Venous leg ulcer Assessment &
The importance of a Definitive Diagnosis

Associate Professor
Geoff Sussman

**Basic Principles**

1. Define ætiology
2. Control factors affecting healing
3. Select appropriate dressings
4. Plan for management
Assessment

Environment

Whole Person

Local Area

Wound

Remember
Treat the WHOLE patient
and not just the HOLE in the patient

Hand Held Doppler

Using Doppler Ultrasound to assess arterial flow.
How to Calculate the ABPI

**ABPI calculations**
- Highest ankle systolic pressure (for each leg)
- Highest brachial systolic pressure

**Right ABPI**
- Brachial: 145
- Posterior Tibial: 80
- Dorsalis Pedis: 85

**Left ABPI**
- Brachial: 150
- Posterior Tibial: 120

Normal ABPI ratio is equal or greater than 1.00 but not greater than 1.3

<table>
<thead>
<tr>
<th>ABPI</th>
<th>Status</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 1.3</td>
<td>Calcification of Arteries</td>
<td>Apply compression therapy with care</td>
</tr>
<tr>
<td>&gt; 1.4</td>
<td>Circulation Uncertain</td>
<td>Perform Toe Pressure test</td>
</tr>
<tr>
<td>&gt; 1.0 - 1.3</td>
<td>Normal</td>
<td>Apply compression therapy</td>
</tr>
<tr>
<td>0.8 - 1.0</td>
<td>Mild peripheral disease</td>
<td>Apply compression therapy with caution</td>
</tr>
<tr>
<td>0.5 - 0.7</td>
<td>Significant arterial disease</td>
<td>Do not compress - refer to specialist</td>
</tr>
<tr>
<td>&lt; 0.5</td>
<td>Severe arterial disease</td>
<td>Do not compress - refer urgently to vascular specialist</td>
</tr>
<tr>
<td>0.5 - 0.7</td>
<td>Significant arterial disease</td>
<td>Do not compress - refer to specialist</td>
</tr>
<tr>
<td>&lt; 0.5</td>
<td>Severe arterial disease</td>
<td>Do not compress - refer urgently to vascular specialist</td>
</tr>
<tr>
<td>&lt; 0.5</td>
<td>Severe arterial disease</td>
<td>Do not compress - refer urgently to vascular specialist</td>
</tr>
</tbody>
</table>
**VPPG**

*(Venous Photoplethysmoigrophy)*

**Figure 3: Procedure**
- Remove footwear and stockings.
- Place foot on insulated mat.
- Adjust height to minimise weight on feet.
- Obese patients should be reclinable to reduce venous compression.
- Fit sensor 10cm above the medial malleolus (use length of blue cable).
- Ensure patient is relaxed, i.e., pulse rate stable.
- Undertake exercise routine.

---

**Graphs:**
- **Normal**: RT > 25s
  - Venous refill from arterial inflow
- **Abnormal**: RT < 20s
  - Venous incompetence present
- **Equivocal**: RT = 20-25s
  - Some venous reflux present
- **Abnormal**: RT < 10s
  - Deep venous obstruction/insufficiency
  - Vp < 10
Other Vascular Assessment

Duplex Ultrasound is used to view both Venous and Arterial Circulation. It is an ultrasound device that will also detect DVT’s, arterial stenosis and incompetent venous valves.

Classification of Chronic Leg Ulcers

Vascular
- Arterial
- Venous
- Mixed
- Vasculitic

Atypical
- Pyoderma Gangrenosum
- Polycythemia

Neoplastic
Venous Disease

Venous ulcers result from the breakdown of the venous circulation of the leg, and are an association of the inability of the leg to force the passage of blood through the various connecting veins via the bicuspid valves by muscular contraction. Venous ulcer may also be the end result of venous stasis, a lack of venous return.

with complements of Jean-Francois UHL MD
Venous Disease

This is the result of a lack of movement or standing or sitting for long periods of time. This lack of movement causes a pooling of blood in the lower limbs and oedema and venous thrombosis may occur. This is commonly evident when travelling by car, bus, train or plane for long trips commonly and incorrectly called economy class syndrome.
Venous Incompetence - Clinical Signs

- Oedema
- Staining - Haemosiderin deposition
- Lpodermatosclerosis
- lower 1/3 of leg (in the gaiter area)
- skin changes including eczema
- often painless
- *Atrophie blanche* (white stippled scars on the skin).
- irregular shape
- may be copious exudate
- distended small veins on the medial aspect of the foot

**Venous Incompetence - Clinical Signs**

*Typical Venous Ulcer  ATROPHIE BLANCHE*
Venous Ulcers
Inverted Champagne Bottle Legs

Diagnosis
The most essential issue is to ensure a diagnosis of venous disease. It is often the case that if some venous signs are found eg. Oedema then it is assumed that the wound is venous. Peripheral oedema may be caused by a other issues including:

- Heart Failure
- Nephrotic Syndrome
- Liver Disease
- Drugs

Medications may cause, or exacerbate, peripheral oedema. Antihypertensive drugs such as calcium channel blockers and direct vasodilators are most frequently implicated.
Leg ulcers may also result in patients with lymphoedema, caused by a reduction in the function of the lymph vessels to drain extracellular fluid.

