Management of Chronic Venous Insufficiency and Venous Leg Ulcers

Igor Altman, DO
ACOFP FULL DISCLOSURE FOR CME ACTIVITIES

Please check where applicable and sign below. Provide additional pages as necessary.
Name of CME Activity: 2015 AOA/ACOFP Osteopathic Medical Conference & Exposition (OMED)

Dates and Location of CME Activity: October 17 - October 21, 2015 Orange County Convention Center Orlando, Flor
Topic: Management of Chronic Venous Insufficiency and Venous Leg Ulcers Sunday, October 18, 2015, 11:00-Noor
Name of Speaker/Moderator: Igor Altman, DO

DISCLOSURE OF FINANCIAL RELATIONSHIPS WITHIN 12 MONTHS OF DATE OF PRESENTATION

A. Neither I nor any member of my immediate family has a financial relationship or interest with any proprietary entity producing health care services.
B. I have, or an immediate family member has, a financial relationship or interest with a proprietary entity producing health care services.

- Research Grants
- Speakers' Bureaus*
- Ownership
- Consultant for Fee
- Stock/Bond Holdings (excluding mutual funds)
- Employment
- Partnership
- Others, please list:

Please indicate the name(s) of the organization(s) with which you have a financial relationship or interest, and the specific relationship(s). If more than four relationships, please list on separate piece of paper:

<table>
<thead>
<tr>
<th>Organization With Which Relationship Exists</th>
<th>Clinical Area Involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
<td>4.</td>
</tr>
</tbody>
</table>

*If you checked “Speakers' Bureaus” in Item B, please continue:
- Did you participate in company-provided speaker training related to your proposed topic?
- Did you travel to participate in this training?
- Did the company provide you with slides of the presentation in which you were trained as a speaker?
- Did the company pay the travel/lodging/other expenses?
- Did you receive an honorarium or consulting fee for participating in this training?
- Have you received any other type of compensation from the company? Please specify:
- When serving as faculty for ACOFP, will you use slides provided by a proprietary entity for your presentation? Please specify:
- Will your topic involve information or data obtained from commercial speaker training?

DISCLOSURE OF UNLABELED/INVESTIGATIONAL USES OF PRODUCTS

A. The content of my material(s)/presentation(s) in this CME activity will not include discussion of unapproved or investigational uses.
B. The content of my material(s)/presentation in this CME activity will include discussion of unapproved or investigational uses, as indicated below:

I have read the ACOFP policy on full disclosure. If I have indicated a financial relationship or interest, I understand that the ACOFP will review the information to determine whether a conflict of interest may exist, and I may be asked to provide additional information to disclose, false disclosure, or inability to resolve conflicts will require the ACOFP to identify a replacement.

Signature: Igor Altman, DO
Management of Chronic Venous Insufficiency and Venous Leg Ulcers

Igor Altman, DO, MBA

Assistant Professor of Clinical Family Medicine
Assistant Professor of Clinical Surgery
University of Illinois Hospital & Health Sciences System
Division of Vascular Surgery,
Section of Wound Healing and Tissue Repair
Objectives

- Recognize critical anatomical and clinical elements of Chronic Venous Disease.
- Become familiar with pathophysiology and clinical evaluation of venous disease.
- Formulate effective management plan of Chronic Venous Insufficiency and wounds associated with it.

Epidemiology

- Up to 33% of women and 20% of men in Western countries with CVI
- ~20% of people with CVI will develop VLU
- VLUs are the most common LE ulceration – 70% of all leg ulcers
- VLU prevalence rate in the US – 1-1.5% of the population


Epidemiology

- US – direct cost of treating VLUs ~$2,500/patient
- Surgical interventions to treat superficial venous system do not significantly increase the total cost, but significantly reduce the recurrence rate (34% vs. 5%)


Definitions

- CVI is a condition that occurs when the venous wall and/or valves in the leg veins are not working effectively, making it difficult for blood to return to the heart from the legs.
- Venous Hypertension is the result of reflux or obstruction
- VLU – is an open skin lesion of the leg or foot that occurs in an area affected by venous hypertension

Venous Anatomy Nomenclature

- **Deep** (Femoral, Sciatic, Popliteal, AT, PT, Peroneal, Sural)

- **Superficial** (GSV, SSV)

- **Perforating** (thigh, knee, calf, ankle, foot)


VLU Pathophysiology

- **Primary and Secondary**

- **Vein wall and the valve**

- **Inflammation, valvular insufficiency, varicosities, venous hypertension, thrombosis (edema, pain, skin changes, VLU)**
Clinical Evaluation

- Risk Factors – obesity, prior DVT, FHx, varicose veins

- Symptoms – burning, itching, aching, throbbing, cramps, heaviness, tiredness, fatigue, or restless legs.

- Symptoms usually exacerbated by dependency and are relieved by elevation.

