



MASSACHUSETTS

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## Medical Policy

### Treatment of Varicose Veins/Venous Insufficiency

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#### Policy Number: 238

BCBSA Reference Number: 7.01.124

NCD/LCD: Local Coverage Determination (LCD): Varicose Veins of the Lower Extremity, Treatment of (L33575)

#### Related Policies

None

#### Policy

##### Commercial Members: Managed Care (HMO and POS), PPO, and Indemnity

#### SAPHENOUS VEINS

##### Great or Small Saphenous Veins

Treatment of the greater or lesser saphenous veins by surgery (ligation and stripping) or endovenous radiofrequency or laser ablation, or microfoam sclerotherapy may be considered **MEDICALLY NECESSARY** for symptomatic varicose veins/venous insufficiency when the following criteria have been met:

- There is demonstrated saphenous reflux and CEAP [Clinical, Etiology, Anatomy, Pathophysiology] class C2 or greater, **AND**
- There is documentation of one or more of the following indications:
  - Ulceration secondary to venous stasis; **OR**
  - Recurrent superficial thrombophlebitis; **OR**
  - Hemorrhage or recurrent bleeding episodes from a ruptured superficial varicosity; **OR**
  - Persistent pain, swelling, itching, burning, or other symptoms are associated with saphenous reflux, **AND** the symptoms significantly interfere with activities of daily living, **AND** conservative management including compression therapy for at least 3 months has not improved the symptoms.

Treatment of great or small saphenous veins by surgery, endovenous radiofrequency or laser ablation, or microfoam sclerotherapy that do not meet the criteria described above is considered cosmetic and **NOT MEDICALLY NECESSARY**.

### **ACCESSORY SAPHENOUS VEINS**

Treatment of accessory saphenous veins by surgery (ligation and stripping) or endovenous radiofrequency or laser ablation, or microfoam sclerotherapy may be considered **MEDICALLY NECESSARY** for symptomatic varicose veins/venous insufficiency when the following criteria have been met:

- Incompetence of the accessory saphenous vein is isolated, **OR** the great or small saphenous veins had been previously eliminated (at least 3 months); **AND**
- There is demonstrated accessory saphenous reflux; **AND**
- There is documentation of one or more of the following indications:
  - Ulceration secondary to venous stasis; **OR**
  - Recurrent superficial thrombophlebitis; **OR**
  - Hemorrhage or recurrent bleeding episodes from a ruptured superficial varicosity, **OR**
  - Persistent pain, swelling, itching, burning, or other symptoms are associated with saphenous reflux, **AND** the symptoms significantly interfere with activities of daily living, **AND** conservative management including compression therapy for at least 3 months has not improved the symptoms.

Treatment of accessory saphenous veins by surgery or endovenous radiofrequency or laser ablation, microfoam sclerotherapy, that do not meet the criteria described above is considered cosmetic and **NOT MEDICALLY NECESSARY**.

### **SYMPTOMATIC VARICOSE TRIBUTARIES**

The following treatments are considered **MEDICALLY NECESSARY** as a component of the treatment of symptomatic *varicose tributaries* when performed either at the same time or following prior treatment (surgical, radiofrequency or laser) of the saphenous veins (none of these techniques has been shown to be superior to another):

- Stab avulsion
- Hook phlebectomy
- Sclerotherapy
- Transilluminated powered phlebectomy.

Treatment of symptomatic *varicose tributaries*, when performed either at the same time or following prior treatment of saphenous veins using any other techniques than noted above is considered **INVESTIGATIONAL**.

### **PERFORATOR VEINS**

Surgical ligation (including subfascial endoscopic perforator surgery) or endovenous radiofrequency or laser ablation of incompetent perforator veins may be considered **MEDICALLY NECESSARY** as a treatment of leg ulcers associated with chronic venous insufficiency when the following conditions have been met:

- There is demonstrated perforator reflux, **AND**
- The superficial saphenous veins (great, small or accessory saphenous and symptomatic varicose tributaries) have been previously eliminated, **AND**
- Ulcers have not resolved following combined superficial vein treatment and compression therapy for at least 3 months, **AND**
- The venous insufficiency is not secondary to deep venous thromboembolism.

Ligation or ablation of incompetent perforator veins performed concurrently with superficial venous surgery is **NOT MEDICALLY NECESSARY**.

### **TELANGIECTASIA**

Treatment of telangiectasia such as spider veins, angiomata, and hemangiomas is considered cosmetic and **NOT MEDICALLY NECESSARY**.

### OTHER VEINS

Techniques for conditions not specifically listed above are **INVESTIGATIONAL**, including, but not limited to:

- Sclerotherapy techniques, other than microfoam sclerotherapy, of great, small or accessory saphenous veins
- Sclerotherapy of perforator veins
- Sclerotherapy of isolated tributary veins without prior or concurrent treatment of saphenous veins
- Stab avulsion, hook phlebectomy, or transilluminated powered phlebectomy of perforator, great or small saphenous, or accessory saphenous veins
- Endovenous radiofrequency or laser ablation of tributary veins
- Mechanochemical ablation of any vein
- Cyanoacrylate adhesive of any vein
- Endovenous cryoablation of any vein.

### Medicare HMO Blue<sup>SM</sup> and Medicare PPO Blue<sup>SM</sup> Members

Medical necessity criteria and coding guidance for **Medicare Advantage members living in Massachusetts** can be found through the link(s) below.

[Local Coverage Determinations \(LCDs\) for National Government Services, Inc.](#)

Local Coverage Determination (LCD): Varicose Veins of the Lower Extremity, Treatment of (L33575)

**Note:** To review the specific LCD, please remember to click “accept” on the CMS licensing agreement at the bottom of the CMS webpage.

For medical necessity criteria and coding guidance for **Medicare Advantage members living outside of Massachusetts**, please see the Centers for Medicare and Medicaid Services website at <https://www.cms.gov> for information regarding your specific jurisdiction.

### Prior Authorization Information

#### Inpatient

- For services described in this policy, precertification/preauthorization **IS REQUIRED** for all products if the procedure is performed **inpatient**.

