Varicose Veins

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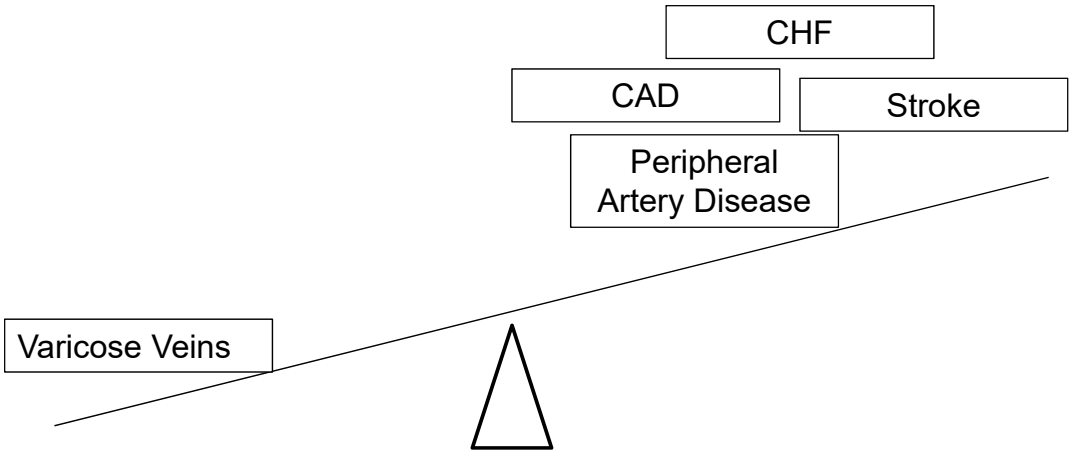
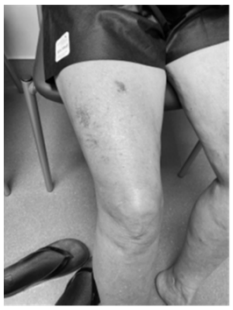
Prevalence



What are varicose veins?

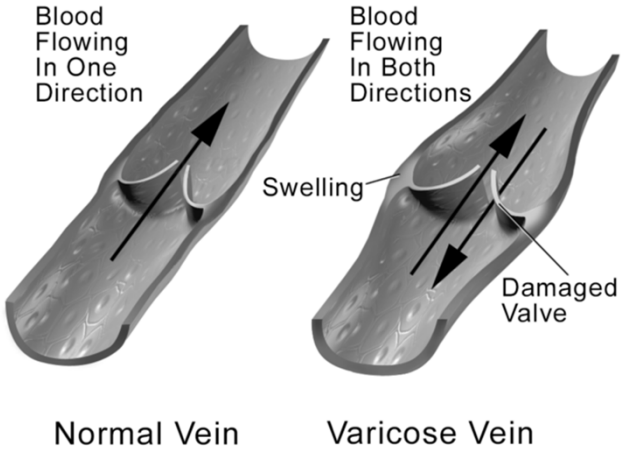
- >3 mm dilatation of subcutaneous vein.



Author: Intermedichbo **(CC BY 3.0)**

Spider Veins → Varicose Veins → Venous Ulcer

Why do Varicose Veins Develop?



Author: Blausen Medical Communications, Inc. (CC BY 3.0) - Link in final slide.

Which veins are affected?

Superficial

GSV, SSV

↓

20% of leg drainage

↓

Varicose Veins

Deep

CFV, FV, PV

↓

80% of leg drainage

↓

Deep Vein Thrombosis (DVT), Post-Thrombotic Syndrome

How to tell if a VV is symptomatic

- Typical Symptoms of Varicose Veins
  - Pain/Discomfort
  - Itching
  - Leg Heaviness

