

CASE REPORT

Capsular origin of the long head of the biceps brachii tendon: a clinical case

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Abstract

The biceps brachii tendon arises directly from the superior glenoid labrum with the remainder usually attached to the supraglenoid tubercle. Although some cases of anomalous origin of this tendon have been described, these anomalies are rarely encountered in daily practice. We report a patient with a capsular origin of the LHBT as a congenital anomaly and present the clinical, magnetic resonance and arthroscopic findings. Recognition of this anatomic variation may be important to explain the patient's clinical data and to aid both diagnosis and surgery.

Keywords: biceps brachii, anatomic variation, shoulder, arthroscopy.

☒ Introduction

The biceps brachii muscle usually has two heads, one originating in the coracoid process (short head) and another from the supraglenoid tubercle (long head). This is one of the muscles that displays anatomic variations more frequently [1], the most common one being the presence of a third humeral head [2]. Other variations, such as anomalous biceps head insertions, are less frequent, and although they have been related to rotator cuff pathology [3–5] their clinical relevance remains unclear. However, knowledge of this variant may be relevant for both the glenohumeral surgery and arthroscopy [6]. During diagnostic arthroscopic exploration, the biceps tendon is the first reference structure to be seen when using the posterior approach (posterior portal). It crosses the visual field from the superior border of the glenoid tubercle towards the humeral bicipital groove. We report one case in which the long head of the biceps brachii tendon (LHBT) did not have an intra-articular origin and merged into the glenohumeral joint capsule.

☒ Patient, Methods and Results

In 2003, a 43-year-old male mechanic presented with pain in the right shoulder, which appeared after a physical effort at work. The examination showed slightly positive in the Jobe's test, cross-arm sign and palpation along the route of the LHBT; there was no retraction of the muscle belly of the biceps in the arm. He reported no episodes of shoulder dislocation or other incidents. The initial X-ray showed no significant alterations. He was prescribed oral medication and received an infiltration. Upon persistence of the symptoms, with a diagnosis of subacromial syndrome, he underwent physiotherapy for three months, although

the symptoms persisted. An MRI of the shoulder showed fracture of the anteroinferior labrum, omarthrosis, subcoracoid bursitis and supraspinatus tendinitis; no alteration of the LHBT was noted (Figure 1).

We performed an arthroscopy and the LHBT was not in its normal position (Figure 2), on the superior edge of the glenoid ridge; the anterior glenoid labrum was disinserted and the superior glenoid labrum severely damaged. We think the LHBT had been torn away and it was locked in the bicipital sulcus as there was no retraction of the muscle belly in the distal part of the arm, as would be expected. We performed a reinsertion of the glenoid labrum with 2.4 mm screws. After further physiotherapy and due to persistence of the pain, we performed a new MRI (informing the radiologist of our arthroscopic findings), which on this occasion showed post-surgical changes, including the fixation elements, synovial effusion, subcoracoid and subacromiodeltoid bursitis and fibrillar disinsertion of the supraspinatus; the absence of the LHBT from the joint space was noted without further details being given.

As the patient showed no improvement, we performed a new arthroscopy which showed that the glenoid labrum that we had reinserted was completely destroyed and a small rupture in the supraspinatus tendon; this was repaired using an anchor and acromioplasty. The intra-articular biceps tendon was also not observed during this intervention. After a further recovery period with physiotherapy, the patient started work again with good mobility and recovery. Six months after returning to work, the patient presented again with recurring pain and we decided to perform an open intervention, during which we found that the repair of the supraspinatus tendon which we had performed presented a lateral flap, therefore we reinforced the suture with another implant;

we followed the LHBT from the bicipital sulcus and found that it tapered and that, instead of joining the joint capsule, it merged with it in the rotator interval (Figure 3).