#### Outpatient

- For services described in this policy, see below for products where prior authorization **might be required** if the procedure is performed **outpatient**.

|  | <b>Outpatient</b>                            |
|--|--|
| <b>Commercial Managed Care (HMO and POS)</b> | Prior authorization is <b>not required</b> . |
| <b>Commercial PPO and Indemnity</b>          | Prior authorization is <b>not required</b> . |
| <b>Medicare HMO Blue<sup>SM</sup></b>        | Prior authorization is <b>not required</b> . |
| <b>Medicare PPO Blue<sup>SM</sup></b>        | Prior authorization is <b>not required</b> . |

### CPT Codes / HCPCS Codes / ICD Codes

*Inclusion or exclusion of a code does not constitute or imply member coverage or provider reimbursement. Please refer to the member’s contract benefits in effect at the time of service to determine coverage or non-coverage as it applies to an individual member.*

*Providers should report all services using the most up-to-date industry-standard procedure, revenue, and diagnosis codes, including modifiers where applicable.*

The above **medical necessity criteria MUST** be met for the following codes to be covered for Commercial Members: Managed Care (HMO and POS), PPO, and Indemnity:

### CPT Codes

| CPT codes: | Code Description  |
|------------|---|
| 36465      | 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)                              |
| 36466      | 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                           |
| 36470      | Injection of sclerosant; single incompetent vein (other than telangiectasia)  |
| 36471      | Injection of sclerosant; multiple incompetent veins (other than telangiectasia), same leg   |
| 36475      | Endovenous ablation therapy of incompetent vein, extremity, inclusive of all imaging guidance and monitoring, percutaneous, radiofrequency; first vein treated  |
| 36476      | Endovenous ablation therapy of incompetent vein, extremity, inclusive of all imaging guidance and monitoring, percutaneous, radiofrequency; second and subsequent veins treated in a single extremity, each through separate access sites (list separately in addition to code for primary procedure) |
| 36478      | Endovenous ablation therapy of incompetent vein, extremity, inclusive of all imaging guidance and monitoring, percutaneous, laser; first vein treated   |
| 36479      | 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)                   |
| 37700      | Ligation and division of long saphenous vein at saphenofemoral junction, or distal interruptions  |
| 37718      | Ligation, division, and stripping, short saphenous vein   |
| 37722      | Ligation, division, and stripping, long (greater) saphenous veins from saphenofemoral junction to knee or below   |
| 37735      | Ligation and division and complete stripping of long and 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  |
| 37765      | Stab phlebectomy of varicose veins, one extremity; 10-20 stab incisions   |
| 37766      | Stab phlebectomy of varicose veins, one extremity; more than 20 incisions   |
| 37780      | Ligation and division of short saphenous vein at saphenopopliteal junction  |
| 37785      | Ligation, division, and/or excision of varicose vein cluster(s), one leg  |

### HCPCS Codes

| HCPCS codes: | Code Description  |
|--------------|-------------------|
| S2202        | Echosclerotherapy |

The following ICD Diagnosis Codes are considered medically necessary when submitted with the CPT and/or HCPCS codes above if medical necessity criteria are met:

### ICD-10 Diagnosis Codes

| ICD-10-CM diagnosis codes: | Code Description  |
|----------------------------|---|
| I83.001                    | Varicose veins of unspecified lower extremity with ulcer of thigh |

|         |   |
|---------|---|
| 183.002 | Varicose veins of unspecified lower extremity with ulcer of calf  |
| 183.003 | Varicose veins of unspecified lower extremity with ulcer of ankle   |
| 183.004 | Varicose veins of unspecified lower extremity with ulcer of heel and midfoot                                    |
| 183.005 | Varicose veins of unspecified lower extremity with ulcer other part of foot                                     |
| 183.008 | Varicose veins of unspecified lower extremity with ulcer other part of lower leg                                |
| 183.009 | Varicose veins of unspecified lower extremity with ulcer of unspecified site                                    |
| 183.011 | Varicose veins of right lower extremity with ulcer of thigh   |
| 183.012 | Varicose veins of right lower extremity with ulcer of calf  |
| 183.013 | Varicose veins of right lower extremity with ulcer of ankle   |
| 183.014 | Varicose veins of right lower extremity with ulcer of heel and midfoot  |
| 183.015 | Varicose veins of right lower extremity with ulcer other part of foot   |
| 183.018 | Varicose veins of right lower extremity with ulcer other part of lower leg                                      |
| 183.019 | Varicose veins of right lower extremity with ulcer of unspecified site  |
| 183.021 | Varicose veins of left lower extremity with ulcer of thigh  |
| 183.022 | Varicose veins of left lower extremity with ulcer of calf   |
| 183.023 | Varicose veins of left lower extremity with ulcer of ankle  |
| 183.024 | Varicose veins of left lower extremity with ulcer of heel and midfoot   |
| 183.025 | Varicose veins of left lower extremity with ulcer other part of foot  |
| 183.028 | Varicose veins of left lower extremity with ulcer other part of lower leg                                       |
| 183.029 | Varicose veins of left lower extremity with ulcer of unspecified site   |
| 183.10  | Varicose veins of unspecified lower extremity with inflammation   |
| 183.11  | Varicose veins of right lower extremity with inflammation   |
| 183.12  | Varicose veins of left lower extremity with inflammation  |
| 183.201 | Varicose veins of unspecified lower extremity with both ulcer of thigh and inflammation                         |
| 183.202 | Varicose veins of unspecified lower extremity with both ulcer of calf and inflammation                          |
| 183.203 | Varicose veins of unspecified lower extremity with both ulcer of ankle and inflammation                         |
| 183.204 | Varicose veins of unspecified lower extremity with both ulcer of heel and midfoot and inflammation              |
| 183.205 | Varicose veins of unspecified lower extremity with both ulcer other part of foot and inflammation               |
| 183.208 | Varicose veins of unspecified lower extremity with both ulcer of other part of lower extremity and inflammation |
| 183.209 | Varicose veins of unspecified lower extremity with both ulcer of unspecified site and inflammation              |
| 183.211 | Varicose veins of right lower extremity with both ulcer of thigh and inflammation                               |
| 183.212 | Varicose veins of right lower extremity with both ulcer of calf and inflammation                                |
| 183.213 | Varicose veins of right lower extremity with both ulcer of ankle and inflammation                               |
| 183.214 | Varicose veins of right lower extremity with both ulcer of heel and midfoot and inflammation                    |
| 183.215 | Varicose veins of right lower extremity with both ulcer other part of foot and inflammation                     |
| 183.218 | Varicose veins of right lower extremity with both ulcer of other part of lower extremity and inflammation       |
| 183.219 | Varicose veins of right lower extremity with both ulcer of unspecified site and inflammation                    |
| 183.221 | Varicose veins of left lower extremity with both ulcer of thigh and inflammation                                |
| 183.222 | Varicose veins of left lower extremity with both ulcer of calf and inflammation                                 |
| 183.223 | Varicose veins of left lower extremity with both ulcer of ankle and inflammation                                |
| 183.224 | Varicose veins of left lower extremity with both ulcer of heel and midfoot and inflammation                     |

