I. Duplex Scanning and Treatment of Superficial Truncal Reflux: Endorsed by the Society for Vascular Medicine and the International Union of Phlebology. *J Vasc Surg Venous Lymphat Disord*. 2023;11(2):231-261.e6. doi:10.1016/j.jvsv.2022.09.004.
23. Gloviczki P, Lawrence PF, Wasan SM, et al. The 2023 Society for Vascular Surgery, American Venous Forum, and American Vein and Lymphatic Society clinical practice guidelines for the management of varicose veins of the lower extremities. Part II: Endorsed by the Society of Interventional Radiology and the Society for Vascular Medicine. *J Vasc Surg Venous Lymphat Disord*. 2024 Jan;12(1):101670.doi:10.1016/j.jvsv. 2023.08.011.
24. Lurie F. Anatomical Extent of Venous Reflux. *Cardiol Ther*. 2020 Dec;9(2):215-218.doi:10.1007/s40119-020-00182-7.
25. Caggiati A, Labropoulos N, Boyle EM, et.al. The Anterior Saphenous Vein. Part 2. Anatomic considerations in normal and refluxing patients. Endorsed by the American Vein and Lymphatic Society, the American Venous Forum and the International Union of Phlebology. *Phlebology*.2024 Jun;39(5):313-324.doi:10.1177/02683555231223055.
26. [www.bostonscientific.com/content/dam/varithena/hcp/Varithena-Full-Prescribing-Information.pdf](http://www.bostonscientific.com/content/dam/varithena/hcp/Varithena-Full-Prescribing-Information.pdf)
27. Hong KP. Prognosis of reflux of the below-knee great saphenous vein after surgical or endovenous treatment of reflux of the above-knee great saphenous vein. *J Vasc Surg Venous Lymphat Disord*. 2020;8(4):629-633.
28. Puggioni A. Endovenous laser treatment of superficial truncal veins. In: Gloviczki P, ed. *Handbook of Venous and Lymphatic Disorders: Guidelines of the American Venous Forum*. 5th ed. CRC Press; 2024:Chapter 43. doi.10.1201/9781003328971.
29. Merchant RF, DePalma RG, Kabnick LS. Endovascular obliteration of saphenous reflux: a multicenter study. *J Vasc Surg*. 2002 Jun;35(6):1190-6. doi: 10.1067/mva.2002.124231.

# Embolization

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# Vascular Embolization Indications

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## Vascular Embolization Coding

Procedure description	CPT®
Vascular embolization or occlusion, inclusive of all radiological supervision and interpretation, intraprocedural roadmapping, and imaging guidance necessary to complete the intervention; venous, other than hemorrhage (e.g., congenital or acquired venous malformations, venous and capillary hemangiomas, varices, varicoceles)	37241
Vascular embolization or occlusion, inclusive of all radiological supervision and interpretation, intraprocedural roadmapping, and imaging guidance necessary to complete the intervention; arterial, other than hemorrhage or tumor (e.g., congenital or acquired arterial malformations, arteriovenous malformations, arteriovenous fistulas, aneurysms, pseudoaneurysms)	37242
Vascular embolization or occlusion, inclusive of all radiological supervision and interpretation, intraprocedural roadmapping, and imaging guidance necessary to complete the intervention; for tumors, organ ischemia, or infarction	37243
Vascular embolization or occlusion, inclusive of all radiological supervision and interpretation, intraprocedural roadmapping, and imaging guidance necessary to complete the intervention; for arterial or venous hemorrhage or lymphatic extravasation	37244

## Arteriovenous Malformations

Vascular embolization/occlusion of cutaneous and/or deep tissue hemangioma or other vascular malformation (e.g., venous, arteriovenous, lymphatic) is considered medically necessary for **any** of these indications:

- Prior to planned scheduled surgery or SRS (Stereotactic radiosurgery)
- The lesion is affecting a vital structure (e.g., nose, eyes, ears, lips, or larynx)
- The lesion results in **any** of the following:
  - Bleeding
  - High output heart failure

- Pain
- Repeated infection
- Interferes with activities of daily living

## Uterine Artery Embolization

Uterine artery embolization is considered medically necessary to treat **any** of the following conditions:

- Abnormal placental implantation (e.g., placenta accreta or increta) leading to bleeding
- Postpartum hemorrhage, after failure of pharmacologic uterotonic measures, surgical treatments, or uterine massage
- Uterine bleeding secondary to uterine arteriovenous malformation
- Uterine leiomyomas documented on prior imaging (US, MRI) with **any** of the following signs or symptoms:
  - Abnormal uterine bleeding such as atypical bleeding pattern or volume, anemia or hemorrhage with a normal recent endometrial sampling biopsy
  - Dysmenorrhea unresponsive to analgesics causing impairment in ability to carry out daily activities
  - Dyspareunia greater than 6 months not attributable to other pathology
  - Urinary symptoms secondary to mass effect from fibroid disease

