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Functional outcomes after shoulder resection: the patient's perspective

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Background: Resection arthroplasty is a salvage procedure used for the treatment of deep-seated infections after total shoulder arthroplasty, hemiarthroplasty, and reverse total shoulder arthroplasty. Previous studies have reported a 50% to 66% rate of pain relief after resection arthroplasty but with significant functional limitations. Our study aimed to qualify the perspective of the patients on their limitations and satisfaction with resection arthroplasty.

Methods: A retrospective record review of resection arthroplasties performed between September 2003 and December 2012 yielded 14 patients, and 7 completed the survey. The patients completed surveys with the focus on the "patient perspective." Functional scores, including American Shoulder and Elbow Surgeons, Simple Shoulder Test, Disabilities of the Arm, Shoulder, and Hand (DASH), DASH work, and DASH sports, were determined.

Results: Pain reduction and functional outcomes were similar to past reports of resection arthroplasty. Five of the 7 patients (71%) reported satisfaction with their resection arthroplasty, and 6 of the 7 patients (86%) would undergo the procedure again if given the choice. Five of the 7 patients (71%) were able to most of activities of daily living.

Conclusions: Patients in our study were generally satisfied with their resection arthroplasty. Resection arthroplasty is a reasonable option for treatment of deep-seated periprosthetic infections or for patients with multiple previous failed procedures for total shoulder arthroplasty, hemiarthroplasty. and reverse shoulder arthroplasty.

Level of evidence: Level IV, Case Series, Treatment Study.

Keywords: Shoulder arthroplasty; resection arthroplasty; periprosthetic infections; patient perspectives

Total shoulder arthroplasty and hemiarthroplasty are relatively common procedures for the treatment of various disorders of the shoulder. Outcomes of the procedures continue to improve, but infection remains a devastating complication. The rate of infection ranges from 0.7% to 2.7% after total shoulder arthroplasty and 1.3% for hemiarthroplasty.[5,6] One salvage procedure for treating deep periprosthetic infections is shoulder resection arthroplasty. Authors have previously reported the clinically relevant limitations of resection arthroplasty, including active abduction, active external rotation, active forward flexion, and strength, as well as clinical scoring methods of shoulder function.[1,3,4,7] All previous studies have shown significant objective functional limitations of the shoulder after resection arthroplasty, but few have commented on the

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patients' abilities to perform activities of daily living and their satisfaction with the procedure.

Our study sought to evaluate patients' experiences after shoulder resection arthroplasty, particularly their ability to perform activities of daily living and their pain before and after the procedure. Resection arthroplasty is a difficult treatment option to explain to patients, and scant literature is available to provide the patients' perspective of this procedure. We felt this would be valuable information for surgeons who are recommending this procedure to their patients and that this information would provide more real-life patient feedback about what it means to live with resection shoulder arthroplasty.

Methods

A retrospective record review of cases performed by the senior author (A.D.A.) at Milton S. Hershey Medical Center between September 2003 and December 2012 yielded 322 primary shoulder arthroplasty cases and 80 revision cases; of which 14 procedures were resection arthroplasty. Of the 14 procedures, 2 patients had died, and 1 patient had bilateral resections, resulting in 11 possible surveys. Seven patients, including the patient with bilateral resections, completed the survey. To obtain data, the patients were asked in the clinic by a research assistant if they would like to complete the survey; if they consented, the surveys were mailed to their place of residence. Only 1 patient declined to participate. Three patients consented to complete the survey but never returned it. We decided not to follow-up on unreturned surveys because we wanted responses to be completely voluntary. Five of the 7 patients who completed the survey had undergone multiple surgeries on their affected shoulders. A complete list can be found in Table I.

All of the resection arthroplasties were performed on shoulders with previous arthroplasty: 2 were hemiarthroplasties, 3 were reverse (1 patient had bilateral reverse arthroplasty), and 3 were total shoulder arthroplasties. Six of the procedures were performed for uncontrolled pain and possible infection, and the other 2 were performed for uncontrolled pain with negative infectious workups (Table I). Surgical history and preoperative examination was determined from the retrospective record review.

All of the procedures were performed through a deltopectoral approach, typically using the previous surgical scars, with the patient in the beach chair position. Four were performed on the right, and 4 on the left. The previous incision was dissected down to the joint, preserving tissue planes when possible. Four of the shoulders had frank pus at the time of surgery. Multiple cultures were taken during each procedure. If sinus tracts were present, they were excised. All of the joints showed poor soft tissue quality. Resection was proximal to the deltoid insertion in all cases. Table I summarizes the pertinent details for each patient and a general assessment of the amount of humeral bone left after resection. Fig. 1 shows postoperative X-ray images displaying the amount of residual bone stalk in each patient. One can appreciate in many of the patients there was also significant glenoid bone loss. We have not provided more information about the residual degree of glenoid bone stock remaining because this would require a computed tomography scan for more accurate assessment and is beyond the scope of this report. However, Fig. 1 provides the images to give a general impression of the overall bone remaining.

Each patient received extensive débridement and irrigation with at least 9 liters of normal saline before closure. If an infection was present, an antibiotic spacer made out of vancomycin-impregnated cement was placed in the humeral shaft. If possible after resection, the subscapularis was sutured to the humerus to act like an interposition. The subcutaneous tissue was closed, and a Hemovac drain (JAckson Pratt, Cardinal Health, IL, USA) was placed. The patient was placed in a bulky dressing and sling.

The patients remained immobilized for 6 weeks postoperatively and then were allowed to start their own self-guided active assisted and then active range of motion. No patients had formal therapy postoperatively.

The questions on the survey (Fig. 2) included pain before surgery, current shoulder pain, happiness with the decision to undergo resection, influence on having resection, decision to undergo the procedure again, what the patients like most and least about their resection, which activities of daily living they can and cannot perform, shoulder function compared with before surgery, and reduction of pain after resection. Pain questions were rated on a sliding scale from no pain to worst pain possible, and then a number was assigned to their answer (range, 0-10). Function was rated as worse, the same, or better compared with before surgery. All of the other questions were free response. Surveys were collected at least 1 year postoperatively (average 2 years; range 1-5 years).

The patients were also evaluated postoperatively using standardized functional scores, including American Shoulder and Elbow Surgeons (ASES), Simple Shoulder Test (SST), Disabilities of the Arm, Shoulder, and Hand (DASH), DASH work, and DASH sports. When available, preoperative and postoperative physical examinations were reviewed. Physical examinations were performed at least 3 months postoperatively (average, 13.5 months; range 3-24 months).

Results

Procedure

Of the patients who completed the survey, 4 patients were found to have infections intraoperatively (Table I). These patients were treated with an antibiotic spacer placed in the humeral shaft that was not subsequently removed because the patients felt they had good pain control and did not want another surgery. Furthermore, they received 6 weeks of intravenous and oral antibiotics, managed by an infectious disease specialist. Patient 2 had an allergic reaction to vancomycin, necessitating a change in therapy and a longer course (3 months) of treatment, but all were able to successfully complete antibiotic therapy. In a current record review, patient 3 was the only patient who had a recurrent infection. This occurred 2 years after the shoulder resection arthroplasty/antibiotic spacer and necessitated irrigation and débridement along with placement of a new antibiotic spacer.