Saturday General Session

Chronic Venous Insufficiency: Diagnosis and Treatment

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Interventional Radiology and Medical Director
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The Woodlands, Texas

Educational Objectives
By the end of this activity, the participant should be better able to:
1. Discuss the basic pathophysiology of chronic venous insufficiency.
2. Identify the clinical presentations of chronic venous insufficiency.
3. Discuss the diagnosis/workup of chronic venous insufficiency.
4. Utilize treatment options for chronic venous insufficiency.

Speaker Disclosure
Dr. Radhakrishnan has disclosed that he has no actual or potential conflict of interest in relation to this topic.
Chronic Venous Insufficiency: Diagnosis and Treatment

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Prevalence of Venous Disease

Venous Anatomy

• 3 systems:
  1. Superficial
     • Skin changes, pain, ulcers – WON’T KILL
  2. Deep – DVT WILL KILL
  3. Perforating
     • Connects superficial and deep systems

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Annual Cost of CVI
• 2 million work days
• $1.4 billion

Annual U.S. Incidence

U.S. Prevalence

Venous Anatomy
Ambulatory Venous Hypertension

Pathophysiology: Reflux from Valve Incompetence

CEAP Classification
- C1: Telangiectasias/reticular veins ("spider veins")
- C2: Large varicose veins ("bulging veins")
- C3: Edema
- C4: Skin changes
- C5: Healed ulceration
- C6: Active ulceration

Quality of Life
Risk Factors for CVI

- HEREDITARY – # 1 RISK FACTOR
- Gender – Women > Men
- Age – 1 > 50 yrs
- Pregnancy – Multiple increase risk
- Standing occupation
- Sedentary lifestyle
- Obesity
- Prior History of DVT

Symptoms of CVI

- Aching
- Fatigue, heaviness in legs
- Pain: Throbbing, burning, stabbing
- Cramping (Night)
- Swelling (peripheral edema)
- Itching
- Restless Leg Syndrome
- Numbness (Venous Neuropathy)

Venous Disease: Physical Exam

- Telangiectasias
- Reticular veins
- Varicose veins
- Hyperpigmentation
- Edema
- Healed or active ulcerations

Telangiectasia (Spider Vein) – C1

Reticular Veins – C1

Varicose Veins – C2
Edema – C3

Hyperpigmentation – C4

SKIN CHANGES = ADVANCED DZ
- Medial aspect of lower leg and ankle ("gaiter zone")
- Predictor of future ulceration*

Lipodermatosclerosis (LDS) – C4

Corona Phlebectasia – C4

Atrophie Blanche – C4
Venous Ulcer – C5/C6

Perforating Veins

Compotent perforating veins carry blood from the superficial to deep venous system.

Incompetent perforating veins cause blood to flow from the deep to superficial venous system, creating localized venous hypertension.

Localized venous hypertension leads to localized skin changes, pain, edema, and recurrent ulcerations.

Ulcer Recurrence at 1 Year

When to Refer to a Phlebologist?

• Symptoms (aching, pain, swelling, etc.) unresponsive to conservative measures
• Skin changes suggestive of Chronic Venous Insufficiency
• Impending or active ulceration

Vein Disease: Work-Up

• Detailed Ultrasound
• Conservative Therapy
• Procedures
  • Endovenous ablation
  • Phlebectomy
  • Sclerotherapy
Not All Ultrasounds are the Same!

<table>
<thead>
<tr>
<th>Identified Pathology</th>
<th>Standard venous ultrasound</th>
<th>Detailed venous ultrasound</th>
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</thead>
<tbody>
<tr>
<td>Deep vein reflux, DVT</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Saphenous vein reflux</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Perforating vein reflux</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Impression: “No Evidence of DVT”

Vein Disease: Work-up

- Detailed Ultrasound
- **Conservative Therapy**
- Procedures
  - Endovenous ablation
  - Phlebectomy
  - Sclerotherapy

Conservative Therapy

- Exercise
  - At least 30 minutes daily
- Leg elevation
- Pharmacologic
  - OTC NSAIDs
  - MPFF
- Graded Compression Stockings
- Pneumatic Compression Device

Venous Hypertension

Micronized Purified Flavonoid Fraction (MPFF)

- Derived from diosmin (Flavonoid found in citrus) and Hesperidin (oranges)
- Classified as a “Prescription Medical Food Product”
- Minor side effect - <5% GI irritation
Reducing Venous HTN

