Treatment Options for Proximal Humerus Fractures in the Elderly

Studies find comparable results for surgical and nonsurgical interventions

MAUREEN LEAHY

For more than two generations, orthopaedic surgeons have treated 3-part proximal humerus fractures in the elderly with open reduction and internal fixation (ORIF), and 4-part fractures with hemiarthroplasty (HA), noted Andrew Jawa, MD, of Boston University Medical Center, at a symposium on common fracture treatment held during the 2014 AAOS Annual Meeting. This treatment rationale is based on the conclusions of a landmark article published by Charles Neer, MD, in 1970.

“Since that time, however, very few prospective trials have reevaluated these conclusions,” he said.

During his presentation, “Proximal Humerus Fractures in the Elderly: Operative vs. Nonoperative,” Dr. Jawa summarized the results of four recent European studies that shed new light on treatment of these fractures.

**ORIF vs nonsurgical treatment**

The first study, conducted in Sweden, involved 60 patients, aged 56 years to 92 years (mean age: 74 years) with displaced 3-part proximal humerus fractures. Patients were prospectively randomized to ORIF with a locking plate (LP) or nonsurgical treatment with a sling and swathe.

According to Dr. Jawa, the study’s exclusion criteria are important. He noted that patients with 100 percent translated fractures, for which the researchers believed surgery was indicated, were excluded. Fracture-dislocations and valgus-impacted fractures, which normally do very well when treated nonsurgically, were also excluded. “However, this produced an inherent bias because the number of surgical exclusions was smaller than the number of nonsurgical exclusions. Another criticism of the study was that it was underpowered,” he said.

Dr. Jawa added that the study’s 2-year outcomes were very surprising. “Constant scores and Disabilities of the Arm, Shoulder and Hand (DASH) scores were essentially the same in both groups (Table 1). In the ORIF cohort, 9 patients underwent either minor or major reoperations; no one in the nonsurgical cohort required surgery,” he said.

The second study was conducted in Norway and compared surgical and nonsurgical treatment of displaced 3- and 4-part proximal humerus fractures in 50 patients aged 60 years or older. The patients were prospectively randomized to ORIF with an angular stable plate or nonsurgical treatment.

“This study was also underpowered. Interestingly, instead of excluding patients whose fractures were 100 percent translated, however, the researchers performed a closed reduction in the operating room,” Dr. Jawa said.

At one-year follow-up, Constant and American Shoulder and Elbow Surgeons scores in the two cohorts were identical, according to Dr. Jawa. In the ORIF cohort, the researchers reported two perioperative deaths, two incidences of osteonecrosis, and one revision surgery for tuberosity pull-off. The nonsurgical cohort had two nonunions, but no operations.

**HA vs nonsurgical treatment**

The third study was conducted by the same authors of the first study. A total of 55 patients aged 58 years to 92 years (mean age: 77 years) with 4-part proximal humerus fractures were prospectively randomized to hemiarthroplasty (HA) or nonsurgical treatment. Again, 100 percent translated fractures, fracture-dislocations, and valgus-impacted fractures were excluded, resulting in the same potential bias as the ORIF study, noted Dr. Jawa.

At 2-year follow-up, three reoperations had occurred in the HA cohort. Despite the fact that five patients had arthritis, three had osteonecrosis, and one had a nonunion, only one of the patients in the nonsurgical cohort underwent surgery, Dr. Jawa pointed out.

“Interestingly, the EuroQol-5D—a validated quality-of-life measure—showed a clear advantage to HA,” Dr. Jawa said. “However, the Constant and DASH scores were the same in both cohorts, and although forward flexion was slightly better in the nonsurgical group, the difference was not statistically significant. The results of this study, therefore, were somewhat equivocal.”

The results of the final study reviewed by Dr. Jawa, however, were definitive. The study was conducted in the Netherlands and involved 50 patients older than age 65 years (mean age: 70 years) with 4-part proximal humerus fractures prospectively randomized to HA or nonsurgical treatment.

“At one-year follow-up, Constant, DASH, visual analog scale, and Simple Shoulder Test scores showed absolutely no difference between the two cohorts, and forward flexion was surprisingly similar at 90 degrees,” Dr. Jawa said. The HA cohort had one reoperation for tuberosity pull-off; the nonsurgical cohort had one operation for nonunion.

Dr. Jawa also noted that reverse shoulder arthroplasty (RSA) may be a better option than HA for treating proximal humerus fractures in some patients. “One recent trial, in particular, showed that RSA performed better in terms of function and range of motion than HA,” he said. “However, several retrospective studies have shown that RSA has a high complication rate. I believe RSA has great potential, but more research is needed to determine its specific indications.”

**Bottom Line**

- ORIF and HA have been the standard of care for 3- and 4-part proximal humerus fractures in the elderly since 1970.
- Recent European studies suggest that surgical and nonsurgical interventions produce similar outcomes in elderly patients who have sustained these fractures.
- These conclusions do not apply to younger patients or patients with fracture-dislocations.
- RSA shows potential for treating proximal humerus fractures in the elderly.

**Table 1: 2-Year Outcome Scores, Surgical vs Nonsurgical**

<table>
<thead>
<tr>
<th>Measure (scoring)</th>
<th>Surgical (mean)</th>
<th>Nonsurgical (mean)</th>
<th>P</th>
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<tbody>
<tr>
<td>Constant Score (0-100)</td>
<td>61.0 (19.2)</td>
<td>58.4 (23.1)</td>
<td>.64</td>
</tr>
<tr>
<td>I. Pain (0-15)</td>
<td>12.4 (3.8)</td>
<td>11.2 (3.3)</td>
<td>.12</td>
</tr>
<tr>
<td>II. ADL (0-20)</td>
<td>14.1 (5.4)</td>
<td>14.6 (5.8)</td>
<td>.75</td>
</tr>
<tr>
<td>III. ROM (0-40)</td>
<td>27.3 (8.6)</td>
<td>24.7 (10.0)</td>
<td>.41</td>
</tr>
<tr>
<td>IV. Strength (0-25)</td>
<td>7.3 (4.6)</td>
<td>7.9 (8.2)</td>
<td>.88</td>
</tr>
<tr>
<td>DASH (100-0)</td>
<td>26.4 (25.2)</td>
<td>33.0 (26.8)</td>
<td>.19</td>
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</tbody>
</table>

According to the results of a Swedish study involving 60 patients with displaced 3-part proximal humerus fractures randomized to either surgical or nonsurgical treatment, outcomes at 2 years, particularly for Constant and DASH scores, were similar.

**Disclosure information: Dr. Jawa reports no conflicts.**

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References for the studies cited in this article may be found in the online version available at www.aaosnow.org

May 2014 AAOS Now