Varicose Veins

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Prevalence

Varicose Veins

CHF

CAD

Stroke

Peripheral Artery Disease
What are varicose veins?

- >3 mm dilatation of subcutaneous vein.

Spider Veins → Varicose Veins → Venous Ulcer

Why do Varicose Veins Develop?

Blood Flowing In One Direction → Swelling
Blood Flowing In Both Directions → Damaged Valve

Normal Vein → Varicose Vein

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

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
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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?

- Recurrent or long segment SVT of VV → more aggressive treatment
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
Comparative study in leg telangiectasias treatment with Nd:YAG laser and sclerotherapy

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

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

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
- Proprietary mix of gasses
- Smaller foam that is more stable
- Less risk of air embolism
- Not necessarily more effective than “home made”

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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


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
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


**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

**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


**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

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.