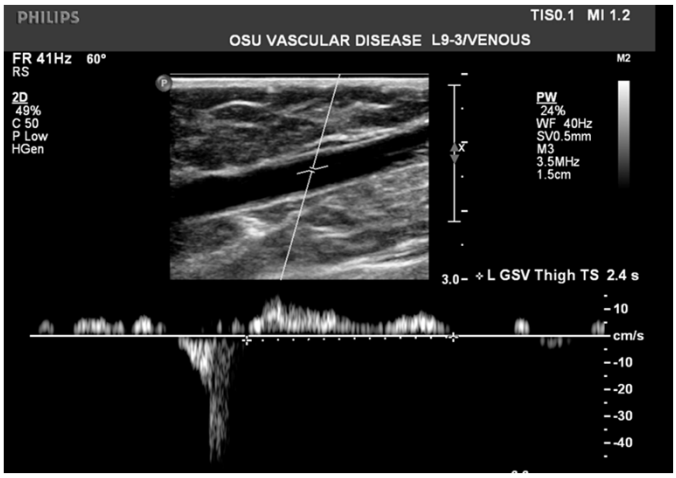
Symptoms are typically worst at the end of the day.

Diagnosing Venous Insufficiency

- Clinical Findings

+

- Venous *Reflux* Study



Diagnosing Venous Insufficiency

Segment	Left			
	Compressibility	Competent Valve	Diam AP cm	VCT(S)
CFV	Complete	Reflux		1.8
Mid FV	Complete			
Popliteal	Complete	Competent		
PTV	Complete			
SFJ		Competent	0.8	
GSV- Prox Thigh		Reflux	0.73	2.8
GSV- Mid Thigh		Reflux	0.54	2.4
GSV- Knee		Reflux	0.32	4.7
GSV- Mid Calf			0.27	
GSV- Ankle			0.21	
SSV Junction		Competent	0.21	
SSV- Mid Calf			0.21	

Chang S, Huang Y, Lee M, et al. Association of Varicose Veins With Incident Venous Thromboembolism and Peripheral Artery Disease. JAMA. 2018;319(8):807–817. doi:10.1001/jama.2018.0246

CEAP Classification System

- C: Clinical classification
- E: Etiologic classification
- A: Anatomic classification
- P: Pathophysiologic classification

CEAP: Clinical Classification System

- C1: Telangiectasia
- C2A: Asymptomatic Varicose Veins
- C2S: Symptomatic Varicose Veins
- C3: Edema
- C4: Skin or subcutaneous tissue changes
- C5: Healed Ulcer
- C6: Active Ulcer

CEAP: Clinical Classification System

- C1: Telangiectasia
- C2A: Asymptomatic Varicose Veins

COSMETIC

- C2S: Symptomatic Varicose Veins
- C3: Edema
- C4: Skin or subcutaneous tissue changes
- C5: Healed Ulcer
- C6: Active Ulcer

MEDICAL

How can Varicose Veins be managed?

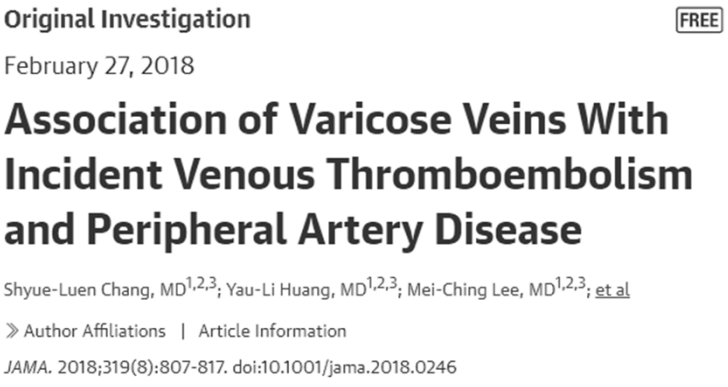
- Conservative Measures:
  - Weight loss
    - *Prevent Varicose Veins*
    - Reduce progression of varicose veins already present.
  - Leg Elevation
  - Compression Therapy
    - *20-30 Thigh-High Compression*
    - "The best compression is the one the patient will wear."

