Chronic Venous Insufficiency

VENOUS DISEASE: UNDERSTANDING EDEMA, ITS CAUSES AND WHAT WE CAN DO

Science and Management Symposium
SAM 2018
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Lower Extremity Venous Disease

- By age 50, nearly 40% of men and 20% of women have significant venous problems
  Venous Disease Foundation (2012)
- VLUs affect 1% of the adult population and may be primary or secondary
  Johnson and Rodgers, Podiatry Management August 2011
- 600,000 DVT/yr in US with 50% to PE
  WebMD LLC (2013)
- Up to 1/3 of people with venous insufficiency can not work outside of the home
  USF “Understanding Compression” (2001)
- 30 million Americans affected by varicose veins or CVI, only 1.9 million seek treatment annually
  Gloviczki P, et al., JVS; May 2011

Risk Factors for Venous Disease

- Heredity and age
- Prolonged Standing
- Heavy Lifting
- Multiple pregnancies
- Ligamentous Laxity
- Obesity
- Hormonal (females)
- Diabetes??
- PAD risk factors ??
- Inc. in circulatory fluid volume
- Decrease in skeletal muscular activity
## Presentations: Superficial and/or Deep

<table>
<thead>
<tr>
<th>Etiology</th>
<th>Manifestations</th>
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<tr>
<td>Venous Obstruction (DVT)</td>
<td>Recurrent Edema</td>
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<td>Hyperpigmentation</td>
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### Pathogenesis
- Defects in venous wall strength
- Valvular incompetence
- Venous hypertension
- Cellular problems

- Venous Stasis Dermatitis
- Lipodermatosclerosis
- Varicose Veins
- Telangiectasias & reticular veins
- Corona Phlebectatica
- Venous Ulcerations

## Pathogenesis

- Defects in venous wall strength
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## Progressive Stages

<table>
<thead>
<tr>
<th>I. Varicose veins</th>
<th>I. Heavy Foot Syndrome</th>
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<td>II. Ankle/leg edema</td>
<td>II. Intermittent edema</td>
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<td>III. Stasis dermatitis</td>
<td>III. Persistent edema and skin changes</td>
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<td>IV. Lipodermatosclerosis</td>
<td>IV. Ulceration</td>
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<td>V. Venous stasis ulcer</td>
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### CEAP Classification of Venous Disease

- Clinical
- Etiological
- Anatomical
- Pathophysiological

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Venous Disease in Podiatric Practices

Hyperpigmentation and Venous Stasis Dermatitis and Ulceration
Skin loses elasticity and becomes dry and shiny

Lipodermatosclerosis (LDS)
- LDS literally means scarring of the skin and fat
- Chronic panniculitis with lipomembranous changes
- Found with long standing venous insufficiency
- Skin becomes brown, smooth, indurated and painful
- Proximal to the ankle, usually medial
- Tapering proximal to the ankles “inverted Champaign bottle”
- Skin is permanently and irreversibly damaged

Superficial Vein Reflux
- Telangiectasia (spider veins)
  - Confluence of red dilated venules
  - Intradermal <1 mm in caliber
  - 15% of men and 25% of women
  - Family hx, sun exposure, pregnancy
  - Can be caused by Reticular Veins
- Reticular Veins (blue veins)
  - Also called intradermal varies.
  - Dilated bluish subdermal vein
  - 1 mm to less than 3 mm in diameter
  - Usually Tortuous but nonpalpable
  - Called “Feeder Veins” if associated with Telangiectasia veins
Corona Phlebectatica (CP)

- CP is classically described as the presence of abnormally visible cutaneous blood vessels at the ankle with four components: "venous cups," blue and red telangiectases, and capillary "stasis spots."
- Fine visible vessels too numerous to delineate
- Dilation and elongation of venules in the dermis of the ankle and foot

Varicose Veins

- Twisted, elongated and palpable – est. 29 million suffer
- Irreversible damaged walls and valves between deep/superficial
- Also known as a varix, varices and varicosities – palpable
- Ant/Pos/Med/Lat thigh and legs and med/Lat ankles as well as female genitalia
- Blood pools in stagnant segments and get inflamed causing chronic phlebitis, aching, pain, itching, burning and cramping

Venous Anatomy of the Lower Extremity

- Subcutaneous Superficial system not paired with arteries
- Deep system within the muscular fasciae paired with corresponding arteries
- Perforating veins uni-directionally connect superficial to deep
Dysfunction, mainly of the valves, may occur in each system and in combination
Superficial Venous Supply of the Foot

Dorsal Venous Arch
- Dorsal Digital veins
- Intercapitular (plantar)
- Via perforators
- Common digital Veins form Dorsal Venous Arch
- Medial Marginal to GSV
- Lateral Marginal to SSV
- Perforating Veins to GSV

Dorsally, more organized than plantar

Superficial Venous System

Small (Lesser) Saphenous Vein (SSV)
- Courses lateral to posterior
- Posterior to lateral malleolus
- Superficial to the deep fascia
- Midline to upper calf,
  Between two heads of the gastrocnemius
- Usually joins the Popliteal
  1/3 time feeds into GSV via communicating veins

