

Traumatic Rotator Cuff Tear in A Young Recreational Athlete: A Case Report



Medical Science

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*Zuheb Ahmed Siddiqui	Tutor, Department of Rehabilitation Sciences, HIMSR, Jamia Hamdard, New Delhi, India *Corresponding author
Shibili Nuhmani	Assistant Professor, Department of Rehabilitation Sciences, HIMSR, Jamia Hamdard, New Delhi, India
Abdul Salam Ansari	Internship Student, Department of Rehabilitation Sciences, HIMSR, Jamia Hamdard, New Delhi, India

ABSTRACT

Rotator cuff tears occur chronically in older population. In young athletes, rotator cuff tears are a rare injury, but occur as a result of traumatic event instead of overuse injuries. Acute tears may be overlooked with other conditions such as rotator cuff contusion or brachial neuropraxia. Timely diagnosis is crucial before the tear progresses to the point of irreparability. This case report presents a case of young athlete with traumatic rotator cuff tear managed by an arthroscopic repair and surgery specific rehabilitation.

INTRODUCTION

Across all ages and activity levels rotator cuff injuries are one of the most common causes of shoulder pain. Disorders of the rotator cuff involve painful rotator cuff syndromes, partial-thickness and full thickness tears of varying sizes and functional limitations¹. Rotator cuff lesions often occur chronically in older population. The prevalence of rotator cuff tears increase with age². Sher et al reported that 4% of asymptomatic individuals aged < 40 years and more than 50% individuals aged ≥ 60 years showed partial or full-thickness rotator cuff tear on magnetic resonance imaging (MRI)³. Templehof et al, using ultrasound scanning demonstrated that 13% of the population in 5th decade, 20% in the 6th decade and 31% in the seventh decade of life has a rotator cuff tear⁴. Rotator cuff injuries in younger athletes most often occur due to acute traumatic events, repetitive overhead activities resulting in repetitive microtrauma and subacromial impingement⁵. In younger athletes, partial thickness tears occur as a result of traumatic event rather than overuse. Acute tears are rare and must not be overlooked with brachial neuropraxia and rotator cuff contusion⁶. Timely diagnosis is crucial before the tear progresses to an irreparable state.

In young patients presenting with a rotator cuff tear operative treatment is widely indicated. The goal of surgical management is to eliminate pain and improve function with increased shoulder strength and range of motion⁷. Surgery specific rotator cuff rehabilitation is the cornerstone of management of patient after surgical repair of the cuff. Rehabilitation depends on surgical intervention used, age of patient, activity level, and chronicity of tear and size of tear^{7,8}. Exercise programmes should be individually tailored according to the post-operative examination of the patient.

This case report demonstrates the presentation of partial rotator cuff tear in a young athlete sustained by a traumatic mechanism. We aim to describe the management and rehabilitation of a young athlete following an arthroscopic repair.

CASE REPORT

A 20 year old male recreational cricket player reported to the rehabilitation center with complaints of pain and decreased shoulder movements. About one month ago the patient got injured while playing cricket. The patient suffered a fall on the right shoulder while trying to field a ball. The right upper extremity was outstretched overhead while trying to stop a ball. The patient had severe pain and was unable to play further. He consulted an orthopedician next day due to pain and difficulty to elevate right upper extremity. Radiographs revealed no bony injury or subluxation. He was advised to take medications, rest and cryotherapy.

On follow-up visit after 1 week patient still complained of pain

on anterolateral aspect of the right shoulder and decreased shoulder movements. Initially the pain was sharp with shoulder movements and aggravated by reaching/lifting with right arm or lying on right shoulder. Pain was relieved by medications and cryotherapy. An MRI was scheduled for the patient, which revealed a partial tear of the supraspinatus muscle without retraction of the tendon. One week after the examination, the patient underwent an arthroscopic repair of the rotator cuff using double row fixation method. The patient was advised for physical therapy 3 days after the surgery.

