Midterm Results of Two-Stage Revision Surgery for Periprosthetic Shoulder Infection

Prashant Meshram, MS DNB, Edward G. McFarland, MD, Jorge Rojas, MD, Jacob Joseph BS, Uma Srikumaran, MD, Stephen Weber, MD

The Johns Hopkins School of Medicine
Disclosures

• The following relationships exits:
  1. Royalties and stock options- none
  2. Consulting income- none
  3. Employee Msquared Associates
  4. Other support
     • No conflict related to this talk
Periprosthetic Shoulder Infection Represents a Serious Problem

- 66,000 procedures/year in US
- 0.98% rate of infection
- 5% infection rate in revision cases
Periprosthetic Shoulder Infection Represents a Serious Problem

- There are no studies of reinfection rates and clinical results at mid-term follow-up after two-stage revision for PSI
- The purpose of this study was to determine the reinfection rate and clinical outcomes of two-stage revision for PSI at a minimum follow-up of five years.
- The secondary aim was to evaluate the application of the new guidelines from the International Consensus Meeting (ICM) in 2018 for diagnosis of PSI in this cohort.
Method

• 17 patients with infection after shoulder arthroplasty between 2005 and 2014 who were treated with a two-stage revision and had a minimum follow-up of five years (range 5 to 9 years)

• Mean patient age was 64 ± 7 years and 65% were male.

• The average time from the index arthroplasty to treatment was 40 months.

• All patients were revised to a RTSA at second stage revision

• Complications, visual analogue scale for pain, Simple Shoulder Test, American Shoulder and Elbow Surgeons and Western Ontario Osteoarthritis of the Shoulder scores, and range of motion were noted.

• Patients were retrospectively scored and categorized using the ICM 2018 diagnostic criteria.
Results

- A recurrent infection developed in 3 (18%) of the 17 patients.
- The cumulative incidence of recurrence of infection was 0% at 1 year, 6% at 2 years and 18% at 5 years.
- At latest follow-up, patients had a statistically and clinically significant improvement in functional outcomes and range of motion in abduction and forward flexion.
- Using ICM 2018 criteria at first stage revision surgery, the category of PSI for ten (59%) patients was “Definite PSI”, four (23%) patients was “Probable PSI”, and three (18%) patients was “Possible PSI”
Results

- Humeral loosening: 3 (18%)
- Positive intraoperative culture 12/17 (71%)
  - C. acnes 6/12 (50%)
  - MSSA 2/12 (18%)
  - MRSA 1/12 (8%)
  - Others 3/12 (34%)
- Positive histology (> 5 WBCs/ HPF)
  - 17 patients (100%)
Complications

- Other complications 6 (36%)
  - 4 Periprosthetic fractures
    (3 were intra-op GT fracture)
  - 1 Spacer fracture
  - 1 Dislocation

- Overall complication rate of 54%

- Risk factors
  - Male
  - Obese
  - ASA III
  - Smoking
Three recurrent infections (18%)

• One C. Acnes (same organism)
  revised to permanent spacer

• Two single-stage re-revision to RTSA
  – Different organism than first revision culture, presumably infected at revision
### Preoperative and postoperative values for clinical outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Preoperative</th>
<th>Postoperative</th>
<th>P-value</th>
<th>Improvement exceeding MCID (Yes/No)</th>
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</thead>
<tbody>
<tr>
<td>Pain VAS</td>
<td>7.1 ± 2.5</td>
<td>2.7 ± 2.2</td>
<td>0.001</td>
<td>Yes</td>
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<tr>
<td>SST score</td>
<td>2.5 ± 2.0</td>
<td>6.6 ± 3.9</td>
<td>0.001</td>
<td>Yes</td>
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<tr>
<td>ASES score</td>
<td>27.4 ± 16.8</td>
<td>70.3 ± 22.9</td>
<td>0.001</td>
<td>Yes</td>
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<tr>
<td>WOOS score</td>
<td>31.2 ± 18.7</td>
<td>75.9 ± 19.4</td>
<td>0.001</td>
<td>Yes</td>
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<tr>
<td>Abduction</td>
<td>61.1 ± 39.1˚</td>
<td>121.8 ± 20.8˚</td>
<td>0.001</td>
<td>Yes</td>
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<tr>
<td>Forward flexion</td>
<td>62.9 ± 39.4˚</td>
<td>116.8 ± 22.5˚</td>
<td>0.001</td>
<td>Yes</td>
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<tr>
<td>ER with arm at side</td>
<td>30.4 ± 14.7˚</td>
<td>35.9 ± 13.0˚</td>
<td>0.336</td>
<td>-</td>
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<tr>
<td>ER with arm at 90˚ abduction</td>
<td>48.2 ± 26.0˚</td>
<td>55.9 ± 22.5˚</td>
<td>0.444</td>
<td>-</td>
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<tr>
<td>IR with arm at 90˚ arm abduction</td>
<td>18.6 ± 33.3˚</td>
<td>26.4 ± 15.5˚</td>
<td>0.486</td>
<td>-</td>
</tr>
</tbody>
</table>

Data is presented as mean ± standard deviation.

Summary

• The rate of reinfection after a two-stage revision surgery for PSI at midterm follow up was 18%.
• The clinical outcomes of patient were favorable in the patients who remained free of infection.
• The ICM 2018 criteria require further study with larger cohorts of patients.