|         |  |
|---------|--|
| 183.225 | Varicose veins of left lower extremity with both ulcer other part of foot and inflammation               |
| 183.228 | Varicose veins of left lower extremity with both ulcer of other part of lower extremity and inflammation |
| 183.229 | Varicose veins of left lower extremity with both ulcer of unspecified site and inflammation              |
| 183.811 | Varicose veins of right lower extremity with pain  |
| 183.812 | Varicose veins of left lower extremity with pain   |
| 183.813 | Varicose veins of bilateral lower extremities with pain  |
| 183.819 | Varicose veins of unspecified lower extremity with pain  |
| 183.891 | Varicose veins of right lower extremity with other complications   |
| 183.892 | Varicose veins of left lower extremity with other complications  |
| 183.893 | Varicose veins of bilateral lower extremities with other complications                                   |
| 183.899 | Varicose veins of unspecified lower extremity with other complications                                   |
| 187.2   | Venous insufficiency (chronic) (peripheral)  |

The above **medical necessity criteria MUST** be met for the following codes to be covered for Commercial Members: Managed Care (HMO and POS), PPO, and Indemnity:

| <b>CPT codes:</b> | <b>Code Description</b>   |
|-------------------|---|
| 37500             | Vascular endoscopy, surgical, with ligation of perforator veins, subfascial (SEPS)                                |
| 37760             | Ligation of perforator veins, subfascial, radical (Linton type) including skin graft, when performed, open, 1 leg |
| 37761             | Ligation of perforator vein(s), subfascial, open, including ultrasound guidance, when performed, 1 leg            |

The following ICD Diagnosis Codes are considered medically necessary when submitted with the CPT codes above if **medical necessity criteria** are met:

### ICD-10 Diagnosis Codes

| <b>ICD-10-CM diagnosis codes:</b> | <b>Code Description</b>  |
|-----------------------------------|--|
| 183.001                           | Varicose veins of unspecified lower extremity with ulcer of thigh                |
| 183.002                           | Varicose veins of unspecified lower extremity with ulcer of calf                 |
| 183.003                           | Varicose veins of unspecified lower extremity with ulcer of ankle                |
| 183.004                           | Varicose veins of unspecified lower extremity with ulcer of heel and midfoot     |
| 183.005                           | Varicose veins of unspecified lower extremity with ulcer other part of foot      |
| 183.008                           | Varicose veins of unspecified lower extremity with ulcer other part of lower leg |
| 183.009                           | Varicose veins of unspecified lower extremity with ulcer of unspecified site     |
| 183.011                           | Varicose veins of right lower extremity with ulcer of thigh                      |
| 183.012                           | Varicose veins of right lower extremity with ulcer of calf                       |
| 183.013                           | Varicose veins of right lower extremity with ulcer of ankle                      |
| 183.014                           | Varicose veins of right lower extremity with ulcer of heel and midfoot           |
| 183.015                           | Varicose veins of right lower extremity with ulcer other part of foot            |
| 183.018                           | Varicose veins of right lower extremity with ulcer other part of lower leg       |
| 183.019                           | Varicose veins of right lower extremity with ulcer of unspecified site           |
| 183.021                           | Varicose veins of left lower extremity with ulcer of thigh                       |
| 183.022                           | Varicose veins of left lower extremity with ulcer of calf                        |
| 183.023                           | Varicose veins of left lower extremity with ulcer of ankle                       |
| 183.024                           | Varicose veins of left lower extremity with ulcer of heel and midfoot            |
| 183.025                           | Varicose veins of left lower extremity with ulcer other part of foot             |

|         |   |
|---------|---|
| 183.028 | Varicose veins of left lower extremity with ulcer other part of lower leg |
| 183.029 | Varicose veins of left lower extremity with ulcer of unspecified site     |
| 187.2   | Venous insufficiency (chronic) (peripheral)                               |

The following CPT code is considered not medically necessary for **Commercial Members: Managed Care (HMO and POS), PPO, and Indemnity:**

### CPT Codes

| CPT codes: | Code Description  |
|------------|---|
| 36468      | Injection(s) of sclerosant for spider veins (telangiectasia), limb or trunk |

The following CPT codes are considered investigational for **Commercial Members: Managed Care (HMO and POS), PPO, and Indemnity:**

### CPT Codes

| CPT codes: | Code Description  |
|------------|---|
| 36473      | Endovenous ablation therapy of incompetent vein, extremity, inclusive of all imaging guidance and monitoring, percutaneous, mechanochemical; first vein treated   |
| 36474      | 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 |

The following CPT codes are considered investigational for **Commercial Members: Managed Care (HMO and POS), PPO, Indemnity, Medicare HMO Blue and Medicare PPO Blue:**

### CPT Codes

| CPT codes: | Code Description   |
|------------|--|
| 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; first vein treated   |
| 36483      | 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) |
| 0524T      | Endovenous catheter directed chemical ablation with balloon isolation of incompetent extremity vein, open or percutaneous, including all vascular access, catheter manipulation, diagnostic imaging, imaging guidance and monitoring   |

## Description

### Venous Reflux/Venous Insufficiency

The venous system of the lower extremities consists of the superficial veins (this includes the great and small saphenous and accessory, or duplicate, veins that travel in parallel with the great and small saphenous veins), the deep system (popliteal and femoral veins), and perforator veins that cross through the fascia and connect the deep and superficial systems. One-way valves are present within all veins to direct the return of blood up the lower limb. Because the venous pressure in the deep system is generally greater than that of the superficial system, valve incompetence at any level may lead to backflow (venous reflux) with pooling of blood in superficial veins. Varicose veins with visible varicosities may be the only sign of venous reflux, although itching, heaviness, tension, and pain may also occur. Chronic venous insufficiency secondary to venous reflux can lead to thrombophlebitis, leg ulcerations, and hemorrhage. The CEAP classification of venous disease considers the clinical, etiologic, anatomic, and pathologic characteristics of venous insufficiency, ranging from class 0 (no visible sign of disease) to class 6 (active ulceration).

