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Prospective evaluation of clinical and radiologic factors predicting return to activity within 6 months after arthroscopic rotator cuff repair

Philippe Collin, MD[a], Arifaizad Abdullah, MD, PhD[b], Omar Kherad, MD, MPH[c], Solenn Gain, PT[a], Patrick J. Denard, MD[d,e], Alexandre Lädermann, MD[f,g,h,*]

[a]*Saint-Grégoire Private Hospital Center, Saint-Grégoire, France*
[b]*Department of Orthopaedics, University Putra Malaysia, Serdang, Malaysia*
[c]*La Tour Hospital, Division of Internal Medicine, University of Geneva, Geneva, Switzerland*
[d]*Southern Oregon Orthopedics, Medford, OR, USA*
[e]*Department of Orthopaedics and Rehabilitation, Oregon Health & Science University, Portland, Oregon, USA*
[f]*Division of Orthopaedics and Trauma Surgery, La Tour Hospital, Meyrin, Switzerland*
[g]*Faculty of Medicine, University of Geneva, Geneva, Switzerland*
[h]*Division of Orthopaedics and Trauma Surgery, Department of Surgery, Geneva University Hospitals, Geneva, Switzerland*

Background: This study aimed to report the outcome of patients who underwent arthroscopic rotator cuff repair (ARCR) and to determine the factors associated with return to work and activity.
Materials: Three hundred sixty-five patients who underwent ARCR were prospectively evaluated. The cohort was divided into 2 groups based on clinical results at 6 months. Group A consisted of patients who were considered to have a satisfactory outcome based on return to their previous professional or spare-time activities. Group B consisted of patients with an unsatisfactory outcome based on a lack of return to normal work or activities.
Results: Of the patients, 305 had a satisfactory outcome (group A) and 60 were categorized as having an unsatisfactory outcome (group B). On multivariate analysis, preoperative factors associated with group B included female gender and heavy manual labor. Postoperative bursitis on ultrasound at 6 months was associated with being in group B. Lack of tendon healing was not associated with group B. However, if a patient without healing had persistent pain at 6 months, the pain persisted at 9 months.
Conclusion: ARCR is an effective procedure that leads to significant improvement in pain, function, and tendon healing in most cases. However, in 1 of 5 cases, patients were unable to resume normal activity at 6 months postoperatively. Persistent limitation at 6 months was associated with female gender, heavy manual workers, and the presence of postoperative persistent bursitis.

Ethical committee approval was received from Association des Médecins du Canton de Genève et Société Médicale; protocol 12-26; November 12, 2012.

*Reprint requests: Alexandre Lädermann, MD, Division of Orthopaedics and Trauma Surgery, La Tour Hospital, Avenue J.-D. Maillard 3, CH-1217 Meyrin, Switzerland.
E-mail address: alexandre.laedermann@gmail.com (A. Lädermann).

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Arthroscopic rotator cuff repair (ARCR) leads to good midterm to long-term results in most cases.[13-15,17] Several factors may affect patient satisfaction and return to work after rotator cuff repair, including anatomic factors (eg, tendon non-healing),[29] clinical factors (eg, persistent pain, postoperative stiffness, and loss of strength),[16] and social factors (eg, workers' compensation claims).[11] However, only a few prospective studies have examined these factors,[3,5,6,11,24,31,33,36,37,40] and there is still controversy about the factors that limit outcome.

In particular, although several studies have examined tendon healing and midterm to long-term functional outcome, few studies have examined the timeline for return to work or activity and the factors associated with a timely return. In the workers' compensation population, for instance, there is an emphasis on return to work within 6 months of injury because a delay beyond this has been associated with a lower rate of return in the long-term.[18] Currently, return to work or activity is based on an individual physician's protocol and clinical impression of outcome. However, objective factors associated with return to work or activity are lacking.

This aims of this prospective study were to evaluate the clinical and ultrasound outcomes of patients who underwent ARCR for full-thickness rotator cuff tears and to determine the factors associated with return to work at 6 months after surgery. The hypothesis was that tendon healing would provide the best prognostic factor for return to work by 6 months postoperatively.

Materials and methods

Patient selection

Between January 2011 and June 2012, all patients who underwent primary ARCR performed by 1 surgeon were considered eligible for inclusion in this prospective study. All patients gave informed written consent. Inclusion criteria included a full-thickness rotator cuff, failure of conservative treatment (medication and strengthening of rotator cuff) for at least 3 months in nontraumatic cases, a complete arthroscopic repair, and a minimum follow-up of 6 months. Such a time period is sufficient to perform structural and functional assessments of rotator cuff repairs.[27] Workers' compensation patients, patients involved in motor vehicle accidents, and patients involved in litigation were also included. Exclusion criteria included glenohumeral arthritis, an acromiohumeral distance of less than 7 mm, fatty infiltration of grade 3 or higher according to Goutallier et al,[21,42] previous shoulder surgery, irreparable tears or partial repairs, partial-thickness tears, and combined labral repairs.

Surgical technique

A consistent operative technique was used during the study period. Repairs were performed with patients in the beach-chair position. Rotator cuff tear size was assessed after subacromial bursectomy but before rotator cuff debridement. Massive rotator cuff tears ($\geq$2 tendons)[19] were subclassified into 5 types based on the Collin classification:[8] type A, supraspinatus and superior subscapularis tears; type B, supraspinatus and entire subscapularis tears; type C, supraspinatus, superior subscapularis, and infraspinatus tears; type D, supraspinatus and infraspinatus tears; and type E, supraspinatus, infraspinatus, and teres minor tears. Criteria similar of those of Hartzler et al[23] (good, rotator cuff tissue was noted as satisfactory and of normal quality and thickness; moderate, tendon was still of firm quality and of at least one-half normal thickness; and poor, tendon was soft or of friable quality and of less than one-half normal thickness) were used to determine soft-tissue quality. If still present, the biceps routinely underwent tenotomy or tenodesis. The subscapularis tendon was inspected and repaired in all cases in which there was a tear. Retracted tears were repaired after a 3-sided release. All subscapularis tears were repaired to the lesser tuberosity bone bed with a single-row suture technique. Attention was then turned to the posterosuperior rotator cuff. Arthroscopic acromioplasty was performed and was limited to the impingement site, with preservation of the coracoacromial ligament as much as possible. A single-row or double-row technique (Fig. 1) was used for repair of the posterosuperior rotator cuff as previously described based on tendon length and mobility.[7,12] In the setting of sufficient tendon length and mobility, a double-row repair was performed, whereas a single-row repair was reserved for those tears in which a double-row repair would have overtensioned the tendon. The quality of the repair was subjectively classified as good, moderate, or poor.

Postoperatively, all patients followed the same standardized rehabilitation protocol.[16] During the first 6 weeks, patients performed progressive passive overhead stretches and external rotation with the arm at the side. Sling use was discontinued after 6 weeks. Active range of motion and progressive strengthening started at 6 weeks.[30]

Clinical evaluation

The primary clinical outcome variable was full return to work or activity at 6 months postoperatively. Baseline characteristics included age, gender, tobacco use, side of shoulder pathology, limb dominance, workers' compensation status, and preoperative Constant score.[10] A tear was considered traumatic if it was abrupt in origin and from an external cause.[1] All other tears were