RSA Tops Hemiarthroplasty for Humeral Fractures in Elderly

TERRY STANTON

Reverse shoulder arthroplasty (RSA) may be a better choice than hemiarthroplasty (HA) in treating humeral fractures in the elderly, according to a study presented during the American Shoulder and Elbow Surgeons (ASES) 2013 Specialty Day session on shoulder trauma and arthroplasty. The study, which the researchers note is the largest prospective study to date that includes complete radiographic follow-up in comparing the two procedures, was presented by Derek Cuff, MD, of the Foundation for Orthopaedic Research and Education in Tampa, Fla.

Dr. Cuff noted that HA has historically been the standard of care for comminuted proximal humeral fractures in the elderly. However, many clinical series have reported mixed results, which has led to increased consideration of RSA (Fig. 1) as an alternative treatment.

In his study, RSA “yielded better patient outcome scores, better forward elevation of the patient’s shoulders, markedly higher patient satisfaction with the procedure, a lower rate of revision surgery, and a similar complication rate when compared to hemiarthroplasty (Fig. 2) for the treatment of complex three- and four-part proximal humeral fractures,” Dr. Cuff said.

Two cohorts, single surgeon

The study consisted of 53 consecutive elderly patients with a proximal humeral fracture treated with an arthroplasty by a single surgeon. The inclusion criteria were as follows:

- Patient age of 70 years or older
- Four-part fracture or a three-part fracture with severe greater tuberosity comminution or a fracture that involved an articular split of the humeral head
- Minimum of 2 years follow-up

The initial 26 patients underwent an HA and the subsequent 27 underwent an RSA. Six patients were lost to follow-up prior to study completion, leaving a total of 47 patients (23 in the HA group and 24 in the RSA group) with an average follow-up of 30 months.

A deltopectoral approach was used in all cases. Each patient completed ASES and Simple Shoulder Test (SST) functional measure outcome questionnaires. Patient-reported satisfaction was recorded at the 1 year postoperative point and at all subsequent follow-up visits, and patients were asked to rate their outcomes as satisfactory or not satisfactory.

A digital recording of range of motion was made of each patient as he or she performed a standardized range of motion test to evaluate forward elevation, external rotation, and internal rotation.

Outcome measures

The RSA group had significantly better mean ASES and SST scores, higher mean forward elevation values, and a higher patient satisfaction percentage in comparison to the HA group (Table 1). No significant differences were found between the two groups with respect to mean internal or external rotation values.

At the 1 year postoperative evaluation, the tuberosity healing rate was 61 percent (14/23) in the HA group, with 39 percent (9/23) having complete resorption of one or more tuberosities. None of the patients in the HA group had any evidence of humeral stem loosening at last follow-up.

In the RSA group, the tuberosity healing rate at the 1-year postoperative evaluation was 83 percent (20/24), with 17 percent (4/24) having complete resorption of one or more tuberosities. At last follow-up, no evidence of scapular notch, baseplate loosening, or humeral stem loosening was found in the RSA group.

“The final clinical outcomes and range of motion values of the elderly patients who were treated with a hemiarthroplasty for their acute comminuted proximal humeral fracture exhibited a bimodal distribution of good outcomes if tuberosity healing occurred or poor outcomes if their tuberosities underwent resorption,” Dr. Cuff said. “In comparison, the patients whose fractures were treated with RSA had more consistent and superior results irrespective of tuberosity healing.”

Dr. Cuff’s coauthor is Derek Pupello, MBA.

Disclosure information: Dr. Cuff—DJ Orthopaedics; Arthrex. Mr. Pupello—DJ Orthopaedics; Arthrex.

Terry Stanton is senior science writer for AAOS Now. He can be reached at tstanton@aaos.org

![Fig. 1 Radiograph of reverse shoulder arthroplasty after proximal humeral fracture.](image1)

![Fig. 2 Radiograph of hemiarthroplasty after proximal humeral fracture.](image2)

**Table 1: Outcome Comparison**

<table>
<thead>
<tr>
<th>Measure</th>
<th>RSA Group</th>
<th>HA Group</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean ASES Score</td>
<td>77</td>
<td>62</td>
<td>0.0001</td>
</tr>
<tr>
<td>Mean SST Score</td>
<td>7.4</td>
<td>5.8</td>
<td>0.0062</td>
</tr>
<tr>
<td>Mean Forward Elevation</td>
<td>139°</td>
<td>100°</td>
<td>0.0002</td>
</tr>
<tr>
<td>Patient Satisfaction</td>
<td>91%</td>
<td>61%</td>
<td>0.038</td>
</tr>
<tr>
<td>Tuberosity Healing Rate</td>
<td>83%</td>
<td>61%</td>
<td></td>
</tr>
</tbody>
</table>

**Bottom Line**

- In this small study, patients older than age 70 with proximal humeral fractures had better outcomes with reverse shoulder arthroplasty than with hemiarthroplasty.
- Patients treated with hemiarthroplasty had good outcomes if tuberosity healing occurred, but not if their tuberosities underwent resorption.
- Neither group showed any sign of component loosening 2 years after surgery.