Superficial Venous System

Great Saphenous Vein (GSV)
- Anterior to medial malleolus
- Crosses posteriorly to lie medial
- Anteromedial AK
- Superficial to the deep fascia
- Passes thru foramen ovale
- Feeds common femoral vein at saphenofemoral junction

Common Femoral Vein
- Saphenofemoral junction
- Other veins that feed into it around the junction:
  - the superficial inferior epigastric
  - the superficial external pudendal
  - the superficial circumflex iliac
- Above the knee
  - Anterior and Posterior Circumflex
- Below the knee
  - Anterior Tibial
  - Posterior Arch Vein
Perforating Veins of the Foot

- Medial more developed than Lateral
- Perforator extending across the 1st IM space extends from the superficial venous arch dorsally to the (deep) pedal vein (dorsalis pedis vein) which leads to the anterior tibial vein

Deep Venous Supply of the Foot

### Deep Plantar Venous Arch
- "Plantar Venous Pump"
- Plantar digital veins ??
- Send intercapitular veins to superficial dorsal venous arch
- Metatarsal plantar veins
- Deep plantar venous arch
- Medial/Lateral plantar veins
- Posterior Tibial Vein

### Dorsal Deep Veins
- less prominent than Plantar
- Dorsal digital veins are superficial
- Deep veins begin at digital clefts
- Pedal Vein (Dorsalis Pedis Vein)
  - Along with the 1st IM space perforator of the superficial venous arch
- Anterior Tibial Vein

Deep Venous System

Valvular, IM and return to Right Atrium

- External Iliac Vein
- Common Femoral Vein
  - Deep Femoral Vein
    - Short course with deep muscle tributaries
  - Femoral Vein
    - Course through the adductor canal
  - Popliteal Vein
  - Peroneal Vein
    - soleal and gastrocnemius intramuscular veins
    - join mid calf from sinusoid venous network
  - Anterior Tibial
  - Posterior Tibial
## Valvular Incompetence

**Venous Insufficiency – Increased SVP**

- **Primary Cause of Chronic Venous Insufficiency (CVI)**
- **Venous Reflux Disease results**
- **Venous Outflow Obstruction**
- **Venous insufficiency also tends to be progressive**
- Superficial venous reflux can cause spider veins, varicose veins, and lead to edema, hyperpigmentation, and venous ulcers
- Most patients with venous dysfunction and venous ulcers have incompetent valves in both superficial and perforator veins

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## Chronic Venous Insufficiency

**Deep Veins**

- **Deep Vein Incompetence usually the result of a DVT**
- **Deep venous insufficiency may result from increased pressure from superficial insufficiency**
- **Post phlebitic syndrome may develop**
  - pain, edema, pruritus, hypohydrosis, exema and eventually ulceration
- **Venous Claudication may occur**
  - deep incompetency and increased venous pressure during muscle contraction
- **DVT recurrence rate is about 30% within 8yrs of patients who receive only 3-6 months of initial anticoagulation**
- **Deep venous disease is treatable but not curable**

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## Chronic Venous Insufficiency

**Other Etiology and Pathogenesis**

- **Pathogenesis**
  - Valvular incompetence
  - Defects in venous wall strength
  - Venous hypertension
  - Cellular problems
- **70% hereditary females > males – hormonal relaxation of venous walls**
- **Inflammatory changes in the veins**
- **Inflammation causes ischemic and trophic injury to skin**
Symptoms of CVI

- Pain, throbbing or cramping
- Burning or itching, especially around a vein
- Heaviness, aching or fatigue especially late in the day or after periods of dependency
- Same symptoms found with Pes Valgus or PTTD
- DDx - can be found with periods of sitting or NWB
- Course: Progressive Preventable Manageable

Edema

- Clinical state characterized by an accumulation of fluid in the interstitial or intracellular space
- CVI edema is chronic, pitting and either unilateral or bilateral
- Edema is the result of excess fluid in the interstitial space and occurs when there is a breakdown in this pressure gradient

Treating CVI and Edema with Compression

- Bandaging
  - Unna’s Boots
  - Casts
  - Ace wraps
- Intermittent Pumps
  - Refractory Edema or Venous Dysfunction
  - Used in conjunction with stockings
  - Does not involve muscle pump
  - Adjustable pressure
- Compression Stockings
  - Ready to Wear or Custom
  - Must remove (>20mmHg) at night!
Compression of Superficial Veins

- Acts as a "restraint" as superficial veins do not have the muscular and fascial support system of deep veins
- External compression can compensate for both superficial and perforator valvular disease
- Return distended, over dilated veins to a more normal size
- Fabric is an external replacement for lost elasticity and resistance of skin
- Decreases the progression of both venous and lymphatic disease, dermatitis and post thrombosis syndrome

In Summary....

Lower Extremity Venous Disease affects our patients and needs as much attention as peripheral arterial disease for prevention of progression.

Conservative treatment for edema needs to be treated with elevation, increasing the muscle pump with activity and supportive measures to reduce the subjective and objective symptoms of superficial and deep venous disease.

Thank You