Graded Compression Stockings

- Class 1 - 10 to 20 mm Hg
- Class 2 - 20 to 30 mm Hg
- Class 3 - 30 to 40 mm Hg
- Class 4 - 40 to 50 mm Hg

Pneumatic Compression

- Mechanical, sequential compression from the distal foot to the knee/thigh/hip/trunk – DISTAL TO PROXIMAL COMPRESSION
- Indications
  - Lymphedema
  - Chronic, non-healing venous ulcers

Pneumatic Compression Pump

Vein Disease: Treatment

- Detailed Ultrasound
- Conservative Therapy
- Procedures
  - Endovenous Ablation
  - Phlebectomy
  - Ultrasound Guided Sclerotherapy
Endovenous Thermal Ablation

- Used to treat saphenous and perforating veins
- Office-based procedure
- Takes approximately 30 minutes
- LOCAL ANESTHESIA-NO SEDATION
- >90% closure at 2 yrs.
- REPLACED VEIN STRIPPING SURGERY

Endovenous Ablation

Endovenous Ablation

Endovenous Ablation

Endovenous Ablation

Endovenous Ablation

Microphlebectomy

- Removal of bulging varicose veins through a 0.5 – 1.0 cm incision
- Local anesthesia
Sclerotherapy

- Injection of smaller varicose veins, reticular veins and telangiectasias
- Chemical agents used – STS (Sodium Tetradecyl Sulfate) OR Polidocanol
- Liquid agent mixed with room air (or CO₂) to make “foam”
- Injected using ultrasound guidance
Post-Procedure Care

- Ambulate immediately after procedure
- Return to normal activities immediately
- Wear compression stockings for 1-2 weeks post procedure
- Follow-up ultrasound done within 7-10 days

Insurance Coverage

- When is Vein Disease covered?
  - Symptoms not controlled by conservative treatment
  - Skin Changes from venous insufficiency (C4-C6)

Leg Ulcers

- What is an ulcer?
  - Defined as an area of discontinuation of the surface epithelium
  - Leg ulcer – Discontinuation of the squamous epithelium usually around the ankle or foot

Leg Ulcers, Cont.

- Common, chronic, and recurring condition
- Prevalence – 1.5 to 3 per 1000
- Increase w/ age
- Estimated that up to 20 per 1000 over the age of 80 will suffer from a leg ulcer
Causes of Leg Ulcers

- VENOUS INSUFFICIENCY: 80-85%
  - Other causes
    - Arterial
    - Mixed arterial and venous
    - Diabetic
    - Systemic vasculitis
    - Trauma
    - Malignancy

Arterial vs. Venous Ulcers

**Venous**
- Varicose veins, immobility
- Prior history of DVT
- Phlebitis in the affected leg
- Family Hx of venous dz
- Signs of venous dz – Heaviness, aching, cramping, itching, hyperpigmentation, venous stasis dermatitis
- Ugly, ill defined borders, usually in distal calf/ankle region

**Arterial**
- ABI less than 0.8
- Diabetes
- Hx of heart dz, TIA, stroke
- Hx of systemic vasculitis
- Risk factors – High cholesterol, smoking
- Signs of arterial dz – Exercise induced claudication
- Well circumscribed, “punched out” appearing, usually on dorsum of foot/ toes/ heel

Arterial vs. Venous

Assessing an Ulcer

**Criteria**
- Size, depth, and edges
- Ulcer base – Epithelialization, granulation, eschar, necrosis
- Level of exudate – Mild, moderate, severe
- Signs of infection – Enlargement, pyrexia, foul odor
- Pain – Assess level, frequency, and duration

**Rationale**
- Document progress
- Aid choice of dressing and indicate healing progress
- Aid in dressing choice and frequency of changes
- May require Antibx
- Relieve distress and improve Rx compliance

Venous Leg Ulcer Treatment

- Irrigate with warm saline or water, then dry. Sterile aseptic technique not required
- Remote slough or necrotic tissue by gentle washing
- If debridement needed, should be done by trained professional
- For uncomplicated, non-infected ulcers apply compression bandage
  - 3 or 4 layer if immobile
  - 2 layer if mobile

