

MR Imaging of a Bilateral Lateral Segmental Anomalous Origin of the Lateral Head of the Gastrocnemius Muscles: A Case Report

양쪽 외측 비복근의 외측 분절 변이기에 대한 자기공명영상 소견:
증례 보고

Jeong Eun Kim, MD, Jae Chan Shim, MD, Ghi Jai Lee, MD, Kyoung Eun Lee, MD,
Ho Kyun Kim, MD, Jung Ho Suh, MD

Department of Radiology, Seoul Paik Hospital, Inje University College of Medicine, Seoul, Korea

A variety of anatomic variations of the gastrocnemius muscle have been identified, predominantly through cadaver studies. Magnetic resonance imaging (MRI) findings of anomalies of the medial head of the gastrocnemius muscle have also been well reported, but anomalies of the lateral head of the gastrocnemius muscle have been less frequently reported. We present a case of an anatomic variation of the lateral head of the gastrocnemius muscle detected as an incidental finding on MRI.

Index terms

Gastrocnemius
Anatomic Variation
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Corresponding author: Jae Chan Shim, MD
Department of Radiology, Seoul Paik Hospital, Inje
University College of Medicine, 9 Mareunnae-ro,
Jung-gu, Seoul 100-032, Korea.
Tel. 82-2-2270-0139 Fax. 82-2-2266-6799
E-mail: jshim96@unitel.co.kr

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INTRODUCTION

The gastrocnemius muscle is located along with the soleus muscle in the posterior compartment of the leg. The lateral head originates from the lateral condyle of the femur, whereas the medial head originates from the medial condyle of the femur. The muscle extends to about midway along the calf; the muscle fibers of the medial head extending lower than those of the lateral head and inserting into a broad aponeurosis. The distal end of the aponeurosis extends for a variable distance as a thin, tendinous sheet and receives the tendon of the soleus muscle to form the tendocalcaneus or the tendon of Achilles.

Anatomic variations in the attachment of the gastrocnemius muscle to the soleus muscle and variations of the medial head of gastrocnemius muscle have been well-studied, but it is difficult to find any reported case about an anatomic variation of the origin of the lateral head of the gastrocnemius muscle.

We encountered a rare case of an anatomic variation of the

origin of the lateral head of the gastrocnemius muscle, which was detected as an incidental finding on magnetic resonance imaging (MRI).

CASE REPORT

A 29-year-old man visited the hospital with pain in both knees over the past 1 month. Six years previously he had undergone subtotal meniscectomy of his left lateral meniscus due to a meniscal tear. The pain in both knees occurred gradually without any specific cause and he had no history of trauma.

On physical examination, he had no tenderness, swelling, or range-of-motion limitation in either knee joint. X-ray showed no abnormality.

MRI of both knees was performed using a 1.5-T MR scanner (Achieva 1.5T SE, Philips, the Netherlands). An examination of the MRI scans revealed a variation in the lateral head of the gastrocnemius muscles of both knees. The lateral head of both gas-

trocnemius muscles originated from the posterior aspect of the lateral femoral condyle, but the lateral segment of the muscles originated from the iliotibial band (Figs. 1, 2). The other abnormalities were: complete lateral discoid meniscus in the right

knee, and osteoarthritis with lateral femoral condylar grade 2 cartilage lesions by the modified Outerbridge classification.

The patient underwent a left lateral meniscus transplantation and right lateral meniscoplasty for complete discoid meniscus.

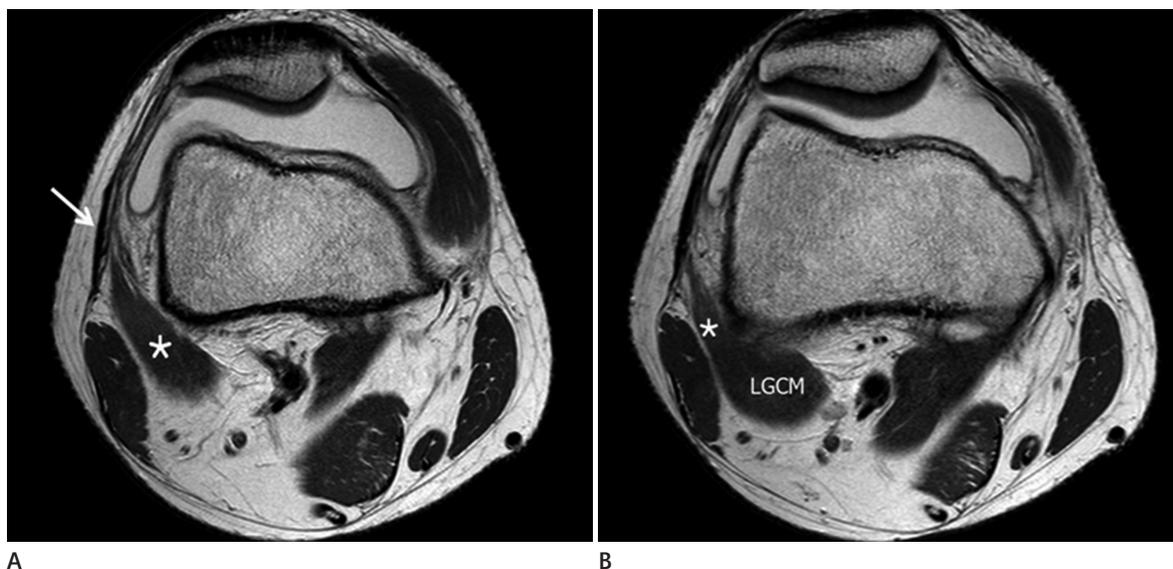


Fig. 1. Axial MR images of the right knee.
A. Right knee shows an anomalous muscle (asterisk) which originates from the iliotibial band (arrow).
B. Inferiorly, this muscle (asterisk) combines with the body of the lateral head of gastrocnemius muscle (LGCM), which normally originates from the lateral condyle of the femur.



