



Rare case of intra-articular biceps incarceration following traumatic massive rotator cuff tear

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The long head of the biceps tendon (LHB) is a common source of shoulder pain. As it exits the glenohumeral joint, the LHB is stabilized by its pulley, which is formed by the superior glenohumeral and coracohumeral ligaments, and the insertions of the subscapularis and supraspinatus tendons.^{8,15} Damage to this complex anatomical structure may lead to LHB instability of varying degrees, with several patterns of dislocation reported, usually associated with rotator cuff tears (RCT).^{5,14}

Even though LHB instability itself is usually associated with anterior shoulder pain or other minor symptoms such as clicking or jerking, these are usually obscured by the clinical findings of the associated RCT.^{13,14} However, with glenohumeral intra-articular dislocation of the tendon, more differentiating symptoms may occur as the tendon becomes entrapped in the joint, such as mechanical locking sensation and more severe snapping of the shoulder.^{11,14} We intend to illustrate the clinical and imagiological findings of an unusual case of intra-articular biceps glenohumeral entrapment following a traumatic massive RCT.

Case report

We report the case of a 70-year-old woman, who presented for severe acute right shoulder pain and loss of function, 7 weeks after a fall. There was no history of previous shoulder symptoms or

interventions, nor other relevant medical history. On clinical examination, she presented with a pseudoparalytic shoulder with combined loss of elevation and external rotation,¹ with 30° and 10° of active forward elevation and external rotation, respectively. Passive range of motion was near symmetrical to the contralateral shoulder, but affected by pain and significant snapping of the joint. Articular mechanical locking and apprehension were reproducible with passive elevation and full arc rotational movements of the arm, which was possible to overcome after a painful snapping with gradual manipulation. Plain radiographs were unremarkable (Fig. 1A), but a magnetic resonance imaging (MRI) study revealed a retracted massive tear of the subscapularis, supraspinatus and infraspinatus tendons, with an intra-articular medially dislocated biceps tendon entrapped in the glenohumeral joint space (Fig. 1, B–D).

Due to the mechanical symptoms and persistent pain, early surgical treatment was decided. The massive RCT was deemed irreparable preoperatively due to significant tendon retraction, and considering the patient's age and presentation with a pseudoparalytic shoulder, she was therefore admitted for a reverse total shoulder arthroplasty. Intraoperatively, after incising a residual superficial suprascapular fascia, the complete subscapularis tear was confirmed, along with a humeral detachment of the antero-inferior capsule. The dislocated flattened biceps tendon was identified in a “true” intra-articular position (far posterior to the usual displacement observed in medial articular dislocations), entrapped between the glenoid and humeral head (Fig. 1, E and F). The LHB was released from its incarcerated position and a tenolysis was performed down to the level of the pectoralis major, where a soft tissue tenodesis was performed. The prosthesis was implanted subsequently, with no complications recorded (Fig. 1G). At 8

Institutional review board approval was not required for this case report. Informed consent was obtained from the patient for publication of this case report and any accompanying images.

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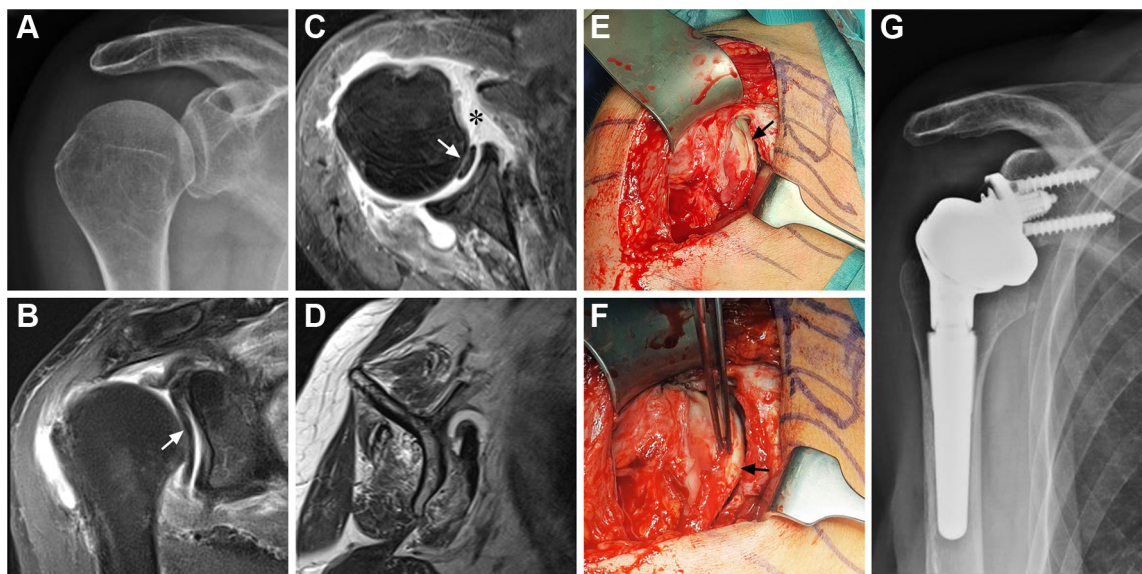


