Diagnosis and á la carte treatment of intra-articular painful shoulder lesions after single nondislocating traumatic event to the shoulder

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Background
There is an intra-articular forgotten and sometimes hidden pathology that leads to post-traumatic chronic shoulder pain.
Aim
The aim of this study was to define the intra-articular pathology associated with chronic shoulder pain after nondislocating traumatic event and to evaluate the results of á la carte treatment of these conditions.
Patients and methods
Between April 2009 and November 2010, 100 patients were presented to us at the outpatient clinic in Mansoura University Hospital with shoulder pain after traumatic event. Sixty-eight patients were male and 32 patients were female. Their average age was 40.8 years (range: 27–55). Clinical examination and plain radiograph were performed for all patients. Conservative treatment was started; 80 patients had improved and 20 male patients did not improve, to whom MRI and shoulder arthroscopy and á la carte management according to the confronted intra-articular lesion(s) were performed.
Results
The results were assessed according to the University of California at Los Angeles shoulder score. All patients were satisfied with the results of treatment; 16 patients had excellent results, four patients had good results (>27 points), and no one had fair or poor results (<27 points) according to UCLA shoulder score.
Conclusion
Chondrolabral lesions, subscapularis tears, and long head of the biceps tendon tears and/or instability are important causes of shoulder pain after nondislocating shoulder trauma. Shoulder arthroscopy is both diagnostic and therapeutic for these lesions.

Á la carte management including debridement, repair (arthroscopic or open), tenotomy, and capsular plication according to the confronted intra-articular lesion(s) gives excellent results in 80% of patients according to ULCA sore.

Keywords:
intra-articular painful shoulder lesions, single nondislocating, the shoulder

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Introduction

Many traumatic painful conditions in the shoulder region share similar clinical features, creating a diagnostic challenge and potential confusion for the clinician. Post-traumatic shoulder pain is frequently due to glenohumeral instability and supraspinatus impingement. Other forgotten and sometimes hidden causes of post-traumatic shoulder pain are labral injury, long head of the biceps (LHB) tendon lesions, and subscapularis tears [1–3].

The shoulder trauma may be dislocating/nondislocating trauma or repetitive microtrauma. The dislocating trauma is usually and typically associated with Bankart lesion. The repetitive microtrauma is usually associated with capsular laxity and stretch. Nondislocating trauma may be associated with an intra-articular pathology, including chondrolabral injury, LHB tendon lesion, subscapularis tear, and/or supraspinatus tear.

In this study, patients were exposed to a single severe traumatic event not severe enough to cause shoulder dislocation or fracture but followed by shoulder pain not relieved with conservative treatment. The aim of this work was to diagnose shoulder pain and evaluate the results of á la carte management of the intra-articular pathology associated with these conditions.

Patients and methods

Patients were included if they had chronic shoulder pain after nondislocating trauma and did not respond to conservative measures. Patients were excluded if they had acute or nontraumatic shoulder pain or had a history of shoulder dislocation or fractures.

Between April 2009 and November 2010, 100 patients were presented to us at the outpatient clinic in Mansoura University Hospital with shoulder pain after traumatic event. Sixty-eight patients were male and 32 patients were female. Their average age was 40.8 years (range: 27–55 years). Clinical examination and plain radiograph were performed for all patients. Conservative treatment in the form of complete rest, NSAIDs, local corticosteroid injection (20 patients), and physiotherapy (30 patients) was started. Eighty patients had improved, and 20 male patients did not improve, to whom MRI and shoulder arthroscopy were performed.

In 20 patients with chronic shoulder pain, the diagnosis was vague and confusing. Clinical examination showed positive apprehension sign in 18 patients, positive speed test in six patients, positive impingement sign in two patients, and positive lift-off test in one patient. Plain radiographs were normal for all patients. MRI was performed for all of them and shoulder arthroscopy revealed an intra-articular pathology (Table 1).

One patient had a longitudinal lamellar tear of the subscapularis and the capsular lining of the tendon was thin and torn in some areas. The tear was repaired with circumferential sutures (Fig. 1). Another patient had chronic pain after falling from height holding a bar in his abducted externally rotated position. MRI and shoulder arthroscopy revealed full thickness tear of the subscapularis with medial retraction and subcoracoid impingement and the labrum was intact (Fig. 2). Transosseous sutures were performed for refixation of the tendon using an open approach [4,5].

Six patients had pathology of the LHB tendon. Two patients had biceps instability; both occurred after falling on abducted, externally rotated arm. MRI and shoulder arthroscopy revealed medial dislocation of the LHB tendon (Fig. 3), associated with partial tear of the subscapularis in one and partial tear of the undersurface of the supraspinatus in the other. Both patients were treated with tenotomy of the LHB [6] and debridement of the subscapularis and supraspinatus tears, which were small tears.

