



ORIGINAL ARTICLE

Location of the popliteal artery and its relationship with the vascular risk in the suture of the posterior horn of the lateral meniscus[☆]



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KEYWORDS

Meniscal suture;
Lateral meniscus;
Popliteal artery;
Vascular injury;
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Abstract

Introduction: The proximity of the posterior horn of the lateral meniscus to the popliteal artery determines a risk of vascular injury in its suture. The aim of this study is to determine the location of the popliteal artery, and to establish the minimal distance from the posterior wall of the lateral meniscus to the artery, the common peroneal nerve (CPN), and its correlation to other variables.

Material and methods: A total of 102 magnetic resonance studies were retrospectively reviewed from patients undergoing surgery at our institution. The axial section where the lateral meniscus could be clearly defined was selected, and the measurements were performed.

Results: The artery lay laterally to the midline in 94% of the cases. The minimal mean distance from the posterior wall of the lateral meniscus to the popliteal artery was 1.01 cm (0.32–1.74, SD: 0.304). The minimal mean distance to the CPN was 1.74 cm (0.75–2.87, SD: 0.374). No association was found between the minimal mean distance from the posterior wall to the popliteal artery with the height, weight, BMI, the lateral meniscus diameter, or the tibial plateau diameter. An association was found between the distance from the posterior wall to the CPN with the weight and the BMI.

Conclusions: The proximity of the posterior horn to the popliteal artery should be considered when performing sutures. This distance is within the recommended depth for all-inside meniscus repair devices. This distance is not related to height, weight, BMI, lateral meniscus nor tibial plateau diameters.

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PALABRAS CLAVE

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Menisco externo;
Arteria poplítea;
Lesión vascular;
Resonancia
magnética nuclear

Localización de la arteria poplítea y su relación con el riesgo vascular en la sutura del cuerno posterior del menisco externo

Resumen

Introducción: La proximidad del cuerno posterior del menisco externo a la arteria poplítea condiciona un riesgo de lesión vascular en su sutura. El objetivo es definir la localización de la arteria poplítea, establecer la distancia mínima del muro posterior del menisco externo a la arteria, al nervio ciático poplíteo externo (CPE) y su correlación con otras variables.

Material y método: Se revisaron retrospectivamente 102 resonancias magnéticas nucleares de pacientes operados en nuestro centro. Se seleccionó el corte axial donde se identificase adecuadamente el menisco externo y se realizaron el conjunto de mediciones.

Resultados: La arteria se localizó lateral a la línea media antero-posterior en el 94% de los casos. La distancia mínima media del muro posterior del menisco externo a la arteria poplítea fue de 1,01 cm (0,32–1,74, SD: 0,304). La distancia mínima media al CPE fue de 1,74 cm (0,75–2,87, SD: 0,374). No se encontró una correlación de la distancia del muro posterior a la arteria poplítea con la altura, el peso, el IMC, el diámetro del menisco externo ni el diámetro de la meseta tibial. Se encontró una correlación entre la distancia del muro posterior al CPE con el peso y el IMC.

Conclusiones: La proximidad del muro posterior a la arteria poplítea debe ser tenida en cuenta a la hora de realizar suturas. Esta distancia está dentro de la profundidad recomendada en los dispositivos de sutura «todo-dentro» y no está en relación con la talla, el peso, el IMC, el tamaño del menisco externo ni la meseta tibial.

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Introduction

It has been proven that joint degeneration is frequent and takes place rapidly after an external meniscectomy.¹ This is due to the alteration in the load distribution of the knee that is produced following the intervention, where the severity is directly related to the amount of meniscus excised.² The stability and function of the knee following a reconstruction of the anterior cruciate ligament (ACL) is conditioned by the preservation of the menisci.²

Thus, it is essential to preserve the menisci by carrying out repairs in those cases where the characteristics of the tear allow it. Performing meniscectomies in tears that can be repaired by suture is firmly contraindicated. The number of meniscal sutures performed with “all-inside”³ arthroscopic systems has increased in recent years, as these are less invasive than “inside–outside” suture techniques.

The popliteal artery is a structure that can be affected by these procedures, due to its anatomical proximity to the posterior horn of the external meniscus. Although the reported incidence of vascular lesions is low, it is likely that real incidence is higher. The sequelae observed once a complication of this type takes place are significant and include pseudoaneurysms, fistulas, need for secondary interventions and a high rate of amputation, which can sometimes reach up to 66%.^{4,5} Most published series on the incidence of vascular lesions only mention knee arthroscopies or meniscectomies generically, so the incidence could be higher in cases of meniscal sutures.⁶

The objective of this work is to define the location of the popliteal artery, establish the minimal distance from the posterior wall of the external meniscus to the popliteal

artery, to the common peroneal nerve (CPN) and its correlation with weight, height, body mass index (BMI), the diameter of the external meniscus and the tibial plateau; studying whether this distance is altered by the presence of a Baker cyst or a tear of the ACL and comparing these distances to the depth recommended by various “all-inside” meniscal suture devices.

Material and methods

A total of 102 magnetic resonance imaging (MRI) scans were retrospectively reviewed. These scans corresponded to the knees of patients with different diagnoses who were surgically treated at our hospital consecutively between 2012 and 2014.

The preoperative MRI images were obtained using a 3-Tesla Philips Achieva (Philips Medical Systems, Best, The Netherlands) device. We analyzed the axial sections obtained through proton density sequences with fat suppression (SPAIR sequences), with a repetition time of 5917 ms and an echo time of 30 ms. The width of the sections was 3 mm, with a 0.3 mm gap between sections and a 500 × 355 matrix. We selected those axial sections which offered an adequate visualization of the external meniscus.

We excluded from our study those patients with “bucket handle” tears of the external meniscus, as they did not allow an adequate location of the necessary references to carry out measurements, as well as patients with multi-ligament lesions, as the location of the popliteal artery could vary in these cases due to an abnormal displacement of the tibia relative to the femur.

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