Clinical Evaluation – PE Findings
Clinical Evaluation – Non-venous Causes of Leg Ulcers

- **Swedish Study** – N=827 (chronic LUs), random sample N=382; 54% venous, the rest non-venous (CI 95%)
  

- **German Study** – N=31,619
  
  ◦ 47.6% venous
  ◦ 52.4% other etiologies (4.5% arterial, 17.6% combined, others – diabetes, vasculitis, traumatic, PG, infection, neoplasia, calciphilaxis, & drug induced)


Clinical Evaluation

**Wound Documentation**

- Serial Measurements
- # of wounds
- Position
- Area/Volume
- Tissue Quality/Drainage/Infection
- Photography

**Wound Culture**

- If there are no clinical signs of infection and the wound is responding to treatment, there is NO INDICATION to culture the wound.

Clinical Evaluation

Wound Biopsy

- Routinely not recommended
- No response to therapy w/in 4-6 wks
- Atypical features
- Obtain several, from the edge and mid-portion

Punch Biopsy of a Wound
Clinical Evaluation

Laboratory Testing
Hypercoagulable work-up for patients with recurrent or recalcitrant VLUs


Arterial Testing
- ~15-25% of patients with VLUs, have concomitant PAD
- Hand-held doppler
- Formal non-invasive arterial studies


Venous Duplex Ultrasound
- ALL patients with VLUs
- Evaluate for both obstructive and reflux patterns

Clinical Evaluation

Venous Imaging

- CTV or MRV to rule out central venous obstruction, thrombotic & non-thrombotic (fibrosis, masses, May-Thurner Syndrome, etc.)

Clinical Evaluation – CEAP System

Clinical*  
C0 = No clinical signs  
C1 = Small varicose veins  
C2 = Large varicose veins  
C3 = Edema  
C4 = Skin changes without ulceration  
C5 = Skin changes with healed ulceration  
C6 = Skin changes with active ulceration  

Etiology*

E0 = Congenital  
E1 = Primary  
E2 = Secondary  
(usually due to prior DVT)

Anatomy*

A0 = Superficial veins  
A1 = Deep veins  
A2 = Perforating veins

Pathophysiology*

P0 = Reflux  
P1 = Obstruction

Clinical Classifications with examples

- Pigmentation or telangiectasia
- Venous ulcer
- Ulceration
- Venous claudication
- Chronic venous insufficiency

*Early application of compression should be performed to correct swelling and progressive scarring and to initiate the healing process by improving the venous microcirculation.*


Wound Care

Wound Bed Preparation

- Debridement
- Wound exudate control
- Management of surface bacteria

Wound Care – Debridement

<table>
<thead>
<tr>
<th>Mechanical</th>
<th>WTD and Pulse Lavage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autolytic</td>
<td>Hydrogel, Transparent film, Hydrocolloid</td>
</tr>
<tr>
<td>Enzymatic</td>
<td>Collagenase (Santyl)</td>
</tr>
<tr>
<td>Sharp</td>
<td>Blade, curette</td>
</tr>
<tr>
<td>Biologic</td>
<td>Maggots</td>
</tr>
</tbody>
</table>
Anesthesia for Sharp Debridement

- 4% or 5% liposomal topical lidocaine
- Eutectic Mixture of Local Anesthetics (EMLA) lidocaine-prilocaine cream
- Injectable anesthetics
- Regional nerve blocks
- General anesthesia

Wound Care

Wound Cleansers
• Any are OK, as long as they are not cytotoxic (betadine, dakin’s solution, H₂O₂, acetic acid, etc.)

Objectives
◦ Maintain temperature
◦ Minimize damage to granulation tissue
◦ Maintain acidic environment


Cellulitis vs. Acute Lipodermatosclerosis (ALDS) vs. Venous Dermatitis (VD)
Management of Limb Cellulitis

- Most common pathogens – strep or staph
- Systemic gram-positive antibiotics
- Reserve broader coverage for unresponsiveness
- Not enough evidence to support the use of topical or systemic antibiotics for treatment of colonization and biofilm, without clinical evidence of infection.


Wound Colonization and Bacterial Biofilms

Biofilm

Healthy Tissues

Critical Colonization
Treatment of Wound Infection

- Pus, malodor, cellulitis, fever, leukocytosis
- If available — quantitative cultures (>1x10^6 CFU/g of tissue) & clinical evidence of infection
- Lower levels of CFU/g of tissue for virulent or difficult to eradicate bacteria (ß-hemolytic strep, pseudomonas, or resistant staph species)
- Most successful way to eradicate infection – debridement + antibiotic therapy
- **Insufficient evidence to recommend the use of antimicrobial dressings or topical antibiotics for treatment of infected or contaminated wounds**


Dressing Selection

None can be labeled as ideal!
“Dressing for the Occasion”