## **Treatment**

Treatment of venous reflux/venous insufficiency seeks to reduce abnormal pressure transmission from the deep to the superficial veins. Conservative medical treatment consists of elevation of the extremities, graded compression, and wound care when indicated. Conventional surgical treatment consists of identifying and correcting the site of reflux by ligation of the incompetent junction followed by stripping of the vein to redirect venous flow through veins with intact valves. While most venous reflux is secondary to incompetent valves at the saphenofemoral or saphenopopliteal junctions, reflux may also occur at incompetent valves in the perforator veins or the deep venous system. The competence of any single valve is not static and may be pressure-dependent. For example, accessory saphenous veins may have independent saphenofemoral or saphenopopliteal junctions that become incompetent when the great or small saphenous veins are eliminated, and blood flow is diverted through the accessory veins.

## **Treatment of Saphenous Veins and Tributaries**

Saphenous veins include the great and small saphenous and accessory saphenous veins that travel in parallel with the great or small saphenous veins. Tributaries are veins that empty into a larger vein. Treatment of venous reflux typically includes the following:

1. Identification by preoperative Doppler ultrasonography of the valvular incompetence
2. Control of the most proximal point of reflux, traditionally by suture ligation of the incompetent saphenofemoral or saphenopopliteal junction
3. Removal of the superficial vein from circulation, eg, by stripping of the great and/or small saphenous veins.
4. Removal of varicose tributaries (at the time of the initial treatment or subsequently) by stab avulsion (phlebectomy) or injection sclerotherapy.

Minimally invasive alternatives to ligation and stripping have been investigated. They include sclerotherapy, transilluminated powered phlebectomy, and thermal ablation using cryotherapy, high-frequency radio waves (200-300 kHz), or laser energy.

## **Thermal Ablation**

Radiofrequency ablation is performed using a specially designed catheter inserted through a small incision in the distal medial thigh to within 1 to 2 cm of the saphenofemoral junction. The catheter is slowly withdrawn, closing the vein. Laser ablation is performed similarly; a laser fiber is introduced into the great saphenous vein under ultrasound guidance; the laser is activated and slowly removed, along the course of the saphenous vein. Cryoablation uses extreme cold. The objective of endovenous techniques is to injure the vessel, causing retraction and subsequent fibrotic occlusion of the vein. Technical developments since thermal ablation procedures were initially introduced include the use of perivenous tumescent anesthesia, which allows successful treatment of veins larger than 12 mm in diameter and helps to protect adjacent tissue from thermal damage during treatment of the small saphenous vein.

## **Sclerotherapy**

The objective of sclerotherapy is to destroy the endothelium of the target vessel by injecting an irritant solution (either a detergent, osmotic solution, or chemical irritant), ultimately occluding the vessel. Treatment success depends on accurate injection of the vessel, an adequate injectate volume and concentration of sclerosant, and compression. Historically, larger veins and very tortuous veins were not considered good candidates for sclerotherapy due to technical limitations. Technical improvements in sclerotherapy have included the routine use of Duplex ultrasound to target refluxing vessels, luminal compression of the vein with anesthetics, and a foam/sclerosant injectate in place of liquid sclerosant. Foam sclerosants are commonly produced by forcibly mixing a gas (eg, air or carbon dioxide) with a liquid sclerosant (eg, polidocanol or sodium tetradecyl sulfate). The foam is produced at the time of treatment.



### **Endovenous Mechanochemical Ablation**

Endovenous mechanochemical ablation uses both sclerotherapy and mechanical damage to the lumen. Following ultrasound imaging, a disposable catheter with a motor drive is inserted into the distal end of the target vein and advanced to the saphenofemoral junction. As the catheter is pulled back, a wire rotates at 3500 rpm within the lumen of the vein, abrading the lumen. At the same time, a liquid sclerosant (sodium tetradecyl sulfate) is infused near the rotating wire. It is proposed that mechanical ablation allows for better efficacy of the sclerosant, and results in less pain and risk of nerve injury without the need for the tumescent anesthesia used with endovenous thermal ablation techniques (radiofrequency ablation, endovenous laser ablation).

### **Cyanoacrylate Adhesive**

A cyanoacrylate adhesive is a clear, free-flowing liquid that polymerizes in the vessel via an anionic mechanism (ie, polymerizes into a solid material on contact with body fluids or tissue). The adhesive is gradually injected along the length of the vein in conjunction with ultrasound and manual compression. The acute coaptation halts blood flow through the vein until the implanted adhesive becomes fibrotically encapsulated and establishes chronic occlusion of the treated vein. Cyanoacrylate glue has been used as a surgical adhesive and sealant for a variety of indications, including gastrointestinal bleeding, embolization of brain arteriovenous malformations, and surgical incisions or other skin wounds.

### **Transilluminated Powered Phlebectomy**

Transilluminated powered phlebectomy is an alternative to stab avulsion and hook phlebectomy. This procedure uses 2 instruments: an illuminator, which also provides irrigation, and a resector, which has an oscillating tip and suction pump. Following removal of the saphenous vein, the illuminator is introduced via a small incision in the skin and tumescence solution (anesthetic and epinephrine) is infiltrated along the course of varicosity. The resector is then inserted under the skin from the opposite direction, and the oscillating tip is placed directly beneath the illuminated veins to fragment and loosen the veins from the supporting tissue. Irrigation from the illuminator is used to clear the vein fragments and blood through aspiration and additional drainage holes. The illuminator and resector tips may then be repositioned, thereby reducing the number of incisions needed when compared with stab avulsion or hook phlebectomy. It has been proposed that transilluminated powered phlebectomy might decrease surgical time, decrease complications such as bruising and lead to a faster recovery than established procedures.

### **Treatment of Perforator Veins**

Perforator veins cross through the fascia and connect the deep and superficial venous systems. Incompetent perforating veins were originally treated with an open surgical procedure, called the Linton procedure, which involved a long medial calf incision to expose all posterior, medial, and paramedial perforators. While this procedure was associated with healing of ulcers, it was largely abandoned due to a high incidence of wound complications. The Linton procedure was subsequently modified by using a series of perpendicular skin flaps instead of a longitudinal skin flap to provide access to incompetent perforator veins in the lower part of the leg. The modified Linton procedure may occasionally be used to close incompetent perforator veins that cannot be reached by less invasive procedures.