## Aneurysms

### Visceral Artery Aneurysm or Pseudoaneurysm (PSA)

- Coil embolization is medically necessary to treat visceral artery aneurysm or pseudoaneurysm (PSA) when diagnostic imaging (CTA, MRA, US, angiogram) documents **any** of the following:
  - hepatic artery aneurysm  $\geq 2.0$ cm
  - celiac artery aneurysm  $\geq 2.0$ cm and any size celiac artery PSA
  - colic artery aneurysm any size
  - gastric and gastroepiploic artery aneurysm of any size
  - jejunal and ileal artery aneurysm  $\geq 2.0$ cm
  - superior mesenteric artery (SMA) aneurysm of any size
  - pancreaticoduodenal and gastroduodenal artery aneurysm of any size
  - splenic artery aneurysm  $\geq 3.0$ cm and any size splenic artery PSA
  - renal artery aneurysm  $\geq 3.0$ cm

### Embolization as an adjunct to EVAR

- Internal iliac (hypogastric) artery embolization prior to EVAR is considered medically necessary when a common iliac artery aneurysm requiring stenting to the level of the external iliac artery is identified pre-operatively.
- Embolization of aortic side branches is medically necessary in individuals with a Type 2 endoleak with sac enlargement.

### Non-indications

- Embolization of aortic side branches prior to EVAR for the purpose of preventing Type 2 endoleak is **not** medically necessary. This includes but is not limited to the embolization of lumbar arteries and internal mesenteric arteries.

## Embolization for Musculoskeletal Indications

### Genicular artery embolization, shoulder joint embolization, and plantar artery embolization for plantar fasciitis

Genicular artery embolization is considered medically necessary in an individual with **any** of the following conditions:

- History of total knee arthroplasty with **any** of the following:
  - Hemarthrosis
  - Chronic pain and failed pain management with oral medications and VAS pain score  $\geq 55$  or WOMAC score  $\geq 40$
- Osteoarthritis in the setting of **all** the following:
  - Referred by Musculoskeletal specialist (orthopedic surgeon or sports medicine physician or PM R)
  - Kellgren and Lawrence (KL) Grade 1-3
  - VAS pain score  $\geq 55$  or WOMAC score  $\geq 40$
  - Failure of  $\geq 3$  months of conservative therapy which may include any of the following:
    - topical or oral anti-inflammatory medications
    - joint injection of steroid, PRP, or viscous agent
    - physical therapy/ home exercise program
- Not a candidate for total knee arthroplasty due to age, obesity or other comorbid illnesses as determined by a Musculoskeletal specialist (orthopedic surgeon or sports medicine physician, or PM&R) and **both**
  - KL Grade 4
  - VAS pain score  $\geq 55$  or WOMAC score  $\geq 40$

## Shoulder Joint embolization

Embolization for shoulder joint pathology is considered medically necessary for **either** of the following conditions:

- Individuals with hemarthrosis
- Individuals with adhesive capsulitis (frozen shoulder) when **all** of the following apply:
  - Physical exam consistent with adhesive capsulitis
  - Plain X-ray excludes other diagnosis
  - Failure of  $\geq 3$  months of conservative therapy including **any** of the following:
    - topical or oral anti-inflammatory medications
    - steroid injection
    - physical therapy/ home exercise program

## Hemorrhoids

Endovascular embolization for hemorrhoids is considered medically necessary for individuals who have failed non-surgical treatment including dietary and lifestyle changes and any of the following:

- Grade 1-3 hemorrhoids with recurrent hemorrhoidal bleeding episodes confirmed on anoscopy or no other source of bleeding identified
- Grade 1-3 hemorrhoids with symptoms other than bleeding who are not candidates for in-office procedures or surgery due to co-morbid illnesses such as requirement for anticoagulation, coagulopathy, immunosuppression or inflammatory bowel disease.
- Grade 1-3 hemorrhoids with symptoms other than bleeding and failed prior interventions such as sclerotherapy or band ligation

Repeat embolization for hemorrhoidal disease is considered medically necessary for individuals with recurrent daily rectal bleeding secondary to recurrent or persistent hemorrhoids

## Urologic Conditions

### Prostatic Artery Embolization (PAE) for Benign prostatic hyperplasia (BPH)

Prostate artery embolization is considered medically necessary in individuals with BPH and lower urinary tract symptoms (LUTS) who have failed or could not tolerate medical therapy such as Alpha-1 blockers or 5-alpha-reductase inhibitors and have documentation of any of the following:

- Hematuria of prostatic origin

- Acute or chronic urinary retention with preserved bladder function to achieve catheter independence
- Severe LUTS as described in clinical note or by AUA score ( $\geq 20$ ) and prostate size ( $\geq 50$  cm<sup>3</sup>)
- Bladder outlet obstruction caused by Intravesicular Prostate Protrusion (IPP)
- Individuals deemed not surgical candidates for any of the following reasons:
  - Advanced age
  - Multiple comorbidities
  - Coagulopathy or inability to stop anticoagulation or antiplatelet therapy

Repeat Prostate artery embolization may be indicated for patients who had significant initial response but recurrence of symptoms after 6 months.

