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ABOUT COVER

Editorial board member of *World Journal of Orthopedics*, Dr. Georgios A Koumantakis is an Assistant Professor at the University of West Attica (UNIWA) in Athens, Greece. Having received his Bachelor's degree from the Technological Educational Institute of Athens in 1996, Dr. Koumantakis undertook his postgraduate training in the United Kingdom. He received his Master's degree from the Manchester School of Physiotherapy in 1997 and his PhD from the University of Manchester in 2001. He became Clinical Physiotherapist at the 401 General Army Hospital of Athens in 2006, where he stayed until 2020, when he became Assistant Professor at UNIWA. His ongoing research interests involve the application of evidence-based physiotherapy practice in prevention and management of neuromusculoskeletal pathologies, particularly the effects of physiotherapy interventions within a wide age, occupational and physical activity population spectrum. (L-Editor: Filipodia)

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WJO mainly publishes articles reporting research results and findings obtained in the field of orthopedics and covering a wide range of topics including arthroscopy, bone trauma, bone tumors, hand and foot surgery, joint surgery, orthopedic trauma, osteoarthropathy, osteoporosis, pediatric orthopedics, spinal diseases, spine surgery, and sports medicine.

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Treatment of a rotator cuff tear combined with iatrogenic glenoid fracture and shoulder instability: A rare case report

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Abstract

BACKGROUND

The brisement manipulation is an effective treatment for refractory shoulder stiffness. Rotator cuff tears can sometimes exist in combination with adhesive capsulitis. Arthroscopic capsular release combined with rotator cuff repair has achieved good outcomes in published reports.

CASE SUMMARY

We report the case of a patient with right shoulder pain for more than 1 year that was suspected to have adhesive capsulitis and a rotator cuff tear that was treated with brisement manipulation and arthroscopic management. An iatrogenic glenoid fracture with shoulder instability occurred during the manipulation. Arthroscopic treatment for fracture fixation, capsular release, and rotator cuff repair was performed, and the functional results are reported.

CONCLUSION

Arthroscopic fixation for iatrogenic glenoid fracture and repairing coexisting rotator cuff tear can provide the stability needed for early rehabilitation.

Key Words: Frozen shoulder; Bursitis; Arthroscopy; Fracture; Glenoid fracture; Manipulation; Iatrogenic; Case report

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Core Tip: Manipulation under anesthesia is an effective treatment for refractory stiff shoulder, but some severe complications have been reported. We present a rare case of rotator cuff tear and antero-inferior glenoid rim fracture combined with shoulder instability after manipulation for shoulder stiffness. Arthroscopic repair of the glenoid fracture and concomitant rotator cuff tear was performed. A good outcome was achieved with this treatment in the 2-year postoperative follow-ups.

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INTRODUCTION

Rotator cuff tears accompanied by adhesive capsulitis are common in clinical practice^[1-3]. Both problems are prevalent causes of shoulder pain and disability. Manipulation under anesthesia with or without arthroscopic capsular release is an effective operative treatment for a refractory stiff shoulder^[3-6]. Rotator cuff repair combined with capsular release can achieve a good functional outcome with a low retear rate^[7]. Some severe complications have been reported after the manipulation (e.g., humeral fracture, glenohumeral dislocation, and brachial plexus injury)^[3,8]. Therefore, performing an arthroscopic capsular release before a shoulder manipulation is suggested to decrease the incidence of complications^[3,9,10]. However, some surgeons still prefer to perform the manipulation before arthroscopy to facilitate the performance of the arthroscopy, and the use of an arthroscope after manipulation could increase the release and address any concomitant problems^[9-12]. Furthermore, a high rate of iatrogenic intraarticular damage may occur during the manipulation^[13]. The incidence of glenoid fracture after manipulation is rare, according to historical reports^[8,14,15]. We present a case of antero-inferior glenoid rim fracture combined with shoulder instability after manipulation for shoulder stiffness. Arthroscopic repair of the glenoid fracture and concomitant rotator cuff tear was performed. A good outcome was achieved with this treatment. Informed consent was obtained from the patient, and she gave permission for her case to be published.

CASE PRESENTATION

Chief complaints

A 58-year-old woman presented to our clinic with a history of right shoulder pain and decreased range of motion (ROM) for more than 1 year.

History of present illness

She had a history of diabetes mellitus and was treated with oral diabetic medication. Adhesive capsulitis was suspected, and a physical therapy program was arranged to increase passive motion. Unfortunately, the ROM and right shoulder function showed no improvement after 2 mo of rehabilitation (Table 1).

History of past illness

She denied history of trauma of the right shoulder. She had a history of diabetes mellitus and was treated with oral diabetic medication.

Personal and family history

The patient herself and her family had not suffer from this symptom before.

Physical examination

There were positive findings for the Hawkin's and empty can tests. The decreased ROM function is described in Table 1.