Arterial Leg Ulcers

- Caused by reduced blood supply to lower limb secondary to blockage or narrowing in an artery – Leads to hypoxia, tissue damage/ ulcer formation
- May take months to years to heal and are often painful
- High rate of infection
- Typically over toes, heel, bony prominences of foot
- Treatment
  - DO NOT APPLY COMPRESSION – May lead to further ischemia
  - Revascularization is the mainstay of treatment – i.e., endovascular intervention using angioplasty/stent or surgical bypass
  - Hyperbaric O₂ and/or skin graft
<table>
<thead>
<tr>
<th>Wound Dressings</th>
<th>Semi-permeable Films</th>
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<tbody>
<tr>
<td>• Arterial ulcer – keep wound dry</td>
<td>• Non-absorbent</td>
</tr>
<tr>
<td>• Venous ulcer – keep wound warm and moist</td>
<td>• Superficial burns, grazes, closed surgical incisions, small skin tears and IV sites</td>
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<tr>
<td>• Control the amount of leakage</td>
<td>• Control odor from the wound</td>
</tr>
<tr>
<td>• Protect wound from further pain, damage, infection</td>
<td>• Be comfortable and not restrict movement</td>
</tr>
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<td>• Minimize dressing changes and promote healing and formation of granulation tissue</td>
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<tr>
<th>Foams</th>
<th>Alginates</th>
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<tbody>
<tr>
<td>• Moderate to heavily exuding, superficial and cavity wounds, venous ulcers (with compression), pretibial lacerations, infected ulcers, pressure ulcers, pilonidal sinuses</td>
<td>• Needs exudate to function</td>
</tr>
<tr>
<td>• Heavily exuding leg ulcers, pressure ulcers, and dehisced abdominal wounds</td>
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<tr>
<th>Hydrocolloids</th>
<th>Hydrogels</th>
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<tr>
<td>• Light to moderately exuding wounds that would benefit from autolytic debridement</td>
<td>• Limited absorbency</td>
</tr>
<tr>
<td>• Leg ulcers, pressure ulcers, and donor sites</td>
<td>• Best for minimally exuding or dehydrated wounds such as minor burns, grazes, lacerations</td>
</tr>
<tr>
<td>• Thin sheets useful over suture lines and IV sites</td>
<td></td>
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</table>
Hydroactive

- Waterproof, expandable, non-residual, and semi-permeable
- Highly exudating surface and cavity wounds including leg ulcers, pressure ulcers, and minor burns
- Useful over joints – Expand and contract without causing constriction
- Not indicated for dry or lightly exudating wounds

Case #1

Case #2

Case #3
Take Home Points

• LOOK FOR VEIN DISEASE ON YOUR PATIENTS
• If you don’t see it, you may not be looking for it
• Refer to a phlebologist who knows what they’re doing
  • Physician Credentials
    • American Board of Venous & Lymphatic Medicine (ABVLM)
  • PROVIDER’S TRAINING AND KNOWLEDGE OF ULTRASOUND

References

• A. Rameler. Clinical Benefits of Daflon 500 mg in the Most Severe Stages of Chronic Venous Insufficiency; Angiology; Vol 52; Suppl 1, 2001; pg. 549-556.
• G. Jantet. Chronic Venous Insufficiency: Worldwide Results of the RELIEF Study; Angiology; Vol 53, Num 3, 2002; pg. 245-256.
• K. Roztocil, V. Stvrtinova, and J. Strejcek. Efficacy of a 6 month treatment with Daflon 500 mg in patients with venous leg ulcers associated with Chronic Venous Insufficiency; International Angiology; March 2003; pg. 24-31.

References, Cont.

• F.G.R. Fowkes. Epidemiology of Chronic Venous Insufficiency; Phlébologie; Vol 11:pp 2-5.
• S. Onida, A. Davies. Predicted Burden of Venous Disease; Phlébologie; Vol 31, Issue 1 Suppl:pp 74-79.
The following medications were discussed in this presentation. The table below lists the generic and trade name(s) of these medications.

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Trade Name</th>
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<tr>
<td>Alignates</td>
<td>Alignate M, Algoderm, Comfeel Seascorb, Curasorb, Kaltostat</td>
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<tr>
<td>Foams</td>
<td>Allevyn, Cavi-care, Curafoam, Tegafoam, Truefoam</td>
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<tr>
<td>Hydroactive</td>
<td>Allevyn Thin, Biatain, Cutinova, Hydro, Ploymen, Tieile</td>
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<tr>
<td>Semi-permeable Films</td>
<td>Bioclusive, Cutilfilm, Hydrofilm, Opsite, Tegaderm</td>
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