### Indications for Varicocele Embolization

Venous embolization of a varicocele documented on physical exam or ultrasound imaging is considered medically necessary for **either** of the following clinical scenarios:

- Management of infertility with palpable varicocele
- Recurrent varicocele

### Oncologic Indications

Vascular embolization is medically necessary for treatment of **any** of the following conditions:

- In the setting of malignancy for chemoembolization or cessation of bleeding
- Hepatocellular carcinoma
- Hepatic metastases from colorectal and neuroendocrine tumors
- Renal cell carcinoma
- Localized resectable giant cell tumor of the bone and/or unresectable axial lesions
- Metastatic follicular, Hurthle cell, or papillary thyroid carcinoma when these tumors are not amenable to radioactive iodine therapy
- Medullary thyroid cancer with symptomatic distant metastases
- Highly vascular tumors for treatment purposes

### Ovarian Vein Embolization

Ovarian Vein Embolization is medically necessary for the treatment of pelvic congestion syndrome when **all** of the following apply:

- Chronic pelvic pain of more than six months duration accompanied by any of the following criteria:

- Pain exacerbated by walking, standing, and fatigue
- Post coital ache
- Dysmenorrhea
- Dyspareunia
- Bladder irritability and rectal discomfort
- Recurrent lower extremity varicosities
- No evidence of inflammatory disease
- Pelvic congestion syndrome is supported by **either** of the following imaging results:
  - Ultrasound demonstrates **one** of the following:
    - Tortuous pelvic veins diameter of >6mm
    - Slow blood flow <3 cm/sec or reversed caudal flow
    - Dilated arcuate veins in the myometrium communicating between bilateral pelvic varicose veins
    - Polycystic changes in the ovaries
  - CT or MR of the pelvis demonstrates **one** of the following:
    - Four ipsilateral tortuous para-uterine veins with a diameter of >4mm
    - An ovarian vein diameter of >8mm

## Non-indications

Due to the lack of evidence supporting the clinical benefit over other treatments, indications for vascular embolization not listed in this guideline are considered to be not medically necessary.

## Evidence Discussion

### Embolization for Hemorrhoid Disease

Catheter directed hemorrhoidal embolization for rectal bleeding due to hemorrhoids has shown promise as a safe and minimally invasive technique in several small studies. Clinical success rates have ranged between 63 and 97% in small studies.<sup>1</sup> Large studies have not been completed and long-term follow-up beyond a year is limited. A 2023 study by DeGregario et al reviewed a Spanish hemorrhoid registry of 80 patients treated with embolization for Grade 1-3 hemorrhoids.<sup>2</sup> Technical success was 100% but 31% of patients had recurrence of rectal bleeding at 1 year and 21% required repeat embolization with 5% having open hemorrhoidectomy. In 2021, Talaie et al reviewed the available studies and concluded that " Hemorrhoid embolization can preserve the anal tone and maintain the hemorrhoidal tissue in place requiring minimal local wound care on an outpatient basis. However, due to the paucity of high-quality trials, further research is warranted to evaluate its long-term outcomes, compare its efficacy with

other treatment modalities, and fully assess its role in the treatment of hemorrhoid." The Italian Society of colorectal surgery (SICCR) consensus statement in 2020 noted weak evidence (2C) for embolization in the management of hemorrhoids except in controlling bleeding in patients with contraindications for conventional surgery such as coagulopathy, immunosuppression or inflammatory bowel disease(1C).<sup>4</sup> In May 2024, the American Society of Colon and Rectal Surgeons Clinical Practice Guidelines for the management of Hemorrhoids, did not include embolization as part of the recommended management options.<sup>5</sup> Guideline recommendation: Based on the available data, hemorrhoidal embolization may be medical necessary for some patients.