Subfascial endoscopic perforator surgery is a less invasive surgical procedure for the treatment of incompetent perforators and has been reported since the mid-1980s. Guided by Duplex ultrasound scanning, small incisions are made in the skin, and the perforating veins are clipped or divided by endoscopic scissors. The surgery can be performed as an outpatient procedure. Endovenous ablation of incompetent perforator veins with sclerotherapy and radiofrequency ablation has also been reported.

### **Summary**

A variety of treatment modalities are available to treat varicose veins/venous insufficiency, including surgery, thermal ablation, and sclerotherapy. The application of each modality is influenced by the severity of the symptoms, type of vein, source of venous reflux, and the use of other (prior or concurrent) treatment.

## **Saphenous Veins**

For individuals who have varicose veins/venous insufficiency and saphenous vein reflux who receive endovenous thermal ablation (radiofrequency or laser), the evidence includes randomized controlled trials (RCTs) and systematic reviews of controlled trials. The relevant outcomes are symptoms, change in disease status, morbid events, quality of life (QOL), and treatment-related morbidity (TRM). There are a number of large RCTs and systematic reviews of RCTs assessing endovenous thermal ablation of the saphenous veins. Comparison with the standard of ligation and stripping at 2- to 5-year follow-up has supported the use of both endovenous laser ablation and radiofrequency ablation (RFA). Evidence has suggested that ligation and stripping lead to more neovascularization, while thermal ablation leads to more recanalization, resulting in similar clinical outcomes for endovenous thermal ablation and surgery. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have varicose veins/venous insufficiency and saphenous vein reflux who receive microfoam sclerotherapy, the evidence includes RCTs. The relevant outcomes are symptoms, change in disease status, morbid events, QOL, and TRM. For physician-compounded sclerotherapy, there is high variability in success rates and some reports of serious adverse events. By comparison, rates of occlusion with the microfoam sclerotherapy (polidocanol 1%) approved by the Food and Drug Administration are similar to those reported for endovenous laser ablation or stripping. Results of a noninferiority trial of physician-compounded sclerotherapy have indicated that once occluded, recurrence rates at two years are similar to those of ligation and stripping. Together, this evidence indicates that the more consistent occlusion with the microfoam sclerotherapy preparation will lead to recurrence rates similar to ligation and stripping in the longer term. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

Based on the available evidence, clinical input obtained in 2015, and clinical practice guidelines, the use of endovenous RFA, endovenous laser ablation, and microfoam sclerotherapy are considered to improve outcomes when used in the saphenous veins. For treatment of saphenous tributaries at the same time or following treatment of the saphenous vein, stab avulsion, hook phlebectomy, sclerotherapy, or transilluminated powered phlebectomy improve outcomes.

For individuals who have varicose veins/venous insufficiency and saphenous vein reflux who receive mechanochemical ablation, the evidence includes two RCTs and case series. The relevant outcomes are symptoms, change in disease status, morbid events, QOL, and TRM. Mechanochemical ablation is a combination of liquid sclerotherapy with mechanical abrasion. Potential advantages of this procedure compared with thermal ablation are that mechanochemical ablation does not require multiple needle sticks with tumescent anesthesia and may result in less pain during the procedure. One RCT with high loss to follow-up has been published, and a larger RCT is comparing mechanochemical ablation with RFA has reported early results. These short-term results have suggested that intraprocedural pain is lower with mechanochemical ablation than with RFA. However, liquid sclerotherapy is not as effective as thermal ablation techniques for saphenous veins, and mechanochemical ablation has been assessed in relatively few patients and for short durations. Longer follow-up in larger RCTs is needed to evaluate its efficacy and durability compared with established procedures. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have varicose veins/venous insufficiency and saphenous vein reflux who receive cyanoacrylate adhesive, the evidence includes an RCT and a prospective cohort. The relevant outcomes are symptoms, change in disease status, morbid events, QOL, and TRM. Evidence assessing cyanoacrylate adhesive for the treatment of varicose veins and venous insufficiency includes a multicenter noninferiority trial with initial 3 months of follow-up and subsequent reports with follow-up through 24 months. The short-term efficacy of cyanoacrylate adhesive has been shown to be noninferior to RFA at three months; the loss to follow-up in the further follow-up studies limits the confidence in this outcome. A prospective cohort reported high closure rates at 30 months but also had a high loss to follow-up. Adequately powered trials with adequate follow-up are needed to determine the durability of this treatment. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have varicose veins/venous insufficiency and saphenous vein reflux who receive cryoablation, the evidence includes RCTs and multicenter series. The relevant outcomes are symptoms, change in disease status, morbid events, QOL, and TRM. Results from a recent RCT of cryoablation have indicated that this therapy is inferior to conventional stripping. Studies showing a benefit on health outcomes are needed. The evidence is insufficient to determine the effects of the technology on health outcomes.

### Varicose Tributary Veins

For individuals who have varicose tributary veins who receive ablation (stab avulsion, sclerotherapy, or phlebectomy) of tributary veins, the evidence includes RCTs and systematic reviews of RCTs. The relevant outcomes are symptoms, change in disease status, morbid events, QOL, and TRM. The literature has shown that sclerotherapy is effective for treating tributary veins following occlusion of the saphenofemoral or saphenopopliteal junction and saphenous veins. No studies have been identified comparing RFA or laser ablation of tributary veins with standard procedures (microphlebectomy and/or sclerotherapy). Transilluminated powered phlebectomy is effective at removing varicosities; outcomes are comparable to available alternatives such as stab avulsion and hook phlebectomy. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