<table>
<thead>
<tr>
<th>Absorb Moisture</th>
<th>Neutral (“keep what's already there”)</th>
<th>Add Moisture</th>
<th>Antimicrobial</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Alginate</td>
<td>• Transparent Films</td>
<td>• Hydrogel</td>
<td>• Silvasorb</td>
</tr>
<tr>
<td>• NPWT (VAC)</td>
<td>• Biological dressings</td>
<td>• Debridng agents (Santyl)</td>
<td>• Iodoflex/iodosorb</td>
</tr>
<tr>
<td>• Gauze</td>
<td>• Collagen dressings</td>
<td></td>
<td>• Silver Alginate</td>
</tr>
<tr>
<td>• Foams</td>
<td>• Hydrocolloid (duoderm)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Peri-ulcer Skin Management

- If dermatitis – consider topical steroids
- Moisturizing emollients
- Zink oxide to peri-wound area
Indications for Adjuvant Therapies

- Recommended for VLUs that fail to demonstrate positive healing trajectory (PHT) after a minimum of 4-6 weeks of standard wound therapy (SWT)

- PHT – ~25% volumetric size reduction w/in 4 weeks

- SWT – compression, selective debridement, control of bioburden, wound moisture balance with appropriate dressings.


Cellular Therapy – Apligraf

- Bi-layered (epi-/dermal)

- FDA approved for VLUs > 4wks

- 44 sq cm

- 12wks, 5 total, 1-3 wks apart
**Split-thickness Skin Grafting**

- Generally for VLUs > 50 cm² that did not respond to SWT w/in 4-6 weeks
- Consider NPWT for wound bed preparation

**Other Adjunctive Therapies**
Compression – Ulcer Healing

Healing rate is superior with compression than without it (Grade – I; Level of Evidence A) (70% vs. 25% w/in 12 wks)

Multilayer, short-stretch compression wraps or alike are recommended (Unna boots, PROFORE wraps, Circaids, etc.) over single component compression.

Compression – 12-months Ulcer Recurrence

- 67% without compression
- 28% with compression and good compliance
- 12% with compression and superficial venous surgery
- Compression Stockings (20-30 vs. 30-40mmHg)
  - No difference in recurrence, but significantly lower compliance with higher compression


Compression – Arterial Insufficiency

- Safe if ABI ≥ 0.8
- Needs to be modified if ABI 0.5 to 0.8
- Not recommended if ABI ≤ 0.5

Operative/Endovascular Management

Ablation of the incompetent superficial and/or perforating vein

- Ulcer Healing (Grade 2, Level of Evidence C)
- Ulcer Recurrence (Grade 1, Level of Evidence B)
- Open Surgery, Radiofrequency or Laser ablation – equivalent in effect and safety


Ancillary Measures

Nutrition Assessment and Management

- Check Vit. A and E, albumin and zinc levels
- Supplement only if deficient!

Ancillary Measures
Systemic Drug Therapy
- Pentoxifylline (Trental) – Grade-I, Level of Evidence – B)
  - Powerful inhibitory effect on:
    - Cytokine-mediated neutrophil activation
    - White cell adhesion to endothelium
    - Oxidative stress

If cannot tolerate Trental, consider:
- Horse Chestnut Seed Extract
- Rutin

Primary Prevention
Clinical CEAP C3-4 Primary Venous Disease
Compression stockings – 20-30 mmHg, knee or thigh high, determined by patient’s preference
To improve compliance, may use lighter compression
Primary Prevention

Clinical CEAP C1-4 Post-Thrombotic Venous Disease

- Compression stockings – 30-40 mmHg, knee or thigh high, determined by patient’s preference (Grade-1, Level of Evidence – B)
- Lesser compression strength is not as effective

Primary Prevention

Education Measures
- Regular exercises
- Leg elevation when at rest
- Careful skin care
- Weight control
- Proper foot wear
Inter-Professional Approach

<table>
<thead>
<tr>
<th>Aim</th>
<th>Doc</th>
<th>RN</th>
<th>PT/OT</th>
<th>Dietitian</th>
<th>PharmD</th>
<th>SW</th>
<th>DME</th>
<th>SCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization and support of home-based care</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Edema control and exercise program</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight loss and nutritional optimization</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wound Care</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wound Care supplies</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychosocial support</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking Cessation</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Drug Therapy</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

Osteopathic Considerations

- Primary goal – fluid mobilization prior to compression wrap application
- **REMEMBER:**
  - Physical Exam – TART findings
  - Assessment – Somatic Dysfunction …
- Plan/Treatment – address thoracic inlet, diaphragms (thoracic, pelvic, popliteal, plantar), lymphatic techniques
- Billing – may use 25 modifier and bill based on the amount of areas treated
Conclusion

- Recognize additional pathologic processes that may cause the ulceration or prolong its healing course
- Accurately assess the severity of venous disease
- Design comprehensive wound management program
- Multidisciplinary, inter-professional approach

E-MAIL: IALTMAN@UIC.EDU