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Temporary total hip arthroplasty-like spacer for treating an infected periprosthetic femoral fracture using a long stem: A case report

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ABSTRACT

INTRODUCTION: Infected periprosthetic femoral fractures are among the most complex and significant complications of total hip arthroplasty (THA). We report the novel use of a temporary THA-like spacer for treating an infected periprosthetic femoral fracture after revision surgery using a long stem.

CASE PRESENTATION: We present a 72-year-old woman sustained a left infected periprosthetic femoral fracture after revi - streptococci in the culture sample. On suspicion of a periprosthetic joint infection, we planned a two-stage procedure. We used a temporary THA-like spacer comprising the removed femoral long stem, which was autoclaved and then reimplanted, and applied a new polyethylene acetabular liner. Both components were cemented in place with antibioticloaded bone cement, without applying strong pressure. Pain control waseasily achieved postoperatively because the fracture had been stabilized early. The THA-like spacer was stable, and allowed a good range of motion without pain. She was allowed to move with a wheelchair and was walk with partial weight bearing without pain. Seven week after the initial THAlike spacer placement, we performed a revision THA after successful control of infection. At the 1-year follow-up, the patient remained free of infection.

CONCLUSIONS: Temporary antibiotic-loaded cement-coated THA-like spacer using a long stem facilitated the eradication of infection, fracture stabilization, and enables partial weight bearing without pain.

1. Introduction

Infected periprosthetic femoral fractures are among the most complex and significant complications of total hip arthroplasty (THA) [1]. Two-stage reconstruction with the temporary insertion of an antibiotic-loaded cement spacer remains the gold standard for treatment of an infected THA [2]. The treatment of periprosthetic femoral fractures after revision surgery using a long stem is also challenging [3]. Here we report the novel use of a temporary THA-like spacer for treating an infected periprosthetic femoral fracture after revision surgery using a long stem to eradicate infection, stabilize the fracture, and allow partial weight bearing without pain. This case report has been prepared in line with the SCARE criteria [4].

2. Case presentation

A 72-year-old woman sustained a left infected periprosthetic femoral fracture after revision THA using a long stem (Fig. 1). She had previously undergone a left THA in 1993 for osteoarthritis, and underwent left revision THA procedures in 2003 and 2010 for aseptic loosening of the prosthesis. The Institutional Review Board of Shiga Medical Center for Adults approved the protocol for this report, and informed consent was obtained from the patient for publication.

She presented to our clinic and complained of persistent pain in the left hip and thigh. Plain radiographs demonstrated a left periprosthetic femoral fracture of type B3 according to the Vancouver classification [5]. She had persistent wound swelling and elevated inflammatory markers (erythrocyte sedimentation rate and C-reactive protein). A diagnostic hip aspiration showed elevated leukocytes counts and increased numbers of neutrophils. We identified β-streptococci in the culture sample. On suspicion of a periprosthetic joint infection, we planned a two-stage procedure.

The acetabular and femoral components in the left hip were removed and extensive debridement was performed. The fracture site demonstrated a fibrous nonunion status and was unstable. Acetabular and femoral bone loss was extensive. We used a temporary THA-like spacer comprising the removed femoral long

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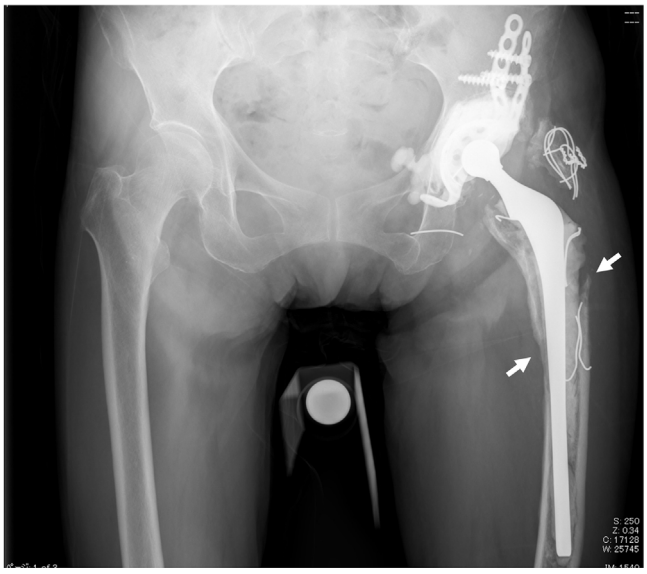

