

## MANAGEMENT OF THE INFECTED HIP ARTHROPLASTY BY TWO-STAGE REIMPLANTATION

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**Summary:** The aim of this study is to present our experience with two-stage reimplantation in the management of the infected hip arthroplasty. Between January 1993 and December 2001 the replacement of the total hip arthroplasty in two stages was performed in 18 patients. There were 7 male and 11 female patients and the average age was 62 years. The mean follow-up after revision was 3.5 years. The mean postoperative Harris Hip Score averaged 78 (50–96) points. None of 18 patients had a recurrence of the infection. Two-stage reconstruction of the infected hip is preferred to one-stage exchange arthroplasty at our department because of higher rate of eradication of the infection.

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**Key words:** Total hip arthroplasty; Infection; Two-stage exchange arthroplasty

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### Introduction

Possible option for the operative management of an infected hip arthroplasty includes débridement with retention of the prosthesis, immediate one-stage exchange arthroplasty and resection arthroplasty, either as a definitive procedure or as the first of a two-stage reconstructive procedure (4,6,7,13). The choice of a particular treatment is affected by a number of factors (17).

The purpose of this study is to present our experience with two-stage exchange arthroplasty in patients who had an infected hip prosthesis.

### Material and Methods

Between January 1993 and December 2001 we performed resection arthroplasty of the hip in 51 patients who had infected hip prosthesis.

Replacement of the total hip prosthesis in two stages had been carried out in 18 of these 51 patients during follow-up in 2002. There were 7 male and 11 female patients in the study and the average age was 62 years (range 46 years to 75 years). The series included various infected prostheses: 9 cemented total hip prostheses, 1 cemented tumorous total hip prosthesis, 2 cemented hemiarthroplasties and 6 hybrid total hip prostheses. The primary diagnoses were primary osteoarthritis in 10 patients, post-dysplastic osteoarthritis and femoral neck fracture in 3 patients each and posttraumatic osteoarthritis in 2 patients. The patients had the following systemic diseases: diabetes

mellitus in two, thyreopathy and ochronosis in one patient each.

Early postoperative infection, occurred within one month after the operation, was present in 4 cases. Late postoperative infection, occurred more than a month after the operation, was present in 14 cases. A single microorganism was isolated in specimens from 9 hips and more than one microorganism in specimens from 2 hips. There were no microorganisms isolated from 7 specimens because of preoperative antibiotic therapy given by the referring surgeon.

The interval between the first and second stage of a two-stage exchange arthroplasty has varied widely. In our first group of 9 patients, who were treated at our department till January 1999, a total hip reimplantation had been carried out after an average of 10 months. Nowadays we prefer the interval from 3 to 4 months. The following prostheses were used for the revision: acetabular components – 7 cemented Ultima (Johnson and Johnson), 3 cemented Poldi (Beznoska), 1 cemented Exeter (Howmedica), 2 cementless Plasmacup (Aesculap), 2 cementless LOR (Allopro), 1 cementless CLS (Protek), 1 cementless ABG (Howmedica), 1 cementless Zweymuller (Allopro), femoral components – 6 cemented standard Poldi (Beznoska), 5 cemented extreme Poldi (Beznoska), 3 cementless revision stem SL (Protek), 2 cementless revision stem Aesculap (Aesculap), 1 cementless ABG (Howmedica) and 1 cementless Zweymuller (Allopro). The bone autografts were used in 8 patients for the acetabulum. Antibiotics were administered postoperatively to all patients for 6 weeks.

The mean follow-up after reconstruction was 3.5 years. At follow-up the range of movement of the hip was examined and a questionnaire completed. The Harris Hip Score for the individual patients was used based on these data.

## Results

Mean postoperative Harris Hip Score averaged 78 (50–96) points in our 18 patients. Fifteen patients suffered from no or slight pain, the other 3 had moderate pain. Walking distance was unlimited in 9 patients and limited in 9 cases too. The mean range of flexion in the hip was 89 degrees. The mean shortening of the involved extremity was 1.5 cm. The Trendelenburg sign was negative in 6 patients.

None of 18 patients had a recurrence of the infection at an average follow-up of 3.5 years. Complications of the treatment included hip dislocation in 2 cases and aseptic loosening of the cemented total hip arthroplasty in 3 cases.

## Discussion

Operative treatment of an infected hip arthroplasty includes débridement with retention of the prosthesis, immediate one-stage exchange arthroplasty, resection arthroplasty as a permanent procedure and two-stage exchange arthroplasty. There are these following factors important for choice of a particular treatment: the infecting micro-organism and its ability to manufacture glycocalyx, its sensitivity to antibiotics, the duration of the infection, the condition of the patient, the fixation of the implants, the presence of the bone defects and the surgeon's philosophy (2,7,18).

It is generally accepted that the débridement with retention of the prosthesis can be successful only in patients treated for early postoperative and late hematogenous infection of well fixed cemented total hip arthroplasty (5).

The resection arthroplasty of the hip is highly effective in infection controlling and reducing pain, but it is associated with considerable loss of function. This procedure is usually unacceptable as a definitive solution for relatively young and active patients (1,15,16). However, not even the resection arthroplasty is quite without a risk of the recurrence of the infection. There was reported a 18 per cent rate of the recurrence after the removal of the infected hip arthroplasty (3,17).

Reimplantation after débridement and removal of a prosthesis can be performed during the same procedure (one stage) or later (two stages). The use of these techniques varies among different centers (8,10,12,14). At our department two-stage reconstruction is preferred to one-stage exchange arthroplasty because of higher rate of eradication of the infection. We observed no recurrence after two-stage procedure in 18 patients and 8 recurrences after one-stage procedure in 11 patients (9).

The principles of a two-stage exchange arthroplasty include removal of the implants and all cement with débride-

ment, postoperative administration of antibiotics and eventual implantation of a new total hip prosthesis. The interval between the first and second stages has varied widely and nowadays the interval from 3 to 4 months is preferred at our department. We proceed with reimplantation if clinical appearance and erythrocyte sedimentation rate with C-reactive protein level are indicative of resolution of the infection. Our approach minimizes the risk of the infection recurrence (9). The use of the cement spacer was reported recently to provide the patients with comfort and the spacer also reduces the dead space and soft tissue shortening thereby facilitating easier reimplantation (8,11).

## Conclusions

Two-stage reconstruction of the infected hip is preferred at our institution to one-stage exchange arthroplasty because of higher rate of eradication of the infection. Nowadays the interval between the first and second stage ranges from 3 to 4 months and the prostheses inserted without bone cement are used. Although methods for the diagnosis and treatment of the infected hip prosthesis were improved, the importance of the prevention cannot be overemphasized.

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