Table 1 Functional result before surgery and at the postoperative 2-year follow-up

	Before surgery	1-yr follow-up	2-yr follow-up
VAS at rest	5	2	1
VAS during activity	8	3	2
ASES score	20.0	80	85.0
UCLA shoulder score	10	30	31
Range of motion in °			
FE	130	160	175
ER, arm at side	50	70	70
ER, arm at 90° abduction	60	85	90
IR, arm at side	Buttock level	L1 level	T10 level
IR, arm at 90° abduction	10	60	70
Abduction	120	150	160

ASES: American shoulder and elbow surgeons^[23]; ER: External rotation; FE: Forward elevation; IR: Internal rotation; UCLA: University of California at Los Angeles^[24]; VAS: Visual analog pain scale (0, no pain; 10, worst pain).

Laboratory examinations

All laboratory tests revealed no significant result.

Imaging examinations

A magnetic resonance imaging assessment revealed a small-sized full-thickness supraspinatus tear and wall thickening at the inferior capsule of the shoulder. No fractures were identified in the preoperative image evaluation (Figure 1).

FINAL DIAGNOSIS

Before operation, the tentative diagnosis was small-sized full-thickness supraspinatus tear and adhesive capsulitis. After manipulation, the final diagnosis was shifted to small-sized full-thickness supraspinatus tear combined with the glenoid fracture and shoulder instability.

TREATMENT

She was given general anesthesia and placed in the supine position. Brisement manipulation was first performed and begun with forward flexion in internal rotation with light traction, which held the arm close to the axilla to decrease the lever effect. Continuous gentle pressure was applied, and a distinct clicking sound with a giving-way sensation was noted mid-way when the arm elevation was at 150 degrees. The X-ray was checked, and no proximal humeral fracture or dislocation was found. Then, manipulation for abduction, external rotation, and internal rotation was performed. After the manipulation, an examination revealed grade II laxity during anterior translation for the right shoulder^[16].

Shoulder arthroscopy was then performed with the patient in the beach-chair position, starting from the standard posterior portal. A fresh fracture of the anteroinferior rim of the glenoid was noted (Figure 2). The size of the fragment was measured by a laser-marked device about 5 mm and 15 mm in the anterior-posterior and superior-inferior directions, respectively. Due to hypermobile anterior translation of the glenohumeral joint, fracture fixation was decided. Anteroinferior and accessory anterosuperior portals were established *via* an outside-in technique. Three 2.8-mm Twinfix Ti suture anchors (Smith & Nephew, Andover, MA, United States) were set in place at the lower edge, upper edge, and middle of the fractured glenoid for fixation of the fractured glenoid rim (Figure 2). After fracture fixation, the anterior translation test found no instability. Then, a complete capsular release was performed

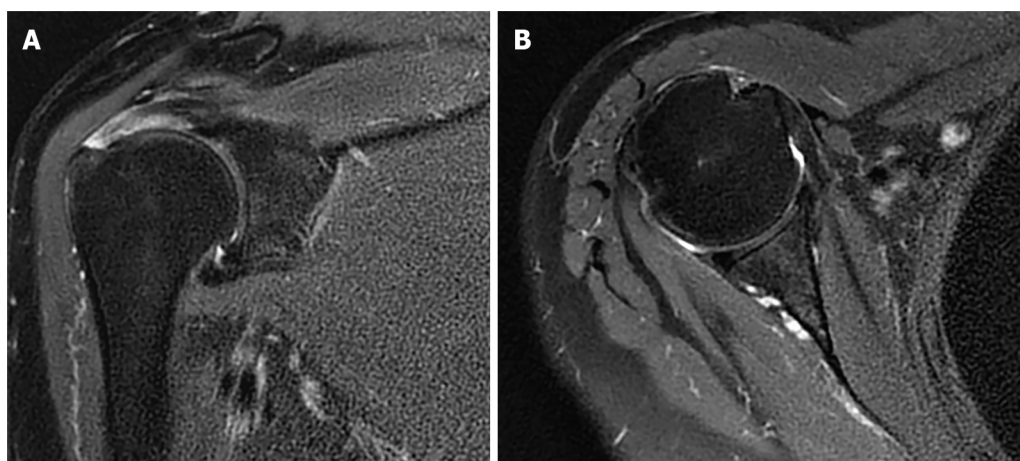


Figure 1 Magnetic resonance imaging of the right shoulder before surgery. A: The full-thickness rotator cuff tear; B: The intact glenoid of the right shoulder.