Fig. 2. Axial and coronal MR images of the left knee.
A. Axial scan shows an anomalous muscle (asterisk) originating from the iliotibial band (arrow). This muscle also merges with the body of the lateral head of gastrocnemius muscle (LGCM), as is also the case in the right knee (not shown).
B. Serial coronal scans from posterior to anterior confirm the body of the LGCM normally originating from the posterior aspect of the lateral femoral condyle, and the lateral segment of the muscle (asterisk) originating from the iliotibial band (arrow). Osteoarthritis with lateral femoral condylar grade 2 cartilage lesions are also noted.

His pain disappeared after operation and he was followed up periodically as an outpatient.

DISCUSSION

Various anatomic variations of the gastrocnemius muscle have been reported previously, but mainly by cadaveric studies. The gastrocnemius muscle may have a sesamoid bone in its medial or lateral head, the two heads may be separable further down than usual, the tendon may be perfectly separated from that of the soleus muscle for a few inches, the lateral head may have a few lower fibers attached to the external lateral ligament or the posterior ligament of Winslow, a third head may arise from the popliteal surface of the femur, the entire muscle may be bilaminar, and the lateral head may be entirely tendinous (1). Cases of the bottom third of the gastrocnemius lateral head joining the lower two-thirds of the soleus muscle or the gastrocnemius muscle tendon joining the lower third of the soleus tendon have been reported as well (2).

Of the reported variations, a third head (caput tertium) is the most common variation of the gastrocnemius muscle. It arises from some part of the popliteal surface of the femur. It may also arise from: the linea aspera, the long head of the biceps femoris, the lateral epicondyle, the knee joint capsule, the midfibula, and the crural fascia. The third head may manifest clinically as popliteal artery entrapment syndrome (PAES) (3). A third head joining the medial head of the gastrocnemius muscle is most commonly cited as causing problems and occurs in 21% of patients with PAES (3, 4). As the third head originates from the popliteal surface of the femur, then passes lateral to the popliteal vessels and finally becomes inserted into the medial head of the gastrocnemius muscle, it compresses the popliteal nerve and vessels and causes intermittent claudication, arterial stasis and aneurysm, venous stasis, and impaired nerve function. However, an anomaly of the lateral head of the gastrocnemius muscle has been reported to be the cause in 34% of cases of PAES, including both abnormal insertion type and an aberrant accessory head (5).

In our case, the lateral segment of the lateral head of the gastrocnemius had an anomalous origin bilaterally from the iliotibial band. MRI findings of anatomic variations of the lower extremities, including the soleus, peroneus, flexor digitorum

longus muscles and the medial head of the gastrocnemius muscle are well-known; but not for anatomic variations of the lateral head of the gastrocnemius muscle (5-9).

Kim et al. (10) reported anatomic variations of the lateral head of the gastrocnemius in pediatric patients. Anatomic variations of the lateral head of the gastrocnemius muscle were noted on MRI in 3.4% of patients, and lateral segmental anomalous origins of the lateral head were identified in 1.9% of patients. Of these, 56% patients had patellofemoral symptoms but there was no abnormality on MRI except a lateral segmental anomalous origin of the lateral head. Kim et al. (10) raised the possibility of the relationship between a lateral segmental anomalous origin of the lateral head of gastrocnemius muscle and lateral stability of the patella. Although this variation was not related to knee pain in our patient, further study will be needed to evaluate whether this variation is associated with knee symptoms.

In conclusion, the gastrocnemius muscle has a number of variable anatomic variations. MRI is an excellent means of detecting cases of anomalous muscles and determining their anatomic relationship with surrounding structures such as blood vessels and nerves. In addition, this information also helps the surgeon to prevent unexpected injury during surgery.

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양쪽 외측 비복근의 외측 분절 변이기시에 대한 자기공명영상 소견: 증례 보고

김정은 · 심재찬 · 이기재 · 이경은 · 김호균 · 서정호

비복근의 다양한 해부학적 변이는 잘 알려져 있으나 주로 카테바 연구를 통해 알려져 왔다. 내측 비복근의 해부학적 변이에 대한 자기공명영상 소견 역시 많은 보고들이 있어 왔으나, 외측 비복근의 해부학적 변이에 대한 자기공명영상 소견은 찾아 보기가 어렵다. 이에 저자들은 자기공명영상에서 우연히 발견된 외측 비복근의 해부학적 변이에 대해 보고하고자 한다.

인제대학교 의과대학 서울백병원 영상의학과