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ORIGINAL ARTICLE

Partial rotator cuff repair and biceps tenotomy for the treatment of patients with massive cuff tears and retained overhead elevation: midterm outcomes with a minimum 5 years of follow-up

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Background: A subset of patients with massive irreparable rotator cuff tears present with retained overhead elevation and pain as their primary complaint. Our aim was to evaluate the outcomes of partial arthroscopic rotator cuff repair with biceps tenotomy and to report the failure rate of this procedure for patients with >5 years of follow-up.

Methods: Thirty-four patients underwent partial rotator cuff repair and biceps tenotomy for treatment of a massive rotator cuff tear. Patients had preoperative active forward elevation >120° and no radiographic evidence of glenohumeral arthritis. Patients were followed up clinically and radiographically, and 28 patients had a minimum of 5 years of follow-up. Failure was defined as an American Shoulder and Elbow Surgeons score of <70, loss of active elevation >90°, or revision to reverse shoulder arthroplasty during the study period.

Results: Patients demonstrated improvements in average preoperative to postoperative American Shoulder and Elbow Surgeons scores (46.6 to 79.3 [$P < .001$]) and Simple Shoulder Test scores (5.7 to 9.1 [$P < .001$]) along with decrease in visual analog scale for pain scores (6.9 to 1.9 [$P < .001$]). No significant change in forward elevation (168° to 154° [$P = .07$]), external rotation (38° to 39° [$P = 1.0$]), or internal rotation (84% to 80% [$P = 1.0$]) was identified; 36% of patients had progression of the Hamada stage. The failure rate was 29%; 75% of patients were satisfied with their index procedure.

Conclusion: Partial rotator cuff repair and biceps tenotomy for patients with massive irreparable rotator cuff tears with retained overhead elevation and pain as the primary complaint produced reasonable outcomes at midterm follow-up of at least 5 years.

Level of evidence: Level IV; Case Series; Treatment Study

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Keywords: Massive rotator cuff tear; surgical management; cuff repair; biceps tenotomy; arthroscopy

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Patients with massive rotator cuff tears, as defined by a tear of 2 or more of the rotator cuff tendons or a maximum diameter of 5 cm, may present with pain and significant functional limitations.^{7,8} The management of this injury can present

a challenge to the treating orthopedic surgeon. Various surgical options have been described to treat massive rotator cuff tears, including arthroscopic débridement with a biceps tenotomy or tenodesis, complete repair, partial repair, muscle-tendon transfer, superior capsular reconstruction, patch augmentation, and reverse shoulder arthroplasty (RSA).^{4,6,9,12,14-17}

Because of the chronicity of these massive degenerative tears, some patients have marked muscle atrophy with fatty infiltration and poor tissue quality or severe retraction that may render the tear irreparable even with advanced arthroscopic techniques. Despite the severity of this underlying condition, a subset of these patients with massive degenerative tears can present with retained overhead elevation and reasonable function, little or no evidence of glenohumeral degenerative changes, and a chief complaint of pain and associated weakness.

When this type of patient has failed to respond to conservative management, it can pose a dilemma in terms of surgical treatment. This subset of patients with retained overhead elevation and no significant arthritis have yet to develop advanced degenerative changes of the glenohumeral joint or evidence of pseudoparalysis and may not meet indications for RSA. At the same time, because of the magnitude of the tear, the rotator cuff may be at the point where the preferred treatment of complete repair of the injury is not possible. In these patients, an attempt at a partial rotator cuff repair and biceps tenotomy is an option in an effort to try to preserve the rotator cuff force couple and to treat any pain associated with the biceps.⁴

The purpose of this study was to perform a retrospective review evaluating patients with massive degenerative rotator cuff tears and retained overhead elevation who were treated with partial arthroscopic rotator cuff repair and biceps tenotomy. Our goal was to evaluate the midterm outcomes of this procedure to determine the success and failure rate of this operation. Our hypothesis was that arthroscopic partial repair and biceps tenotomy would demonstrate satisfactory results for this difficult subset of patients at a minimum of 5 years of follow-up.

Materials and methods

This was a retrospective review of patients treated from September 2007 through March 2010. Thirty-four patients met indications and underwent the operation. To be included in this study, a minimum of 5 years of follow-up was required. Two patients were deceased before the 5-year follow-up point, 3 patients were unable to be located, and 1 patient would not participate in the study, leaving us with 28 patients available for study.

Inclusion criteria and patient demographics

Our algorithm and decision tree for the surgical treatment of patients with massive rotator cuff tears is presented in Figure 1. This represents our indications for surgery and mirrors the inclusion criteria for this study. The patients included in this study had a

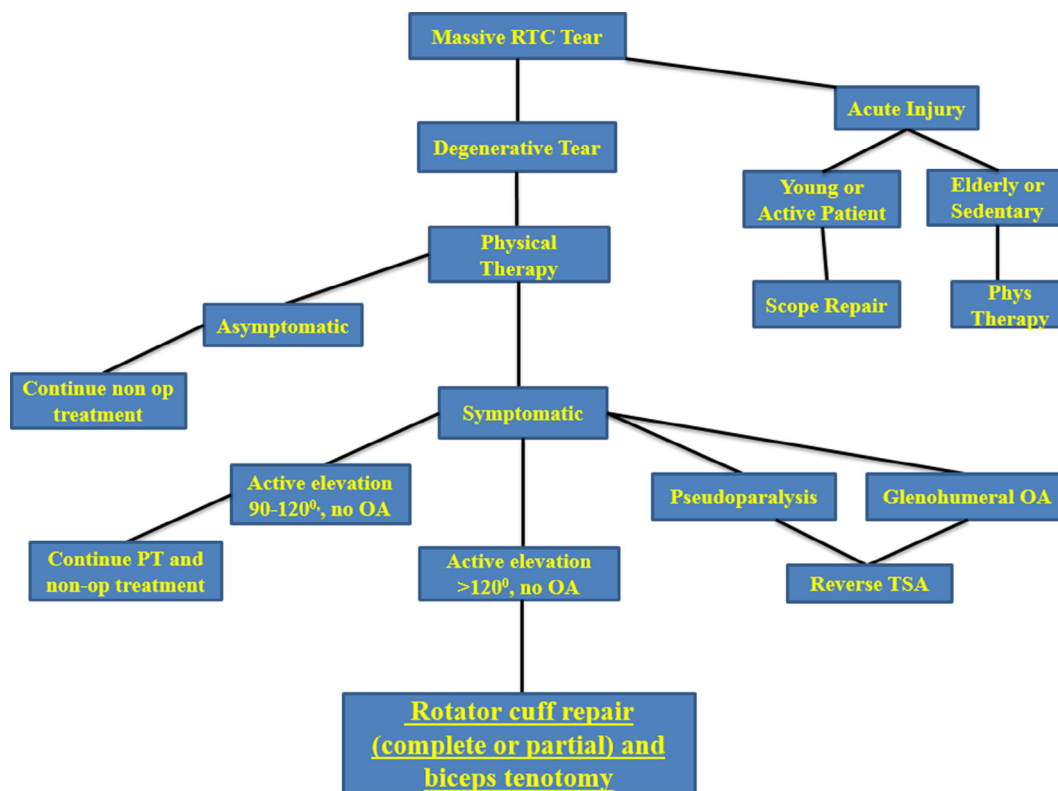


Figure 1 Flow chart illustrating the selection criteria of the 34 possible patients available for study. OA, osteoarthritis; PT, physical therapy; RTC, rotator cuff; TSA, total shoulder arthroplasty.

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