### Genicular Artery Embolization

Osteoarthritis of the knee is a common and progressive disease. Management includes anti-inflammatory and pain medication, injections with steroids, pain medication and hyaluronan lubricant and surgical knee replacement. Over the past ten years, the evaluation of genicular artery embolization (GAE) for the management of knee pain secondary to synovial inflammation as part of the cascade of osteoarthritis has been explored. Initially, genicular artery embolization was used for treatment of hemarthrosis associated with prior knee surgery or spontaneous hemarthrosis.<sup>1</sup> More recent studies have shown significant promise for the treatment of knee pain that is resistant to medical therapy and injections.<sup>4-8</sup> Patients experience a significant improvement in pain scores following GAE with minimal risk of complication. The patients with less severe osteoarthritis as judged by KL scores 1-3, seem to have more durable pain relief compared to those with KL 4 disease.<sup>7,8</sup> The benefits of GAE include increased mobility and decreased need for lifelong anti-inflammatories or pain medications. Bagla et al demonstrated significant improvement compared to sham procedures.<sup>6</sup> Recent trials including the MOTION trial and GENESIS 2, are comparing GAE to standard therapy. These studies are currently enrolling. Based on the current data, GAE appears to be safe, effective in reducing pain scores and medication use in patients with mild-moderate osteoarthritis with durability out to 2 years. For those with more advanced osteoarthritis, the relief from pain is not as durable but may still play a role in decreasing pain to delay the need for TKA, improve ability to walk and adjust risk factors prior to TKA. Multiple meta-analysis have shown significant initial and sustained improvement in pain scores and patient satisfaction following GAE out to 2 years.

### Shoulder Joint Embolization

Adhesive capsulitis or "frozen shoulder" is an inflammatory condition that leads to significant shoulder pain and limited mobility. Its cause is unknown but generally progresses in three clinical phases. The first phase "freezing phase" is characterized by worsening shoulder pain with decreasing range of motion (ROM) and typically lasts 3-9 months. The second, "frozen phase" is characterized by decreased active

and passive ROM due to mechanical restriction and may last 4-12 months. Pain may improve with the decreased ROM in phase 2. The final phase, known as the "thawing" phase is characterized by gradual return of ROM in some patients and typically lasts 12-42 months. Synovitis is the main finding in the first two phases is synovitis with development of adhesions as it progresses. Increased soft tissue and vascularity is noted on US during these phases.<sup>4</sup> This was also confirmed with FDG PET imaging showing significant inflammation.<sup>5</sup> Multiple studies have been published regarding non-surgical management including physiotherapy, steroid injection, and hydrotherapy. In the early phases, steroid injection and home exercise therapy has the most consistent improvement for pain relief and improving ROM. Surgical therapies, including arthroscopic capsular release (ACR) and Manipulation under Anesthesia (MUA) are considered a treatment of last resort for patients who do not respond to conservative therapy and have mixed results with significant risks including fractures, axillary nerve injury, rotator cuff and labral tears. 2-4 Additionally, the FROST trial<sup>2</sup>, failed to show statistical difference in improvement in the Oxford Shoulder Score between physical therapy, MUA and ACR. More recently, embolization of the synovium has become an option for treatment of adhesive capsulitis given the underlying inflammatory response in the initial stages. Shintaku et al used FDG PET to assess patient before and after transarterial embolization.<sup>5</sup> They confirmed significant inflammation prior to intervention and improvement after embolization with decreased pain and decreased FDG uptake.

### Prostatic Artery Embolization

Initially, PAE was used in patients with hematuria secondary to prostatic origin with significant success. Over the past 20 years, several trials have been performed to look at prostatic artery embolization for BPH/LUTS. The majority of the studies compared PAE to TURP with some initial trials comparing PAE to SHAM for efficacy. All trials showed improvement in symptoms compared to baseline as confirmed in the SHAM trials. When comparing PAE to TURP, several randomized, controlled studies showed the outcomes are similar for symptom relief of symptoms with better volume reduction and long-term outcomes with TURP. However, TURP is also associated with higher rates of incontinence and sexual dysfunction including erectile dysfunction and ejaculatory issues. In 2024 the AUA released an amendment to their guidelines stating that PAE may be offered as be offered for the treatment of LUTS/BPH. They noted that continued evaluation of PAE in trials is need but there is evidence for its use in select patients.

Recurrent prostate enlargement and LUTs symptoms may occur and can be divided into early recurrence ( 12-18 months) or late recurrence. Early recurrence is usually secondary to collateral flow or recanalization of embolized vessels. Costa et al published a series on 108 patients who had undergone repeat prostate artery embolization for BPH and LUTS symptoms. This can be secondary to initial unilateral embolization only,

or due to collateral flow or recanalization of embolized vessels. They assessed patients who had no significant response to initial embolization (group 1) compared to those that had initial clinical improvement in the first 6 months then recurrence of their symptoms (group 2). They found little impact of repeat embolization in group 1. There was a significant clinical response in group 2, with an 84% cumulative probability of clinical success in this group.<sup>1</sup> Most of the time this is due to collateral flow or recanalization of embolized vessels. Lehrer et al found similar results and concluded that only 18% of patients who had persistent symptoms after initial embolization benefited from repeat embolization.<sup>3</sup> Repeat embolization was found to be safe and effective with low risk of complication. Late recurrence can be due to prostate gland regrowth over time.<sup>2</sup> These patients may also benefit from repeat intervention.