### Perforator Veins

For individuals who have perforator vein reflux who receive ablation (eg, subfascial endoscopic perforator surgery) of perforator veins, the evidence includes RCTs and systematic reviews of RCTs. The relevant outcomes are symptoms, change in disease status, morbid events, QOL, and TRM. The literature has indicated that the routine ligation or ablation of incompetent perforator veins is not necessary for the treatment of varicose veins/venous insufficiency at the time of superficial vein procedures. However, when combined superficial vein procedures and compression therapy have failed to improve symptoms (ie, ulcers), treatment of perforator vein reflux may be as beneficial as an alternative (eg, deep vein valve replacement). Comparative studies are needed to determine the most effective method of ligating or ablating incompetent perforator veins. Subfascial endoscopic perforator surgery has been shown to be as effective as the Linton procedure with a reduction in adverse events. Although only one case series has been identified showing an improvement in health outcomes, endovenous ablation with specialized laser or radiofrequency probes has been shown to effectively ablate incompetent perforator veins with a potential decrease in morbidity compared with surgical interventions. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

## Policy History

| Date    | Action  |
|---------|---|
| 3/2019  | BCBSA National medical policy review. Description, summary and references updated. Policy statements unchanged.   |
| 1/2019  | Clarified coding information.   |
| 7/2018  | BCBSA National medical policy review. Background and summary clarified. New references added.   |
| 1/2018  | Clarified coding information.   |
| 10/2017 | Clarified coding information.   |
| 6/2017  | New references added from BCBSA National medical policy.  |
| 5/2017  | Clarified coding information.   |
| 1/2017  | Clarified coding information for the 2017 code changes.   |
| 4/2016  | BCBSA National medical policy review. The requirement of failure of compression therapy was removed from the policy statements on ulceration secondary to venous stasis and recurrent superficial thrombophlebitis; terminology was changed from greater and lesser to great and small saphenous veins. Effective 4/1/2016. |
| 4/2015  | BCBSA National medical policy review. Clarified coding information. New medically necessary and investigational indications described. Effective 4/1/2015.  |

|                |   |
|----------------|---|
|                | Local Coverage Determination (LCD): Varicose Veins of the Lower Extremity, Treatment of (L25519) added.     |
| 1/2015         | Clarified coding information.   |
| 9/2014         | LCD Varicose Veins of the Lower Extremity, Treatment of (L25519) added.                                     |
| 6/2014         | Updated Coding section with ICD10 procedure and diagnosis codes. Effective 10/2015.                         |
| 4/2014         | New references added from BCBSA National medical policy.  |
| 11/2013        | Added HCPCS code S2202.   |
| 5/2013         | New references from BCBSA National medical policy.  |
| 11/2011-4/2012 | Medical policy ICD 10 remediation: Formatting, editing and coding updates. No changes to policy statements. |
| 11/2011        | Reviewed - Medical Policy Group - Plastic Surgery and Dermatology. No changes to policy statements.         |
| 12/2010        | Reviewed - Medical Policy Group - Plastic Surgery and Dermatology. No changes to policy statements.         |
| 11/1/2010      | Medical Policy 238 describing covered and non-covered indications. Effective 11/2/2010.                     |

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## References

1. O'Meara S, Cullum NA, Nelson EA. Compression for venous leg ulcers. *Cochrane Database Syst Rev*. Jan 21 2009(1):CD000265. PMID 19160178
2. O'Meara S, Cullum N, Nelson EA, et al. Compression for venous leg ulcers. *Cochrane Database Syst Rev*. Nov 14 2012;11:CD000265. PMID 23152202
3. Shingler S, Robertson L, Boghossian S, et al. Compression stockings for the initial treatment of varicose veins in patients without venous ulceration. *Cochrane Database Syst Rev*. Nov 9 2011;11(11):CD008819. PMID 22071857
4. Howard DP, Howard A, Kothari A, et al. The role of superficial venous surgery in the management of venous ulcers: a systematic review. *Eur J Vasc Endovasc Surg*. Oct 2008;36(4):458-465. PMID 18675558
5. O'Donnell TF, Jr. The present status of surgery of the superficial venous system in the management of venous ulcer and the evidence for the role of perforator interruption. *J Vasc Surg*. Oct 2008;48(4):1044-1052. PMID 18992425
6. Jones L, Braithwaite BD, Selwyn D, et al. Neovascularisation is the principal cause of varicose vein recurrence: results of a randomised trial of stripping the long saphenous vein. *Eur J Vasc Endovasc Surg*. Nov 1996;12(4):442-445. PMID 8980434
7. Rutgers PH, Kitslaar PJ. Randomized trial of stripping versus high ligation combined with sclerotherapy in the treatment of the incompetent greater saphenous vein. *Am J Surg*. Oct 1994;168(4):311-315. PMID 7943585
8. Nesbitt C, Bedenis R, Bhattacharya V, et al. Endovenous ablation (radiofrequency and laser) and foam sclerotherapy versus open surgery for great saphenous vein varices. *Cochrane Database Syst Rev*. Jul 30 2014;7(7):CD005624. PMID 25075589
9. Paravastu SC, Horne M, Dodd PD. Endovenous ablation therapy (laser or radiofrequency) or foam sclerotherapy versus conventional surgical repair for short saphenous varicose veins. *Cochrane Database Syst Rev*. Nov 29 2016;11:CD010878. PMID 27898181
10. Brittenden J, Cotton SC, Elders A, et al. A randomized trial comparing treatments for varicose veins. *N Engl J Med*. Sep 25 2014;371(13):1218-1227. PMID 25251616