The other four patients had chronic shoulder pain after lifting a heavy weight; one of them had positive Popeye sign. MRI and shoulder arthroscopy showed shallow bicepital groove, severe tenosynovitis at the rotator interval, and nearly detachment of LHB from the superior labrum and the supraglenoid tubercle. On arthroscopy, probing revealed curled and very lax tendon (Fig. 4). Refixation of the LHB to the

Table 1 Patient findings and á la carte treatment

Number of patients	Causative trauma	MRI findings	Arthroscopic findings	Á la carte treatment
2	Traction injury with severe abduction and external rotation (one patient)	Subscapularis vertical tear	Subscapularis complete tear	Open repair
	Forced external rotation (one patient)	Subscapularis horizontal tear	Subscapularis intratendinous tear	Arthroscopic repair
6	Falling on abducted, externally rotated arm (two patients)	Dislocated LHB tendon	Dislocated LHB tendon	Tenotomy of dislocated LHB
	Lifting a heavy weight (one patient)	LHB rupture	Incomplete rupture of LHB at its attachment	Refixation with anchor sutures
	Falling on abducted limb (two patients)	Biceps tendinitis	Partial tear of LHB tendon at its attachment to the superior labrum; chronic synovits; small tear of the undersurface of the supraspinatus	Debridement
	Throwing a heavy object (one patient)			
2	Falling on outstretched abducted limb	Supraspinatus tear	Incomplete intra-articular supraspinatus tear	Debridement
1	Traction trauma of adducted limb	GLAD lesion	GLAD lesion	Anchor suture fixation
9	Traction trauma of abducted limb	Labral tear	Labral tear+capsular laxity	Debridement+capsular suture placation

GLAD, glenoid labral articular disruption; LHB, long head of the biceps.

supraglenoid tubercle was carried out with anchor sutures and arthroscopic debridement of the chronic synovitis. Three patients had pain due to falling on abducted limb in two and after throwing a heavy object in one. The arthroscopy revealed partial tear at attachment of LHB tendon to the superior labrum associated with chronic synovitis and small incomplete tear of the undersurface of the supraspinatus. The patients were treated with debridement.

Two patients after falling on outstretched abducted limb had chronic shoulder pain and positive impingement sign. MRI and arthroscopy showed increased signal intensity at the supraspinatus insertion at T2-weighted sequences and a partial tear of the undersurface of the supraspinatus and were treated with debridement.

The other 10 patients after traction trauma (of adducted limb in one and abducted limb in the other nine patients) developed a chronic shoulder pain, not relieved with medical treatment or physiotherapy. In one patient, the MRI and shoulder arthroscopy showed a chondrolabral lesion that involved the articular edge with loss of a few millimeters of cartilage [glenoid labral articular disruption (GLAD)] and treated with anchor suture fixation to roll the edge of the labrum over the chondral defect [7] (Fig. 5). In the other nine patients, arthroscopy showed positive drive-through sign associated with capsular laxity and labral tear and treated with debridement and suture repair and capsular plication [8].

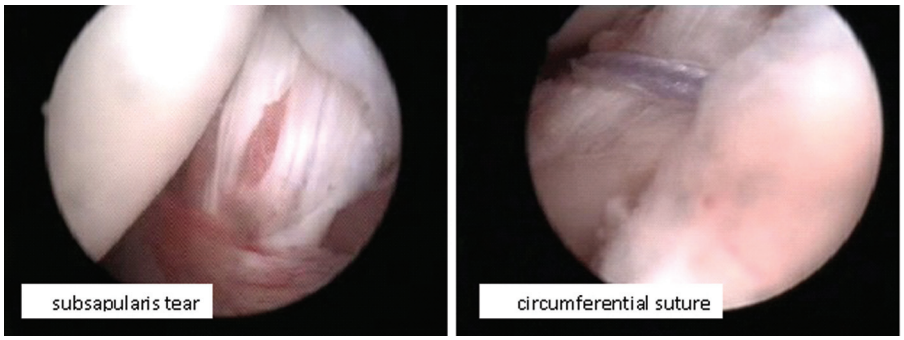
Postoperatively, all patients used a sling for 3 weeks, encouraging range of motion, and then physiotherapy was performed for another 6 weeks.

Results

After single nondislocating traumatic event to the shoulder of 100 patients, 80% improved with conservative treatment. Twenty percent had persistent shoulder pain and did not improve with conservative treatment. MRI and shoulder arthroscopy revealed an intra-articular lesion.

