Value of IVUS to Improve the Diagnosis and Treatment of Popliteal Entrapment

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Introduction
• Diagnosis should be considered in the young to middle aged athletic population without atherosclerotic risk factors
• Delay in diagnosis can result in arterial damage due to extrinsic compression
• Repetitive arterial injury can lead to occlusion, embolism, aneurysm
• Has become more common in females now over the past decade

Classification of Popliteal Entrapment

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>I</td>
<td>Popliteal artery displaced medially around normal medial head of gastrocnemius</td>
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<tr>
<td>II</td>
<td>Medial head of gastrocnemius is lateral to popliteal artery</td>
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<tr>
<td>III</td>
<td>Popliteal artery is compressed by an accessory slip of muscle from medial head of gastrocnemius</td>
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<tr>
<td>IV</td>
<td>Entrapment by a deeper popliteus muscle</td>
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<tr>
<td>V</td>
<td>Popliteal vein entrapment</td>
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<tr>
<td>VI</td>
<td>Functional entrapment</td>
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</tbody>
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Functional Popliteal Entrapment

• Increasingly diagnosed
• Can be confused with chronic recurrent compartment syndrome (CRECS)
• Diagnostic tests can be positive in a percentage of normal patients, so symptoms consistent with this diagnosis must be present
• Treatment differs so diagnosis of PAES versus CRECS is important

Work-up/Diagnosis

• Diagnosis not always straightforward
• Multiple modalities available, but particularly in functional entrapment (type VI) diagnosis is challenging
• Usually ABI with exercise as first line test
• If abnormal, proceed with duplex with provocative maneuvers – may be more likely CRECS
• Remember to think of other causes – Cystic adventitial disease, endofibrosis, venous compression

Disclosures
• None
Introduction

- Performed at baseline with active plantar flexion, but this can be difficult to hold for extended periods of time
- Often non-diagnostic, high false negative rate
- Better for Type I/II, but small muscle bands/fibers in Type III/IV can be easily missed and functional PAES (Type VI) can be easily missed

Work-up/Diagnosis: MRA

- Provocative angiography can be useful with adjuncts (vasodilators)
- Should only be used in selective patients with symptoms, work-up consistent with the diagnosis
- Long segment areas of compression on angiography often do not identify the exact location of compression
- Mainly used in settings where Type III/IV or VI are considered

Work-up/Diagnosis: Provocative Angiography

- Adjunctive tool, especially for functional PAES (Type VI) and also Types III/IV
- Should only be used in selective patients with symptoms, work-up consistent with the diagnosis where chronic compartment syndrome has been ruled out
- Can help identify exact location of compression and allows for a more precise surgical approach

Work-up/Diagnosis: IVUS

- Based on bony landmarks can guide area needed to decompress
- Used intra-operatively to confirm that compression is relieved both by provocative angiography and on IVUS

Angio/IVUS use intra-operatively

Algorithm for PAES Work-up
Introduction

• Claudication in young athletes is presenting more frequently
• Accurate diagnosis/treatment are essential
• IVUS and other new technologies can aid in the diagnosis and treatment of these disorders

Summary