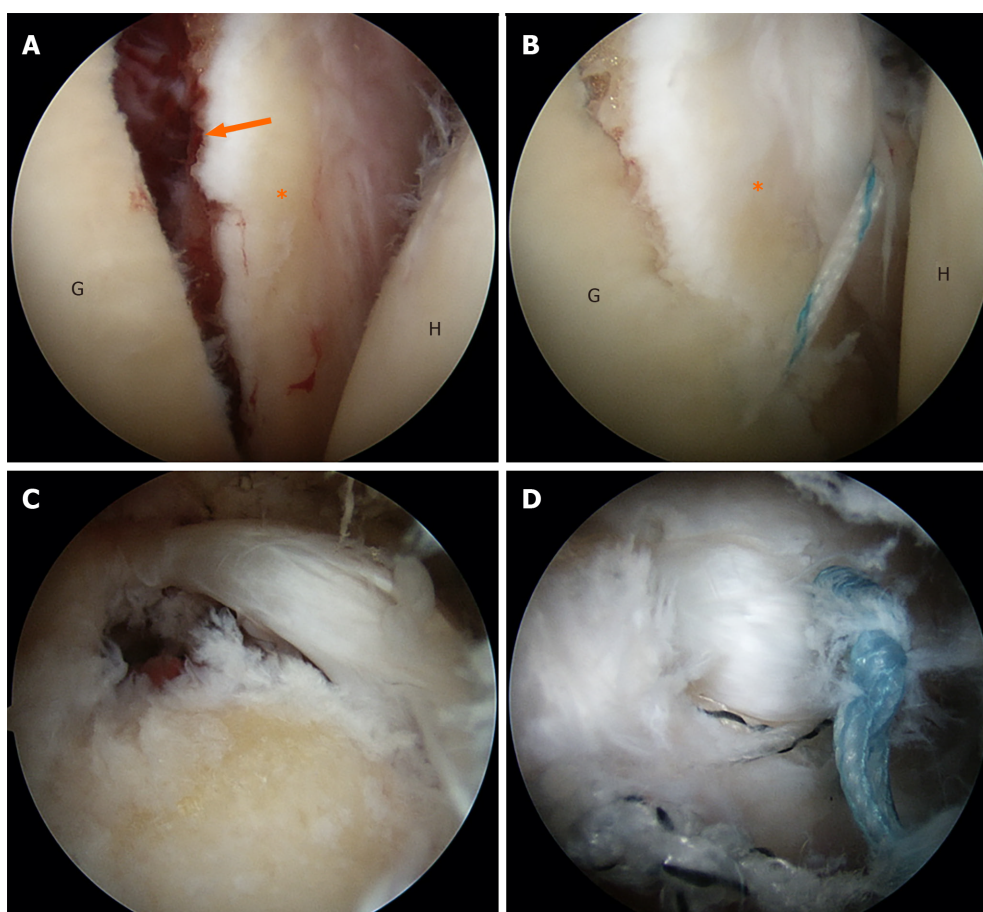


Figure 2 Intraoperative photographs. A: A fresh fracture with displacement at the anteroinferior glenoid rim. The size of the fragment was about 5 mm and 15 mm in the anterior-posterior and superior-inferior directions, respectively; B: The suture anchors for fixation of the fracture; C: The small-sized full-thickness supraspinatus tear; D: Torn rotator cuff was repaired by the double-row arthroscopic technique. G: Glenoid; H: Humeral head; Star: The fragment of anteroinferior glenoid with intact anterior joint capsule; Black arrow: Fresh fracture line.

arthroscopically^[8]. Repeated examinations showed good stability with full ROM. The fixed glenoid fracture was checked again arthroscopically and showed good stability with no displacement. Arthroscopic rotator cuff repair was then performed by two 5.0-mm Twinfix Ti suture anchors (Smith & Nephew) as the double-row suture technique in the subacromial space (Figure 2).

OUTCOME AND FOLLOW-UP

After surgery, the patient was immobilized in a simple sling, and gentle passive pendulum exercise was allowed for 6 wk, followed by active-assisted ROM exercises coupled with a comprehensive strengthening program. A computed tomography scan revealed healing of the fracture 3 mo after surgery (Figure 3). More aggressive training for strengthening and overhead lifting began from month 4, in accordance with the recovery of ROM and strength.

At the 1-year and 2-year postoperative follow-ups, functional outcomes had improved beyond the baseline preoperative measures, and the patient was satisfied with the surgical outcome (Table 1 and Figure 4).

DISCUSSION

Manipulation under anesthesia or arthroscopic capsular release is effective in treating a refractory stiff shoulder. For cases with coexisting rotator cuff tears, arthroscopic capsular release for the stiff shoulder combined with repair for the rotator cuff tear can achieve a good result^[7]. Therefore, in cases of a stiff shoulder combined with a rotator cuff tear, surgeons can use an arthroscope to evaluate and address possible injuries and to perform additional capsular release, in addition to the manipulation procedure. Although there was no evidence to show that aggressive treatment for the coexisting problems could achieve a better outcome than manipulation only, it is reasonable to suggest that a better outcome can be achieved if all the problems can be treated in a minimally invasive manner, rather than with open surgery. This kind of aggressive treatment would be more suitable for patients with a strong motivation for rehabilitation and would result in a shorter treatment time than treating both of the problems separately or nonoperatively^[1].

