New Developments in the Diagnosis of Popliteal Entrapment Syndromes and How They Should be Treated- Including Functional Entrapment

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Popliteal Entrapment Syndrome

- **Background**
  - Uncommon disorder
  - Compression of the popliteal artery
  - Symptoms of LE ischemia
  - Often seen in younger patients (athletes, soldiers)
  - Misdiagnosed
  - *No standard protocol for diagnosis/treatment*

Presentation

- Sinha et al,
  - Systemic review of 30 studies on PES
  - Intermittent claudication most common presenting symptom
  - Acute ischemia in 11% of patients
  - 15 of 30 studies revealed a median of 13.5% prevalence of *post-stenotic dilatation*
  - Median duration of symptoms was noted to be 12 months


Optimizing the Diagnosis

- **History**
  - High index of suspicion
  - Claudication in a young patient
  - Acute ischemia in same population
- **PE**
  - Pulse evaluation with provocative maneuvers
- **Non-invasive Studies**
  - Treadmill ABIs
  - Duplex US with provocative maneuvers

Duplex at Rest

Disclosures

- None
Plantar Flexion

Axial Imaging

- MRI/MRA
  - Identifies abnormal popliteal artery position or aberrant muscular slips
  - Imaging can variable at different institutions
- CTA
  - Readily available
  - Reproducible but can still miss minor muscles slips
- Both are static imaging

Axial Imaging

- Provocative imaging now commonly being employed
  - MRI provocation had a mean sensitivity of 94%
  - CT provocation demonstrated 100% sensitivity
- Excellent potential but relies on protocols and if not done correctly exposure to radiation


Arteriography

- Can obtain detailed vascular findings
- Dynamic component much easier to visualize versus static imaging
- IVUS
  - Evaluation of intimal changes
  - Confirmation of area of compression

Arteriography

Baseline Image Initial Plantar Flexion Prolonged Plantarflexion

IVUS
PES Treatment Options

- Non-operative management not common
  - Young active patients
  - Repetitive trauma to the artery may lead to limb-threatening event
  - Mandates surveillance

- Delayed presentation
  - Can be observed and curtail activities
  - Need monitoring of the artery with a duplex

Surgical Approach

- Medial Approach
  - Advantage-Most surgeons comfortable with this approach
  - Disadvantage-Visualization not optimal of the popliteal artery

- Posterior Approach
  - Advantage-Excellent visualization of the popliteal fossa
  - Disadvantage-Many surgeons not comfortable with this approach

Posterior Approach

Dissecting the Popliteal Artery

- Utilize Intraoperative Duplex to ensure adequate decompression of the popliteal artery

Optimizing Treatment

Addition of Duplex US

- Place US probe over popliteal artery to obtain a baseline in neutral position and confirm decrease with passive dorsiflexion
Perform Clinical Resection

Repeat Intraoperative Duplex

Operative Results

- Large series report nearly 100% return to prior level of activity
- Caveat of young patients not around for long-term follow-up
- Series with nearly 15% complication rate
  - Majority with wound issues


New Modalities?

- Endovascular Treatment
  - Case report of successful treatment in a single patient?
- Botulinum toxin
  - Treatment for functional popliteal artery entrapment syndrome
  - Case report from France with successful treatment


Conclusion

- Optimize the diagnosis
  - Strong index of suspicion in younger patients
  - Use of dynamic noninvasive studies to confirm PE findings (positional duplex)
  - Arteriography and IVUS as confirmatory studies
  - +/- axial imaging based on institutional expertise
- Optimize the treatment
  - Posterior approach allows for excellent exposure
  - Intraoperative duplex to confirm adequate decompression particularly for FPES