Popliteal Artery Entrapment Syndrome (PAES)

The etiology of lower extremity pain in the younger population (under 40) at rest or with exercise is overwhelmingly a result of musclo sketal disorders. Patients with symptoms suggestive of claudication and a normal pulse exam may have an unusual anatomic condition known as PAES which is responsible for the symptoms and which is correctable.

Role of angiography in popliteal artery entrapment syndrome

Case Report:

Popliteal artery entrapment syndrome (PAES) is a rare but potentially limb-threatening disease seen predominantly in young athletes. We present an 18- year-old female avid soccer player, who complained of severe pain in both calves for over a year. Clinical examination and laboratory data were not helpful for diagnosis. Magnetic resonance imaging of both knees was inconclusive. Diagnostic angiography demonstrated bilateral, smooth and focal narrowing of both popliteal arteries only on active flexion and extension. PAES was confirmed by surgery. Our case is unique because of female gender and functional PAES.

A full clinical workup was performed on the patient, revealing noncontributory family history, normal laboratory analysis and an inconclusive MRI (magnetic resonance imaging) showing no pathology to explain the clinical symptoms. A diagnostic angiography via the right femoral artery showed bilateral (rights > left) smooth narrowing of the popliteal arteries seen only on active plantar flexion and extension.

Surgical exploration of both popliteal fossae revealed a fibrous band compressing the popliteal artery. Both popliteal arteries were slightly discolored which suggests early onset of arteriosclerosis. Despite the findings in surgery, the clinical presentation was more severe than expected from a fibrous band compressing the popliteal artery. Therefore, a strong functional component rather than an anatomic abnormality of PAES was considered to be the etiology of the symptoms.

LARGE ARTERY OBSTRUCTION

The popliteal fossa is a diamond-shaped depression at the posterior aspect of the knee that is bordered by the biceps femoris tendon superolaterally, the semimembranosus muscle superomedially, and the medial and lateral heads of the gastrocnemius muscle inferiorly. The popliteal artery normally courses between the medial and lateral heads of the gastrocnemius
muscle. The popliteal artery can be entrapped by neighboring muscles and tendons due to variations that occur during embryologic development of the muscles and arteries.

Patients with PAES are typically of a young age (60% <30 years old), healthy males (15:1 male predilection). In young athletes with calf claudication (pain caused by too little blood flow during exercise) 60% of these cases are due to PAES. It has been found that patients with functional PAES are much younger than those with anatomic types (age 24 vs. 43) and are more commonly female, as our stated patient.

Patients with PAES usually present with the following:

- Calf Claudication
- Normal pulses but may disappear or decrease with plantar flexion or dorsal flexion
- Normal resting ABIs
- Decreased ankle pressure with exercise
- Ultrasound positive for stenosis

Prior to undergoing surgery, a stress angiography is performed to confirm the diagnosis. The results would normally show a normal arterial lumen when the foot is in the relaxed position, and a narrowing of the arterial lumen during stress maneuvers. If PAES goes untreated, permanent narrowing of the popliteal artery will be present making the vessels susceptible to thrombosis.

In patients with functional PAES, myomectomy of the medial head of the gastrocnemius muscle can result in complete relief of symptoms, but is only recommended for patients that present with discrete and typical symptoms.