LETTER / *Musculoskeletal imaging*

A symptomatic anomalous biceps femoris tendon insertion



Keywords Knee; Tendon; Biceps femoris; Scan; MRI

The biceps femoris is the most lateral component of the so-called hamstring muscles. Classically, this muscle has a distal insertion onto the fibular head, proximal tibia and the crural fascia. We report a case of lateral knee pain related to an anomalous biceps femoris tendon insertion.

Case report

The patient was a 27-year-old woman running athlete who suffered from a lateral knee pain after ten minutes of running. Upon medical examination, a localized pain at the level of the fibular head was noted. There was no audible or palpable snapping. Ultrasonography revealed an anterior insertion of the biceps femoris tendon (BFT) onto the fibular head and a thick tibial arm, with a hypoechoic anomaly surrounding this tibial arm (Fig. 1). There was also a hypoechoic collection around the fibular collateral ligament (FCL). This suggested an impingement between the tibial arm of the BFT and the FCL which occurred during knee flexion. Dynamic sonography did not show strike artifact to provide evidence of a snapping of the BFT. Ultrasonography of the other side of the knee revealed the same anatomical anomalies. Magnetic resonance imaging (MRI) confirmed the anatomical variation of the BFT insertion (Fig. 2). The long head of the BFT separated into two tendons: one on the anterior part of the fibular head anterior to the FCL (instead of the postero-lateral aspect of the fibular head), and one on the lateral tibial condyle, just below and lateral to Gerdy's tubercle (Fig. 3).

A sonographically-guided injection of a mixture of 1 cc of lidocaine and 1 cc of corticosteroid (cortivazol) was inserted between the anomalous tibial arm of the BFT and the FCL (Fig. 4). The diagnostic block was successful and there was pain relief for a period of seven months. Thereafter, the patient experienced a recurrence of lateral knee pain and underwent surgical resection of the tibial arm of the BFT. During surgery, the surgeon saw that the insertion of the long head of BFT was divided into two elements. One element was placed on the anterior portion of the fibular head and was intact; the other element inserted into the antero-lateral aspect of the proximal tibia and resulted in a strong inflammatory reaction. This pathological tibial arm of the long head of the BFT was resected.

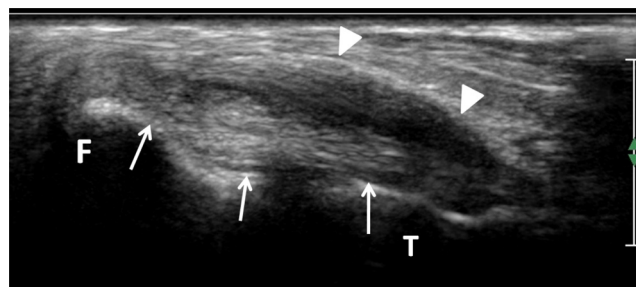


Figure 1. Sonography of the biceps femoris tendon. Transversal view. Thick tibial arm (arrows) with a hypoechoic anomaly surrounding this tibial arm (arrowheads).

Discussion

In anatomical studies, the insertion of BFT reveals a short and a long head both of which further divide into different arms [1]. The long head shows signs of being tendinous and aponeurotic. The direct arm which inserts into the postero-lateral aspect of the top of the fibular and the anterior arm which inserts into the anterolateral aspect of the fibular head and adjacent tibia, form the two arms of the tendinous element. The aponeurotic reflected arm of the long head inserts into the posterior aspect of the ilio-tibial band.

Lateral knee pain due to an anomalous BFT is a relatively rare condition. Snapping BFT had previously been reported in relation to acute tendon injury, anomalous insertion of the long head of BFT and fibular head deformity [2].

Lateral knee pain can be the result of an injury to the meniscus, an ilio-tibial band syndrome, a proximal tibiofibular joint instability, a snapping of the biceps femoris or popliteus tendons, and a fibular nerve compression syndrome or neuritis.

