Case Report

Bifurcated intraarticular long head of biceps tendon

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Abstract

Though rare, many anomalous origins of long head of the biceps tendon (LHBT) have been reported in the literature. Anatomic variations commonly explained are a third humeral head, anomalous insertion, congenital absence and adherence to the rotator cuff. We report a rare case who underwent shoulder arthroscopy with impingement symptoms where in LHBT was found to be bifurcated with a part attached to superior labrum and the other part to the posterior capsule of joint. Furthermore, intraarticular portion of LHBT was adherent to the undersurface of the supraspinatus tendon. Awareness of such an anatomical aberration during the shoulder arthroscopy is of great importance as it can potentially avoid unnecessary confusion and surgery.

Key words: Anatomic variation, arthroscopy, bifurcated, long head biceps brachii, shoulder joint
MeSH terms: Arthroscopy, shoulder joint, shoulder impingement syndrome

Introduction

The long head of biceps tendon (LHBT) has frequently displayed congenital or developmental variation in cadaveric dissection where it is reported to be absent, with a third humeral head, of capsular origin and greater variations in labral attachment.[1-3] The true incidence of LHBT variations reported 1.91%.[4] It is the first structure to be visualized from the posterior portal during shoulder arthroscopy acting as an initial reference point; therefore, any congenital or developmental anomaly affecting LHBT can change the orientation of the surgeon while performing the arthroscopy. We report a case of bifurcated intraarticular LHBT confluent with under surface of supraspinatus tendon.

Case Report

A 36 year old male, right handed and driver by occupation, presented with pain in the right shoulder for a period of 2 months. Pain was insidious gradually progressive and aggravated with overhead activities. There was no history of trauma or dislocation. Clinical examination revealed mild tenderness on greater tuberosity and positive Neer's impingement and Hawkins sign.[5] Speed's test was negative with no tenderness over biceps tendon. Jobe's supraspinatus test[5] and Belly press sign[5] were negative. There was a full range of movement with a painful course in terminal flexion and abduction. Plain radiograph revealed Bigliani type III hooked acromion.[6] Ultrasonography of right shoulder showed supraspinatus tendinopathy with dynamic impingement of supraspinatus tendon and thickened subacromial-subdeltoid bursa. Patient was treated conservatively by an local orthopedic surgeon for the last 2 months. Hence, we decided to perform arthroscopic subacromial decompression. Preoperative Constant Murley score was 72.[7]

After routine preoperative workup, patient was taken up for shoulder arthroscopy in lateral position under general anesthesia. Initially, diagnostic air arthroscopy was performed from the standard posterior portal. The biceps tendon was found to be bifurcated. One part was attached to superior labrum and the other slip merged with the posterosuperior capsule [Figure 1]. The LHBT tendon was found to be confluent with the undersurface of the supraspinatus tendon [Figure 2]. The biceps tendon was probed through standard anteroinferior portal and found to be adherent to the proximal part of the undersurface of supraspinatus tendon. However the LHBT was free distally and with abduction, gliding smoothly within the bicipital groove. Biceps tendon surface revealed minimally increased vascular pattern. Initially, we were unaware of the fact that the LHBT can be adhered to the undersurface of the supraspinatus tendon as an anomaly. Therefore, a

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Access this article online	
Quick Response Code:	Website: www.ijoonline.com
	DOI: 10.4103/0019-5413.136313

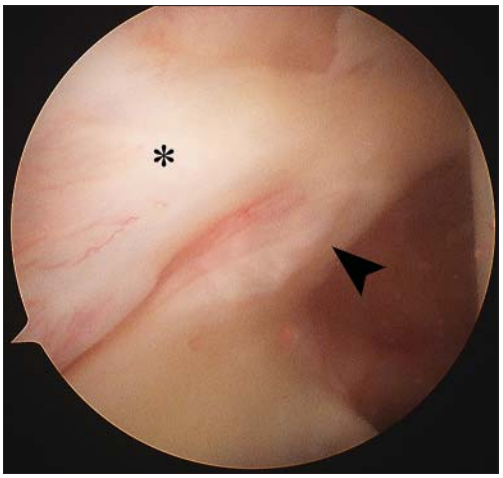

Figure 1: Arthroscopic view showing bifurcated long head of the biceps tendon. With one part (black arrow) attached to the superior labrum and the other merged from the posterosuperior capsule (asterisk)

