



Clinical and radiographic results of cementless reverse total shoulder arthroplasty: a comparative study with 2 to 5 years of follow-up

J. Michael Wiater, MD^{a,*}, James E. Moravek Jr, MD^a, Matthew D. Budge, MD^a,
Denise M. Koueiter, MS^b, David Marcantonio, MD^c, Brett P. Wiater, MD^a

^aDepartment of Orthopaedic Surgery, Beaumont Health System, Royal Oak, MI, USA

^bDepartment of Orthopaedic Research, Beaumont Health System, Royal Oak, MI, USA

^cDepartment of Radiology, Beaumont Health System, Royal Oak, MI, USA

Background: Most studies of reverse total shoulder arthroplasty (RTSA) involve cemented humeral stems. To our knowledge, this is the first study to compare the results of cementless RTSA, using a porous-coated stem designed for uncemented fixation, with cemented RTSA.

Methods: A prospective database of patients undergoing RTSA was retrospectively reviewed for patients with a diagnosis of cuff tear arthropathy or severe rotator cuff deficiency with minimum 2-year follow-up. Of these, 37 patients had cemented RTSA and 64 patients had cementless RTSA. Outcome measures included Constant-Murley scores, American Shoulder and Elbow Surgeons scores, visual analog pain scale scores, range of motion, patient satisfaction, and radiographic evidence of complication.

Results: Compared with preoperative values, both cohorts demonstrated significant improvements ($P < .01$) in all functional scores, active forward elevation, and active internal rotation. There was no significant difference ($P > .05$) in comparing the changes in these values after surgery between the cemented and cementless cohorts. On radiographic evaluation, there was no evidence of loosening or humeral components "at risk" of loosening in either group. There was no significant difference ($P = 1.0$) in the incidence of humeral component radiolucent lines between the cemented and uncemented cohorts. There was no significant difference ($P = .30$) in the incidence of scapular notching between the cemented ($n = 8$) and uncemented ($n = 10$) cohorts.

Conclusion: Cementless fixation of a porous-coated RTSA humeral stem provides clinical and radiographic outcomes equivalent to those of cemented stems at minimum 2-year follow-up. With advantages such as simplified operative technique, no cement-related complications, greater ease of revision, and long-lasting biologic fixation, uncemented fixation may provide several benefits over cemented fixation.

Level of evidence: Level III, Retrospective Cohort Study, Treatment Study.

© 2014 Journal of Shoulder and Elbow Surgery Board of Trustees.

Keywords: Reverse total shoulder arthroplasty; uncemented fixation; cuff tear arthropathy; rotator cuff deficiency; porous-coated stem

All data were collected and reviewed under approval of the Beaumont Health System Human Investigations Committee, protocol #2006-088.

*Reprint requests: J. Michael Wiater, MD, Department of Orthopaedic Surgery, Beaumont Health System, 3601 W 13 Mile Rd, Royal Oak, MI 48073, USA.

E-mail address: mwiater@beaumont.edu (J.M. Wiater).

Studies have demonstrated both clinical and radiologic success of reverse total shoulder arthroplasty (RTSA) with follow-up approaching 10 years.^{9,14} Despite a few promising long-term outcomes studies, the rate of humeral loosening is thought to be high with RTSA compared with total shoulder arthroplasty.⁸ The higher rate of humeral loosening may in part be related to the semiconstrained nature of the RTSA articulation, imparting a greater shear stress at the stem-bone interface.¹⁹ To avoid the risk of loosening, in addition to a lack of commercially available alternatives designed for cementless fixation, many surgeons have in the past used cemented humeral components in RTSA. As such, the bulk of the RTSA literature includes a majority of patients in whom a cemented humeral component was implanted.^{2,3,7,9-11,15,22,24,28,33-35} Although a recent study reported on early radiographic outcomes of uncemented, proximally porous-coated (PPC) RTSAs,¹ the remaining series in the literature involving cementless RTSAs have used implants not designed for bone ingrowth.^{19,34} Also, the clinical and radiographic results of these non-porous-coated stems that have been implanted without cement are somewhat contradictory.^{19,34} Furthermore, in total shoulder arthroplasty, some studies have shown cemented stems to lead to better functional outcomes¹⁸ and a longer survivorship free of revision surgery⁴ than with uncemented stems. Nonetheless, cementless fixation using PPC, press-fit humeral implants designed for bone ingrowth holds promise in RTSA, given promising studies in total shoulder arthroplasty³² and its proven track record in total hip arthroplasty that has shown survivorship approaching 99% at more than 10 years.^{6,27} Currently, the number of commercially available PPC RTSA implants is steadily growing, but despite this increased popularity, there has been no published study examining clinical and radiographic outcomes in PPC, press-fit humeral stems in comparison to more traditional cemented stems. We hypothesized that the clinical and radiographic results of uncemented RTSA using a PPC humeral stem would be similar to those of cemented RTSA stems with follow-up for at least 2 years.

