Infection after Total Hip Arthroplasty for Rheumatoid Arthritis

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Abstract

This study was done to evaluate the long-term outcome of total hip arthroplasty (THA) for rheumatoid arthritis (RA) at the Senami RA center and to discuss the management of infection following THA. Infections occurred in 6 hips (2.8%) out of 212 THAs in RA patients during a 15-year period. Two resulted in an early-onset infection within 1 year after operation and 4 resulted in late-onset infection after more than 1 year. Initially, each case was treated with antibiotics and local debridement, however, in 5 cases the prostheses finally had to be removed. After removal, 2 cases were diagnosed as so-called “Girdle stone,” 2 underwent revision, and one case died because of sepsis. There was no recurrence of infection in any of these cases.

Although, intraoperatively, a sterile procedure is very important in the prevention of postoperative infection, especially in RA patients, pre-existing infections should be treated pre- and postoperatively, because host susceptibility to infection increases dramatically. At our center, specific attention has been given to predisposing conditions, such as diabetes mellitus, renal insufficiency, skin ulcers, and ingrown toe nails, etc., so there have been no infections at the center since 1989.

INTRODUCTION

Some of the complications associated with total joint arthroplasty in patients with rheumatoid arthritis include infections, fractures, and loosening and breakage of the prosthesis. Infection is the most serious of these since it is difficult to manage in either the early or late postoperative period. Though the frequency of infection after THA is generally reported to be 1-2%, in RA patients it seems to be higher. Since we would like to prevent infection as much as possible, cases involving infection were studied in detail in relation to their previous medical history, possible etiological factors, treatment, and outcome.

PATIENTS

Between 1981 and 1995, 212 total hip
arthroplasties were performed at the Senami RA center. Initially, a cemented Charnley prosthesis was mainly used, but recently a non-cemented type is preferred, such as Mallory-Head, Anatomic, Harris, etc. There were 6 cases of infection (2.8%) out of 212 THAs. Four cases were female and 2 were male. The average follow-up period, as of 1996, was 6.9 years (range 1-15). The average age at the time of operation was 60.1 years (range 54-65), and the duration of the disease at the time of operation was 15.3 years (range 5-29).

The types of prostheses used in the infected cases were four Charnley, one Biomet, and one Bateman UPF, mainly cemented types. In terms of infection onset, the patients could be divided into 2 groups: early-onset cases occurring within 3 months after surgery (2 cases), and late cases occurring 1 year after surgery (4 cases). Infection in the early-onset cases was suspected to be due to the delay of wound healing and abscess formation, while in the late-onset cases high fever, hip swelling and pain were suspected. Bacteria were detected in 3 cases (Staphylococcus aureus and epidermidis). All of the RA patients were treated with prednisolone and had many complications (Table 1).

RESULTS
Management of Infection
Initial treatment consisted of wound debridement and administration of appropriate antibiotics for a few weeks. After debridement, suction irrigation was performed for about 2 weeks using a double lumen tube. Although this procedure was performed in all cases and occasionally repeated, ultimately, removal of the prostheses was required in 5 patients. Cement beads containing antibiotics were embedded in dead spaces and closed drainage continued for 7 to 10 days. Revision was done in 2 cases with a non-cemented Biomet and Omnifit prosthesis at 1 and 8 months, respectively, after removal of the prosthesis (Table 2).

Case 1: Female patient, 58 years old at time of operation.
of operation. The patient had been bed-ridden for a few years after a femoral neck fracture. She was admitted to our hospital to receive a joint plasty. After direct traction, total hip arthroplasty (THA) with a Charnley was performed and she was discharged with two crutches gait and admitted to a nursing home. Two years later, revision was done because of loosening. Abscess formation appeared after the revision and closed irrigation was done. The symptoms then disappeared. The infectious signs occurred again 6 years later. The prosthesis was removed, cement-beads containing antibiotics were packed, and closed irrigation was performed again. About 6 weeks after the final surgery, the cement-beads were removed and the patient started rehabilitation. Finally she could walk with

<table>
<thead>
<tr>
<th>case</th>
<th>duration from onset to removal of prosthesis</th>
<th>revision</th>
<th>prognosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6 yrs. &amp; 7 mos.</td>
<td>(−)</td>
<td>Girdlestone crutch gait</td>
</tr>
<tr>
<td>2</td>
<td>4 yrs. &amp; 3 mos.</td>
<td>(−)</td>
<td>Girdlestone crutch gait</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>independent gait</td>
</tr>
<tr>
<td>4</td>
<td>4 yrs. &amp; 1 mo.</td>
<td>OmniFit</td>
<td>wheel chair</td>
</tr>
<tr>
<td>5</td>
<td>1 yr.</td>
<td>Biomet</td>
<td>independent gait</td>
</tr>
<tr>
<td>6</td>
<td>1 mo.</td>
<td>(−)</td>
<td>in bed</td>
</tr>
</tbody>
</table>

