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Reverse shoulder arthroplasty in 41 patients with cuff tear arthropathy with a mean follow-up period of 5 years

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Background: Reverse shoulder arthroplasty (RSA) is an accepted treatment for patients with pseudoparalysis due to cuff tear arthropathy. There have been limited studies with midterm clinical and radiologic results. We present our results for a single surgeon from a district general hospital.

Methods: Forty-one consecutive Delta III RSAs were performed by an anterosuperior approach in 37 patients (29 women and 8 men) with pseudoparalysis due to cuff tear arthropathy. The patients' mean age was 79 years (range, 68-91 years). The mean follow-up period was 5 years. All patients were available for final review, and none were lost to follow-up.

Results: The mean age-adjusted Constant and Oxford scores improved from 34.2 points to 71.0 points and 15 points to 33 points, respectively. Mean abduction and forward flexion improved from 64° to 100° and 55° to 110°, respectively. Scapular notching was seen in 68% of patients, but there was no deterioration in function or satisfaction scores. Stress shielding of the proximal humerus was seen in 10% of patients. One patient underwent revision to a hemiarthroplasty because of glenoid component failure after a fall. There were no early postoperative dislocations in our series.

Conclusion: RSA for pseudoparalysis due to cuff tear arthropathy provides good functional results at 5 years; however, there is a high rate of scapular notching, which does not seem to affect overall functional outcomes.

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

Keywords: Reverse shoulder arthroplasty; cuff tear arthropathy; Delta

Successful surgical management of cuff tear arthropathy is challenging, and the excellent results of unconstrained arthroplasty in primary glenohumeral arthritis have not been replicated in cuff tear arthropathy.[12] The early failures of total shoulder arthroplasty due to eccentric loading of the glenoid component meant that hemiarthroplasty remained the surgical option of choice for most surgeons, despite inconsistent relief of pain and poor function.[10,29,30]

The Delta III reverse shoulder arthroplasty has been used more recently and provides better functional outcomes than hemiarthroplasty because of a medialized center of rotation, which reduces torque on the glenoid component and increases the mechanical advantage of the deltoid.[1] Despite concerns about scapular notching and failure rates, indications and implantations have been increasing. There have been numerous studies reporting the outcome of the Delta III prosthesis; however, they are limited by short

No institutional review board/ethical approval was required for this study.

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Table I Sirveaux classification of scapular notching

Grade 1: Defect confined to pillar
Grade 2: Defect reaches lower screw
Grade 3: Defect crosses lower screw
Grade 4: Defect extends under baseplate

follow-up periods and by varying indications for implantation, including revision, fracture, and nonunion, making it difficult to reliably compare results.[13,15,27,31,32] Other articles have reported on multicenter studies involving different surgeons, with variations in surgical techniques and postoperative rehabilitation leading to confounding factors, making interpretation of results difficult.[13,33]

We present the midterm clinical and radiologic results of primary Delta III prostheses for cuff tear arthropathy performed by a single surgeon in a district general hospital, in patients with no previous surgical procedures, with a mean follow-up period of 5 years.

Materials and methods

Between 2002 and 2010, 41 consecutive Delta III reverse shoulder arthroplasties were performed in 37 patients (29 women and 8 men) with symptomatic cuff tear arthropathy. The mean age of the patients was 79 years (range, 68-91 years). A total of 4 patients underwent bilateral procedures. Surgery was performed on the right shoulder in 31 cases and on the left shoulder in 10 cases. The main indication for implantation was severe pain with functional impairment and pseudoparalysis, with radiologic signs of glenohumeral arthritis and proximal migration of the humeral head. Patients with active sepsis, avascular necrosis, rheumatoid arthritis, post-traumatic arthritis, and symptomatic acromioclavicular joint arthritis were not included in the study. All patients were deemed to have an intact subscapularis tendon by clinical examination.

Preoperative and postoperative clinical and functional outcomes were measured with the Oxford[5] and Constant[2] shoulder scores by 2 independent surgeons who were not involved with the original operation. The Oxford score is a validated 12-question patient-reported scoring system evaluating pain, function, and range of motion. It ranges from 0 points (worse) to 48 points (best). The Constant score is a 100-point validated scoring system that is patient reported and clinician assessed and covers pain, function, range of motion, and strength.

Anteroposterior, lateral, and axillary radiographs were obtained in all patients at 6 weeks and 6 months, as well as yearly thereafter.

Serial radiographs were evaluated for component malposition, periprosthetic radiolucency, scapular notching, stress shielding, heterotrophic ossification, and prosthesis failure by 2 independent assessors. Scapular notching was graded according to the classification of Sirveaux et al[34] (Table I). Radiolucent lines were assessed according to the criteria of Sperling et al.[35]

All operations were performed by the senior author (R.P.) with patients under a general anesthetic, supplemented with an interscalene block. The anterosuperior McKenzie approach was used.

The subscapularis tendon was inspected and confirmed to be intact in all cases. The humeral neck was resected by use of the appropriate jig. All components (glenoid baseplates and humeral stems) were uncemented and hydroxyapatite coated. The glenosphere was implanted in a neutral position as inferiorly as possible, in an effort to achieve an inferior overhang as described by Nyffeler et al.[28] The glenoid baseplate was held in place with 4-mm peripheral locking screws. The size of the glenosphere was determined by the size that helped achieve the best soft-tissue tension and stability. Humeral stems were implanted in 10° of retroversion.

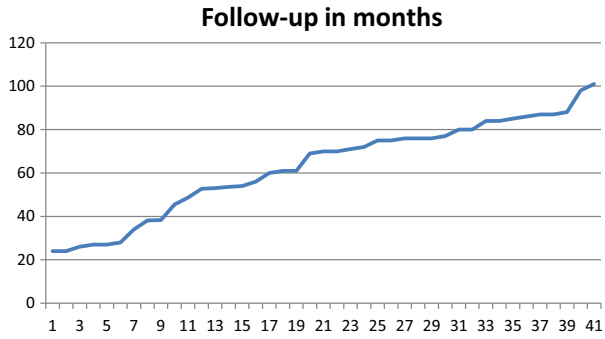

Figure 1 Follow-up duration in months.

The postoperative antibiotic protocol consisted of 1 intravenous dose of 1.5g cefuroxime. The arm was placed in a sling to immobilise the shoulder joint. Physiotherapy was started on day 1 and included full unrestricted passive-assisted mobilization, progressing to gradually increase function by 4 to 6 weeks. Concentric strengthening was increased at 6 weeks postoperatively, after which use of the sling was discontinued.

Statistical analysis

The Constant and Oxford scores were normally distributed. The paired *t* test was therefore used to compare the preoperative and postoperative scores. All analyses were performed with SPSS software program (version 9.0; SPSS, Chicago, IL, USA). $P < .05$ was considered significant.

Results

All patients were available for follow-up at a mean of 60 months (range, 20-101 months) (Fig. 1). Patients were split into 2 groups depending on whether they had more or less than 48 months' follow-up. There were 9 shoulders (group 1) with less than 48 months' follow-up and 32 shoulders (group 2) with more than 48 months' follow-up.

Functional outcome

On subjective assessment, 20 patients (49%) felt that their shoulder was much better, 11 (27%) thought it was better, 6 (15%) were unsure, and 3 (7%) thought it was worse. The preoperative and postoperative Constant and Oxford scores are reported in Table II and range of motion in Table III. There were significant gains ($P < .05$) between preoperative and postoperative scores (24 months and final follow-