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Five Year Outcomes of Surgical Treatment for Popliteal Artery Entrapment Syndrome

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WHAT THIS PAPER ADDS

The long-term follow up data of patients who were treated by surgical revascularization for popliteal artery entrapment syndrome were retrospectively reviewed. It was shown that surgical reconstruction provides good long-term graft patency when lesions are limited to the popliteal artery. In the case of extensive lesions upstream or downstream from the popliteal artery, outcomes are significantly worse. This highlights the need for early detection and treatment.

Objective/Background: The aim of this study was to evaluate long-term outcomes following surgery for popliteal artery entrapment syndrome.

Methods: A retrospective study of all patients that underwent surgery for popliteal artery entrapment syndrome between January 2003 and December 2009 was performed. Patient demographic data, clinical features, imaging modalities, and surgical management were recorded. The primary outcome was 5 year patency.

Results: Eighteen patients (25 limbs) underwent surgery. The mean age at the time of surgical procedure was 35 (median 35 years; range 15–49). Presentation was bilateral in seven patients (39%). Diagnosis was made using various imaging modalities, including position stress test, Duplex ultrasonography, computed tomography angiography, magnetic resonance imaging and conventional angiography. In four limbs the popliteal artery was compressed and undamaged (16%), and treatment consisted of musculo-tendinous division alone. In 16 limbs the popliteal artery was damaged with lesions limited to the popliteal artery (64%) where treatment consisted of venous interposition. In five limbs lesions extended beyond the popliteal artery (20%) and procedures included one below knee femoro-popliteal bypass, three femoro-posterior tibial bypasses, and one popliteo-posterior tibial bypass. Musculo-tendinous division was associated with vascular reconstruction in 19 limbs (90%). Mean follow up was 82 months (median 81 months, range 60–120). Five year patency was 84%.

Conclusion: Long-term outcomes of surgical procedures performed for popliteal artery entrapment syndrome can be considered satisfactory.

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INTRODUCTION

Popliteal artery entrapment syndrome (PAES) results from an abnormal anatomical relationship between the popliteal artery and the surrounding musculo-tendinous structures. It was first described by Stuart in 1879, with the first operative treatment reported 80 years later.[1,2] Its true incidence is unknown, and probably underestimated.[3] It is thus believed to be responsible for a significant proportion of vascular symptoms, mostly intermittent claudication in young patients without atherosclerotic risk factors.[4] It can be a source of significant disability and impairment, and can lead to progressive injury to the popliteal artery with the risk of subsequent limb loss.[3]

The surgical strategy for PAES depends on the clinical presentation, the extent of the arterial injury (arterial lesions can be limited to the popliteal artery or sometimes extend to distal run off), and the underlying anatomic abnormalities.[5] Surgical release of the entrapping mechanism is the treatment of choice when the popliteal artery remains intact. In case of a damaged or occluded popliteal artery, vascular reconstruction is generally needed.[6–8]