The management of the glenoid fracture remained controversial. Magnussen *et al*^[17] reported a case with glenoid fracture during manipulation. The fracture healed only after immobilization without any surgical treatment. On the other hand, glenoid rim fractures often lead to chronic shoulder instability, and avulsion fractures of more than 5 mm with the instability of the glenohumeral joint may require operative stabilization^[18,19]. Patients with glenoid fracture treated with arthroscopic anchor or screw fixation can also achieve uneventful healing and good functional results^[20]. Arthroscopic fixation for glenoid fracture can minimize soft tissue dissection and manipulation. Additionally, with stable fixation and a reduced glenoid fossa, early rehabilitation can be allowed, complications related to malunion can be avoided, and good functional outcomes are more likely.

The reported results for arthroscopic repair of rotator cuff tears only and of tears combined with Bankart lesions have been similar and good^[21,22]. The conditions in our case may be similar to those of a rotator cuff tear combined with a Bankart lesion. The treatment for both sites may have outcomes similar to those of rotator cuff repair only. Although the results are affected by capsule release, we would be more confident in allowing the patient to begin early motion rehabilitation if the glenoid fracture could be fixed together with the rotator cuff.

CONCLUSION

We would like to suggest that surgeons who experience a giving-way sensation after an obvious popping sound perform a radiographic check-up or an arthroscopic exam. Additionally, shoulder instability tests could be performed to evaluate possible instability. Arthroscopic fixation for an iatrogenic glenoid fracture and repair of a coexisting rotator cuff tear can provide stability needed for early rehabilitation. Fracture healing and good functional outcomes can be achieved.

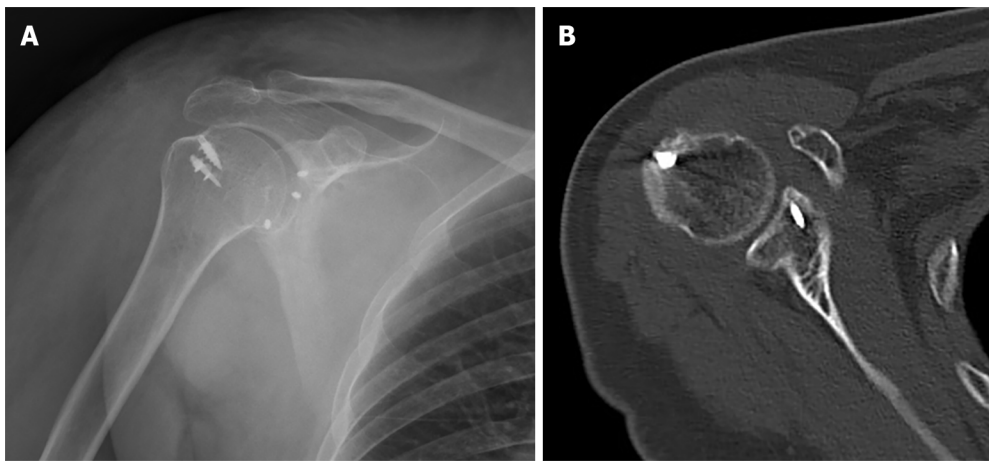


Figure 3 Radiograph at the 3-mo follow-up. A: The position of the anchors and the computed tomography scan are shown; B: Good healing of the fracture.

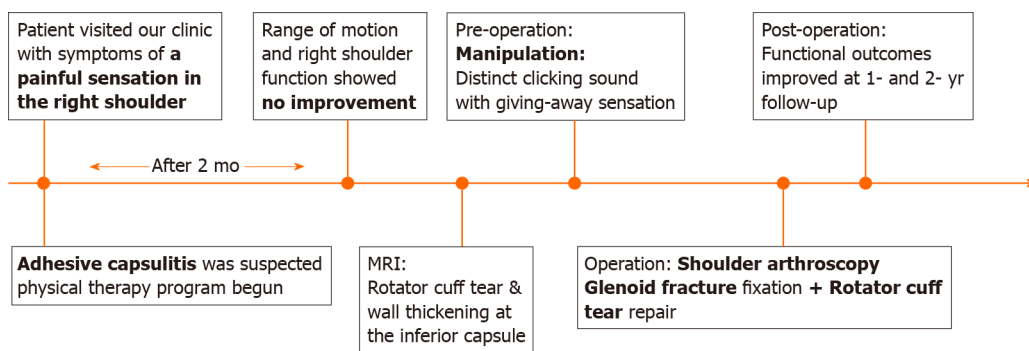


Figure 4 Timeline of the case. MRI: Magnetic resonance imaging.

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