Medication Therapy for VV

- No well organized data about medications for VV in the US.
- Most press: Flavonoids
  - May have antiangiogenic property.
- Alternative Regimens
  - These are not proven and should be reviewed for interactions.
  - Horse Chestnut
  - Ginkgo Biloba
  - Grape (leaves or fruit)

Recent 2021 manuscript shows some potential for a combined formula.

Do Varicose Veins Cause DVT?



Original Investigation FREE

February 27, 2018

Association of Varicose Veins With Incident Venous Thromboembolism and Peripheral Artery Disease

Shyue-Luen Chang, MD[1,2,3]; Yau-Li Huang, MD[1,2,3]; Mei-Ching Lee, MD[1,2,3]; et al

» Author Affiliations | Article Information

JAMA. 2018;319(8):807-817. doi:10.1001/jama.2018.0246

- Recurrent or long segment SVT of VV → more aggressive treatment

Attributions:

Slide 3: IntermedichboFile:Ulcus cruris art.JPG - Wikimedia Commons

Slide 5: Blausen Medical Communications, Inc. File:Blausen 0891 VaricoseVein.png - Wikimedia Commons

Varicose Veins

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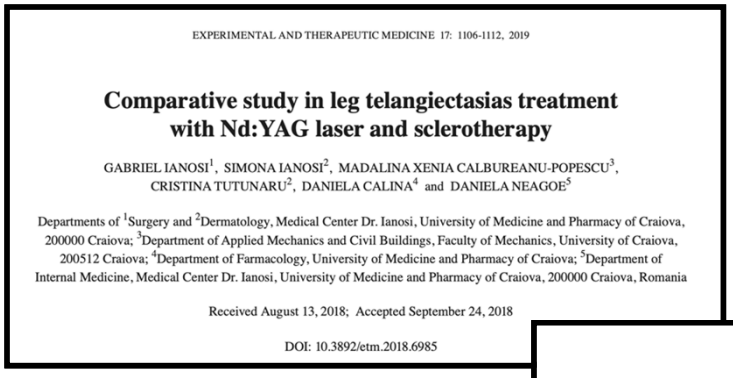
Invasive Treatment Options

- Intense Pulsed Light(IPL) or Topical LASER
- Sclerotherapy
- Phlebectomy
- High Ligation and Stripping
- Ablation (thermal and non-thermal)

IPL and Topical LASER

- Suitable for most patients with telangiectasia or matting from prior treatments
- No maximum dose per session (outside of pain tolerance)
- Advantages over needle based therapy
  - Needle-phobic patients
  - Resistant telangiectasia or matting
  - Patients prone to hyperpigmentation
  - Intolerance to sclerosants



EXPERIMENTAL AND THERAPEUTIC MEDICINE 17: 1106-1112, 2019

Comparative study in leg telangiectasias treatment with Nd:YAG laser and sclerotherapy

GABRIEL IANOSI[1], SIMONA IANOSI[2], MADALINA XENIA CALBUREANU-POPESCU[3], CRISTINA TUTUNARU[2], DANIELA CALINA[4] and DANIELA NEAGOE[5]

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Received August 13, 2018; Accepted September 24, 2018

DOI: 10.3892/etm.2018.6985

Attempts to randomize and compare sclerotherapy to Laser Challenges – blinding, assessment of discomfort

In general, telangiectasias 1mm or smaller Laser works as well as sclerotherapy, >1mm sclerotherapy is more effective

Current health sciences journal

Curr Health Sci J. 2020 Apr-Jun; 46(2): 141–149.
Published online 2020 Jun 30. doi: 10.12865/CHSJ.46.02.07: 10.12865/CHSJ.46.02.07
PMCID: PMC7445644
PMID: 32874686

Single Blind, Randomised Study Regarding the Treatment of the Telangiectasia of the Lower Limbs (C1EAP) Using Polidocanol 0,5%, 1%, and Nd:YAG Laser

NICOLAE GABRIEL IANOSI,[1] CARMEN DANIELA NEAGOE,[2] CRISTINA VIOLETA TUTUNARU,[3] MADALINA XENIA CĂLBUREANU-POPESCU,[4] LIVIU DRĂGUSIN,[1] GABRIEL GÎNGEOVEANU,[1] ANCA FARMAZON,[2] ION PĂUN,[5] and SIMONA LAURA IANOSI[3]

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Received 2019 Nov 4; Accepted 2020 Mar 2.

