The Bridge is On Fire: Outcomes of Reverse Shoulder Arthroplasty After Failed Rotator Cuff Surgery

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ABSTRACT

Introduction*:* Rotator cuff pathology is exceedingly common with increasing prevalence in older patients and reported rates as high as 62% in adults over the age of 80 years.[1] It is often discussed that rotator cuff repair or cuff salvage procedures should be considered as a first line approach when possible, and reverse shoulder arthroplasty can be subsequently used as a secondary option when needed. However, the question remains whether we are compromising the outcome of RTSA by attempting a soft tissue reconstructive procedure first. There is limited evidence describing the effect of failed rotator cuff repair (RCR), superior capsular reconstruction (SCR), or tendon transfer (TT) prior to reverse total shoulder arthroplasty (RTSA) on postoperative outcomes. The purpose of this study is (1) to compare patient-reported outcome measures, range of motion, and complication rates in patients with prior ipsilateral shoulder surgery to those without prior surgery undergoing RTSA; (2) to compare outcomes between patients with a failed SCR or TT to those with a failed RCR.

Methods: Patients who underwent RTSA from 2016 to 2021 were retrospectively identified through an institutional database. Patients who underwent RTSA for a failed RCR, SCR, or TT (Prior Surgery; PS) were matched by age, gender, BMI, and concomitant latissimus dorsi tendon transfer with patients undergoing RTSA for rotator cuff tear arthropathy with no prior surgery (NPS). Primary outcome measures included MCID, SCB, PASS achievement for American Shoulder and Elbow Surgeons (ASES), and Single Assessment Numeric Evaluation (SANE) scores. Secondary outcome measures included Veterans Rand (VR) 12 scores, complication rates, and postoperative range of motion. A sub-analysis compared outcomes in patients with a prior failed RCR to patients with a failed SCR or TT.

Results: A total of 150 patients (PS: n=60; NPS: n=90) met inclusion criteria. The PS cohort consisted of 33 (55.0%) primary RCR, 10 (16.7%) revision RCR, 10 (16.7%) SCR, and 7 (11.7%) TT. Adjusted analysis showed the NPS cohort had higher rates of MCID (93.3% vs. 73.3%, p=0.007), SCB (88.3% vs. 56.7%, p<0.001), and PASS (73.3% vs. 26.7%, p<0.001) achievement for ASES and higher SCB (56.7% vs. 20.0%, p<0.001) and PASS (74.6% vs. 39.0%, p<0.001) for SANE. The NPS cohort had greater forward flexion (p<0.001) at final follow-up. The PS cohort had higher overall complication rates (30.0% vs 13.3%, p=0.022) and prosthetic instability or dislocation (10.0% vs 1.1%, p=0.033). Sub-analysis showed the SCR/TT cohort had significantly lower rates of SCB (ASES: p=0.004; SANE: p=0.034) and PASS (ASES: p=0.014; SANE: p=0.009) compared to prior RCR patients.

Discussion: The results of this study highlight the significant impact of prior reconstructive procedures on functional outcome scores following RTSA. Patients with a history of a failed RCR, SCR, or TT attempted to address rotator cuff insufficiency prior to RTSA have greater range of motion deficits, higher complication rates, and lower clinically significant outcome achievement rates than those without prior ipsilateral shoulder surgery. The results in this study are consistent with other studies on this topic; Dean et al. reported that patients with a history of failed RCR exhibited notably lower scores for ASES, Simple Shoulder Test, and Visual Analog Scale (VAS) following RTSA over an average follow-up of 36.3 months.[8] Notably, the mean time to conversion to arthroplasty

for SCR and TT within this study were both within 2 years of the most recent procedure. Often, performing an SCR may be viewed as a “bridge” preserving the option for arthroplasty further down the line. However, the findings of this study suggest that patients with a prior failed SCR or TT have markedly inferior clinical benefit following RTSA with poorer range of motion and higher risk of complication. The burden to the patient undergoing a complex rotator cuff repair or cuff salvage procedure followed by a requirement for a second procedure and conversion to arthroplasty cannot be underestimated. Although this study reports that patients with a history of rotator cuff repair or cuff salvage procedures experience inferior outcomes following conversion to RTSA, these findings must be weighed against the decision to proceed directly to RTSA in younger patients. Patients should be counseled on the trade-offs between attempting a salvage procedure and opting for primary RTSA as this discussion is essential to guide patients toward the most appropriate treatment strategy based on their unique circumstances, goals, and risk tolerance.

References:

1. May T, Garmel GM. Rotator Cuff Injury. In: *StatPearls*. StatPearls Publishing; 2024.
2. Dean RS, Waterman BR, Naylor AJ, et al. Failed prior rotator cuff repair is associated with worse clinical outcomes after reverse total shoulder arthroplasty. *Seminars in Arthroplasty: JSES*. 2022;32(2):272-278.