11. Rass K, Frings N, Glowacki P, et al. Comparable effectiveness of endovenous laser ablation and high ligation with stripping of the great saphenous vein: two-year results of a randomized clinical trial (RELACS study). *Arch Dermatol*. Jan 2012;148(1):49-58. PMID 21931012
12. Rass K, Frings N, Glowacki P, et al. Same site recurrence is more frequent after endovenous laser ablation compared with high ligation and stripping of the great saphenous vein: 5 year results of a randomized clinical trial (RELACS Study). *Eur J Vasc Endovasc Surg*. Nov 2015;50(5):648-656. PMID 26319476
13. Christenson JT, Gueddi S, Gemayel G, et al. Prospective randomized trial comparing endovenous laser ablation and surgery for treatment of primary great saphenous varicose veins with a 2-year follow-up. *J Vasc Surg*. Nov 2010;52(5):1234-1241. PMID 20801608
14. Biemans AA, Kockaert M, Akkersdijk GP, et al. Comparing endovenous laser ablation, foam sclerotherapy, and conventional surgery for great saphenous varicose veins. *J Vasc Surg*. Sep 2013;58(3):727-734 e721. PMID 23769603
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*. Sep 2015;102(10):1184-1194. PMID 26132315
16. Wallace T, El-Sheikha J, Nandhra S, et al. Long-term outcomes of endovenous laser ablation and conventional surgery for great saphenous varicose veins. *Br J Surg*. Dec 2018;105(13):1759-1767. PMID 30132797
17. Theivacumar NS, Darwood RJ, Gough MJ. Endovenous laser ablation (EVLA) of the anterior accessory great saphenous vein (AAGSV): abolition of sapheno-femoral reflux with preservation of the great saphenous vein. *Eur J Vasc Endovasc Surg*. Apr 2009;37(4):477-481. PMID 19201621
18. Hamann SAS, Giang J, De Maeseneer MGR, et al. Editor's Choice - Five Year results of great saphenous vein treatment: a meta-analysis. *Eur J Vasc Endovasc Surg*. Dec 2017;54(6):760-770. PMID 29033337
19. Vahaaho S, Halmesmaki K, Alback A, et al. Five-year follow-up of a randomized clinical trial comparing open surgery, foam sclerotherapy and endovenous laser ablation for great saphenous varicose veins. *Br J Surg*. May 2018;105(6):686-691. PMID 29652086
20. Shadid N, Ceulen R, Nelemans P, et al. Randomized clinical trial of ultrasound-guided foam sclerotherapy versus surgery for the incompetent great saphenous vein. *Br J Surg*. Aug 2012;99(8):1062-1070. PMID 22627969
21. U.S. Food and Drug Administration, Center for Drug Evaluation and Research. Summary Review: 205098 Varithena. 2013; [https://www.accessdata.fda.gov/drugsatfda\\_docs/nda/2013/205098Orig1s000SumR.pdf](https://www.accessdata.fda.gov/drugsatfda_docs/nda/2013/205098Orig1s000SumR.pdf). Accessed April 27, 2018.
22. Todd KL, 3rd, Wright D, for the Vanish-Investigator Group. The VANISH-2 study: a randomized, blinded, multicenter study to evaluate the efficacy and safety of polidocanol endovenous microfoam 0.5% and 1.0% compared with placebo for the treatment of saphenofemoral junction incompetence. *Phlebology*. Oct 2014;29(9):608-618. PMID 23864535
23. Vasquez M, Gasparis AP, Varithena 017 Investigator G. A multicenter, randomized, placebo-controlled trial of endovenous thermal ablation with or without polidocanol endovenous microfoam treatment in patients with great saphenous vein incompetence and visible varicosities. *Phlebology*. May 2017;32(4):272-281. PMID 26957489
24. Bootun R, Lane T, Dharmarajah B, et al. Intra-procedural pain score in a randomised controlled trial comparing mechanochemical ablation to radiofrequency ablation: The Multicentre Venefit versus ClariVein(R) for varicose veins trial. *Phlebology*. Feb 2016;31(1):61-65. PMID 25193822
25. Lane T, Bootun R, Dharmarajah B, et al. A multi-centre randomised controlled trial comparing radiofrequency and mechanical occlusion chemically assisted ablation of varicose veins - Final results of the Venefit versus Clarivein for varicose veins trial. *Phlebology*. Mar 2017;32(2):89-98. PMID 27221810
26. Lam YL, Toonder IM, Wittens CH. Clarivein(R) mechano-chemical ablation an interim analysis of a randomized controlled trial dose-finding study. *Phlebology*. Apr 2016;31(3):170-176. PMID 26249150
27. Sun JJ, Chowdhury MM, Sadat U, et al. Mechanochemical ablation for treatment of truncal venous insufficiency: a review of the current literature. *J Vasc Interv Radiol*. Oct 2017;28(10):1422-1431. PMID 28811080

28. Witte ME, Zeebregts CJ, de Borst GJ, et al. Mechanochemical endovenous ablation of saphenous veins using the ClariVein: A systematic review. *Phlebology*. Dec 2017;32(10):649-657. PMID 28403687
29. Witte ME, Holewijn S, van Eekeren RR, et al. Midterm outcome of mechanochemical endovenous ablation for the treatment of great saphenous vein insufficiency. *J Endovasc Ther*. Feb 2017;24(1):149-155. PMID 27742900
30. U.S. Food and Drug Administration. VenaSeal Closure System. PMA P140018. 2015; <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpma/pma.cfm?id=P140018>. Accessed April 27, 2018.
31. Morrison N, Gibson K, McEnroe S, et al. Randomized trial comparing cyanoacrylate embolization and radiofrequency ablation for incompetent great saphenous veins (VeClose). *J Vasc Surg*. Apr 2015;61(4):985-994. PMID 25650040
32. Gibson K, Ferris B. Cyanoacrylate closure of incompetent great, small and accessory saphenous veins without the use of post-procedure compression: Initial outcomes of a post-market evaluation of the VenaSeal System (the WAVES Study). *Vascular*. Apr 2017;25(2):149-156. PMID 27206470
33. Morrison N, Gibson K, Vasquez M, et al. VeClose trial 12-month outcomes of cyanoacrylate closure versus radiofrequency ablation for incompetent great saphenous veins. *J Vasc Surg Venous Lymphat Disord*. May 2017;5(3):321-330. PMID 28411697
34. Gibson K, Morrison N, Kolluri R, et al. Twenty-four month results from a randomized trial of cyanoacrylate closure versus radiofrequency ablation for the treatment of incompetent great saphenous veins. *J Vasc Surg Venous Lymphat Disord*. Sep 2018;6(5):606-613. PMID 29914814
35. Eroglu E, Yasim A, Ari M, et al. Mid-term results in the treatment of varicose veins with N-butyl cyanoacrylate. *Phlebology*. Dec 2017;32(10):665-669. PMID 28669248
36. Zierau UT. Sealing veins with the VenaSeal Saphen Closure System: results for 795 treated truncal veins after 1000 days. *Vasomed*. 2015;27:124-127. PMID
37. Klem TM, Schnater JM, Schutte PR, et al. A randomized trial of cryo stripping versus conventional stripping of the great saphenous vein. *J Vasc Surg*. Feb 2009;49(2):403-409. PMID 19028042
38. Disselhoff BC, der Kinderen DJ, Kelder JC, et al. Randomized clinical trial comparing endovenous laser with cryostripping for great saphenous varicose veins. *Br J Surg*. Oct 2008;95(10):1232-1238. PMID 18763255
39. Disselhoff BC, der Kinderen DJ, Kelder JC, et al. Five-year results of a randomized clinical trial comparing endovenous laser ablation with cryostripping for great saphenous varicose veins. *Br J Surg*. Aug 2011;98(8):1107-1111. PMID 21633948
40. Tisi PV, Beverley C, Rees A. Injection sclerotherapy for varicose veins. *Cochrane Database Syst Rev*. Oct 18 2006(4):CD001732. PMID 17054141
41. Leopardi D, Hoggan BL, Fitridge RA, et al. Systematic review of treatments for varicose veins. *Ann Vasc Surg*. Mar 2009;23(2):264-276. PMID 19059756
42. El-Sheikha J, Nandhra S, Carradice D, et al. Clinical outcomes and quality of life 5 years after a randomized trial of concomitant or sequential phlebectomy following endovenous laser ablation for varicose veins. *Br J Surg*. Aug 2014;101(9):1093-1097. PMID 24916467
43. Yamaki T, Hamahata A, Soejima K, et al. Prospective randomised comparative study of visual foam sclerotherapy alone or in combination with ultrasound-guided foam sclerotherapy for treatment of superficial venous insufficiency: preliminary report. *Eur J Vasc Endovasc Surg*. Mar 2012;43(3):343-347. PMID 22230599
44. Michaels JA, Campbell WB, Brazier JE, et al. Randomised clinical trial, observational study and assessment of cost-effectiveness of the treatment of varicose veins (REACTIV trial). *Health Technol Assess*. Apr 2006;10(13):1-196, iii-iv. PMID 16707070
45. Luebke T, Brunkwall J. Meta-analysis of transilluminated powered phlebectomy for superficial varicosities. *J Cardiovasc Surg (Torino)*. Dec 2008;49(6):757-764. PMID 19043390
46. Chetter IC, Mylankal KJ, Hughes H, et al. Randomized clinical trial comparing multiple stab incision phlebectomy and transilluminated powered phlebectomy for varicose veins. *Br J Surg*. Feb 2006;93(2):169-174. PMID 16432820
47. Barwell JR, Davies CE, Deacon J, et al. Comparison of surgery and compression with compression alone in chronic venous ulceration (ESCHAR study): randomised controlled trial. *Lancet*. Jun 5 2004;363(9424):1854-1859. PMID 15183623