IPL and LASER - limitations

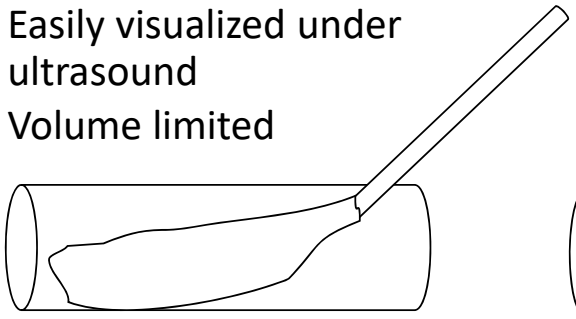
- Melanin will compete with hemoglobin at absorbing energy from Lasers
  - Use caution in darker skin
  - Avoid tanning and sun exposure before or after
- Skin needs constant cooling during treatment

Sclerotherapy

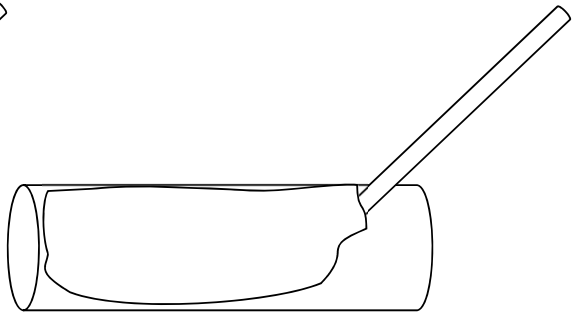
- Directly accessing the varicosity with a fine needle
- Injection of chemical compound to damage the vein
- Results in fibrosis of the vein
- Primarily used for small varicose veins and telangiectasias after underlying source of reflux treated, but can be used on saphenous vein and its tributaries

Sclerotherapy

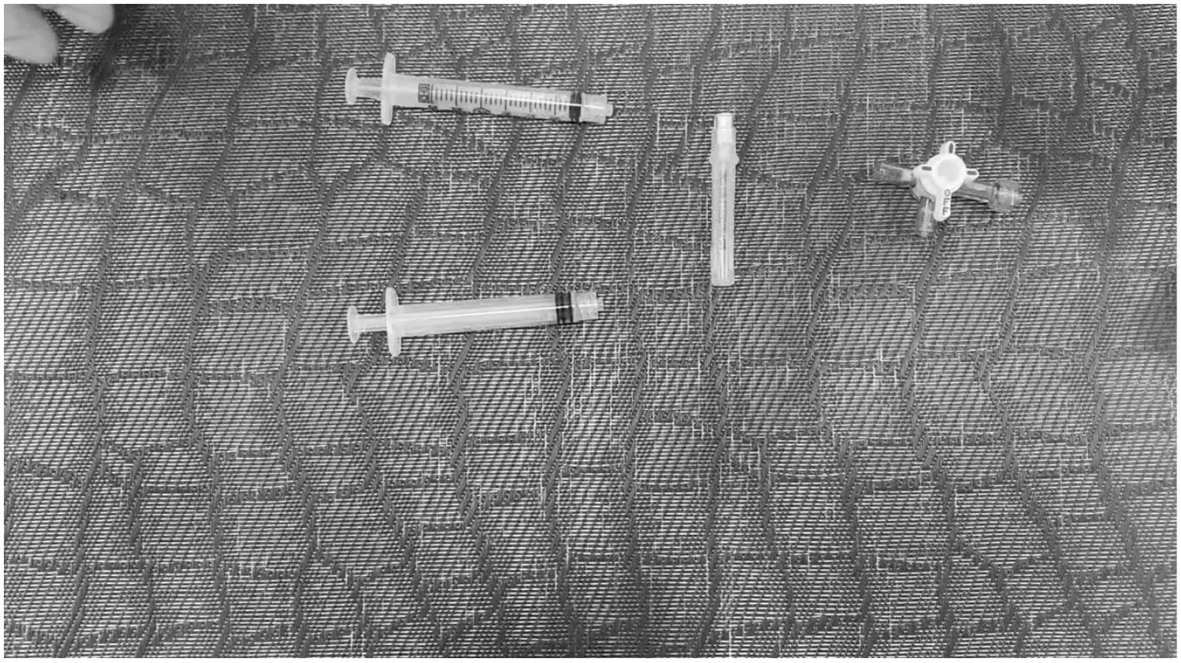
- Can be liquid or foamed
  - Longer dwell time in the vein
  - More surface area covered
  - Easily visualized under ultrasound
  - Volume limited