Varicocele development may occur in all age groups and may lead to pain, testicular swelling and may have an impact on fertility. Management of varicoceles for male infertility remains somewhat controversial based on a recent global survey by Shah et al in 2022. The majority are still being managed by surgical technique with only 2.6% of respondents citing embolization or sclerotherapy as their preferred repair technique. The risk of hydrocele and spermatic artery injury are associated with surgical repair and eliminated with embolization procedures. A review of the available guidelines included a meta-analysis of varicocele and fertility studies in 2016 and a more recent study by Sheehan et al, both showed a positive impact in sperm concentration, motility and morphology after varicocele embolization. These findings would support an improvement in male fertility following embolization. This is also supported in the AUA/ASRM guideline on infertility in Men published in 2021. Venous embolization of varicoceles has been shown to be effective in decreasing pain with durability of symptom relief over 4 years. The American Vein and Lymphatic Society working group on pelvic venous disorders include varicocele in their definition of pelvic venous disorders (PeVD) as result of extra pelvic varices that may result from pelvic origins (V<sub>3a</sub>) along with vulvar varices in 2021. Pelvic vein embolization is supported for the management of V<sub>3a</sub> varices.

# References

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1. Management of Symptomatic Uterine Leiomyomas: ACOG Practice Bulletin, Number 228. *Obstet Gynecol.* 2021;137(6):e100-e115. doi:10.1097/AOG.0000000000004401.
2. Barrionuevo P, Malas MB, Nejjim B, et al. A systematic review and meta-analysis of the management of visceral artery aneurysms. *J Vasc Surg.* 2019;70(5):1694-1699. doi:10.1016/j.jvs.2019.02.024.
3. Farion, AT, Falso R, Speziali S, et al. Results of current endovascular treatments for visceral artery aneurysms. *J Vasc Surg.* 2023. 78(2):387-93.
4. Bosanquet DC, Wilcox C, Whitehurst L, et al. Systematic Review and Meta-analysis of the Effect of Internal Iliac Artery Exclusion for Patients Undergoing EVAR. *Eur J Vasc Endovasc Surg.* 2017;53(4):534-548. doi:10.1016/j.ejvs.2017.01.009.
5. Dariushnia SR, Nikolic B, Stokes LS, Spies JB; Society of Interventional Radiology Standards of Practice Committee. Quality improvement guidelines for uterine artery embolization for symptomatic leiomyomata. *J Vasc Interv Radiol.* 2014;25(11):1737-1747. doi:10.1016/j.jvir.2014.08.029.
6. Yu YH, Lindstrom D, Wanhainen A, et al. Systematic review and meta-analysis of prophylactic aortic side branch embolization to prevent type II endoleaks. *J Vasc Surg.* 2020 Nov;72(5):1783-1792.
7. National Comprehensive Cancer Network (NCCN). Bone Cancer Version 2.2023. Revised September 27, 2022. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Bone Cancer Version 2.2023. ©2023 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org
8. National Comprehensive Cancer Network (NCCN). Head and Neck Cancer Version 1.2023. Revised December 20, 2022. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Head and Neck Cancer Version 1.2023. ©2023 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
9. National Comprehensive Cancer Network (NCCN). Kidney Cancer Version 4.2023. Revised January 18, 2023. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Kidney Cancer Version 4.2023. ©2023 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
10. National Comprehensive Cancer Network (NCCN). Pancreatic Adenocarcinoma Version 2.2022. Revised December 6, 2022. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Pancreatic Adenocarcinoma Version 2.2022. ©2023 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
11. National Comprehensive Cancer Network (NCCN). Thyroid Carcinoma Version 3.2022. Revised November 1, 2022. Referenced with permission from the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines™) for Thyroid Carcinoma Version 3.2022. ©2023 National Comprehensive Cancer Network, Inc. All rights reserved. The NCCN Guidelines™ and illustrations herein may not be reproduced in any form for any purpose without the express written permission of the NCCN. To view the most recent and complete version of the NCCN Guidelines™, go online to NCCN.org.
12. Martin NA, Khanna R, Doberstein C, Bentson J. Therapeutic embolization of arteriovenous malformations: the case for and against. *Clin Neurosurg.* 2000;46:295-318.