48. Gohel MS, Barwell JR, Taylor M, et al. Long term results of compression therapy alone versus compression plus surgery in chronic venous ulceration (ESCHAR): randomised controlled trial. *BMJ*. Jul 14 2007;335(7610):83. PMID 17545185
49. Nelzen O, Fransson I. Early results from a randomized trial of saphenous surgery with or without subfascial endoscopic perforator surgery in patients with a venous ulcer. *Br J Surg*. Apr 2011;98(4):495-500. PMID 21656715
50. Blomgren L, Johansson G, Dahlberg-Akerman A, et al. Changes in superficial and perforating vein reflux after varicose vein surgery. *J Vasc Surg*. Aug 2005;42(2):315-320. PMID 16102633
51. Tenbrook JA, Jr., Iafrati MD, O'Donnell T F, Jr., et al. Systematic review of outcomes after surgical management of venous disease incorporating subfascial endoscopic perforator surgery. *J Vasc Surg*. Mar 2004;39(3):583-589. PMID 14981453
52. van Gent WB, Catarinella FS, Lam YL, et al. Conservative versus surgical treatment of venous leg ulcers: 10-year follow up of a randomized, multicenter trial. *Phlebology*. Mar 2015;30(1 Suppl):35-41. PMID 25729066
53. Luebke T, Brunkwall J. Meta-analysis of subfascial endoscopic perforator vein surgery (SEPS) for chronic venous insufficiency. *Phlebology*. Feb 2009;24(1):8-16. PMID 19155335
54. Hirsch SA, Dillavou E. Options in the management of varicose veins, 2008. *J Cardiovasc Surg (Torino)*. Feb 2008;49(1):19-26. PMID 18212684
55. Hissink RJ, Bruins RM, Erkens R, et al. Innovative treatments in chronic venous insufficiency: endovenous laser ablation of perforating veins: a prospective short-term analysis of 58 cases. *Eur J Vasc Endovasc Surg*. Sep 2010;40(3):403-406. PMID 20547462
56. Myers KA, Jolley D. Factors affecting the risk of deep venous occlusion after ultrasound-guided sclerotherapy for varicose veins. *Eur J Vasc Endovasc Surg*. Nov 2008;36(5):602-605. PMID 18718772
57. Gloviczki P, Comerota AJ, Dalsing MC, et al. The care of patients with varicose veins and associated chronic venous diseases: clinical practice guidelines of the Society for Vascular Surgery and the American Venous Forum. *J Vasc Surg*. May 2011;53(5 Suppl):2S-48S. PMID 21536172
58. Society of Interventional Radiology. Position Statement on Endovenous Ablation. 2003; [https://www.sirweb.org/globalassets/aasociety-of-interventional-radiology-home-page/practice-resources/standards\\_pdfs/sir\\_venous\\_ablation\\_statement\\_final2015.pdf](https://www.sirweb.org/globalassets/aasociety-of-interventional-radiology-home-page/practice-resources/standards_pdfs/sir_venous_ablation_statement_final2015.pdf). Accessed April 27, 2018.
59. Kundu S, Lurie F, Millward SF, et al. Recommended reporting standards for endovenous ablation for the treatment of venous insufficiency: joint statement of the American Venous Forum and the Society of Interventional Radiology. *J Vasc Interv Radiol*. Sep 2007;18(9):1073-1080. PMID 17804767
60. National Institute for Health and Care Excellence (NICE). Ultrasound-guided foam sclerotherapy for varicose veins [IPG440] 2013; <https://www.nice.org.uk/guidance/ipg440>. Accessed April 27, 2018.
61. National Institute for Health and Care Excellence (NICE). Endovenous mechanochemical ablation for varicose veins [IPG557]. 2016; <https://www.nice.org.uk/guidance/ipg557>. Accessed April 27, 2018.
62. National Institute for Health and Care Excellence (NICE). Varicose veins: diagnosis and management [CG168]. 2013; <https://www.nice.org.uk/guidance/cg168>. Accessed April 27, 2018.
63. 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*. Apr 2015;19(27):1-342. PMID 25858333