Liquid Sclerosant



Foamed Sclerosant

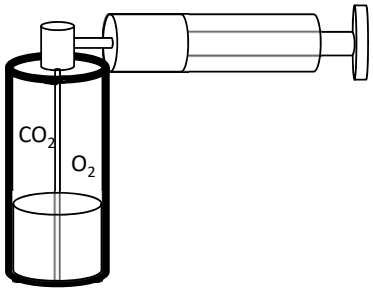


Foam Sclerotherapy

- They produce endothelial damage
- Exposes collagen and leads to activation of platelets and clotting
- Thrombosis and inflammation leads to fibrosis of the vein
- Numerous (>15) randomized trials show similar short term efficacy vs traditional surgery for treatment of truncal reflux
- May be some increased recanalization long term vs traditional ablative methods

Microfoam Chemical Ablation

- In US Varithena™ is FDA approved
- Propriatary mix of gasses
- Smaller foam that is more stable
- Less risk of air embolism
- Not necessarily more effective than "home made"



HCPCS Code	Short Description	Non-Facility Price	Facility Price	Work RVU	Global
36465	Microfoam Chem Ablation 1 vein	$1,420.94	$120.52	2.35	0
36466	Microfoam Chem Ablation mlt vn	$1,586.21	$155.49	3.00	0
36470	Sclerotherapy 1 incmptnt vein	$110.58	$38.90	0.75	0
36471	Sclerotherapy mlt incmptnt vn	$194.86	$76.35	1.50	0

Foam Sclerotherapy

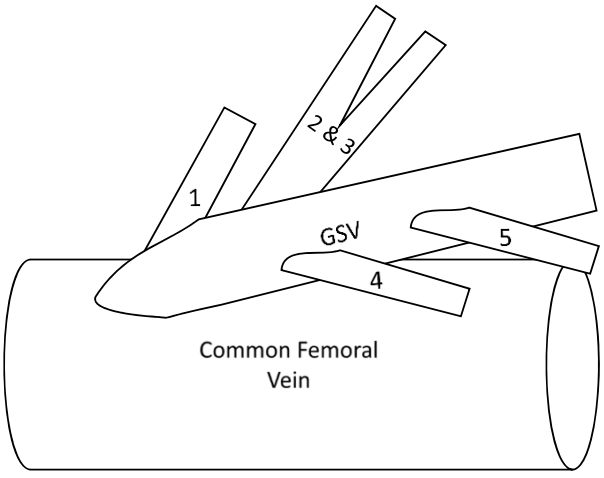
- Side effects most commonly are from localized phlebitis resulting in pain and nodules, hyperpigmentation.
- Serious complications are very rare
  - 0.5% muscular vein thromboses (1)
  - 0-1% with DVT (2)
  - 0.09%–4.5% with visual disturbances (3)
  - Stroke, arterial injection, MI all described but exceedingly rare, thought to be from PFO

1. Guex JJ, Schliephake DE, Otto J et al. The French polidocanol study on long-term side effects: A survey covering 3,357 patient years. Dermatol Surg 2010;36(Suppl. 2):993–1003.
2. Gillet JL, Guedes JM, Guex JJ et al. Side-effects and complications of foam sclerotherapy of the great and small saphenous veins: A controlled multicentre prospective study including 1,025 patients. Phlebology 2009;24:131–8.
3. Willenberg T, Smith PC, Shepherd A, and Davies AH. Visual disturbance following sclerotherapy for varicose veins, reticular veins and telangiectasias: A systematic literature review. Phlebology 2012;28:123–31.

