Long-Term Clinical and Structural Outcomes of Arthroscopic Superior Capsule Reconstruction for Irreparable Rotator Cuff Tears: 10-Year Follow Up

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INTRODUCTION: Functional improvement and pain relief after arthroscopic superior capsule reconstruction (SCR) have been reported for irreparable rotator cuff tears in short-term follow-up studies. The aim of this long-term follow-up study was to assess if good outcomes and graft are maintained and if cuff tear arthropathy progresses over time after SCR.

METHODS:

This is a retrospective analysis of prospectively collected data from a consecutive series of arthroscopic SCR using fascia lata autograft performed by a well-experienced shoulder surgeon from 2007 to 2011. Patients were included if they underwent arthroscopic SCR for irreparable massive rotator cuff tears. Exclusion criteria were 1) reparable rotator cuff tears, 2) Hamada grade 5, 3) asymptomatic rotator cuff tears, and 4) concomitant nerve problem before surgery. Of a total of 48 initially identified patients, 5 had died, 5 had moved and were unable to be contacted, 2 had severe health problems that were unrelated to SCR, 1 refused to participate, and 1 was unable to participate because she was caring for her child with terminal cancer, thus leaving 34 patients with 36 affected shoulders for review. Active shoulder range of motion (ROM), American Shoulder and Elbow Surgeons (ASES), and Japanese Orthopaedic Association (JOA) scores, Visual Analog Scale (VAS) score, rates of return to sport and physical work were evaluated before surgery and then at 1 year, 5 years, and 10 years after SCR. Radiography and MRI were collected at 3 months, 6 months, 1 year, 2 years, 3 years, 4 years, 5 years and 10 years. Acromiohumeral distance (AHD) and Hamada grade (stage of cuff tear arthropathy) were evaluated by using radiography. We defined Hamada grade 3 and 4b as acetabularization and grade 4a and 4b as glenohumeral osteoarthritis. Stage of glenohumeral osteoarthritis was compared between the affected and unaffected shoulders. Graft healing and thickness were assessed by using T2-weighted MRI.

RESULTS:

ASES and JOA scores and active ROM (elevation and external rotation) were increased significantly at 1 year after SCR (ASES, 27±17 preoperatively to 89±13 at 1 year after SCR; JOA, 50±13 to 90±9; elevation, 93±52 to 148±25 degrees; external rotation, 28±17 to 39±16 degrees) ($P<0.001$) and the increased ASES and JOA scores and active ROM after SCR were maintained throughout follow up (5 and 10 years after SCR: ASES, 95±5 and 92±11; JOA, 94±6 and 91±9; elevation, 159±17 and 156±23 degrees; external rotation, 42±18 and 46±19 degrees) (Figure 1). Compared with that before SCR (7.0±1.9), the VAS score was significantly decreased at 1 year (0.7±1.2), 5 years (0.5±1.1), and 10 years (0.3±1.1) after SCR ($P<0.001$).

All 10 patients who had played sports before their injuries had returned fully to their previous activities by 1 year after SCR, and 9 of these 10 patients were still playing at 10 years after SCR. All 17 patients who had ceased to do physical work owing to shoulder pain and/or dysfunction before surgery had returned to their previous physical work by 1 year after SCR. At 10 years after SCR, 15 of these 17 patients (88%) were still working.

Complications occurred in 5 patients (4 graft tears and 1 anchor pull-out) (13.9%). One patient with graft tear was converted to reverse shoulder arthroplasty. Graft survival rate was 94% (34 of 36 shoulders) at 1 year after SCR, 92% (33 of 36 shoulders) at 2 to 4 years after SCR, and 89% (32 of 36 shoulders) at 5 to 10 years after SCR (Figure 2). Among healed grafts, graft thickness did not significantly change during the 10 years after SCR (3 months after SCR, 7.8±2.0 mm, 6 months, 8.0±2.2 mm, 1 year, 8.1±1.9 mm, 2 years, 8.4±2.1 mm, 3 years, 8.5±2.3 mm, 4 years, 8.0±2.2 mm, 5 years, 8.2±1.9 mm, 10 years, 7.8±1.6 mm).

In 32 shoulders with healed graft, incidence of acetabularization (affected shoulder, 0%; unaffected shoulder, 0%) and glenohumeral osteoarthritis (affected shoulder, 12.5%; unaffected shoulder, 16.7%) during the 10 years after SCR was not significantly different between affected and unaffected shoulders. AHD was increased significantly just after SCR (3.5±2.2 to 10.3±2.4 mm) ($P < 0.001$) and the increased AHD was maintained throughout 10-years follow up (6 months, 9.6±2.8 mm, 1 year, 9.5±2.5 mm, 2 years, 8.9±2.9 mm, 3 years, 8.6±2.6 mm, 4 years, 9.0±2.7 mm, 5 years, 8.7±3.0 mm, 10 years, 8.2±2.8 mm).

DISCUSSION AND CONCLUSION:

For irreparable rotator cuff tears, arthroscopic SCR restored shoulder function and relieved shoulder pain with high rates of return to recreational sports and physical work, and maintained significant improvement in clinical and structural outcomes at 10 years after surgery. The graft survival rate at 10 years follow up was 89%. Graft healing completely prevented progression of cuff tear arthropathy after arthroscopic SCR. Arthroscopic SCR is an effective surgical option for irreparable rotator cuff tears with sustained positive outcomes at 10 years.

Figure 1

ASES score before surgery and then at 1 year, 5 years, and 10 years after SCR

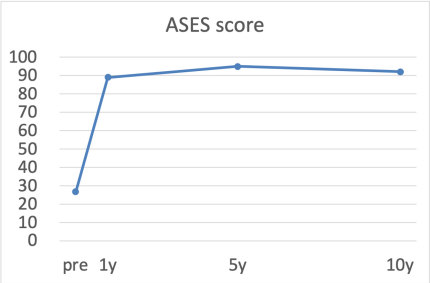

Figure 2

Graft survival rate at 3 months, 6 months, 1 year, 2 years, 3 years, 4 years, 5 years and 10 years after SCR