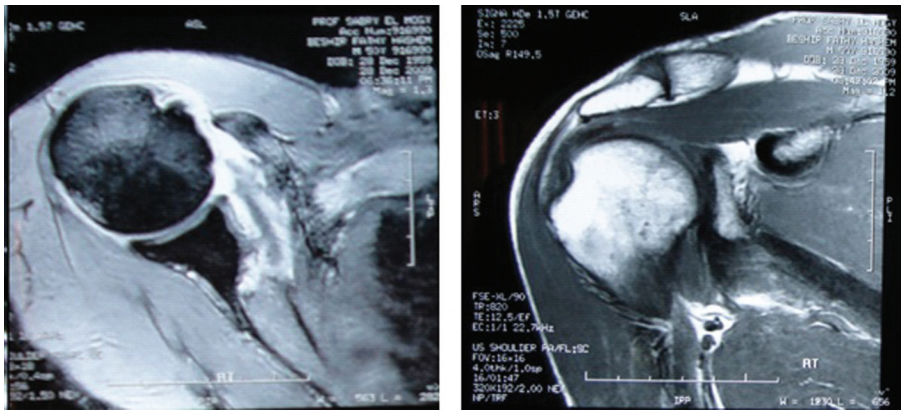
The intra-articular lesion was due to capsular laxity and labral tear in 45%, LHB tendon lesion in 30%,

Figure 1



Fifty-one-year-old male patient with horizontal subscapularis tear.

Figure 2

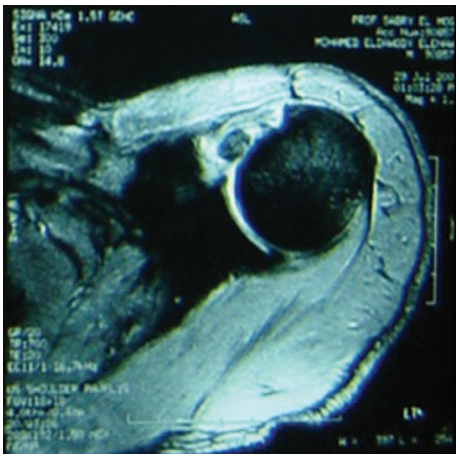


Fifty-year-old male patient with full thickness vertical subscapularis tear.

subscapularis tear in 10%, supraspinatus tear in 10%, and GLAD lesion in 5% of patients.

The results of á la carte treatment of these intra-articular lesions were assessed according to the UCLA shoulder score, which assigns 10 points for pain, 10 points for function, 5 points for active forward flexion, 5 points for strength of forward flexion, and 5 points for patient satisfaction. All patients showed pain improvement. All patients were satisfied with results of treatment; 16 (80%) patients had excellent results, four (20%) patients had good results (>27 points), and no one had fair or poor results (<27 points) according to UCLA shoulder score.

Figure 3



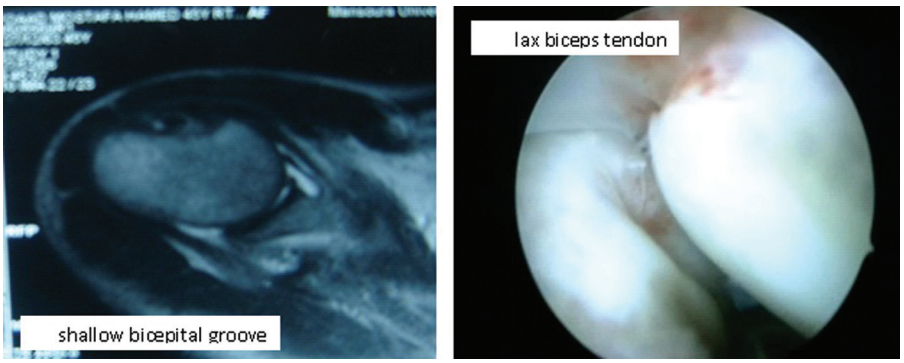
Fifty-three-year-old male patient with medial dislocation of the long head of the biceps tendon.