High Ligation and Stripping

- Largely historical
- Does not provide vastly superior results to ablation
- Has higher morbidity vs ablation so any advantage is lost
- 15-30% had recurrence because of neovascularization

1-Superficial inferior epigastric
2-Superficial circumflex iliac
3-Superficial antrolateral
4-Superficial external pudendal
5-Superficial posteromedial

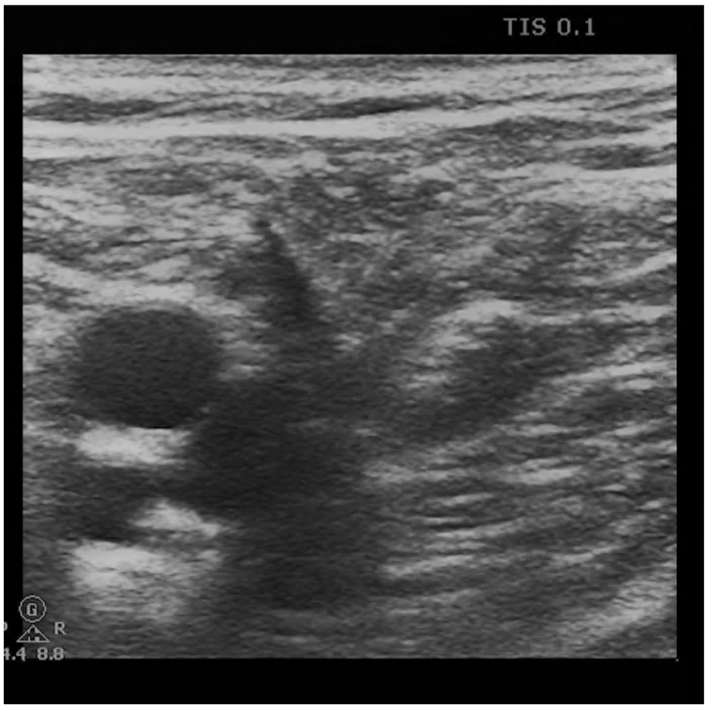


Phlebectomy

- Like High Ligation and Stripping, tradition open phlebectomy not often done
- Uses large incisions, high morbidity
- Dr. Robert Muller in 1950-60's first performed and described modern "Ambulatory Phlebectomies" but adoption took decades
- Varicose veins removed as outpatient, under local anesthesia, with small punctures and hooks.
- Apply hemostatic compression to allow for immediate ambulation.
- AKA: Stab avulsion, stab phlebectomy, microphlebectomy, and microextraction

Ablation (Truncal Veins)

- “Heat based” ablative procedures have been used for >20 years
- Radiofrequency ablation (RFA) or Laser
- Minimally invasive
- Equal efficacy, decreased morbidity, improved recovery, better satisfaction.
- Leaves tributaries at SFJ to preserve the normal physiologic flow
- Less hemodynamic disturbance and therefore less neovascularization.



Ablation - Results

- 90-100% effective short to mid term
- 84% closed at 5 years, 92% remained reflux free
- The analgesic needed in the RF patients is < 600mg ibuprofen/day
- Return to work on average < 7 days

Ablation - Results

- A multicenter study from five centers in the United States and Europe (EVOLVeS Study RFA vs Surgery)
  - less postoperative pain for up to 3 weeks
  - earlier return to activities/work (3days)
  - better cosmetic outcomes
  - 2-year follow-up showed continued improved QoL
- The RECOVERY study (RF versus EVLT)
  - RF had less pain, bruising, and better QoL in early post-operative period.
  - But not sustained at 30 days

