

Long Head of Biceps Rupture in a Middle-Aged Chef - A Case Study

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Abstract: Typically, biceps brachii muscle arise from two separate heads- long head and a short head. Long head of the biceps brachii travels through the glenohumeral joint. Rupture of the long head presents clinically as popeye deformity while actively trying to flex a supinated elbow. Two-thirds of the patients with LHB tendon injury have concomitant rotator cuff pathology. There are several therapeutic approaches to treat LHB tear ranging from conservative therapy to arthroscopic or open or mini open procedures. The two common surgical approaches include tenotomy and tenodesis. Tenotomy is usually reserved for elderly patients while Tenodesis is done for young, active, athletic individuals. Various techniques for tenodesis exist. Open subpectoral tenodesis and arthroscopic intra articular tenodesis are the two most common techniques. Here we describe a case of a middle aged chef who suffered a long head of biceps rupture. This was repaired by mini open sub pectoral biceps tenodesis.

Keywords: Long Head Biceps Tear, Suture Anchor repair, Shoulder surgery, Sports medicine

1. Introduction

Typically the biceps brachii originates with two heads proximally from scapula-a long head from supraglenoid tubercle and a short head from coracoids process with join to form the biceps muscle belly which then inserts distally into radial tuberosity through an aponeurosis. The long head of biceps is encased by synovium and glides within highly constrained intertubercular sulcus during shoulder movements and hence is prone for tenosynovitis and rupture following degeneration. Rupture of LHB clinically manifests as popeye deformity while actively trying to flex a supinated elbow against resistance. Two-thirds of patients with a LHB rupture may have concomitant rotator cuff pathology. There are several therapeutic approaches for treatment of LHB tear ranging from conservative measures to open surgical or arthroscopic approaches based on the type of lesion. The two common surgical approaches include tenotomy and tenodesis. Tenotomy is preferred for elderly while tenodesis is preferred for the younger patients. In general the tenodesis techniques can be categorized based on type of surgery (open, mini open, arthroscopic), fixation site (proximal or distal to bicipital groove) and fixation type (interference screw, bone tunnel, suture anchors and key holes). Open sub pectoral tenodesis and arthroscopic intra articular tenodesis are the most common techniques.

Here we report a case of 35 year old chef who is a fitness enthusiast who sustained an injury to his left arm while uncontrolled lowering of weight in his left arm while working out causing a traumatic left LHB tear which was repaired by open sub pectoral surgical tenodesis using suture anchor.

2. Case Description

History

A 35 year old right hand dominant man who is a chef by profession injured his left arm while lifting weights. He was performing an isolation biceps strengthening exercise when the injury occurred. At the time of injury patient reports of having heard a popping sensation in his left arm followed by ecchymosis of the arm. He denied any premorbid symptoms in the area. The patient was in otherwise good health and

was not on any chronic medication. He denied any alcohol or steroid use.

Examination

At the time of initial examination substantial ecchymosis was present over proximal aspect of left arm. Both passive and active range of motion of elbow and shoulder were full and were symmetrical to contralateral side. There was substantial tenderness over the bicipital groove as assessed by deep palpation. Manual motor testing revealed pain on resisted elbow flexion and supination as well as shoulder flexion. There was a weakness of left elbow flexion and supination against resistance as compared to the contralateral side. The distal neurovascular examination was normal for nerve function and vascular status of the arm.



Figure 1: Clinical Photograph showing Popeye sign on examination

Based on the history and examination findings a provisional diagnosis of Long head of biceps rupture was made and further radiographic studies were ordered. Radiographs did not reveal any abnormality. MRI scan revealed an avulsion of LHB tendon.

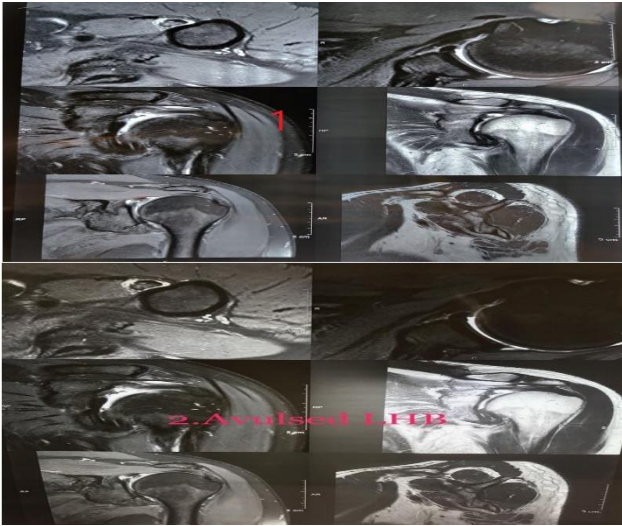


Figure 2: MRI showing avulsed long head of biceps

Management

Treatment options including non operative and operative were discussed with the patient. Given his age and activity levels a decision was made for surgical management.

