Double arthroscopic transtendon repair of partial-thickness articular surface tears of the rotator cuff: a surgical technique

Shoji Fukuta, Rui Amari, Takahiko Tsutsui
Department of Orthopaedic Surgery, Kochi Health Sciences Center, Japan

ABSTRACT

This study describes a technique of simultaneous arthroscopy and bursoscopy for transtendon repair of a partial-thickness articular surface rotator cuff tear. All procedures are under simultaneous visualisation from both the glenohumeral joint and the subacromial space to reduce the risk of intraoperative complications.

Key words: arthroscopy; rotator cuff

INTRODUCTION

Advances in imaging technology enable the diagnosis of partial-thickness articular surface rotator cuff tears. Arthroscopic repair of partial-thickness tears is increasingly popular because of the unsatisfactory results following arthroscopic debridement without repair when the tear is >50% of the tendon thickness. However, it needs to be converted to a full-thickness tear first. The transtendon repair technique restores the medial footprint of the cuff while preserving the intact lateral footprint. Some procedures from the bursal side are performed without visualisation. This study describes a technique of simultaneous arthroscopy and bursoscopy for transtendon repair of a partial-thickness articular surface rotator cuff tear.

SURGICAL TECHNIQUE

The patient is placed in the beach chair position under general anaesthesia with the upper limb fixed by a positioner. A standard arthroscopic examination of the glenohumeral joint is performed through a posterior portal. The articular surface of the supraspinatus is evaluated with the upper limb in 45° abduction and external rotation. The exposed medial footprint on the greater tuberosity is cleared of soft tissue, and the degenerative edge of the torn supraspinatus tendon is debrided using a shaver from the anterior portal. Transtendon repair is performed when the tear is >50% of the tendon thickness. The arthroscope is repositioned in the subacromial space.
from the posterior portal, and the anterolateral portal becomes the working portal. Complete subacromial bursectomy is necessary to confirm the intact bursal surface of the rotator cuff and to handle sutures and anchors easily. Subacromial decompression is performed as needed.

The arthroscope is then returned to the glenohumeral joint and fixed to the operating table with an Octopus retractor holder. A second arthroscope is inserted into the subacromial space through the posterolateral portal. Under simultaneous visualisation from both the glenohumeral joint and the subacromial space, a spinal needle is inserted percutaneously at the medial margin of the footprint as a guide for placing transtendon anchors (Fig. a). A small incision is made along the tendon fibre through a percutaneous anchor portal just adjacent to the lateral border of the acromion. A punch is introduced through an anchor portal and passed through the small hole of the remaining tendon to create a bone socket for the anchor. Bioabsorbable anchors (Panalok Loop RC; Depuy Mitek, Raynhan [MA], USA) double-loaded with no. 2 FiberWire (Arthrex, Naples [FL], USA) are placed into the bone socket in the same manner (Fig. b). A spinal needle is inserted percutaneously, penetrating the full thickness of the tendon 5 to 10 mm medial to the torn edge and adjacent to the long head of the biceps tendon (Fig. c). A No. 0 polydioxanone suture is advanced into the glenohumeral joint through the needle and retrieved by a grasper through the anterior portal. One limb of the anchor suture is relayed with a polydioxanone suture and brought back to the subacromial space. The other limb of the suture is placed approximately 10 mm posterior to the former limb of the anchor suture in the same manner to obtain a triangular suture configuration. A second anchor is placed and the sutures are passed similarly if the tear is >20 mm. The sutures are tied in the subacromial space with a sliding knot, while tension of the sutures is adjusted under visualisation (Fig. d).

Postoperatively, passive exercise is allowed immediately, with the arm kept in a sling for 2 weeks. At 4 to 6 weeks, active motion is allowed. At 12 weeks, muscle strengthening exercises are allowed.

**RESULTS**

13 patients underwent transtendon repair of a partial-thickness articular surface rotator cuff tear by a single surgeon between December 2009 and September 2012. Additional procedures performed included resection of the distal clavicle (n=3), repair of the superior labral

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**Figure** The glenohumeral joint view (left) and the subacromial bursa view (right) showing (a) a spinal needle (asterisks) is inserted percutaneously near the torn edge of the supraspinatus tendon (double asterisks) as a guide to determine the proper position of the anchor placement; (b) a suture anchor and a suture limb (asterisks) are inserted into the bone socket; (c) a polydioxanone suture is inserted through a spinal needle (asterisks) penetrating the full thickness of the supraspinatus tendon, 5 to 7 mm from the torn edge of the supraspinatus tendon (double asterisks); and (d) the suture limbs (asterisks) before and after knot tying.
tear from anterior to posterior (n=1), and capsular release (n=1). The mean duration of surgery was 134.6 minutes. No complications occurred during surgery. 11 of 13 patients were evaluated at one year; the mean UCLA score improved from 16.5 to 32.3.

DISCUSSION

Subacromial decompression or debridement may not be sufficient to relieve clinical symptoms in patients with bursal-side partial-thickness rotator cuff tears with impingement syndrome. Repair for partial-thickness rotator cuff tears of >50% of the thickness in active patients is recommended, but it needs to be converted to a full-thickness tear first.1,3,4 To restore the medial footprint while preserving the lateral footprint of the rotator cuff, an arthroscopic transtendon technique has been described,6 and resulted in excellent outcome at 2 years.5 However, some procedures from the bursal side are performed without visualisation, and the arthroscope needs to be switched frequently between the glenohumeral joint and the subacromial space. Our technique enables visualisation from both the articular and bursal sides.

Proper positioning of the anchors is critical and should be completed at one attempt to minimise damage to the remaining tendon fibres. Conventional transtendon repair with visualisation of only the articular side is technically challenging, because a pilot hole must be created before anchor insertion. Few intra-operative complications, such as anchor malpositioning or chondral damage have been reported. In a study of 22 patients, one suture anchor failure at the eyelet (a device-related complication) and one suture breakage during knot tying secondary to excessive tension were reported.7 Furthermore, suture removal is a technique-related complication; our technique can shorten the learning curve of surgeons.

Limitations to this study included the small sample size, the short follow-up period, the lack of assessment of repair integrity using magnetic resonance imaging or ultrasonography, and the lack of a control group. Further studies with longer follow-up and larger sample are necessary to compare our technique with conventional transtendon repair or repair after conversion to a full-thickness tear. Our technique is also useful for double-row transosseous-equivalent repair of partial-thickness articular surface tears.8

CONCLUSION

Transtendon repair using simultaneous arthroscopy and bursoscopy for repair of partial-thickness articular surface rotator cuff tears enables greater visualisation and thus reduces the risk of intra-operative complications.

DISCLOSURE

No conflicts of interest were declared by the authors.

REFERENCES