Conversion to Allograft-Prosthetic Composite Hemiarthroplasty after Reverse Total Shoulder Arthroplasty Failure as a Salvage Procedure

Ethan Reid Harris, Steve Li, Prasenjit Saha, Seyedeh Zahra Mousavi, Mark Haft, Henry Fox[1], Umasuthan Srikumaran
[1]Johns Hopkins University

Introduction:

A 70-year-old female presented with painful non-union of a periprosthetic humeral fracture sustained intraoperatively during primary reverse total shoulder arthroplasty (RTSA). Computed tomography demonstrated severe proximal humeral bone loss (PHBL), warranting operative intervention. PHBL may occur secondary to tumor resection, complex fractures, and revision of shoulder arthroplasty. The absence of sufficient proximal humeral bone stock and the resultant lack of rotator cuff tendon insertions limit available management options. These deficits may be addressed via an allograft-prosthetic composite (APC) which combines the potential advantages of an allograft's soft-tissue tendinous and capsular attachments while also addressing PHBL.

Indications:

Conversion of primary RTSA to APC hemiarthroplasty is indicated for large proximal humeral bone defects with inadequate glenoid bone stock. In these instances, conversion of the primary RTSA to APC hemiarthroplasty is a salvage procedure. Alternatively, resection arthroplasty may be considered. In this case, the patient had a concomitant non-union of a Wright and Cofield type B periprosthetic humeral shaft fracture. The decision was made to proceed with revision allograft-prosthetic composite (APC) RTSA with long-stemmed distal interlocking humeral fixation. Revision in these settings to an APC RTSA construct is preferred, although conversion to APC hemiarthroplasty may be considered in more challenging revision cases or when soft tissue tensioning prevents RSA. Intraoperatively, the decision was made to switch to a hemiarthroplasty while maintaining the distal interlocking humeral component due to inadequate stability of the RSA due to soft tissue contractures proximally.

Technique:

After obtaining surgical consent, the patient was brought to the operating room. The correct shoulder was marked as the operative site and surgical timeout was performed. The upper extremity was prepped and draped in standard sterile fashion, with the patient in the beach chair position. A deltopectoral approach was used to access the glenohumeral joint and was extended distally. Cerclage fiberwire from the primary surgery was removed and the proximal humeral fragment and humeral RTSA components were removed. The previous glenosphere was removed and replaced. After adequate measurements were made, the APC was prepped on the back table and fitted with a long-stemmed distal interlocking RTSA prosthesis. Multiple humeral cup sizes and angles were trialed, however insufficient soft tissue tensioning prevented glenohumeral stability from being achieved. The decision was made to convert to hemiarthroplasty. The glenosphere and baseplate were removed, and a large humeral head was placed on the humeral stem. Pectoralis major, latissimus dorsi, and teres major tendons were transferred to the allograft, and tendon attachments of the APC were used to reconstruct the capsular and cuff tissues.

Discussion/Conclusion:

In this case, conversion to APC hemiarthroplasty after RTSA failure resulted in satisfactory short-term clinical outcomes including pain control, self-reported overall shoulder assessment, and range of motion. The use of a long-stemmed interlocking humeral RTSA prosthesis allowed for adequate fixation of the APC to the native humeral shaft, addressing the patient’s PHBL and non-united periprosthetic humeral fracture.