Patients and methods

Patients

All patients undergoing RTSA by the senior author (J.M.W.) were offered the opportunity to enroll in a prospective outcomes database. Patients were asked to return postoperatively at 2 weeks, 3 months, 6 months, 1 year, and yearly thereafter for radiographic analysis and collection of clinical outcome data. The database was retrospectively reviewed from 2005 through 2008, during which 247 patients underwent RTSA, with 14 staged bilateral procedures, resulting in 261 RTSAs. Inclusion criteria for this study were diagnosis of cuff tear arthropathy or severe rotator cuff deficiency refractory to all other treatments and minimum 2-year clinical and radiographic follow-up. Exclusion criteria were

Table I Cohort demographics

	Cemented (n = 37)	Uncemented (n = 64)
Age, years (range)	71.95 (55-83)	72.47 (48-92)
Gender		
Male	15 (40.5%)	20 (31.3%)
Female	22 (59.5%)	44 (68.8%)
Follow-up, months (range)	37.0 (24-77)	32.4 (24-63)
Diagnosis		
Cuff tear arthropathy	27 (73%)	34 (53%)
Irreparable rotator cuff tear	10 (27%)	29 (47%)
Implant		
DePuy	10 (27%)	0
Tornier	27 (73%)	0
Zimmer	0	64 (100%)

proximal humeral fractures, glenohumeral instability, rheumatoid arthritis, incomplete follow-up, and revision arthroplasty. These criteria were met by 160 patients, not including 2-year follow-up. Of these, 101 patients had minimum 2-year follow-up (66 men, 35 women), 5 of whom received a staged bilateral RTSA. Only one shoulder from the bilateral patients was included in this study to limit any variables affected by systemic conditions.

Thirty-seven shoulders received a cemented implant by either DePuy Orthopaedics (Delta III; Warsaw, IN, USA) or Tornier (Aequalis Reversed Shoulder; Edina, MN, USA). The use of 2 different cemented implants in this series was due to a shift in implant preference of the senior author (J.M.W.); however, both implants are similar in that each is a Grammont-style prosthesis with the center of rotation located at the glenoid (0 mm of offset) and includes a smooth, tapered humeral stem designed for cemented fixation with a 155° neck-shaft angle. In the cemented group, 28 36-mm and 9 42-mm glenospheres were implanted. Sixty-four shoulders received an uncemented stem by Zimmer (Trabecular Metal Reverse Shoulder; Warsaw, IN, USA). This implant includes a lateralized center of rotation (2.5 mm of offset) and a cylindrical humeral stem with PPC designed for bone ingrowth with a neck-shaft angle of 160°. In the uncemented group, 48 36-mm glenospheres and 16 40-mm glenospheres were implanted. The cemented RTSAs were implanted between 2005 and 2007, and the uncemented RTSAs were implanted between 2007 and 2008 as a result of another change in implant preference of the senior author (J.M.W.). Both cohorts demonstrated comparable demographics with regard to gender, age, follow-up, and diagnosis (Table I). Representative radiographs of a cemented and a cementless RTSA from 2 study patients are shown in Figure 1.

Operative technique

A deltopectoral approach was used in all cases. Soft tissue releases (anterior deltoid insertion, superior pectoralis major tendon insertion, capsule) were performed to facilitate exposure. The long head of the biceps was tenotomized at the level of the superior pectoralis major insertion for later soft tissue tenodesis. The subscapularis, if present, was tenotomized 1 cm medial to the bicipital groove. The humeral neck was cut of 0° to 20° of

Download English Version:

<https://daneshyari.com/en/article/4074122>

Download Persian Version:

<https://daneshyari.com/article/4074122>

[Daneshyari.com](https://daneshyari.com)