**Lymph System**

![Diagram of the lymph system](image)

**LYMPHATIC LOAD ->**

**TISSUE ->**

- Normal
- High-flow Oedema
- Low-flow oedema = Lymphoedema

**LYMPHATIC TRANSPORT ->**

**LYMPH**
1. Primary, not related to a malignancy
   1.1 Malformations
      1.1.1 Hypoplasia
      1.1.2 Lymphangiectasia
   1.2 Sclerosis of lymph nodes
2. Secondary, not related to a malignancy
   2.1 Traumatic
   2.2 Lymphangitis or Lymphangiosis
      2.2.1 Bacteria
      2.2.2 Fungi
      2.2.3 Parasites
      2.2.4 Insects
      2.2.5 Geochemical irritants
   2.3 Iatrogenic
      2.3.1 Block dissection
      2.3.2 Irradiation
      2.3.3 Sequelae of surgical treatment
         2.3.3.1 Inguinal node removal, lipectomy, etc.
         2.3.3.2 Stripping veins
   2.4 Self-mutilation (Lymphoedema factitia)
3. Secondary, caused by malignancy
   3.1 Primary malignancy
      3.1.1 Intralymphatic propagation of tumour
      3.1.2 Compression of lymphatics
      3.1.3 Stewart-Treves syndrome (angiosarcoma)
   3.2 Recurrent malignancy (after operation and/or irradiation)
      3.2.1 Intralymphatic propagation of tumour
      3.2.2 Compression of lymphatics
      3.2.3 Stewart-Treves syndrome (angiosarcoma)
Skin Changes Lymphoedema

- Thickening of the Skin
- Build up of scale and Keratin
- Worsening hyperkeratosis producing a warty appearance
- Difficult to pick up skin fold between the fingers
- Skin creases deepen
  - Around the ankle
  - Base of the toes

Lymphoedema Elephantiasis in India/Asia

Due to Filariasis (Filarial Worms) from a mosquito, fly or similar insect bite. Professor Terence Ryan using a combination of Washing, Oiling, Massage, Ayurvedic Medicine and Bandaging.
Mixed Venous Arterial Ulcers
It is important to note that between 10 to 15 % of leg ulcers are of mixed aetiology.

80% Leg Ulcers are mostly due to either Venous or Arterial or Mixed Disease.

However there is a group of Leg ulcers that are difficult to heal that are due to a wide range of causes.
**Definition:**
An Inflammation of Small Blood Vessels Commonly associated with Auto-Immune or Immune Mediated Disease. The vessel lumen is usually compromised.

**Pathogenesis**
- Immune Complex Deposition
- Complement Activation and Consumption
- Lymphocytic Infiltration
Major Histopathological Features

- Fibrinoid necrosis of the affected vessel wall and inflammatory cells within the vessel wall.
- Extravasation of RBC’s is frequent and responsible for palpable purpura.
- Thrombosis of vessel lumen
- Inflammation and damage to surrounding tissue
- Direct immuno-flourescence staining shows IgG, IgM, IgA and C3 deposition within the vessel wall

Ulcer [RA Patient] ? Diagnosis
Classic Vasculitic Ulcer

Clinical Presentation

- Distribution of Skin lesions
  - Often start on dependent areas, become generalized
  - Hydrostatic force on the post-capillary venules leads to deposition of immune complexes in these sites

Course of skin lesions
- Depends on the etiology
  - Acute - resolving within several days to weeks
  - Chronic / recurrent - persisting from months to years.
Clinical Presentation

Morphology of Skin Lesions

- Petechiae
- Non-palpable Purpura
- Palpable Purpura
- Ecchymoses
- Erythematous macules
- Papules
- Nodules
- Vesicles

- Pustules
- Bullae
- Eschar / Gangrene
- Ulcers
- Urticaria
- Livedo reticularis
- Nail fold telangiectasia
**Vasculitic Like Ulcers**  
**Pyoderma Gangrenosum**

PG is an inflammatory skin disease resulting in painful, enlarged, ulcerated nodules. The ulcer is irregular, raised, with reddish borders and undermined edges with necrotic base. It is associated with Inflammatory Bowel diseases and immune system abnormalities. The ulcers are painful rapidly enlarging with undermined bluish and purplish red margins.

---

**Pyoderma Gangrenosum**

PG is difficult to diagnose and is mostly obtained by exclusion. Wound Biopsy will often help to exclude other cases. It is often the case that if a biopsy is taken that the wound will enlarge (Pathergy).

PG is Difficult to treat this involves pain management, moist environment, systemic use of steroids, Cyclosporin, Dapsone. Other topical treatments include the use of monoclonal antibodies, and topical immuno-suppressives eg. Tacrolimus
Pyoderma Gangrenosum

This is a Haematologic disease resulting in a number of factors that may result in a Leg ulcer. The wounds are purpuric lesions, painful and difficult to heal. On healing they tend to leave an irregularly shaped white scar the cause may be cryofibrinogenemia and antiphospholipid syndrome.

Polycythemia

This is a Haematologic disease resulting in a number of factors that may result in a Leg ulcer. The wounds are purpuric lesions, painful and difficult to heal. On healing they tend to leave an irregularly shaped white scar the cause may be cryofibrinogenemia and antiphospholipid syndrome.
MALIGNANCY

Neoplasia may be the cause of skin damage resulting in a wound or skin lesion requiring surgical removal. Wounds may also result from post cancer surgery with active cancer. Neoplasia may also develop in a chronic Non-healing Venous Ulcer eg. Marjolin Ulcer a Squamous Cell Carcinoma.

Complication of Leg Ulcers

- Neoplastic Development
- Calcification
- Cellulitis
- Infection
- Haemorrhage
- Dermatitis/ Eczema
- Supturation
- Gangrene
**Conclusion**

Venous ulcer management is based on the correct diagnosis of venous disease in the first instance. It is essential to ensure the wound is Venous in nature before commencing Compression if you are uncertain keep looking.