Chronic Venous Insufficiency

Compression and Beyond

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Disclosure of Conflict of Interest

I do not have relevant financial relationships with any commercial interests.

Phlebology

The medical specialty devoted to the diagnosis and treatment of patients with venous disorder.

Chronic Venous Insufficiency

• Condition involving a dysfunction in the venous blood flow.
• Decreased efficiency of return to the heart resulting in pooling of blood in veins.
• Mostly affects the lower extremities

Chronic Venous Insufficiency (CVI)

• Epidemiology
• Anatomy and (Patho)Physiology
• Clinical presentation and Physical Examination
• Clinical Classification
• Treatment
• Case Presentation

Prevalence of CVI

• Estimates of the worldwide prevalence of varicose veins vary widely from 2-56% in men and from 1-60% in women
• Approximately one third of men and women aged 18-64 years have trunk varices
• Incidence increases with age and is more common in women (3 times more likely) with over 40% of women in their 50’s suffering from some sort of venous disorder
Lower Extremity Anatomy and Physiology

- Deep venous system
  - 90% of venous return
- Superficial venous system
  - Collecting system of veins
- Perforating veins
  - Conduits for blood flow from superficial to deep veins
- Musculovenous pump
  - Contraction of leg and foot muscles propels blood up through one-way valves

Superficial Venous System

- Great Saphenous Vein
- Small Saphenous Vein
- Major Tributaries
- Reticular Veins
- Venules
- Capillaries

Pathophysiology

- Valve failure and reflux
- Blood stagnation
- Increased intravascular pressure
- Dilation of vein wall
- Valve fibrosis, destruction, agenesis

Dynamics of Venous Pressure

Risk Factors

- Genetics
- Age
- Obesity
- Pregnancy
- Hormonal changes
- Prolonged standing or sitting
- Mechanical stresses or injury
- Smoking

Venous Insufficiency symptoms

- Aching, burning or cramping pain
- Tiredness
- Heaviness
- Restlessness
- Pruritus
- Swelling
Physical Examination

- Standing position from the groin to the ankle
- Varicose and telangiectatic veins
- Medial and lateral malleolar areas for skin changes
- Corona Phlebectatica

Duplex Ultrasound Evaluation

- Assess for Competency and Patency
  - Superficial System
  - Deep System
  - Perforators
- Colour Doppler or Pulse Wave Doppler
- Post-treatment follow up

Competent Veins

Incompetent Veins

CEAP Classification of CVI

- C: Clinical Findings
- E: Etiology
- A: Anatomical Findings
- P: Pathophysiological Component

Clinical Findings

- \( C_0 \): no visible or palpable signs of venous disease
- \( C_1 \): telangiectasia or reticular veins
- \( C_2 \): varicose veins
- \( C_3 \): edema
- \( C_{4a} \): pigmentation or eczema
- \( C_{4b} \): lipodermatosclerosis or atrophie blanche
- \( C_5 \): healed venous ulcer
- \( C_6 \): active venous ulcer
- S: symptomatic, including ache, pain, tightness, skin irritation, heaviness, and muscle cramps, and other complaints attributable to venous dysfunction
- A: asymptomatic
C₁ - Telangiectasia

C₁ - Reticular Veins

C₂ - Varicose Veins

C₃ - Edema

C₄ₐ - Pigmentation

C₄ₐ - Eczema or stasis dermatitis
C₄b - Lipodermatosclerosis

C₄b - Atrophie Blanche

C₅ - Healed Venous Ulcer

C₆ - Active Venous Ulcer

Etiology
- E₅: congenital
- E₆: primary
- E₇: secondary
- E₈: no venous cause identified

Anatomical Findings
- A₃: superficial veins
- A₄: perforating veins
- A₅: deep veins
- A₆: no venous location identified
Pathophysiology

- **P₁**: reflux
- **P₂**: obstruction
- **Pᵢₒ**: reflux and obstruction
- **P₃**: no venous pathophysiology identifiable

![Vein diagram](image)

Treatment

- **Conservative Treatment**
- **Sclerotherapy**
- **Endovenous Thermal Ablation**
  - Endovenous Laser Ablation (EVLA)
  - Endovenous Radiofrequency Ablation (ERFA)
- **Ambulatory Phlebectomy**
- **Stripping & Ligation**

Exercise and Lymphatic Massage

- Reduces symptoms such as aching and pain
- Reduces ulcer recurrence
- Speeds resolution of superficial phlebitis and DVT
- Minimum of 30 minutes of exercise daily is best
- Lower extremity exercise is helpful (*stay away from heavy weight-lifting or other strenuous activity*).