Examination of the patient postoperatively shows no obvious deformity. The patient appears with right arm immobilized in a sling. The patient has no radiation of symptoms distally. Deep tendon reflexes and light touch sensation are intact. Passive range of motion (PROM) was noted as 100° of forward flexion, 80° of abduction, 40° of external rotation (ER) and 20° of internal rotation (IR). A decreased caudal and posterior glide is noted on evaluation. Special tests for evaluation of instability or impingement are not performed on the post-operative shoulder.

The rehabilitation started one week after the surgery. The primary goals were to decrease pain, improve healing and restoring normal joint motion. Initial rehabilitation of the patient included PROM exercises for shoulder within the prescribed limits. Active range of motion (AROM) exercises for elbow; wrist and hand were also initiated with arm supported by the table. Gentle Pendular exercises were initiated both at the clinic and also at home. Grip strengthening was performed to prevent disuse atrophy. Shoulder extension was contraindicated to protect the repaired cuff from tensile load. Cryotherapy was administered following exercises.

After 2 weeks, the patient reported a considerable pain relief. Submaximal isometrics for glenohumeral joint were initiated in all planes. Due to continuous use of sling, passive stretching of elbow extensors was performed. At 4 weeks post-operatively, PROM exercises were progressed to active-assisted range of motion (AAROM) exercises. The patient performed AAROM exercises with the help of a bar, finger ladder and overhead pulleys within the prescribed limits. Rotator cuff strengthening using isometrics and manual resistance was initiated along with scapular stabilization techniques. Progress of the patient was noted regularly with average ROM as 120° of forward flexion, 100° of abduction, 60° of ER and 30° IR.

After 4 weeks post-operatively, the rehabilitation goals included weaning off the sling and achieving full PROM. Passive mobilization using caudal and posterior glides were performed along with passive stretching. Scapulothoracic joint mobilization was also used. Patient performed AAROM exercises in the pain free range. These included self-assisted forward elevation with a

bar progressing from supine to standing. Initially rotator cuff strengthening was performed using 0.5 kg weight and was gradually progressed to 1.5 kg by 6th week post-operatively.

The patient no longer relied on the sling after 6 weeks post-operatively. AROM exercises were started in the pain free range with emphasis on rotator cuff strengthening. Mobilization of the glenohumeral joint combined with accessory glides and end-range passive stretching was applied to restore normal ROM. At 8 weeks, rotator cuff strengthening is progressed using 2.0 kg weight. Scapular strengthening program is initiated using closed-chain exercises with Swiss ball, shoulder shrugs and serratus anterior dominant activities. Strengthening of the distal muscles is important; mainly biceps/triceps, forearm and wrist strengthening were performed both in rehabilitation center and at home. Progress of the patient was noted as 155° forward flexion, 140° abduction, 80° ER and 50° IR is noted in 90° of abduction.

By 8th week onwards, the goals were to achieve AROM within functional limits and good strength by 12 weeks. Prior to exercise, moist heat and ultrasound were applied by the therapist to aid in flexibility. All rehabilitation exercises were followed by cryotherapy. Accessory mobilization and passive stretching were continued to achieve normal joint motion. Rotator cuff strengthening was further progressed using Therabands and free weights. Progressive resistive exercises were stressed. Strengthening for rotators using Therabands in 90° of abduction was initiated. At 10 weeks, the closed chain exercises were progressed to wide-based exercises. The patient began proprioceptive neuromuscular facilitation (PNF) diagonal patterns. Low intensity plyometrics using medicine balls were initiated as per patient's tolerance. Progress of the patient was noted after 12 weeks with 170° forward flexion, 160° abduction, 80° ER and 60° IR. The patient continued with exercises and close adherence to home programme.

Follow-up visit after 4 months with the orthopaedic surgeon showed normal active and passive range of motion in all shoulder movements. Following discharge of the patient from physiotherapy, rotator cuff and scapular strength maintenance programme must be emphasized.

