**What Is Venous Claudication: How Should It Be Diagnosed And Treated**

Nicos Labropoulos  
Professor of Surgery and Radiology  
Director, Vascular Laboratory  
Division of Vascular Surgery  
Stony Brook University  
Stony Brook, NY  
nlabrop@yahoo.com

---

**Disclosures**

- None

---

**VENOUS SYMPTOMS**  
The SYM Vein Consensus statement developed under the auspices of the European Venous Forum  
Michel Perrin, Bo Eklof, Andre van Rij, Nicos Labropoulos, Michael Vasquez, Andrew Nicolaides for the SYM Vein Group  
Intern Angiol 2016;35:374-98

---

**Venous claudication**

Development of pain or a bursting sensation that occurs when the patient is walking or running.  
Pain is localized to leg, thigh or buttock  
Disappears slowly when the patient rests  
It is facilitated by leg elevation, a finding that allows differentiation from arterial or neurogenic claudication.  
It is almost exclusively seen in patients with iliofemoral or iliac caval obstruction.  
Venous neurogenic claudication caused by dilated veins in the spinal canal that arise from collaterals secondary to iliac caval obstruction. It can be differentiated by MRI or CT.  
A rare form of venous claudication of the calf is due to popliteal vein entrapment.

---

**Venous claudication**

Venous obstruction is so severe that during walking the arterial inflow is increased beyond the ability of the venous drainage leading to swelling and pain.  
Muscular pressures at rest and during exercise in the calf are much higher compared with the contralateral unobstructed limb.  
Unlike arterial claudication the recovery time to baseline is much longer, taking at least 15 minutes.  
Femoral vein pressures, venous outflow resistance and arm-foot pressure differential are higher compared with those having obstruction below the common femoral vein.  
These patients are also more likely to have edema and skin damage.

---

**Venous claudication**

Evaluation of venous obstruction may be controversial
Symptoms are more pronounced and more often present during standing or walking.
All imaging tests are done in supine position.

However, for venous claudication diagnosis is usually easier as CVO is more severe.

Venous outflow tests
- Duplex ultrasound
- IVUS
- MRI/MRV
- CT/CTV
- Ascending phlebography
- Pressure measurements

The role of venous outflow obstruction in patients with chronic venous dysfunction

Arm-Foot Pressure Differential at Rest and After Reactive Hyperemia

<table>
<thead>
<tr>
<th>Case patients</th>
<th>Limbs</th>
<th>Rest</th>
<th>R Hyper</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iliocaval</td>
<td>2</td>
<td>7.2</td>
<td>8.1</td>
<td>.7</td>
</tr>
<tr>
<td>Iliofemoral</td>
<td>5</td>
<td>6.3±2.6</td>
<td>8.9±1.8</td>
<td>.1</td>
</tr>
<tr>
<td>Femoropopliteal</td>
<td>5</td>
<td>4.4±1.3</td>
<td>7.3±1.1</td>
<td>&lt;.005</td>
</tr>
<tr>
<td>Popliteal</td>
<td>4</td>
<td>1.5±0.8</td>
<td>3.1±0.9</td>
<td>&lt;.04</td>
</tr>
<tr>
<td>Control patients</td>
<td>9</td>
<td>1±0.6</td>
<td>2.7±1.2</td>
<td>&lt;.002</td>
</tr>
</tbody>
</table>

The role of venous outflow obstruction in patients with chronic venous dysfunction

Table 2: Incidence of Signs and Symptoms in Relation to the Anatomical Extent of the Obstruction in 2 Study Groups

<table>
<thead>
<tr>
<th>Extent of Obstruction</th>
<th>n</th>
<th>Arm</th>
<th>Swelling</th>
<th>Skin Changes</th>
<th>Ulceration</th>
<th>Venous Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iliac</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Inferior vena cava</td>
<td>9</td>
<td>6</td>
<td>8</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Femoropopliteal</td>
<td>7</td>
<td>5</td>
<td>7</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Iliofemoral</td>
<td>7</td>
<td>3</td>
<td>9</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total (%)</td>
<td>25</td>
<td>14</td>
<td>58</td>
<td>13</td>
<td>23</td>
<td>24 (100)</td>
</tr>
<tr>
<td>Bialar</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Inferior vena cava</td>
<td>5</td>
<td>5</td>
<td>12</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Femoropopliteal</td>
<td>13</td>
<td>3</td>
<td>9</td>
<td>6</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Iliofemoral</td>
<td>17</td>
<td>16</td>
<td>13</td>
<td>13</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Total (%)</td>
<td>38</td>
<td>20</td>
<td>37</td>
<td>22</td>
<td>19</td>
<td>6 (15)</td>
</tr>
</tbody>
</table>

Venous claudication 8% or 17% among supra-inguinal CVO

Effect of Venous Thrombus Location and Extent on Developing PTS

<table>
<thead>
<tr>
<th>Venous claudication</th>
<th>Group A</th>
<th>0/38</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group B</td>
<td>7/67</td>
</tr>
<tr>
<td>P</td>
<td>=0.045</td>
<td></td>
</tr>
</tbody>
</table>

In both studies 1997 and 2008 only limbs with iliofemoral or iliofemoral obstruction developed venous claudication.


Chronic ilio-femoral obstruction

Major impact
Swelling and venous claudication

Failure of recanalization is more common in iliofemoral veins
**Iliofemoral DVT**

Aggressive thrombus removal

- Obstruction is eliminated
- DVT recurrence is reduced
- CVD is avoided

**CFV to CIV DVT**

**Common iliac vein union chronic luminal changes**

**Iliac vein stenting**

**CFV FV and DVF – evaluate femoral veins for inflow**

- Good inflow
- Compromised inflow

**Iliac vein post-thrombotic obstruction IVUS evaluation**

**Venous claudication**

- Recognize the symptoms
- It is post-thrombotic event
- Iliac vein compression by itself is not enough
- Image the iliofemoral veins and IVC
- Aggressive thrombus removal for iliofemoral DVT
- Look for and treat chronic venous obstruction