Evaluation of the Swollen Leg with a Normal Venous Ultrasound

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Complete Management of Venous Disease
April 8-9, 2011, New York, NY
Conflict of Interest

None
Signs of Venous Disease?

- Edema
- Teleangiectasia
- Varicosity
- Skin discoloration
- Corona phlebectatica
- Atrophy blanche
- Lipodermatosclerosis
- Ulcer
- Palpable cord
- Tenderness
- Induration
Symptoms of Venous Disease?

- pain
- sensations of throbbing or heaviness
- swelling
- leg-tiredness and/or fatigue
- tingling
- aching
- burning
- muscle cramps
- itching
- restless legs
Symptoms of Venous Disease?

- Exacerbated by heat or dependency
- Increase during the course of the day
- Relieved by leg rest, leg elevation or by wearing elastic stockings or bandages
Symptoms of Venous Disease?

- Pain after exercise that is relieved with rest and leg elevation (venous claudication)
- Usually caused by venous outflow obstruction (previous DVT or primary stenosis or occlusion of one or both iliac vein (May-Thurner syndrome))
Symptoms of Venous Disease

- Such symptoms are present in about a half the adult population\(^1\)-\(^3\)
- There is little or no relationship between these symptoms and the presence and severity of chronic venous disease
- There is no correlation between symptoms and the pattern and severity of reflux on duplex ultrasonography

Normal Duplex with Swelling?

- **Which segments were not examined?**
  - Venous outflow obstruction?
  - Calf veins?
  - Perforators?

- **Was it a limited Duplex exam or a complete exam for both venous obstruction or valvular incompetence?**
  - Accuracy of $\geq 90\%$ to detect femoropopliteal DVT
  - Accuracy of 50 to 90 % to detect calf vein thrombosis
Normal Duplex with Swelling?

- Consider
  - Repeat or more extensive Duplex scanning
  - Plethysmography
  - CT angiographyography (arterial and venous phase)
  - MRI/MRA/MRV
  - Ankle/brachial index with exercise
  - Lymphoscintigraphy
  - MR lymphangiography
Etiology of Swollen Limb

- Systemic Cause
- Local or Regional Cause
Leg Swelling

- Systemic or Local Cause
- Acute vs. Chronic
- Unilateral vs. Bilateral
- Young vs. Old
- Distribution?
- Limb length?
- Pain?
- Varicose veins?
- Skin changes?
- Ulcer?
Systemic Causes of Limb Swelling

- Cardiac failure
- Hepatic failure
- Renal failure
- Hypoproteinemia
- Hyperthyroidism (myxedema)
- Allergic disorders
- Idiopathic cyclic edema
- Hereditary angioedema
Systemic Causes of Limb Swelling

**Drugs**

**Antihypertensives**
- Methyldopa
- Nifedipine
- Hydralazine

**Hormones**
- Estrogen
- Progesterone

**Anti-inflammatory drugs**
- Phenylbutazone

**Monoamine oxidase inhibitors**
## Local or Regional Causes of Leg Swelling

- Acute deep vein thrombosis
- Chronic venous insufficiency
- Lipedema
- Lymphedema
- Congenital vascular malformation
- Arteriovenous fistula
- Trauma/Reflex sympathetic dystrophy
- Snake or insect bite
- Infection, inflammation
- Hematoma
- Dependency
- Rheumatoid arthritis
- Post-revascularization edema
- Soft tissue tumor
- Hemihypertrophy
Acute vs. Chronic

- **Acute**
  - Deep Vein Thrombosis
  - Congestive heart failure
  - Arteriovenous (aorto-caval, ilio-iliac, peripheral) fistula
  - Lymphangitis/Erysipelas
  - Trauma/hematoma
  - Tumor
  - Compartment syndrome

- **Chronic**
  - Chronic Venous Insufficiency
    - Obstruction vs. incompetence
  - Lymphedema
  - Vascular Malformation
  - Tumor
  - Lipedema
  - Reflex sympathetic dystrophy
  - Chronic compartment syndrome
  - Baker cyst
Severe Pain with Normal Venous Duplex