Discussion

Dislocating/nondislocating trauma

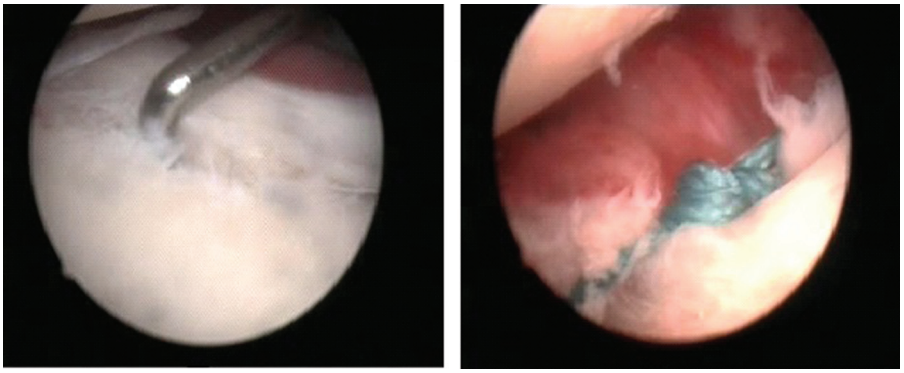
The shoulder trauma may be dislocating/nondislocating trauma or repetitive microtrauma. Frequently, patients with dislocation experience pain only during the episodes of dislocation and for a brief period after the events, whereas others complain of pain only with particular arm positions or activities. A third group experiences a constant ache. Although anterior shoulder pain is a frequent complaint in anterior shoulder instability, it is by no means unique to this diagnosis as it may be present with several other shoulder disorders. The main pathology is labral and labroligamentous lesions [7].

Figure 4



Forty-eight-year-old male patient with biceps tendon lesion. MRI shows shallow bicepital groove.

Figure 5



Forty-year-old male patient with glenoid labral articular disruption lesion treated by rolling and fixation of the labrum to the edge of the glenoid.

The repetitive microtrauma or overuse usually occurs in young overhead athletes (baseball pitchers or back swimmers) or those involved in excessive overhead work. They may develop symptomatic instability after years of competition or overhead activity. Occasionally, they remain asymptomatic until encountering a mild traumatic event. The main pathology is increased glenohumeral joint volume.

In this study, a third group of patients were exposed to single traumatic severe trauma that did not cause shoulder dislocation or fracture but caused shoulder pain that did not improve with conservative treatment. The pain decreases with rest and provoked with certain positions or work leading to chronic shoulder pain and even disability.

Subscapularis tears

Partial thickness tears of the rotator cuff are a common cause of shoulder pain. The subscapularis tears may be partial [9,10] or complete [3,11], horizontal intratendinous tears or vertical tears affecting the bursal surface or commonly the articular surface [12] of the upper or the lower portion of the tendon, occurring after anterior dislocation, forceful hyperextension, or external rotation of the adducted arm [13]. The tears may be isolated (0.8–4%) [3] or combined with anterosuperior rotator cuff lesion [9,10].

Partial tear of the undersurface is the most important biomechanically, and partial tear of the upper portion is the most common (observed in 27% in a case series of shoulder arthroscopies) [14]. Partial subscapularis tears were named a hidden shoulder lesion and the tendon was called the forgotten rotator cuff tendon [15]. The use of arthroscopy as a diagnostic tool explores these frequently missed lesions.

Long head of the biceps tendon lesions

LHB tendon lesions, including superior labral tear from anterior to posterior (SLAP) lesion, tendonitis, partial tears, subluxation, or dislocation [2], are well recognized causes of shoulder pain [16] and even disability [17]. The clinical diagnosis is difficult and confusing [18]; the use of arthroscopy helps in identifying and hence in treating these lesions.

With arthroscopy, SLAP lesion, tendonitis, and partial tears are easily diagnosed. Tendon instability can be diagnosed directly with dynamic medial displacement of the tendon or indirectly by probing of the tendon, fraying of the superior edge of the subscapularis [2], or the presence of chondral print on the humeral head [18].

The LHB tendon is thought to be a key stabilizer of the humeral head within the glenohumeral joint [19]. Sudden contraction of the biceps with resisted flexion and supination of the forearm in the presence of tendon degeneration or frictional wear of the tendon bully can lead to tendon tears [20]. The tear most commonly occurs near the glenoid insertion or at the proximal portion of the intertubercular groove [21].

Chondrolabral lesions

After shoulder dislocation, glenoid lesions may be chondral, chondrolabral, or labroligamentous [7]. Chondrolabral lesions involve the articular edge, with either loss of a few millimeters of cartilage (GLAD) or injury to the cartilage rim (glenoid articular rim divot) [1,22,23].

The repair of chondrolabral lesions is necessary to prevent further damage and to create a watertight peripheral rim using the reconstructed labrum as an anchoring structure [7].

Conclusion

Chondrolabral lesions, subscapularis tears, and LHB tendon tears and/or instability are important causes of shoulder pain after nondislocating shoulder trauma. Shoulder arthroscopy is both diagnostic and therapeutic for these lesions.

Á la carte management including debridement, repair (arthroscopic or open), tenotomy, and capsular plication according to the confronted intra-articular lesion(s) gives excellent results in 80% of patients and good results in 20% of patients according to ULCA sore.

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Conflicts of interest

There are no conflicts of interest.

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