13. Kashef E, Evans E, Patel N, Agrawal D, Hemingway AP. Pelvic venous congestion syndrome: female venous congestive syndromes and endovascular treatment options. *CVIR Endovasc*. 2023;6(1):25. Published 2023 Apr 20. doi:10.1186/s42155-023-00365-y.
14. Greuner DA, DeMarco D. Current Clinical Management of Pelvic Congestion Syndrome. *Vascular Disease Management*. 2020;17(2):E23-E28.
15. Gloviczki P, Lawrence PF, Wasan SM, et al. The 2023 Society for Vascular Surgery, American Venous Forum, and American Vein and Lymphatic Society clinical practice guidelines for the management of varicose veins of the lower extremities. Part II: Endorsed by the Society of Interventional Radiology and the Society for Vascular Medicine. *J Vasc Surg Venous Lymphat Disord*. 2024;12(1):101670. doi:10.1016/j.jvsv.2023.08.011.
16. Shah R, Agarwal A, Kavoussi P, et al, Global Andrology Forum. Consensus and Diversity in the Management of Varicocele for Male Infertility: Results of a Global Practice Survey and Comparison with Guidelines and Recommendations. *World J Mens Health*. 2023 Jan;41(1):164-197. doi:10.5534/wjmh.220048.
17. Shridharani A, Owen RC, Elkelany OO, Kim ED. The significance of clinical practice guidelines on adult varicocele detection and management. *Asian J Androl*. 2016 Mar-Apr;18(2):269-75. doi: 10.4103/1008-682X.172641.
18. Sheehan M, Briody H, O'Neill DC, et al. Pain relief after varicocele embolization: The patient's perspective. *J Med Imaging Radiat Oncol*. 2020 Apr;64(2):215-219. doi: 10.1111/1754-9485.1300.
19. Wong S, Vigneswaran G, Maclean D, et al. 10-year experience of Paediatric varicocele embolization in a tertiary centre with long-term follow-up. *J Pediatr Urol*. 2022 Apr;18(2):113.e1-113.e6. doi: 10.1016/j.jpuro.2021.12.0131.
20. Meissner MH, Khilnani NM, Labropoulos N, et al. The Symptoms-Varices-Pathophysiology classification of pelvic venous disorders: A report of the American Vein & Lymphatic Society International Working Group on Pelvic Venous Disorders. *J Vasc Surg Venous Lymphat Disord*. 2021 May;9(3):568-584. doi: 10.1016/j.jvsv.2020.12.084.
21. Qamhawi Z, Little MW. The State of Evidence in Prostate Artery Embolization. *Semin Intervent Radiol*. 2022 Dec 20;39(6):571-576. doi: 10.1055/s-0042-1759733. PMID: 36561795; PMCID: PMC9767761.
22. Ini' C, Vasile T, Foti PV, et al. Prostate Artery Embolization as Minimally Invasive Treatment for Benign Prostatic Hyperplasia: An Updated Systematic Review. *J Clin Med*. 2024 Apr 25;13(9):2530. doi: 10.3390/jcm13092530.
23. Sandhu JS, Bixler BR, Dahm P, et al. Management of Lower Urinary Tract Symptoms Attributed to Benign Prostatic Hyperplasia (BPH): AUA Guideline Amendment 2023. *Journal of Urology* [Internet]. 2024 Jan 1 [cited 2024 Nov 11];211(1):11-9. doi:10.1097/JU.000000000000369.
24. McWilliams JP, Bilhim TA, Carnevale FC, et al. Society of Interventional Radiology Multisociety Consensus Position Statement on Prostatic Artery Embolization for Treatment of Lower Urinary Tract Symptoms Attributed to Benign Prostatic Hyperplasia: From the Society of Interventional Radiology, the Cardiovascular and Interventional Radiological Society of Europe, Société Française de Radiologie, and the British Society of Interventional Radiology: Endorsed by the Asia Pacific Society of Cardiovascular and Interventional Radiology, Canadian Association for Interventional Radiology, Chinese College of Interventionalists, Interventional Radiology Society of Australasia, Japanese Society of Interventional Radiology, and Korean Society of Interventional Radiology. *J Vasc Interv Radiol*. 2019;30(5):627-637.e1. doi:10.1016/j.jvir.2019.02.013.
25. Rebonato A, Maiettini D, Patrìti A, et al. Hemorrhoids Embolization: State of the Art and Future Directions. *J Clin Med*. 2021 Aug 12;10(16):3537. doi: 10.3390/jcm10163537.
26. Lee L, Epelboym Y. Review of genicular artery embolization, radiofrequency ablation, and cryoneurolysis in the management of osteoarthritis-related knee pain. *Diagn Interv Radiol*. 2023 Jul 20;29(4):614-620. doi: 10.4274/dir.2022.221288.
27. Sajan A, Bagla S, Isaacson A. Musculoskeletal Interventions: A Review on Genicular Artery Embolization. *Semin Intervent Radiol*. 2021 Nov 24;38(5):511-514. doi:10.1055/s-0041-1736529.
28. Rebonato A, Maiettini D, Patrìti A, et al. Hemorrhoids Embolization: State of the Art and Future Directions. *J Clin Med*. 2021 Aug 12;10(16):3537. doi:10.3390/jcm10163537.
29. De Gregorio MA, Guirola JA, Serrano-Casorran C, et al. Catheter-directed hemorrhoidal embolization for rectal bleeding due to hemorrhoids (Goligher grade I-III): prospective outcomes from a Spanish hemorrhoid registry. *Eur Radiol*. 2023 Dec;33(12):8754-8763. doi:10.1007/s00330-023-09923-3.
30. Talaie R, Torkian P, Moghadam AD, et al. Hemorrhoid embolization: A review of current evidences. *Diagn Interv Imaging*. 2022 Jan;103(1):3-11. doi:10.1016/j.diii.2021.07.001.