Operative Procedure

Patient underwent subpectoral biceps tenodesis. In the beach chair position a 4 cm incision was made centered over the inferior border of pectoralis major. After blunt dissection under the inferior edge of pectoralis major the long head of biceps tendon was palpated as a fusiform structure. The muscle was retracted proximally and laterally using Hohmann retractor. Using Chandler retractor coracobrachialis and short head of biceps were retracted. LHB tendon was delivered into the wound. The ends of the tendon were freshened and tendon edge was secured using locking Krackow stitch after removing the excess length of the tendon to ensure proper tensioning of the tendon while allowing full elbow Range of motion. Using a guidewire and a 8-mm reamer a 15mm bone deep tunnel was made at the junction of the middle and distal thirds of the intertubercular groove between the lesser and greater tuberosities. The tendon was fixed to the bone using a suture anchor till the screw head was flush with the bone. The wound was closed in layers after ensuring hemostasis.



Figure 3: Long Head of Biceps identified

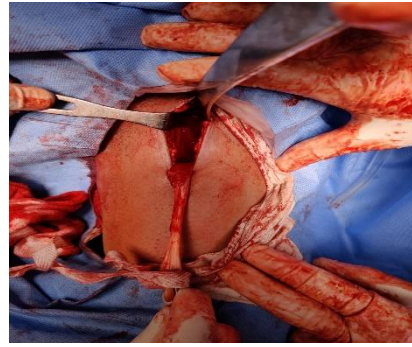


Figure 4: Long Head of Biceps Delivered in the wound

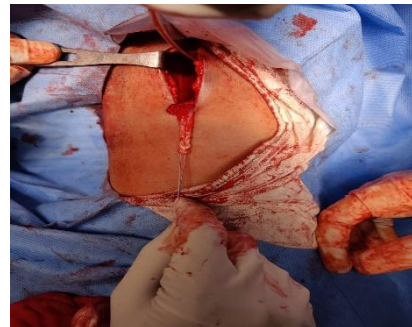


Figure 5: Krackow whipstitch Taken through the tendon

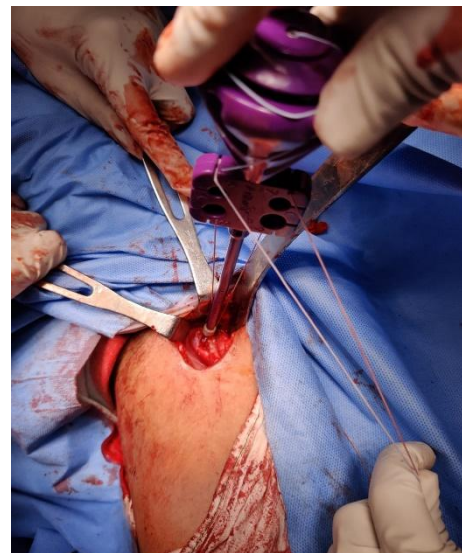


Figure 6: Tendon being fixed using suture anchor



Figure 7: Suture anchor used for fixation

Post Operative Rehabilitation:-

Post operatively patient was placed in an arm sling and was allowed assisted gentle elbow Range of motion from post

operative day 3. Wound check was done at 2 weeks and patient was advised graded physiotherapy to gain back the strength of elbow flexors. Regular follow up was done and graded activity difficulty level was increased for the patient. Patient was allowed to start lifting light weights at 16 weeks post op.

At 18 weeks post op patient has no complains and has gained full elbow range of motion for flexion and supination with gradual return back to his day to day activity and weightlifting.