Lateral knee pain due to the distal biceps BFT can be associated with snapping knee. Some authors reported lateral knee pain with snapping knee due to the insertion of the entire tendon of the long head at the anterolateral aspect of the proximal tibia [3]. Other authors found an abnormal anterior insertion of the BFT on the fibular head [4] or direct arm injury with otherwise normal anatomy [5].

Identifying the cause of lateral knee pain is clinically challenging because of the complexity in any area of a given joint. X-rays and computed tomography are efficient for the study of bone structures. Additionally, MRI has a good contrast resolution for soft tissue elements. Nevertheless, both techniques are usually performed without patient's



Figure 2. a: MRI of the right knee, T2 Fat Sat 3D. Axial view: thick tibial arm of the biceps femoris tendon (arrows). No signal anomalies; b: MRI of the right knee, T2 Fat Sat 3D. Sagittal view: distal biceps femoris tendon bifurcation between fibular arm (arrow) and tibial arm (arrowhead).

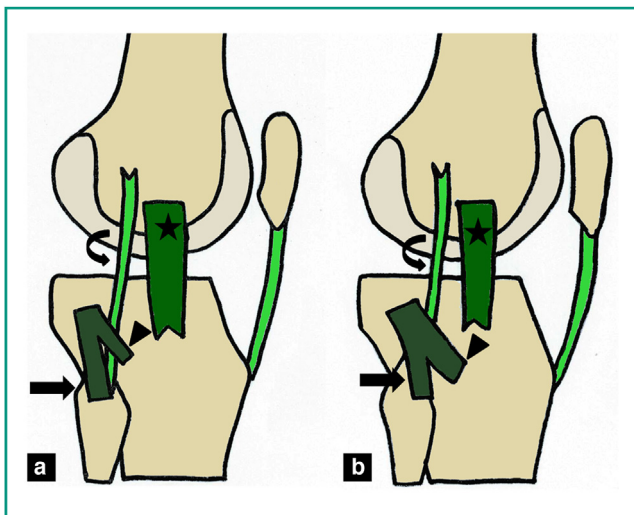


Figure 3. Drawing of the right lateral knee. a: normal anatomy of the biceps femoris tendon: fibular arm (arrow), tibial arm (arrowhead), fibular collateral ligament (curved arrow), ilio-tibial band (star); b: hypertrophied tibial arm of biceps femoris tendon (head arrow) and anterior insertion of the fibular arm (arrow). Fibular collateral ligament (curved arrow), ilio-tibial band (star).

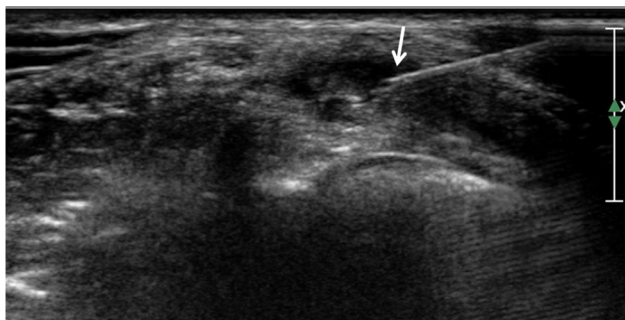


Figure 4. Sonographic-guided injection of lidocaine and corticosteroid. The needle (arrow) is between the tibial arm of the biceps femoris tendon and the fibular collateral ligament.

movement therefore lack time-frame resolution, and prevent proper identification of transient snapping phenomena. Sonography appears to be the only technique with true dynamic capabilities which can provide an accurate correlation between symptoms and the movement of any given joint [6].

To our knowledge, this case is the first to report an anomalous hypertrophied tibial band of BFT with inflammatory reaction with subsequent information associated with anomalous insertion of the fibular band.

Ultrasound allowed accurate diagnosis of this unusual anatomical variant and was a perfect imaging-guidance method to perform the diagnostic block.

Disclosure of interest

The authors have not supplied their declaration of conflict of interest.

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