31. Gallo G, Martellucci J, Sturiale A, et al. Consensus statement of the Italian society of colorectal surgery (SICCR): management and treatment of hemorrhoidal disease. *Tech Coloproctol*. 2020 Feb;24(2):145-164. doi:10.1007/s10151-020-02149-1.
32. Hawkins AT, Davis BR, Bhama AR, et al. The American Society of Colon and Rectal Surgeons Clinical Practice Guidelines for the Management of Hemorrhoids. *Dis Colon Rectum*. 2024 May;67(5):p 614-623. doi:10.1097/DCR.0000000000003276.
33. Bhatia A, Bhatia S. The short-to-midterm outcomes of geniculate artery embolization for mild-to-moderate osteoarthritis of the knee: a systematic review. *J Orthop*. 2023 Apr 5;39:30-41. doi:10.1016/j.jor.2023.03.009.
34. Okuno, Y., Korchi, A.M., Shinjo, T. et al. Transcatheter Arterial Embolization as a Treatment for Medial Knee Pain in Patients with Mild to Moderate Osteoarthritis. *Cardiovasc Intervent Radiol*, 38, 336–343 (2015). https://doi.org/10.1007/s00270-014-0944-8.
35. Hindsø L, Hölmich P, Petersen M, et al. Transarterial Embolization of Geniculate Arteries Reduces Pain and Improves Physical Function in Knee Osteoarthritis-A Prospective Cohort Study. *Diagnostics (Basel)*. 2024 Jul 27;14(15):1627. doi:10.3390/diagnostics14151627.
36. Tyagi R, Ahmed SS, Koethe Y, et al. Genicular Artery Embolization for Primary Knee Osteoarthritis. *Semin Intervent Radiol*. 2022 Jun 30;39(2):125-129. doi:10.1055/s-0042-1745798.
37. Bagla S, Piechowiak R, Hartman T, et al. 3:00 PM Abstract No. 3. DISTINGUISHED ABSTRACT multicenter prospective, randomized, sham-controlled study of genicular artery embolization. *J Vasc Interv Radiol* 2020;31(03):S6.
38. Ahmed O, Block J, Mautner K, et al. Percutaneous Management of Osteoarthritis in the Knee: Proceedings from the Society of Interventional Radiology Research Consensus Panel. *J Vasc Interv Radiol*. 2021 Jun;32(6):919.e1-919.e6. doi:10.1016/j.jvir.2021.03.409.
39. Casadaban LC, Mandell JC, Epelboym Y. Genicular Artery Embolization for Osteoarthritis Related Knee Pain: A Systematic Review and Qualitative Analysis of Clinical Outcomes. *Cardiovasc Intervent Radiol*. 2021 Jan;44(1):1-9. doi: 10.1007/s00270-020-02687-z.
40. Costa NV, Torres D, Pisco J, et al. Repeat prostatic artery embolization for patients with benign prostatic hyperplasia. *J Vasc Interv Radiol*. 2020;31(8):1272-1280. doi:10.1016/j.jvir.2020.04.027.
41. Goyal P, Salem R, Mouli SK, et al. Controversies in prostate artery embolization: future best practice. *Semin Intervent Radiol*. 2022;39(6):562-570. doi:10.1055/s-0042-1759701.
42. Lehrer R, Sapoval M, Di Gaeta A, et al. Benefits of repeat prostatic artery embolization on persistent or recurrent lower urinary tract symptoms in patients with benign prostatic hyperplasia. *Cardiovasc Intervent Radiol*. 2023;46(6):739-745. doi:10.1007/s00270-023-03424-y.
43. Challoumas D, Biddle M, McLean M, Millar NL. Comparison of Treatments for Frozen Shoulder: A Systematic Review and Meta-analysis. *JAMA Netw Open*. 2020 Dec 1;3(12):e2029581. doi:10.1001/jamanetworkopen.2020.29581.
44. Rangan A, Brealey SD, Keding A, et al; UK FROST Study Group. Management of adults with primary frozen shoulder in secondary care (UK FROST): a multicentre, pragmatic, three-arm, superiority randomised clinical trial. *Lancet*. 2020 Oct 3;396(10256):977-989. doi:10.1016/S0140-6736(20)31965-6. Erratum in: *Lancet*. 2021 Jan 9;397(10269):98. doi:10.1016/S0140-6736(20)32719-7.
45. Cho CH, Bae KC, Kim DH. Treatment Strategy for Frozen Shoulder. *Clin Orthop Surg*. 2019 Sep;11(3):249-257. doi:10.4055/cios.2019.11.3.249.
46. Wise, Sean R. MD, CAQSM, RMSK, FAAFP1; Seales, Paul MD, CAQSM, FAAFP2; Houser, Alex P. DO, FAAFP, FAWM3; Weber, Chase B. MD4. Frozen Shoulder: Diagnosis and Management. *Current Sports Medicine Reports* 22(9):p 307-312, September 2023.doi:10.1249/JSR.0000000000001097.
47. Shintaku T, Inui S, Ikegami H, et al. Alteration of chronic inflammatory status by transarterial embolization in frozen shoulder evaluated by fluorine-18 fluorodeoxyglucose positron-emission tomography/computed tomography. *J Shoulder Elbow Surg*. 2023 May;32(5):e227-e234. doi: 10.1016/j.jse.2022.10.021.
48. Talaie R, Torkian P, Moghadam AD, et al. Hemorrhoid embolization: A review of current evidences. *Diagn Interv Imaging*. 2022 Jan;103(1):3-11. doi:10.1016/j.diii.2021.07.001.
49. Gallo G, Martellucci J, Sturiale A, et al. Consensus statement of the Italian society of colorectal surgery (SICCR): management and treatment of hemorrhoidal disease. *Tech Coloproctol*. 2020 Feb;24(2):145-164. doi:10.1007/s10151-020-02149-1.
50. Hawkins A, Davis B, Bhama A, et al. Clinical Practice Guidelines Committee of the American Society of Colon and Rectal Surgeons. The American Society of Colon and Rectal Surgeons Clinical Practice Guidelines for

