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Clinical Efficacy of Tendon Repair Versus Debridement in Massive Rotator Cuff Tears: A Long-Term Study.

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Abstract:

Introduction: Massive rotator cuff tears significantly impair shoulder function and cause pain. While tendon repair is the standard treatment to preserve function and potentially prevent cuff-related osteoarthritis, long-term outcomes remain unclear. This study compared long-term clinical outcomes and patient satisfaction between tendon repair and debridement for massive rotator cuff tears.

Materials and Methods: A retrospective analysis of 165 consecutive patients with massive rotator cuff tears was conducted. Patients underwent either debridement (n=57, mean age 61.9±8.7 years) or tendon repair (n=108, mean age 57.5±8.9 years). Clinical evaluations using the Constant, modified ASES, and DASH scores were performed at 2-4 (short-term), 5-6 (mid-term), and 8-10 (long-term) years post-surgery. Statistical analysis was performed using Sigma-Stat Version 3.5, with $p<0.05$ indicating statistical significance.

Results: At short-term follow-up, no significant differences were observed between the debridement and repair groups across all scoring systems (Constant: 70±11.9 vs. 66±13.6; ASES: 22.3±3.3 vs. 23.3±3.3; DASH: 22.3±11.0 vs. 24.3±10.1). However, at mid-term (Constant: 51±2.9 vs. 68.3±5.2; ASES: 20.3±1.3 vs. 24.3±1.7; DASH: 31.0±6.5 vs. 20.3±5.4) and long-term follow-up (Constant: 42.3±3.8 vs. 60.7±2.6; ASES: 17.3±0.5 vs. 21.7±0.5; DASH: 41.3±6.2 vs. 25.0±1.4), the tendon repair group demonstrated significantly better objective results and patient satisfaction.

Conclusion: Tendon repair for massive rotator cuff tears results in superior long-term clinical outcomes and patient satisfaction compared to debridement. These findings support tendon reconstruction as the preferred treatment for patients with massive rotator cuff tears, effectively preserving shoulder function and potentially delaying the need for reverse arthroplasty.

Keywords: Rotator cuff tear, Tendon repair, Debridement, Long-term follow-up, Clinical outcome, Patient satisfaction.

Materials and Methods:

Study Design and Patient Selection:

This retrospective study analyzed medical records of patients with massive rotator cuff tears treated between 2013 and 2014. Inclusion criteria were: chronic rotator cuff tears with 4-5 cm tendon retraction. Exclusion criteria were: isolated subscapularis tears, traumatic tears, or preoperative shoulder infections. Preoperative MRI confirmed tear size, location, and retraction. 165 consecutive patients were identified: 108 underwent rotator cuff repair and 57 underwent debridement.

Patient Demographics:

The debridement group (n=57) consisted of 32 females and 25 males, with a mean age of 61.9 ± 8.7 years (range: 43-77 years). Tear distribution was as follows: 4 isolated supraspinatus, 35 supraspinatus and infraspinatus, 6 subscapularis and supraspinatus, and 12 involving all three tendons.

The repair group (n=108) included 34 females and 74 males, with a mean age of 57.5 ± 8.9 years (range: 45-74 years). Tear distribution was: 33 isolated supraspinatus, 17 subscapularis and supraspinatus, 44 supraspinatus and infraspinatus, 13 involving all three tendons, and 1 isolated infraspinatus.

Surgical Techniques:

All procedures were performed by two surgeons at a single center.

- **Debridement Group:** Arthroscopic subacromial decompression with acromioplasty and residual tendon debridement was performed in the beach chair position. Acromionizer burrs and 5.5mm full radius resecters were used to smooth tendon remnants and trim the greater tuberosity.
- **Repair Group:** A mini-open technique was used. Diagnostic arthroscopy confirmed tear location and extent. Acromioplasty and bursectomy were performed arthroscopically. A deltoid split approach allowed for rotator cuff assessment. A modified Mason-Allen technique with Ethibond 1.0 was used for tendon repair, followed by transosseous reinsertion. Os acromiale resection was performed in two repair cases.

Postoperative Rehabilitation:

- **Debridement Group:** Passive motion exercises began the day after surgery for three weeks, followed by progressive strengthening exercises.
- **Repair Group:** Passive motion exercises began the day after surgery for three weeks, followed by active exercises for three months.