Compression Therapy

- Provides a gradient of pressure, highest at the ankle, decreasing as it moves up the leg
- Reduces reflux of blood
- Improves venous outflow
- Increases velocity of blood flow to reduce the risk of blood clots

Graduated Compression Stockings

- Must be graduated
- Calf high generally sufficient
- Replace q 6 months to assure proper pressure
- Available in a variety of strengths, styles, colors, and fabrics

<table>
<thead>
<tr>
<th>Compression Strength</th>
<th>Indications</th>
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<tbody>
<tr>
<td>8-15 mmHg, 15-20 mmHg</td>
<td>Leg fatigue, mild aching</td>
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<tr>
<td>20-30 mmHg (Class 1)</td>
<td>Mild Chronic Venous Insufficiency, small varicosities, mild edema/lymphedema, post-sclerotherapy, pregnancy</td>
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<tr>
<td>30-40 mmHg (Class 2)</td>
<td>Moderate Chronic Venous Insufficiency, moderate varicosities, moderate edema/lymphedema, DVT, venous ulcers</td>
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<tr>
<td>40-50 mmHg (Class 3)</td>
<td>Severe Chronic Venous Insufficiency, severe edema, venous ulcers, post trauma: fractures or burns, Lymphedema and lymphotic lymphedema tissue</td>
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<tr>
<td>50-60 mmHg (Class 4)</td>
<td>Lymphedema and lymphotic lymphedema tissue</td>
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Sclerotherapy

- Injection of a substance into a vein, causing endothelial destruction and resulting in fibrosis and obliteration of the lumen
- Visual and ultrasound guided
- Well tolerated, no down time, useful as primary or adjuvant treatment
- Effective use requires understanding of venous anatomy and sclerosant profiles

Ultrasound Guided Sclerotherapy

Indications for Echosclerotherapy

- Primary Rx of incompetent GSV and SSV
- Recurrence following GSV or SSV ligation/stripping or EVLA
- Major tributaries
- Larger deeper varicosities
- Perforating veins

Endovenous Thermal Ablation

- Catheter threaded into refluxing vein generates high temperature, damages vein wall, obliterates lumen
- Laser or Radiofrequency
- Indications:
  - large diameter, straight proximal segment of target vein
  - Usually GSV or SSV, though tributaries also feasible (AASV, PASV)

Past and Future Treatments

- Past
  - Ligation & Stripping
  - Ambulatory Phlebectomy
- Future
  - Mechanochemical Ablation
  - Endovenous Cyanoacrylate
Case Presentation

- 55 y.o. G3T3PoAoL3 otherwise healthy female
- Medication: None  NKDA
- Multiple telangiectasia in her 20's
- Varicosities in her 40's
- Family hx of CVI: Mother and maternal grandmother
- Symptoms: aching/cramping pain mostly in her calf, tiredness towards the end of day, ankle swelling with prolonged standing

Physical Exam

- Multiple moderately sized varicosities along medial aspect of left leg and single on the right.
- Networks of telangiectasia with prominent reticular veins.
- \( C_{1,2}\, E_{A,s,d,P,I} \)

Treatment Plan

- Ultrasound guided foam sclerotherapy using Tromboject (Sodium Tetradecyl Sulfate)
- Veins treated in segments from proximal to distal sources of reflux
- Weekly appointments with follow up U/S
- Compressive dressing
- Post treatment compression stockings

Outcome

Pre-treatment  6 months post-treatment

Questions?

THANK YOU!

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