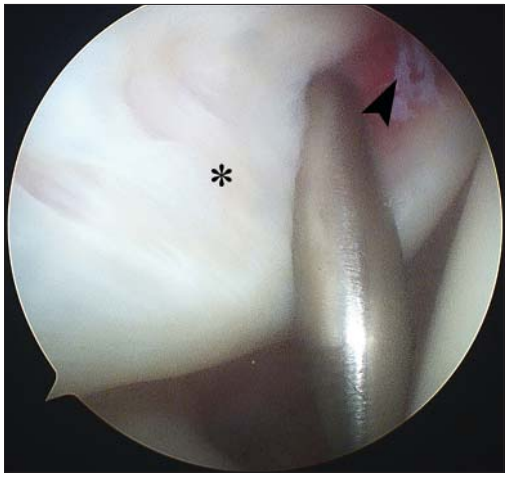

Figure 2: Arthroscopic view showing the long head of the biceps tendon confluent with the undersurface of the supraspinatus tendon (asterisk). Distal intraarticular part of the biceps tendon was free (black arrow)

small rent was made between the LHBT and undersurface to supraspinatus to probe and see mobility of the LHBT. Nevertheless, it was completely adherent to the undersurface of the supraspinatus tendon proximally and was freely gliding in the bicipital groove when it was pulled intraarticularly with the probe. Beside these variations, LHBT including labrum were normal except minimal synovitis; thus it was decided not to perform procedure such as tenodesis or tenotomy of the biceps tendon. Remainder of the glenohumeral arthroscopy was unremarkable. Bursoscopy showed subacromial bursitis and type 3 acromion. Subacromial bursectomy and acromioplasty were performed by standard techniques. Postoperatively, patient was prescribed a sling for 2 weeks, NSAIDs and ice pack to his shoulder. He underwent standard rehabilitation for subacromial decompression. 6 months postoperative, the patient completely recovered from his symptoms with Constant Murley score of 93.

Discussion

LHBT develops from the mesoderm of arm bud between 7 and 8 weeks.[2,8] Theories about further development of tendon have been controversial questioning whether it migrates into the joint from extraarticular position or through the capsule. A study by DePalma[9] described that LHBT develops outside the joint and gradually migrates into the joint. A thin cord like structure later matures into flat tendon by 23-40 weeks and by adulthood; it is a triangular structure originating from supraglenoid tubercle contributing to the glenoid labrum. Neale[10] challenged this concept as he found the biceps tendon deep into the capsule in many of the specimens. He proposed capsular development of LHBT. Testut[11] also affirmed the theory of Neale and explained that LHBT can be related to the capsule in three ways; free, attached to or fused with the mesentery. Several studies have been published on the origin of LHBT and its anatomic variations.[2,4,12] DePalma *et al*.[13] described a variant of a double tendon with separate attachments to the supraglenoid tubercle and posterosuperior capsulolabral tissue. Furthermore, in a cadaveric study, Vangsness *et al*.[12] showed 40-60% of LHBT originated from supraglenoid tubercle, with the remaining originating at superior glenoid labrum. Fibres originating from the labrum displayed four types of variations regarding the attachment. Dierickx *et al*.[4] in their study have reported 57 cases with developmental anomalies of the LHBT in 2976 cases of shoulder arthroscopy from a Belgian and Italian population over 10 years. He classified the LHBT anomalies under four categories; absence of LHBT (ABS), partial or complete fusion with the capsule (ADH), a mesotenon (MESO) and a split variant (SPL). He did not mention any case with a combined anomaly. To the best of our knowledge, this is the only case reported with split LHBT in combination with adherence to undersurface of the supraspinatus. Moreover, Dierickx *et al*. proposed that adherent varieties of biceps can lead to lateral traction over contracting supraspinatus and superimpose a tear. However, he did not explain whether it can cause impingement or not. We hypothesize that the lateral traction of biceps can bunch up contracting supraspinatus tendon as it is adherent to biceps; and in a tight subacromial space with type III acromion it can cause impingement. If type III acromion is acquired with age, this proposed mechanism can well explain his symptoms in adulthood. However if his acromion was curved since childhood, why this variation lead to impingement in adulthood needs further investigations.

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How to cite this article: Pandey V, Laarhoven SN, Arora G, Rao S. Bifurcated intraarticular long head of biceps tendon. Indian J Orthop 2014;48:432-4.

Source of Support: Nil, **Conflict of Interest:** None.