Figure 1 Right shoulder: anteroposterior radiograph (A); MRI T2 weighted oblique-coronal and axial views, showing the entrapped intra-articular biceps tendon (white arrow) and associated massive full-thickness cuff tear, including a retracted subscapularis tear and complete capsular avulsion (*) (B and C); MRI T1 weighted oblique-sagittal view, showing moderate fatty infiltration of the rotator cuff muscles (D); and intraoperative depiction of the dislocated and entrapped biceps tendon (black arrow), after opening of the remaining anterior fascial layer through a deltopectoral approach (E and F).

months of follow-up, the patient reports pain free mobility, with 160° of active forward elevation.

Discussion

Biceps instability and pulley lesions have been thoroughly studied since Meyer first published his findings in 1928.⁸ Walch et al described in detail the anatomy of the anterior pulley, better defining various patterns of medial instability and their relationship with subscapularis tears,^{14,15} which are present in up to 98% of cases.¹⁶ Posterior biceps instability was later addressed by Lafosse et al, who reported a similar rate of anterior and posterior biceps instability in as many as 45% of shoulder arthroscopies performed for cuff repair.⁵

While various patterns of LHB displacement exist, intra-articular dislocations are usually associated with a superior subscapularis lesion, where the tendon partially falls into the joint, remaining however in an anterior extracapsular position.^{5,6,14} Complete biceps dislocations are however less frequent, as most degenerative pulley lesions will not progress to a fully dislocated tendon. As such, most of these injuries occur in a traumatic setting, normally in conjunction with an extensive RCT, or a humerus fracture dislocation.^{7,9,10,12}

Intra-articular dislocations with a complete subscapularis tear have been previously reported when MRI first became available,^{2,3} and correspond to a class IIIB type II lesion in the Habermeyer and Walch classification¹¹ (Table 1). Though occasional glenohumeral interposition can happen with rotation movements, the LHB tendon will typically reside outside the joint space (near the anterior labrum) with the humerus in a static position.^{11,14}

A complete intra-articular dislocation of the LHB with permanent glenohumeral joint entrapment is therefore particularly rare, as it can only happen in the presence of a subscapularis tendon entirely torn from its insertion at the lesser tuberosity, and an associated complete humeral detachment of the anteroinferior capsule. Treatment of these patients must address both the biceps condition and the associated injuries. Due to the total avulsion of the bicipital groove, a subpectoral tenodesis or tenotomy may be

Table 1

Habermeyer and Walch classification of biceps lesions.

I. Origin ¹¹
II. Interval Lesions
A. Biceps tendinitis
B. Isolated ruptures
C. Subluxation
Type I: Superior
Type II: At the groove
Type III: Malunion or nonunion of the lesser tuberosity
III. Associated with RCT
A. Tendinitis
B. Dislocation
Type IA: Extra-articular with a partial subscapularis tear
Type IB: Extra-articular with an intact subscapularis
Type II: Intra-articular
C. Subluxation with RCT
D. LHB rupture with RCT

LHB, long head of the biceps; RCT, rotator cuff tear.

considered, and should be associated with a rotator cuff repair whenever achievable.

In our patient, the dislocation occurred after a trauma and was associated with a massive irreparable RCT, including a complete subscapularis rupture and humeral capsular detachment. Though a deltoid rehabilitation program can be the first step in treatment of irreparable massive tears,⁴ the severe pain and mechanical locking to passive motion caused by the entrapped LHB tendon precluded a trial of conservative management, imposing an early surgical treatment. Considering the patient’s age, clinical presentation, and tear characteristics, a LHB tenodesis and reverse total shoulder arthroplasty was considered the better option for the whole condition in this particular case.

Conclusion

LHB dislocations are a well-described entity, although deserving little recent focus as they are usually outshined by associated lesions and require an unremarkable surgical treatment. As this pathology becomes uncommon in modern orthopedic practice, we

believe this report to be a valuable pictorial review, by providing an MRI diagnosis along with intraoperative images. In patients with a pseudoparalytic shoulder and severe snapping, the presence of a massive acute RCT with intra-articular biceps incarceration should always be considered. Surgeons must be able to accurately identify the typical clinical and imaging findings, as this injury may impose an early surgical indication.

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