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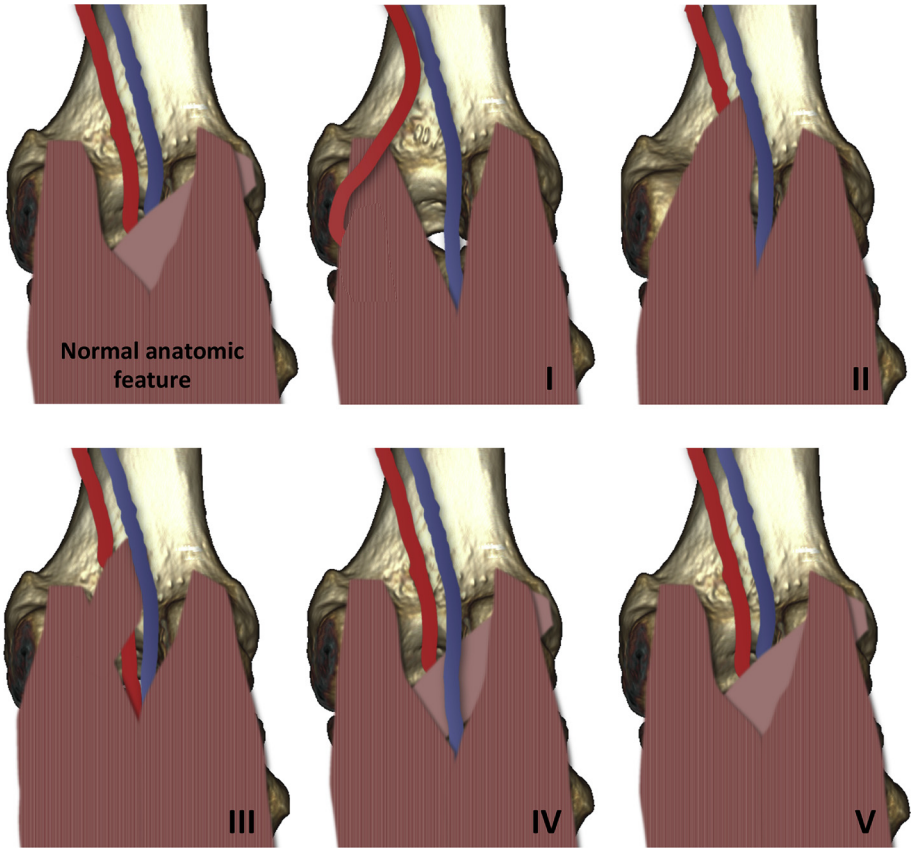

Figure 1. The popliteal artery is running medial to the medial head of the gastrocnemius muscle, which has a normal insertion. The arterial detour is pronounced (I). The insertion of the medial head of the gastrocnemius muscle is higher and more lateral (II). The path of the popliteal artery is vertical and does not show exaggerated looping. There is an accessory slip of the medial head of the gastrocnemius muscle that inserts into the inter-condylar region, and compresses the popliteal artery when joining the medial head of the gastrocnemius muscle (III). The popliteal artery is compressed when passing under the popliteal muscle or under a fibrous web (IV). The vein accompanies the popliteal artery in its unusual route and is caught by the same muscular or fibrous entrapment (V). Functional entrapment, without anatomic abnormality.

However, the diagnosis is often made at an advanced stage of disease because of late presentation or misdiagnosis, with either patients or primary medical referrals neglecting or minimizing the significance of limb pain, and frequently allocating the symptoms to muscular or joint damage. Surgical reconstruction is normally mandatory in these cases and long-term patency should be guaranteed in these young patients if possible.

The aim of this study was to evaluate the 5 year outcomes of surgical management for PAES and to investigate whether patency is affected by the initial extent of the arterial lesion.

MATERIALS AND METHODS

The institutional review board approved this retrospective study and waived the requirement for informed consent.

Design of the study

All patients with PAES who underwent surgery in the Department of Vascular Surgery, University Hospital of Strasbourg between January 2003 and December 2009 were included retrospectively.

Pre-operative parameters

The following pre-operative parameters were recorded: demographic data (age, sex), cardiovascular risk factors (hypertension, diabetes mellitus, dyslipidemia, active smoking, obesity), participation in sport, length of evolution, and clinical presentation (claudication, rest pain, tissue lesion). Data concerning these parameters were prospectively collected from a dedicated institutional database, and analyzed retrospectively.

The pre-operative diagnosis of PAES was made using various modalities. Ankle brachial pressure index (ABI) was calculated at rest, and a positional stress test (PST) was performed in all patients. PST was considered positive when pedal pulses could be palpated in normal leg position but disappeared during dorsiflexion against resistance. Duplex ultrasonography and computed tomography angiography (CTA) with dynamic testing were also performed in all patients. Conventional angiography, and/or magnetic resonance imaging (MRI) were performed, if necessary, to confirm the diagnosis when CTA was not adequate or to study the outflow vessels, depending on the surgical strategy.