

Popliteal Artery Entrapment Syndrome: A Case Report

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Introduction

Moore describes the popliteal artery as the continuation of the femoral artery. It originates in the adductor hiatus and passes inferolaterally through the space occupied by the fat of the popliteal fossa. At the inferior border of the popliteus muscle the popliteal artery divides into two branches, the anterior and posterior tibial artery.¹

Popliteal artery entrapment is described in the literature as being due to external compression of the popliteal artery by a congenital anomalous relationship to the gastrocnemius muscle.² Entrapment of the artery occurs when the popliteal artery courses medially as a variant and enters into a confined space between the medial condyle of the femur and the medial head of the gastrocnemius muscle. This entrapment may also occur by way of an accessory muscle situated between the medial femoral condylus to the medial gastrocnemius muscle.³

Calf contraction as well as repeated compressions of the popliteal artery against the underlying aspect of the femur may further cause compression of the artery. Complications associated with repeated trauma to the area may lead ultimately to arterial wall damage with or without a thrombotic event.²

Clinical Presentation

The entrapment of the popliteal artery is a relatively rare event. Usually a patient who suffers from popliteal artery entrapment is a male, 40-50 years of age. The typical presentation is that of a runner presenting with unilateral symptomatology.

Bilateral events are not well documented in the scientific literature.

There are many clinical presentations of the popliteal artery entrapment. Becquemin noticed that the status of the entrapment depended upon the anatomical relationship of the popliteal artery to the surrounding structures.⁴ The anatomical relationship dictates the diversity of clinical presentations. Thrombosis usually occurs in a sudden fashion at the end of an intensive muscular effort i.e sprint.

When the popliteal artery is patent, signs of ischemia and inflammation occur when the compressive elements are put under tension.⁴ Depending upon the nature of the compression a myriad of presenting complaints is seen.

Case

A 46 year old athletically inclined male presented with the primary complaint of coldness and parathesia of the left foot. He also noticed that at the beginning of calf contractions the pain intensified. Upon examination it was noted that ankle dorsiflexion caused the disappearance of the arterial pulses. Medial rotation of the lower leg by turning the toes inward would relieve the pain. It was also noted in the history that this patient was a devoted runner, even though he still smoked 10-15 cigarettes per day.

Differential Diagnosis

A list of differential diagnosis may be postulated in this case.

- a) Thromboangiitis Obliterans (Buerger's Disease)
- b) Arteriosclerosis obliterans
- c) Popliteal artery aneurysm
- d) Arterial thrombosis

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- e) Adventitial Cystic Disease
 - f) Extra-arterial Compression
- Diagnosis

Diagnosis of the popliteal artery entrapment syndrome may be problematic. Computed axial tomography provides precise anatomic display of the muscle structure of the popliteal fossa and may be an important diagnostic tool in patients suspected of this syndrome.^{3,5,6} Compression dorsally by an accessory muscle which extends from the medial femoral condylus to the medial gastrocnemius has been diagnosed by CT Scan and documented in the literature. Alternative methods have been described in the literature such as contrast arteriography and radionuclide angiography.^{6,7} These methods may document decreased flow in the popliteal artery however they will miss the nature of the obstruction due to lack of precise anatomic imaging of the soft tissues. In some cases the diagnosis is not made prior to surgery. In some cases the diagnosis is not made prior to surgery. In young patients CT Scan may be the diagnostic modality of choice for intermittent claudication and this syndrome.^{3,5}

Treatment

Conservative treatment consists of a series of stretching exercises that concentrate on the affected gastrocnemius muscle. A series of myofascial trigger point therapy and muscle stripping technique may be used to help in the breakdown of fibrous adhesions in the affected muscles. Ultimately, use of interferential current may be used to release the muscular hypertonicity. Although these alternative techniques are much gentler in nature, their level of success is quite limited. A surgical technique that allows for the division and sometimes resection of the constricting muscle is the treatment of choice if the condition is diagnosed before the artery is completely occluded.^{8,9} If the compression is severe, a release or complete detachment

of the medial head of the gastrocnemius is then considered. Most surgeons utilize a dorsal approach through an elaborate S-shaped incision. Lumbar sympathectomy is usually considered as a last resort.⁸ The reconstruction of the popliteal artery may ensue if there is arterial malformation.¹⁰

Nutritional and botanical treatment is not likely to reduce popliteal artery entrapment, however maintaining artery health pre and post surgery is important to full recovery. Ascorbic acid promotes collagen and elastin formation.¹¹ When added to cultured human skin fibroblasts, collagen synthesis increased eight fold¹² and wound healing is faster.¹³ Vitamins A, C and E facilitate healing of surgical incisions.^{14,15} Integrity of the vessel and its wall can be enhanced by bioflavonoids such as anthocyanoside (*Vaccinium Myrtillus*) which protects vessel walls by increasing the endothelium barrier effect, through stabilized membrane phospho-lipids and increased synthesis of mucopolysaccharides in the connective ground substance.¹⁶ Aqueous-ethanol extracts of *Hamamelis Virginiana* and *Aesculus Hippocastanum* are traditional botanical treatments for vascular pain and inflammation.¹⁷ A recommended treatment protocol is 1000 mg ascorbic acid qid, 10,000 IU vitamin A qd, 800 IU vitamin E qd for relief, along with stretching and trigger point therapy followed by a 15 minute warm moist topical pack of *Hamamelis*. Following surgical intervention, oral or 2.5 g (500 mg/mL) ascorbic acid IV qid and oral vitamin A and E should be taken as above for two weeks. Topical vitamin E qid after removal of stitches may reduce scar formation.

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