Chronic Exertional Compartment Syndrome (CECS)
- Fascial Hernia

Dr. Gabriel Marino

Definitions
- Exertional Leg Pain
- Compartment syndrome
- Chronic exertional compartment syndrome (CECS)
- Hernia
Exertional Leg Pain

• Common
• DD- broad

<table>
<thead>
<tr>
<th>Differential Diagnosis of Leg Pain in Athletes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscle and Tendon</td>
</tr>
<tr>
<td>Chronic exertional compartment syndrome</td>
</tr>
<tr>
<td>Plantar arterial entrapment syndrome</td>
</tr>
<tr>
<td>Tumor</td>
</tr>
</tbody>
</table>

- Compartment Syndrome
  - Condition that occurs when pressure within the fascial compartment increases, resulting in decreased perfusion and tissue ischemia.

Chronic Exertional Compartment Syndrome

Hernia

• The protrusion of an organ or other bodily structure through the wall that normally contains it
  - A weak spot or other abnormal opening in a body wall permits part of the organ to bulge through.
• fascial hernia/muscle hernia
  - Protrusion of muscular tissue through its fascial covering

Incidence- CECS

• General population ------- unclear
• Patients with undiagnosed lower leg pain -------14% CECS
• Patients with Chronic exercise induced anterior lower leg pain------- 27%-33% CECS
  - Mean age 26 y.
  - Bilateral 82%
  - Anterior compartment : 40%-60%
  - Deep Posterior compartment : 32%-60%
  - Lateral compartment :12%- 35%
  - superficial compartment : 2%- 20%
Pathophysiology – CECS

- unclear
- ↓Compliance → ↑Compartment pressure?
- Tissue ischemia ?
  - “stimulation of fascia or periosteal sensory nerves, through increased compartment pressures, was the cause of pain in CECS”

Classification

- No classification system has been developed
- Descriptive.

Evaluation

History and physical examination

- Pain with exertion
  - Dull → sharp pain
  - Over involved compartment
  - Ceases when provocative activity is stopped
- A minority - Neurological symptoms (numbness /weakness)
- Usually: young, healthy athletes, bilaterally
Evaluation

- At resting
  - typically benign.
- After exercise
  - Fascial herniation (40%-60%)
  - Tenderness with palpation and passive stretch of involved musculature
  - Weakness and paresthesia
Diagnosis

- Clinical diagnosis !!!!
- If doubt - Intracompartmental pressure testing remains the standard diagnostic test
- MRI: increased signal intensity on T2-weighted images associated with CECS that resolves with rest
- Near-infrared spectroscopy. It demonstrates decreased tissue oxygenation and delayed reoxygenation after exercise in persons with CECS

Diagnostic Evaluation

Modified criteria for the objective diagnosis of chronic compartment syndrome of the leg

<table>
<thead>
<tr>
<th>Time</th>
<th>Pressure Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before exercise</td>
<td>&gt;15 mm Hg</td>
</tr>
<tr>
<td>1 min after exercise</td>
<td>&gt;30 mm Hg</td>
</tr>
<tr>
<td>5 min after exercise</td>
<td>&gt;20 mm Hg</td>
</tr>
</tbody>
</table>

https://youtu.be/ewMD0OUlpqg

"the only time point at which significant overlap did not occur between the symptomatic and control groups is 1 minute after exercise. At that point, pressures greater than 27.5 mm Hg are highly suggestive of CECS."
Treatment - CECS

- Conservative (trial 3-6 months)
- Surgery

Treatment – Conservative - CECS

- forefoot running

Conservative- CECS

- anti-inflammatory drugs
- stretching
- prolonged rest
- decreasing or avoiding the problematic activity,
- orthotics
- massage
Surgery

- Fasciotomy
  - if a facial herniation is present, it must be included in the release
  - all symptomatic compartments should be addressed

Fascial Hernia

- Focal fascial sheath defect.

Classification

- Congenital ('constitutional'), primary
  - overall general weakness in the muscular fascia (mesodermal insufficiency),
  - sites of perforating nerves and vessels
- Acquired, secondary
  - secondary to trauma, TU, etc.

- Herniation is potentiated by increases in intracompartmental pressures
- Incidence of leg hernias is not known
  - In the leg, the tibialis anterior is the most commonly involved

Fascial Hernia

Diagnosis

- History and physical examination
- US
- MRI

Treatment

Conservative

- Controversial.
- Asymptomatic - reassurance, but no specific treatment.
- Minimally symptomatic
  - restriction of exercise
  - use of an elastic support.
Treatment  Fascial Hernia

Surgery – soft tissue approach
- Debridement - fasciotomy
- Suture
- Augmentation
- Reconstruction
  - Autograft
  - Allograft
  - Synthetic

Take home points - CECS
- Common in runners
- Exertional leg pain : D.D.
- Diagnosis : history and physical examination, compartment pressures
- Treatment : activity modifications, surgery
References