Outcome Measurements:

Objective outcomes were assessed using the Constant Score and DASH Score. Subjective outcomes were evaluated using a modified ASES score, focusing on patient satisfaction

(maximum score: 30). Follow-up periods were: short-term (24-48 months), mid-term (60-72 months), and long-term (96-120 months). Statistical analysis was performed using the Mann-Whitney Rank-Sum Test (SigmaStat Version 3.5), with $p<0.05$ considered statistically significant.

Results:

Constant Score:

- At short-term follow-up (24-48 months), the debridement group showed a slightly higher mean Constant score (70±11.9) compared to the repair group (66±13.6), but this difference was not statistically significant ($p>0.05$).
- At mid-term follow-up (60-72 months), the repair group demonstrated a significantly higher mean Constant score (68.3±5.2) compared to the debridement group (51±2.9, $p<0.05$).
- At long-term follow-up (96-120 months), the repair group maintained a significantly higher mean Constant score (60.7±2.6) compared to the debridement group (42.3±3.8, $p<0.05$).

Modified ASES Score:

- No significant difference was observed between the groups at short-term follow-up (repair: 23.3±3.3; debridement: 22.3±3.3, $p>0.05$).
- The repair group showed significantly higher mean ASES scores at both mid-term (24.3±1.7 vs. 20.3±1.3, $p<0.05$) and long-term (21.7±0.5 vs. 17.3±0.05, $p<0.05$) follow-up.

DASH Score:

- No significant difference was found between the groups at short-term follow-up (repair: 24.3±10.1; debridement: 22.3±11.0, $p>0.05$).
- At mid-term follow-up, the repair group had a significantly lower (better) mean DASH score (20.3±5.4) compared to the debridement group (31.0±6.5, $p<0.05$).
- At long-term follow-up, the repair group maintained a significantly lower (better) mean DASH score (25.0±1.4) compared to the debridement group (41.3±6.2, $p<0.05$).

Summary of Findings:

This study demonstrates that while short-term outcomes were comparable between debridement and repair for massive rotator cuff tears, tendon repair resulted in significantly better clinical outcomes and patient satisfaction at mid-term and long-term follow-up, as evidenced by the Constant, modified ASES, and DASH scores.

Discussion:

This study compared long-term clinical outcomes and patient satisfaction between debridement and tendon repair for massive rotator cuff tears. Notably, short-term results were similar between the two groups. However, at mid-term and long-term follow-up, tendon repair demonstrated significantly superior outcomes in terms of objective scores (Constant and DASH) and patient satisfaction (modified ASES). This suggests that while debridement may provide immediate pain relief, tendon repair offers sustained functional improvement and enhanced patient satisfaction over time.

The management of massive rotator cuff tears remains a challenge. Historically, treatment strategies have ranged from palliative debridement to reconstructive tendon repair. While tendon repair is often considered the gold standard for younger, active patients, concerns regarding prolonged surgical time, recovery, and potential for retear have led to the exploration of debridement as a viable alternative, especially in elderly patients.

Previous studies have shown that despite structural retears following tendon repair, clinical outcomes can remain satisfactory. This study supports these findings, emphasizing the importance of focusing on clinical outcomes and patient satisfaction rather than solely on structural integrity. Debridement, while offering pain relief and improved range of motion, appears to provide less durable functional benefits compared to tendon repair.

The observation that debridement yielded comparable short-term results aligns with previous studies showing immediate pain relief and functional improvement. However, the subsequent decline in outcomes at mid-term and long-term follow-up highlights the limitations of debridement in providing sustained benefits.

Interestingly, our findings contradict some previous reports that found no significant difference between debridement and repair. However, many of these studies lacked long-term follow-up data. This study emphasizes the importance of long-term evaluations in assessing the true efficacy of these procedures.

Limitations:

This study has several limitations. First, its retrospective design precluded the collection of preoperative shoulder function data, limiting our ability to assess changes from baseline. Second, the use of mini-open repair, while effective, is not the current gold standard. Arthroscopic repair may yield even better outcomes. Third, the absence of radiological follow-up prevented the assessment of structural integrity, such as retear rates, humeral head migration, and fatty degeneration. Future studies should incorporate radiological evaluations to provide a more comprehensive assessment.

Clinical Implications:

Our findings suggest that tendon repair should be considered the preferred treatment for massive rotator cuff tears, especially in patients seeking long-term functional improvement and

satisfaction. Debridement may be a suitable option for patients prioritizing short-term pain relief or those with contraindications to more extensive surgery.

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