Fig. 1. Preoperative radiograph of an infected periprosthetic femoral fracture after revision surgery using a long stem. Arrows indicated the fracture line.

stem, which was autoclaved and then reimplanted, and applied a new polyethylene acetabular liner (Fig. 2a). Both components were cemented in place with antibiotic-loaded bone cement, without applying strong pressure. We used 700 mg of daptomycin and 200 mg of dibekacin sulfate for each 40 g bag of cement. The acetabular component was inserted during the late stages of polymerization of one bag of the cement to minimize osseous interdigitation. Half of one bag of bone cement was used to coat a uniform thin layer of cement around the entire femoral long stem, which was inserted after polymerization. The remaining half of the bone cement was added to the proximal area of the stem because of massive bone defects.

Tissue cultures showed β-streptococci and the patient received an appropriate systemic antibiotic treatment. After 7 weeks of treatment, she was stable clinically. Pain control was easily achieved postoperatively because the fracture had been stabilized early. The THA-like spacer was stable, and allowed a good range of motion without pain. She was allowed to move with a wheelchair and was able to walk with partial weight bearing without pain. Seven weeks after the initial spacer placement, we performed a revision THA using a cemented long stem and an acetabular liner with KT-plate and allografting after successful control of infection [6]. During the procedure, the acetabular and femoral components of the temporary THA-like spacer were removed easily (Fig. 2b). New acetabular and femoral components were fixed with antibiotic-loaded cement. Allografts were used for structural support of the deficient bone stock in the acetabular defect and femoral fracture site (Fig. 3). Tissue cultures were negative, and there were no further postoperative complications. At the 1-year follow-up, the patient remained free of infection.

3. Discussion

Our report is among the first to report on treatment using a temporary THA-like spacer with a long stem for an infected periprosthetic femoral fracture after revision THA using a long stem. Treatment of periprosthetic femoral fracture after revision THA using a long stem was complex and challenging [3]. Further-

