

POSTER 19

Reverse Total Shoulder Arthroplasty after tumor resection: oncologic outcome and functional results

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Background. After proximal humerus resection for bone tumors, restoring anatomy and shoulder function remains demanding because muscles and bone are removed to obtain tumor-free surgical margins. Current modes of re- construction such as anatomic modular prostheses, osteoarticular allografts, or allograft-prosthetic composites and arthrodeses are associated with relatively poor shoulder function related to loss of the deltoid and rotator cuff muscles. Newer prosthetic designs like the reverse total shoulder arthroplasty (RTSA) are felt to be useful in other reconstructions where rotator cuff function is compromised, so it seemed logical that it might help in tumor reconstructions as well in patients where the deltoid muscle and its innervation can be preserved.

Questions/purposes. In patients with a tumor of the proximal humerus that can be resected with preservation of the deltoid muscle, (1) What complications are associated with tumor resection and reconstruction with a modular RTSA? (2) What are the functional results of modular RTSA in these patients?

Patients and methods. From January 2011 to January 2018, we treated 52 patients for bone tumors of the proximal humerus. Of these, three patients were treated with forequarter amputation, 14 were treated with standard modular proximal humerus implants, seven were treated with allograft-prosthetic composites (RTSA-APC), and 28 were treated with a modular RTSA. Generally, we used anatomic modular prosthetic reconstruction if during the tumor resection none of the abductor mechanism could be spared. Conversely, we preferred reconstruction with RTSA if an innervated deltoid muscle could be spared, but the rotator cuff and capsule could not, using RTSA-APC or modular RTSA if humeral osteotomy was distal or proximal to deltoid insertion, respectively. In this study, we retrospectively analyzed only patients treated with modular RTSA after proximal humerus resection. We excluded three patients treated with modular RTSA as revision procedures after mechanical failure of previous biological reconstructions and three patients treated after December 2016 to obtain an expected minimum follow-up of 2 years. There were nine men and 13 women, with a mean (range) age of 55 years (18 to 71). Reconstruction was performed in all patients using silver-coated modular RTSA protheses. Patients were clinically checked according to oncologic protocol. Complications and function were evaluated at final follow-up by the treating surgeon (PR)

and shoulder surgeon (AC). Complications were evaluated according to Henderson classification. Functional results were assessed with the Musculoskeletal Tumor Society score (range 0 points to 30 points), Constant-Murley score (range 0 to 100), and American Shoulder and Elbow Surgeons score (range 0 to 100). The statistical analysis was performed using Kaplan-Meier curves.

Results. Complications occurred in five of 22 patients; there was a shoulder dislocation (Type I) in four patients and aseptic loosening (Type II) in one. Function in these patients on the outcomes scales we used was generally satisfactory; the mean Musculoskeletal Tumor Society score was 29, the mean Constant score was 61, and the mean American Shoulder and Elbow Surgeons score was 81.

Conclusions. Although this was a small series of patients with heterogeneous diagnoses and resection types, and we were not able to directly compare the results of this procedure with those of other available reconstructions, we found patients treated with RTSA achieved reasonable shoulder function after resection and reconstruction of a proximal humerus tumor. It may not be valuable in all tumor resections, but in patients in whom the deltoid can be partly spared, this procedure appears to reasonably restore short-term shoulder function. However, future larger studies with longer follow-up are needed to confirm these findings.

Level of Evidence IV, therapeutic study.

Keywords: Proximal humerus; Limb salvage; Prosthetic reconstruction;