3. Discussion

Pathology of long head of biceps and rotator cuff are closely correlated and an important and frequent cause of anterior shoulder pain. The long head of biceps is anatomically located in a constrained inter-tubercular sulcus and glides within it during shoulder movement. (1). Unchecked progressive tenosynovitis due to repeated overhead motion in overhead athletes or weightlifters leads to weakening of the long head of biceps tendon making it susceptible to injury. The degenerative cascade leads to tendinosis, delamination, pre rupture and eventually rupture. (2) The tendon consists of an intra-articular and an extra-articular tract. The intra-articular tract originates from the supraglenoid tubercle and superior glenoid labrum. It is extra-synovial and crosses the glenohumeral joint anterosuperiorly to the humeral head. The extra-articular portion passes under the biceps pulley and enters the bicipital groove. (3). The tendon is approximately 5mm wide and 10 cm long. The intra-articular portion of the tendon is flat, wide and ribbon like while the extra-articular portion is round and tubular. (1). The blood supply to the tendon is through branches of anterior circumflex humeral artery. The distal tract of the tendon is relatively avascular making it prone to degeneration and rupture. The tendon can slide up to 18mm in and out of glenohumeral joint in forward flexion and internal rotation. (4). The tendon also turns 30 to 40 degrees after the exit of the joint. (5). The biomechanical function of the LHB in the kinematics of shoulder joint has not yet been elucidated. One of the assumed function of LHB tendon in glenohumeral joint kinematics is to stabilize the humeral head within the glenoid during elbow and forearm motion. (6). When the tendon is damaged the humeral head migrates upwards in the glenoid. LHB also plays a role in stabilizing humeral head during overhead abduction in scapular plane. (7). The inflammatory tendinopathy and degenerative tendinopathy of the tendon are usually related to the overuse with resultant pressure and shear forces acting on the tendon. (8). These pathologies make the long head tendon more prone to rupture. The clinical diagnosis of the disorders affecting the long head of biceps is difficult as the signs are overlapping with other causes of glenohumeral joint pathologies. The most common finding in LHBT pathology is point tenderness in the bicipital groove with arm in 10 degrees of internal rotation. (9). Clinical test used for the diagnosis of LHBT pathology include-Yergason test, Speed test, O'Brien test. The popeye sign is pathognomonic of LHB tendon rupture. (10). Imaging studies used to diagnose the LHB pathology include-radiographs, ultrasonography and MRI. MRI provides an excellent visualization of superior labral

complex, biceps tendon, bicipital groove, and bony osteophytes while also allowing diagnosis of concomitant rotator cuff or other glenohumeral pathologies.

The management strategies for the LHB pathologies include conservative as well as operative management.

Conservative therapy is the most often used first line therapy for the LHB pathologies. It consists of rest, NSAIDs, corticosteroid injections to control the inflammation and graded return to activity. A part of conservative therapy also involves strengthening of periscapular muscles and rotator cuff strengthening.

Surgical therapy is most commonly indicated for partial (>50%) or full thickness tears of LHB Tendon, subluxation of the LHB tendon, associated cuff pathology (cuff tear, SLAP tear etc). The most appropriate surgical option is yet to be identified. Biceps tenotomy and biceps tenodesis are the most common procedures performed. (11).

Biceps tenotomy is usually performed arthroscopically, which allows the surgeon to assess other aspects of LHB pathology or other glenohumeral joint pathologies concurrently. The inflammation on the surface of intra-articular as well as extra articular part is evaluated. (12).

The stability of biceps in the biceps pulley, rotator cuff tendons, biceps sling are also evaluated. The LHB is released as close as possible to the superior labrum such that the integrity of the Superior labral ring is maintained. The released tendon retracts into the bicipital groove.

The arthroscopic release technique is an effective and reliable technique which provides relief from shoulder pain arising due to LHB pathology and allows early return to work and play. (13)

The most common complication associated with tenotomy is popeye deformity and fatigue discomfort in biceps. (10). Hence tenotomy is usually reserved for elderly and people who are unlikely to be affected by cosmetic deformity. The treatment method of choice for young active patients-athletes, laborers, and people who want to avoid cosmetic deformity (physique athletes) is biceps tenodesis.

The main goal of the biceps tenodesis is to maintain length-tension relationship of the biceps, which avoids muscle atrophy and the cosmetic deformity. It can be performed as an arthroscopic, open or mini-open procedure. In all the methods the tendon is fixed in the subpectoral position at the entrance of bicipital groove or under the superior border of pectoralis major insertion (14) several fixation methods exist including-suture anchor fixation, suture-to-adjacent tissue fixation, keyhole-to-bone fixation, interference screw fixation etc which no study demonstrating biomechanical superiority of one over the other.

4. Conclusion

Long head of bicep pathology is a common shoulder pathology occurring in elderly as well as young athletic population. It is a common cause of shoulder pain and

associated morbidity. The clinical diagnosis is difficult as there is a lot of overlap with the other shoulder pathologies. The treatment method for the long head of biceps pathology varies from conservative therapy to operative methods. There are many surgical techniques described for the treatment of LHB tears. Most commonly followed protocol involves biceps tenotomy for the elderly population while biceps tenodesis is reserved for younger, active population and for those who don't want the post operative popeye deformity. The techniques for biceps tenodesis vary from arthroscopic to open to mini open methods. Various fixation strategies exist with no clear cut superiority of one method over the other. LHB pathology often coexist with other rotator cuff/ glenohumeral pathologies and hence a careful assessment for the other co-existing pathologies is warranted to adequately treat the associated shoulder instability.

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