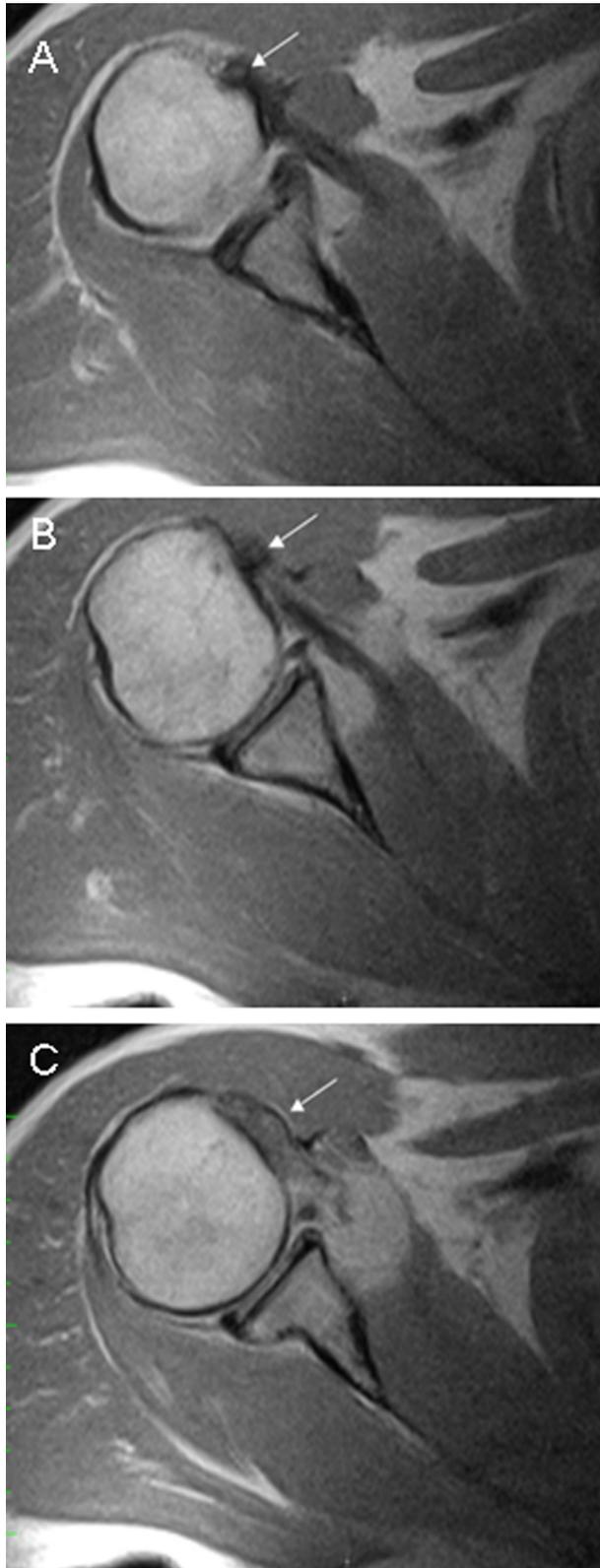


Figure 1 – Preoperative axial MRI images of the right shoulder. *A.* The long head of the biceps brachii tendon (arrow) is clearly located in the bicipital groove. *B.* In a more proximal image, the tendon looks blurred. *C.* The LHBT is indistinguishable and merged into the superior joint capsule.



Figure 2 – Arthroscopic examination of the superior labrum of the right shoulder. The needle is placed under the disinserted labrum, at the place where the tendon of the long head of the biceps brachii tendon should originate.

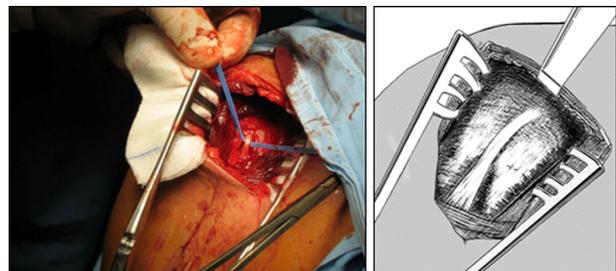


Figure 3 – Localization of the long head of the biceps tendon (LHBT). The LHBT is raised using a vessel-loop (anterior approach) and is located within the humeral bicipital groove. The drawing represents the LHBT and its continuation into the glenohumeral joint.

In our attempts to follow the tendon to its origin we had opened the shoulder joint and displaced the tendon, therefore we reinserted it in the anterior face of the humerus. After four further months of physiotherapy, the patient still reported pain and had to be compensated. This research study has been approved by the Granada Hospital Research Ethics Board. Patient gave written consent after receiving information about the study purpose.

Discussion

Testut L and Latarjet A [7] described three possibilities for the relationship between the biceps and the joint capsule: completely free, related to it through a mesentery or attached to it. However, the study reported by Vangness CT Jr *et al.* [8] on the origin of the LHBT and its insertion variants makes no mention of having found any tendon adhered or with a mesentery in the 105 shoulders dissected. We have found two cases in the literature which clearly show the variant reported here [9, 10] and a further, similar one [11], which means that, to the best of our knowledge, this is the fourth observation in the literature and the first to be confirmed surgically because the case described by Yeh L *et al.* [9] was post mortem. Audenaert EA *et al.* [12] has recently revived the theory concerning migration of the LHBT,

which has yet to be widely accepted [13], to explain all these variants. The case reported by MacDonald PB [14] is not identifiable as this tendon inserts into the superior labrum at the end of its route. Other related anomalies have been reported by Gaskin CM *et al.* [6]. Koplak MC *et al.* [15] reported a case of bilateral absence of the LHBT, but the tendon was absent in MR.

With hindsight, it is easy to see from the first MRI that the biceps tendon, which is present in the bicipital sulcus, fuses with the capsule further up (Figure 1C). This was not reported by the radiologist, who did not notice the absence of the tendon from the capsule as this is not normally specifically looked for outside the bicipital sulcus in standard examinations without contrast agent in the joint; it was also overlooked in the second resonance even though we had informed the radiologist of the absence of the tendon from the joint. As we were unaware that lack of the intra-articular tendon was a possible anatomical variant, this observation, together with damage to the articular labrum, in the first MRI suggested to us that the biceps tendon had been torn away and was (lodged) locked in the bicipital sulcus as there was no retraction of the muscle belly of the arm, thus conditioning our subsequent actions.

Our explanation for the patient's progress is that the lack of a shoulder stabilizer, in this case the LHBT, led to an instability which allowed the humeral head to damage the labrum and trap the cuff against the acromion, which finally resulted in a fracture of the supraspinatus between the first and second arthroscopies. It is also possible that the patient deliberately omitted to mention previous incidents due to the work context. Likewise, during the open intervention there was an iatrogeny by attempting to dissect the tendon when it was impossible to do so as it was fused with the capsule.

☐ Conclusions

Capsular origin of the LHBT is an extremely rare anomaly. The knowledge of the existence of this anatomic variant is necessary to avoid errors in shoulder arthroscopy and surgery and MRI scans.

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Received: October 10th, 2009

Accepted: March 7th, 2010

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