- the Management of Hemorrhoids. *Diseases of the Colon & Rectum*. 2024 May;67(5):614-623. doi:10.1097/DCR.0000000000003276.
51. Melian CM, Giannopoulos S, Tsouknidas I, et al. Geniculate Artery Endovascular Embolization Post-Total Knee Arthroplasty for Hemarthrosis Treatment: A Systematic Review of the Literature. *J Endovasc Ther*. 2024 Dec;31(6):1158-1164. doi:10.1177/15266028231157642.
  52. Chau Y, Roux C, Gonzalez JF, et al. Effectiveness of Geniculate Artery Embolization for Chronic Pain after Total Knee Replacement-A Pilot Study. *J Vasc Interv Radiol*. 2023 Oct;34(10):1725-1733. doi:10.1016/j.jvir.2023.06.026.
  53. Bhatia A, Bhatia S. The short-to-midterm outcomes of geniculate artery embolization for mild-to-moderate osteoarthritis of the knee: a systematic review. *J Orthop*. 2023 Apr 5;39:30-41. doi:10.1016/j.jor.2023.03.009.
  54. Taslakian B, Miller LE, Mabud TS, et al. Genicular artery embolization for treatment of knee osteoarthritis pain: Systematic review and meta-analysis. *Osteoarthr Cartil Open*. 2023 Feb 6;5(2):100342. doi:10.1016/j.ocarto.2023.100342.
  55. Kishore S, Sheira D, Malin ML, Trost DW, Mandl LA. Transarterial Embolization for the Treatment of Chronic Musculoskeletal Pain: A Systematic Review of Indications, Safety, and Efficacy. *ACR Open Rheumatol*. 2022 Mar;4(3):209-217. doi:10.1002/acr2.11383.
  56. Bagla S, Piechowiak R, Sajan A, et al. Multicenter Randomized Sham Controlled Study of Genicular Artery Embolization for Knee Pain Secondary to Osteoarthritis. *J Vasc Interv Radiol*. 2022 Jan;33(1):2-10.e2. doi:10.1016/j.jvir.2021.09.019.
  57. Cusumano LR, Sparks HD, Masterson KE, et al. Genicular Artery Embolization for Treatment of Symptomatic Knee Osteoarthritis: 2-Year Outcomes from a Prospective IDE Trial. *J Vasc Interv Radiol*. 2024 Dec;35(12):1768-1775. doi:10.1016/j.jvir.2024.08.028.
  58. Little MW, O'Grady A, Briggs J, et al. Correction to: Genicular Artery Embolisation in Patients with Osteoarthritis of the Knee (GENESIS) Using Permanent Microspheres: Long-Term Results. *Cardiovasc Intervent Radiol*. 47, 1432 (2024). doi:10.1007/s00270-024-03868-w.