- Infection
- Critical limb ischemia
- Contained hemorrhage/arterial aneurysm rupture
- Incarcerated femoral hernia
- Compartment syndrome
- Sciatica/Spinal stenosis/pseudoclaudication
- Musculoskeletal problem (adductor tendinitis)
- Arthritis
- Reflex sympathetic dystrophy
- Tumor
Lymphedema
Bilateral Congenital Lymphedema
Lymphoscintigraphy
Klippel-Trenaunay Syndrome
Clinical Presentation
252 patients*

<table>
<thead>
<tr>
<th>Malformations</th>
<th>No.</th>
<th>%</th>
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<tbody>
<tr>
<td>Capillary malformations</td>
<td>246</td>
<td>98</td>
</tr>
<tr>
<td>Soft tissue or bone hypertrophy</td>
<td>236</td>
<td>94</td>
</tr>
<tr>
<td>Varicosity/venous malformations</td>
<td>182</td>
<td>72</td>
</tr>
</tbody>
</table>

Klippel-Trenaunay Syndrome
Klippel-Trenaunay Syndrome
Uncommon leg ulcers in the lower extremity

Nicos Labropoulos, PhD, DIC, RVT, a,b Danielle Manalo, MD, a Nima P. Patel, MD, b
Jay Tiongson, MD, a Landon Pryor, MD, a and Athanasios D. Giannoukas, MD, c Maywood, Ill; Newark, NJ;
and Larissa, Greece

Objective: To determine the etiology of leg ulcers presenting to vascular clinics.
Methods: This was a multicenter retrospective study of veterans with suspected venous leg ulcers. Both inpatient and outpatient settings were university hospital based. Patients whose mean leg ulcer area was more than 0.7 were excluded from analysis. All limbs included were in patients who had undergone office-based venous ultrasonography, and skin biopsies were performed if history, clinical examination, and ultrasonography were inconclusive. The study was IRB approved.
Results: The mean age of patients was 73 years (range: 27-97 years). A total of 21 limbs from 16 veterans were evaluated.有2.1% of all leg ulcers seen were uncommon leg ulcers. Thirteen of the patients had venous ulceration. Seven were located in the medial lower leg. Six had a neoplasia, five had a neoplasm, and five had a neoplasm. Three had a neoplasm. One had a neoplasm.
Conclusions: The prevalence of uncommon leg ulcers was low. A variety of chronic venous disease was found in patients managed with the management of venous disease. Infection, and other disorders, infection, and other factors were found to be involved. (J Vasc Surg 2012)

<table>
<thead>
<tr>
<th>Pathology</th>
<th>Limbs</th>
<th>No. Patients</th>
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<tbody>
<tr>
<td>Undetermined</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>No histology available*</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Chronic inflammation</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>SCC</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Kaposi sarcoma</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Carcinoma</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>BCC</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Sickle cell anemia</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Vasculitis</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Pyoderma gangrenosum</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Hydroxyurea</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>RA</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>16</td>
</tr>
</tbody>
</table>

% of uncommon ulcers out of total leg ulcers: 1.3% vs 2.1%

SCC, Squamous cell carcinoma; BCC, basal cell carcinoma.
Conclusions

- In patients with swelling but negative Duplex
  - Review H&P
  - Review Duplex, exclude venous outflow obstruction
  - Investigate the most frequent non-venous causes of limb swelling, with or without pain
    - lipedema, lymphedema, PAD, vascular malformations, infection, tumor, musculoskeletal pain, sciatica/pseudoclaudication, arthritis
Conclusions

• In patients with bilateral limb swelling systemic causes of edema should be excluded first.

• Lateral varicosity, port wine stain or a longer or shorter limb are tip-offs for vascular malformation.

• Soft tissue tumors, reflex sympathetic dystrophy, cellulitis/lymphangitis and arthritis and vasculitis are important rare causes of limb swelling and pain.
Thank You!