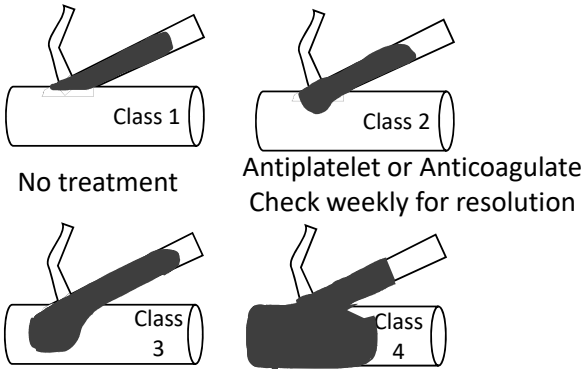
- Lurie F, Creton D, Eklöf B et al. Prospective randomized study of endovenous radiofrequency obliteration (closure) versus ligation and vein stripping (EVOLVeS): Two-year follow-up. Eur J Vasc Endovasc Surg 2005;29(1):67–73.
- Almeida JI, Kaufman J, Göckeritz O et al. Radiofrequency endovenous ClosureFAST versus laser ablation for the treatment of great saphenous reflux: A multicenter, single-blinded, randomized study (RECOVERY Study). J Vasc Interv Radiol 2009;20(6):752–9.

Ablation - Potential Complications

- Phlebitis
  - tender, erythematous, or ecchymosis
  - self-limiting
  - Similar rates in Laser and RFA (1-10%)
- Burns - rarely observed today
- Bruising - in RECOVERY study 2.2% of RFA
- Paresthesia in first generation studies were >5%, now rare

Ablation - Potential Complications

- Deep Vein Thrombosis
  - Mechanism different than typical postoperative thrombosis
  - Related to heat generated from catheters
  - With current generation devices, <1%
  - Endovenous Heath Induced Thrombosis (EHIT)
  - 3-7 days



No treatment

Antiplatelet or Anticoagulate
Check weekly for resolution

Anticoagulate
Check Weekly for resolution

Anticoagulate

Ablation - Limitations

- Previously scarred veins
- Larger than 2-2.5cm, or smaller than 2.5mm
- Tortuosity (maybe)
- Acute thrombus
- Extrafacial superficial vein

Non-Thermal Non-Tumescent Ablation

- Foam sclerotherapy or Microfoam Chemical Ablation
- Cyanoacrylate embolization (CAE)
- Mechanical Occlusion Chemically Assisted (MOCA)
- V-Block-assisted sclerotherapy (VBAS, minimal data available)
- Current limitations based on local markets and insurance

Non-Thermal Non-Tumescent Ablation

- Minimal risk of nerve or skin injury
- Safe below the knee
- Minimal discomfort to patients
- Disposable systems with lower capital equipment costs
- Patients can return to normal activity / work quickly

NTNT - MOCA

- Mechanism is both mechanical damage to the endothelium via 3500 RPM rotating wire and
- Unlike sclerotherapy, media is also damaged
- 96% closure rate at 1 and >2 years
- Minimal complications
  - No DVT, nerve, or skin damage.
- Venous Clinical Severity improved

Elias S, Lam YL, Wittens CHA. Mechanochemical ablation: status and results. Phlebology. 2013;28(1_suppl):10-14. doi:10.1177/0268355513477787

NTNT - CAE

- U.S. pivotal trial, VeClose is non-inferiority vs RFA
- 6-month occlusion rates were equivalent 99% vs 94%
- All measures of QoL were equal
  - procedural pain, bruising, and VCSS and 2 PRO measures

Morrison N, Gibson K, McEnroe S et al. Randomised trial comparing cyanoacrylate embolization and radiofrequency ablation for incompetent great saphenous veins (VeClose). J Vasc Surg Venous Lymphat Disord 2015;4:485–94.

Summary

- Surgical management of symptomatic varicose veins must include investigation and treatment of underlying cause (truncal vein reflux)
- Treatment options depend on size and location of the veins
- Treatments can range from open surgical ones, to anesthetic free local procedures
- Treatment of GSV reflux results in short and long-term improved QoL regardless of the modern modality.