DISCUSSION

Traumatic tears of the rotator cuff are rare in younger population, but often occur chronically in the older population secondary to shoulder impingement^{9,10}. Few reports of traumatic rotator cuff tear involving young athletes exist in the literature. Blevins et al reported on athletes participating in football with traumatic rotator cuff injury. The athletes were aged between 24-36 years¹¹. Itoi reported the incidence of rotator cuff tears in adolescents as 0.8%¹². Another study by Gorse et al reported partial thickness tear of supraspinatus in an intercollegiate football player following an axial loading of the right shoulder¹³. Patient was treated by an open rotator cuff repair and acromioplasty followed by a rehabilitation programme. Turman et al reported a massive rotator cuff tear in an adolescent athlete, treated by an open repair⁵.

Rotator cuff tears in young population are associated extrinsic factors. According to Hulstyn and Fadale, rotator cuff tears in an athletic population can be multifactorial¹⁴. They proposed three mechanisms which included intrinsic tendon disease associated with repetitive overuse and microtrauma, extrinsic tendon impingement (as described by Neer) and intrarticular impingement. The following mechanisms may contribute to rotator cuff pathology in young population¹⁴.

Traumatic rotator cuff lesions in younger population are still believed as result of repetitive microtrauma rather than an isolated episode¹³. This phenomenon was described by Craven as "athletically accelerated ageing" of the shoulder¹⁵. With growing popularity of sports and increased sporting leagues, young athletes participating in overhead activities expose their shoulders to repetitive trauma that ages the shoulder. The increased stress causes, tissue alterations, decrease tensile strength leading to increased risk of rotator cuff lesions¹⁵.

This case involves a young recreational cricket player who sustained an acute, traumatic rotator cuff tear. The mechanism of injury reported was falling on outstretched hand imposing eccentric loading on the tissue. Partial tear of the rotator cuff usually occurs as a result of traction loads¹⁶. Initially such injuries are dismissed as brachial plexus neuropraxia or rotator cuff contusions⁶. If overlooked, the rotator cuff tear may progress and become irreparable overtime. Evaluation of the patient yielded a partial-thickness tear of the rotator cuff. The patient opted for surgical intervention and underwent an arthroscopic repair of the torn cuff^{7,17}.

Postoperatively, the patient was advised for physiotherapy and participated in a rehabilitation programme. Initial goals of rehabilitation were to decrease pain, protect surgical site of repair and restore range of motion¹³. Cryotherapy was administered initially to control pain and patient was advised to use a sling to protect the surgical repair⁸. PROM exercises were initiated followed by AAROM, progressing to full AROM exercises. Rotator cuff strengthening was initiated, once sufficient range of motion was achieved^{18,19}. Rotator cuff strengthening plays a vital role in rehabilitation. According to Sharkey and Marder, rotator cuff musculature opposes superior translation of humeral head during abduction preventing supraspinatus impingement¹⁹. Initially the patient performed submaximal isometrics followed by progressive resistive exercises using dumbbells and elastic resistance (Therabands).

In addition to rotator cuff strengthening, the patient was advised to perform scapular stabilization program²⁰. The scapular stabilizers provide support of movements of glenohumeral joint and maintain scapulohumeral rhythm. Asynchronous scapulohumeral rhythm disrupts the normal glenohumeral motion and increase likelihood of subacromial impingement²¹.

Along with traditional rehabilitation exercises, functional rehabilitation was performed. The goals were restoration of neuromuscular activation patterns and enhance force couples for dynamic glenohumeral stabilization. Plyometric exercises initiated in the last phase impart eccentric loading to the upper extremity to mimic the functional activity²².

SUMMARY

This case report highlighted a young male who sustained rotator cuff tear while playing cricket. The injury occurred during first episode rather than repeated microtrauma. Rotator cuff tears are rare in young population. Early diagnosis and adequate treatment can help achieve good outcomes and early return to function. Surgery specific rotator cuff rehabilitation is important to achieve patient satisfaction and outcomes. The patient, surgeon and physical therapist together play the most significant role in achieving the desired goals.

Conflict of interest: There is no conflicts of interest to declare.

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