Popliteal vein entrapment: when and what do you do?

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No Disclosures

Disclosures

- Commercial support: Biolas, Vascular Insights, Urgo Labortoire, Acergy, Medtronic, Firstkind, Veniti.

Background

- First described in 1967 as a combined Arterial and Venous entrapment
- 10-15% of patients with Popliteal entrapment have isolated venous entrapment

Incidence

- Popliteal vein compression is seen in up to 27% of population - is this significant?
- 42% of patients undergoing ascending venography

Popliteal Vein Entrapment


Are arterial and venous entrapment separate entities?

Type I MGHM is normal, but PA has an aberrant medial course around the head
Type II An abnormal head of the MGHM inserts laterally to the PA
Type III An abnormal slip of the MGHM surrounds the PA
Type IV PA is located deeply within the popliteal fossa and entrapped by a fibrous band or by the popliteus muscle
PV is entrapped with any type I-IV
Type V Functional type: entrapment of the PA and the PV caused by hypertrophy of the muscles
PA popliteal artery, PV popliteal vein, MGHM medial head of the gastrocnemius muscle

Causes

- Muscular/tendinous anomaly - medial head of gastrocnemius
- Muscle hypertrophy
- Peri-venous fascia thickening/fibrous bands
- Adventitial cystic disease
- Aberrant arterial anatomy

Symptomatology

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swelling</td>
<td>87%</td>
</tr>
<tr>
<td>Pain</td>
<td>83%</td>
</tr>
<tr>
<td>Hyper pigmentation</td>
<td>47%</td>
</tr>
<tr>
<td>Hyper pigmentation extending to the middle of upper calf</td>
<td>27%</td>
</tr>
<tr>
<td>Discolouration</td>
<td>23%</td>
</tr>
<tr>
<td>Stasis ulceration</td>
<td>7%</td>
</tr>
<tr>
<td>Recurrent cellulitis</td>
<td>13%</td>
</tr>
</tbody>
</table>

Symptom Prevalence

- Swelling 87%
- Pain 83%
- Hyper pigmentation 47%
- Hyper pigmentation extending to the middle of upper calf 27%
- Discolouration 23%
- Stasis ulceration 7%
- Recurrent cellulitis 13%

Presentation

- CVI symptoms with normal duplex (static)
- Venous claudication
- Unexplained recurrent VTE

When should we consider Popliteal vein entrapment?

- Asymmetry of the circumference of the anterior and posterior compartment muscles on imaging
- Leg oedema and pain below the knee +/- associated with prolonged standing or exertion
- Unexplainable recurrences of varicosities after treatment
- Venous claudication
- Unjustified/recurrent popliteal vein thrombosis and thrombophlebitis
- Severe symptoms that are not alleviated by the use of compression stockings

Assessment

- Chronic venous insufficiency
- Recurrent DVT
- Duplex
- Duplex US
- Isolated reflux
- Vein scarring

Ascending venography

Gold standard

Popliteal vein pressure

Dorsal Foot vein

Popliteal Vein

Magnetic resonance imaging

Sequences acquired during active plantar flexion

Operative Treatment

- Surgical Decompression - MH of Gastrocnemius
- Resection of fibrous peri-venous band
- Valvuloplasty/transplant

Intervention

<table>
<thead>
<tr>
<th>Compressive entrapment mechanism</th>
<th>Number</th>
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<tbody>
<tr>
<td>Gastrocnemius medius head anomalous origin</td>
<td>14</td>
</tr>
<tr>
<td>Anterior tibial tendon of gastrocnemius</td>
<td>1</td>
</tr>
<tr>
<td>Gastrocnemius head origin from</td>
<td>9</td>
</tr>
<tr>
<td>Scoliosis</td>
<td>3</td>
</tr>
<tr>
<td>Tarsal tunnel syndrome</td>
<td>1</td>
</tr>
<tr>
<td>Abnormal course of vascular bundle lateral to</td>
<td>2</td>
</tr>
<tr>
<td>the lateral head</td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>1</td>
</tr>
<tr>
<td>Pathological changes in the popliteal vein</td>
<td></td>
</tr>
<tr>
<td>Scoliosis</td>
<td>13</td>
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<tr>
<td>Parasternal dilatation</td>
<td>1</td>
</tr>
<tr>
<td>Peritendinous dilation</td>
<td>1</td>
</tr>
<tr>
<td>Post-thrombotic changes</td>
<td>2</td>
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</tbody>
</table>

*One case associated with atrophic lateral head, associated with other compressive mechanisms.

Results from intervention

<table>
<thead>
<tr>
<th>Title</th>
<th>Preoperative</th>
<th>Postoperative</th>
<th>P-value</th>
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</thead>
<tbody>
<tr>
<td>Ankle/leg pressure (mmHg)</td>
<td>120 ± 10</td>
<td>40 ± 5</td>
<td>&lt;0.05</td>
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<tr>
<td>Venous filling index (VFI)</td>
<td>29</td>
<td>29</td>
<td>1.0 ± 0.4</td>
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<tr>
<td>Compressive entrapment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eye symptomatology</td>
<td>28</td>
<td>4.4 ± 0.9</td>
<td>1.2 ± 0.3</td>
</tr>
</tbody>
</table>
Key Considerations

- Signs and symptoms not matching initial investigations
- New role for MRI
- Popliteal venous pressure and size play a crucial role in diagnosing

Magnetic resonance imaging

- Difficulty in obtaining clear imaging in the venous phase using first pass MRI
- Gadofosveset trisodium reversibly binds to albumin and is present in circulation for 1 hour