INTRODUCTION
Popliteal artery entrapment syndrome (PAES) is a developmental defect with anomalous anatomic relationships between the popliteal artery and surrounding musculotendinous structures, with consequent compression of the artery which may threaten the viability of the limb.

This anomaly usually affects young men aged between 20 to 40 years. It is the most common of several unusual causes of intermittent claudication in young men. Other causes of limb ischemia in young persons are early atherosclerosis, Buerger’s arteritis, adventitial cystic diseases, adductor canal outlet syndrome, collagen vascular diseases, and Takayasu’s arteritis.

We report a case of PAES in a young soldier.

CASE REPORT
A 32 years old male serving soldier presented to vascular surgery outpatient with 14 months history of intermittent claudication. On the basis of history, physical examination and angiographic findings a diagnosis of popliteal artery entrapment was made. Exploration revealed a fibrous band tightly compressing popliteal artery and irreversibly damaged popliteal artery. Short saphenous vein graft was used to bypass the occluded segment of popliteal artery. This led to complete resolution of symptoms and continuation of active service.


ABSTRACT
Popliteal artery entrapment syndrome is an uncommon cause of intermittent claudication in young athletic persons. A 32 years old soldier presented with 14 months history of intermittent claudication. On the basis of history, physical examination and angiographic findings a diagnosis of popliteal artery entrapment was made. Exploration revealed a fibrous band tightly compressing popliteal artery and irreversibly damaged popliteal artery. Short saphenous vein graft was used to bypass the occluded segment of popliteal artery. This led to complete resolution of symptoms and continuation of active service.

DISCUSSION

PAES is seen mostly in young athletic persons with well-developed calf muscles because hypertrophy of muscles and exercise exacerbates the trauma to the artery due to its anomalous anatomical relationship with musculotendinous structures. Therefore, military surgeons have taken a special interest in this disorder, which has increased the diagnostic rate of PAES in military personnel.3

Different variants have been recognized.4 In type-1, popliteal artery passes medial to and under a normally placed medial head of gastrocnemius. The vein remains in its normal position. In type-2, medial head of the gastrocnemius inserts more lateral than normal. Popliteal artery descends in a straighter path around the medial margin of the muscle. In type-3, the artery passes through the body of the medial head in a relatively straight path. In type-4, popliteal artery lies deep and is entrapped by a fibrous band or popliteus muscle. In type-5, popliteal vein is also entrapped with any type of popliteal artery location.5 In type-6, the "popliteal artery becomes occluded with planter flexion" but no anatomic abnormality exists. It is seen when hypertrophy of the gastrocnemius muscle, especially its medial head occurs for examples in athletes and heavy armoured vehicles military personnel. Soleus and plantaris muscle entrapment of popliteal artery in well-conditioned athletes have also been reported. These abnormal anatomic relationships can produce extrinsic compression of the popliteal artery and cause vascular damage. Repeated trauma ultimately leads to irreversible damage to the vessel wall resulting in limb threatening ischaemia.

Even more uncommonly, PAES may present with acute limb ischaemia due to thromboembolism.8 Functional popliteal artery entrapment syndrome (FPAES) is an uncommon overuse injury in young athletic adults. It manifests by calf cramps and plantar paresthesias. It is commonly confused with chronic recurrent exertional compartment syndrome (CRECS).7

Duplex scan of popliteal artery is a non-invasive, quick, and relatively inexpensive investigation. The effect of passive dorsiflexion and active plantar flexion can be assessed with Doppler ultrasound. However, accurate visualization of compressing soft-tissue structures is not possible and popliteal artery occlusion can occur on active plantarflexion in more than 50% normal population.

The main advantage of the CT scan is due to its capacity to view the position of the artery in relation to that of the surrounding soft tissue structures. It gives high soft tissue contrast and high-spatial-resolution images of a wide anatomic range.8

Angiography has been considered as the gold standard before newer non-invasive imaging modalities established their superiority in many aspects. It can show medial deviation, narrowing or slight angulation, segmental occlusion and sometimes poststenotic dilatation of popliteal artery. When suspected, PAES can be established by stress views. Medial or lateral deviation and occlusion of the proximal popliteal artery with extended knee confirms the diagnosis of popliteal entrapment.

With digital subtraction angiography (DSA) chances of false positive results are very low. It is well suited for the detection of slow flow and retrograde flow. Magnetic resonance imaging (MRI) has proved to be a very reliable imaging modality. It gives both anatomical and functional information required for the diagnosis of PAES. Magnetic resonance angiography (MRA) can also show dynamic compression.9

All cases of PAES should be surgically corrected in order to establish normal anatomy within the popliteal space and restore normal arterial flow to the extremity.

In early diagnosed cases where the popliteal artery is intact, the treatment of choice is the release of the popliteal artery by division of the anomalous musculotendinous structure. In late diagnosis when the popliteal artery is occluded, stenotic, or aneurysmal, the treatment of choice is arterial reconstruction, in addition to division of the anomalous tissue.

Clinicians who come across young athletic persons with history of intermittent claudication, even with palpable distal pulses should suspect this condition. Ankle pulses should be examined both in active plantar flexion and passive dorsiflexion to rule out PAES. Early diagnosis can prevent irreversible damage to popliteal artery.
REFERENCES