Sta. epider. : *Staphylococcus epidermidis*
PSL : prednisolone, DPC : D-penicillamine, AZ : azathioprine
DM : diabetes mellitus, CGN : chronic glomerulonephritis

Table 1 Profiles of infected cases

<table>
<thead>
<tr>
<th>duration to onset</th>
<th>type of prosthesis</th>
<th>symptom</th>
<th>bacteria</th>
<th>PA drug</th>
<th>complication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Charnley</td>
<td>abscess</td>
<td>Sta. aureus.</td>
<td>PSL 5 mg, DPC 100 mg</td>
<td>acute hepatitis gastric ulcer</td>
</tr>
<tr>
<td>2</td>
<td>Charnley</td>
<td>delay of wound healing</td>
<td>(−)</td>
<td>PSL 5 mg</td>
<td>hepatitis A compression fx</td>
</tr>
<tr>
<td>3</td>
<td>Biomet</td>
<td>hip pain fever up</td>
<td>(−)</td>
<td>PSL 2.5 mg</td>
<td>DM</td>
</tr>
<tr>
<td>4</td>
<td>Charnley</td>
<td>greater trochanter pain &amp; bursitis</td>
<td>(−)</td>
<td>PSL 5 mg</td>
<td>CGN osteoporosis</td>
</tr>
<tr>
<td>5</td>
<td>Bateman</td>
<td>hip swelling</td>
<td>Sta. epider.</td>
<td>PSL 2.5 mg, DPC 100 mg</td>
<td>hypertension renal failure</td>
</tr>
<tr>
<td>6</td>
<td>Charnley</td>
<td>hip pain fever</td>
<td>Sta. aureus.</td>
<td>PSL 5 mg, AZ 50 mg</td>
<td>tinea (buttock, chest)</td>
</tr>
</tbody>
</table>

Table 2 Prognosis of infected cases
two crutches and returned to the nursing home (Fig. 2).

Case 2: Female patient, 60 years old. The patient had been suffering from RA since the age of 24. After THA with a Charnley prosthesis, wound drainage persisted, necessitating curettage and continuous drainage. However, signs of infection remained and finally the prosthesis had to be removed. She walks with 2 crutches, so-called “Girdlestone,” because she did not want to have any more operations and has no pain in walking.

Case 3: Male patient, 58 years old. Total arthroplasty was performed in the left hip, which had severe deterioration, with a threaded type of Bioment. When control of diabetes mellitus (DM) deteriorated, signs of infection appeared. Administration of antibiotics, local debridement, and also treatment of DM was done. The infection was “cured,” and after 7 years, there has been no recurrence, but loosening is apparent (Fig. 3).

Case 4: Female patient, 65 years old. About one year after THA (Charnley), bursitis appeared in the patient’s greater trochanteric region. Curettage and closed irrigation was done twice. Though the infection seemed to be cured, dislocation of the hip occurred repeatedly, so revision of THA was performed one year and 8 months after the first operation. However 3 years and 4 months later, the patient fell down and suffered a femur fracture. At that point re-revision was performed with an Omnisfit prosthesis.

Case 5: Female patient, 59 years old. The patient’s hip swelled without apparent cause 6 months after a Bateman THA. In this case, revision was done with Biomet 8 months after removal because the patient was anxious to walk (Fig. 4).

Case 6: Male patient, 65 years old. The patient was a malignant RA case. About 6 years after THA he had a high fever, multiple joint swelling, right hip pain, and tinea fungi was detected generally. Though removal of the prosthesis and antibiotic administration were performed immediately, he died because of sepsis.
DISCUSSION

To prevent postoperative infections, not only is a sterile environment during the operation important but also pre- and postoperative care. Prior to operation, we must reduce the patient’s susceptibility to infection as much as possible, especially where such conditions as DM, renal insufficiency, granulocytopenia, and decrease of immuno-
globulin are involved. In addition to these general conditions, any local infections must be cured. Skin ulcers, ingrown toe nails, and nail tinea must be treated before surgery. In RA patients, host resistance to infection will necessarily be reduced; therefore, hematogenous infection from any source to the skin, urinary tract, and/or pulmonary region should be treated. The cause of infection in early-onset cases was suspected to lie in the surgical procedure. On the other hand, in late-onset cases, complications seemed to have been related to the infection itself. Nevertheless, when signs of infection appear, a thorough surgical debridement should be carried out as soon as possible. Also, antibiotics should be administered even when bacteria are not detected if the infection is diagnosed from the presence of granulomatous debris, pus discharge, etc. Very often infections cannot be controlled, requiring removal of the prosthesis as in 5 of our cases. Compared with cases of osteoarthritis in rheumatoid patients, host factors seemed to play a major role in causing infection. It is difficult to cure infections completely without removal of the prosthesis. Understandably, revision operations are a burden on patients; therefore, we believe the prosthesis should be removed if signs of infection remain after a few local debridements. When the infection has been completely cured, revision can be performed.

REFERENCES