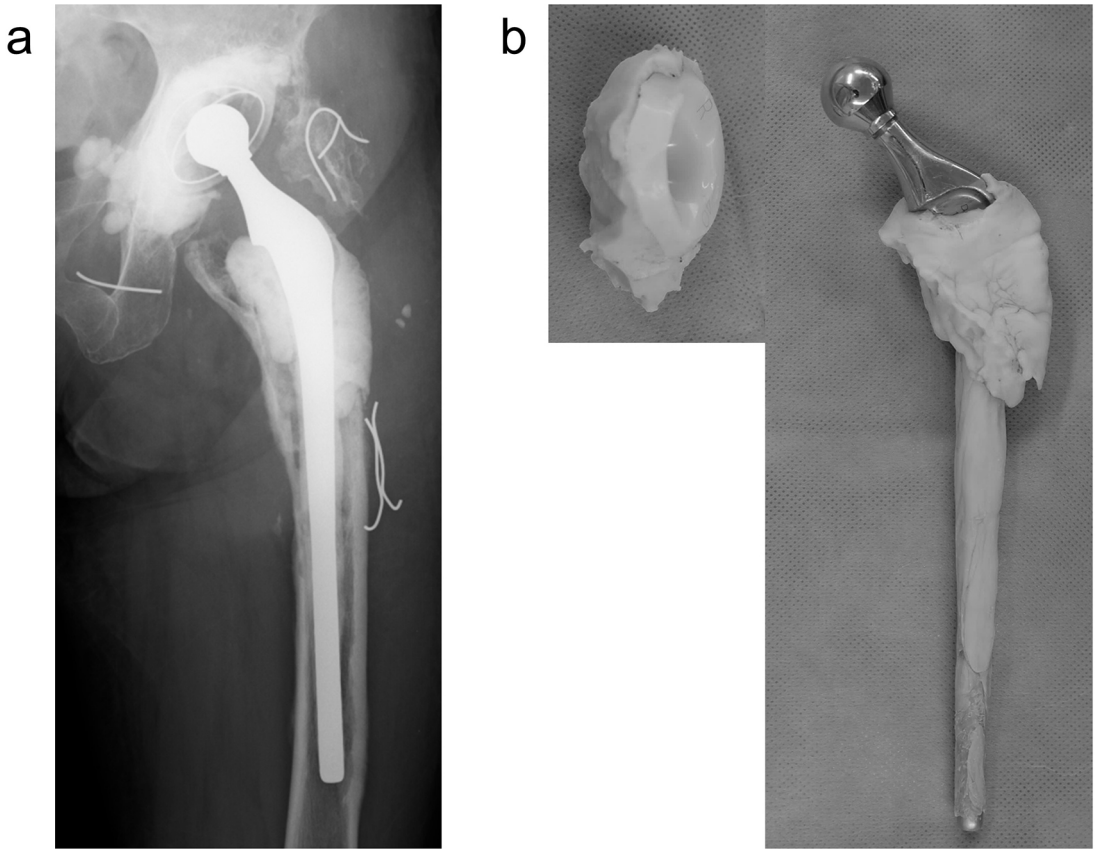

Fig. 2. a) Postoperative radiograph depicting implantation of a temporary total hip arthroplasty (THA)-like spacer. b) Intraoperative picture demonstrating implants after removal of a temporary THA-like spacer.

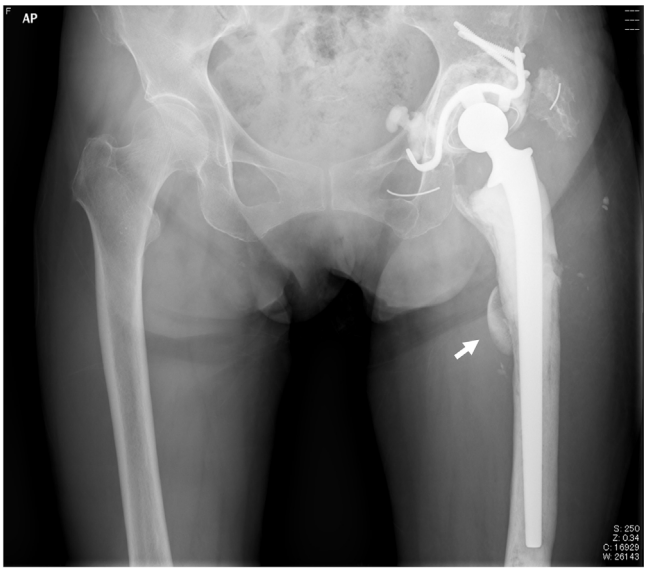

Fig. 3. Postoperative radiograph after revision THA. Allograft was used in fracture site (arrow).

more, treatment of infected periprosthetic femoral fractures is even more difficult [1]. Our approach is simple and effective for treating an infected periprosthetic femoral fracture after revision THA using a long stem.

We found several advantages of this technique that might influence to outcome. First, fracture stabilization was obtained using a long stem coated with antibiotic-loaded cement. Non-articulating spacer, such as beads and rods, and standard articulating spacer could be alternative methods [7–9]. However, these methods do not provide fracture stability for infected periprosthetic femoral fracture after revision THA using a long stem, and might be associated with medical complications because of the need for prolonged bed rest. Konan et al. reported that the use of a distally locked long femoral stem could facilitate the management of infected periprosthetic femoral fractures [1]. However, we suggest that a removed long stem as applied here is more suitable to stabilize a femoral bone defect, as it is sufficient to achieve stability of the fracture site, and is more cost effective. Second, our temporary THA-like spacer improved joint function and permitted early mobilization without pain. Our patient was kept in a wheelchair and was able to walk with partial weight bearing without pain. Etienne et al. have shown good results with the use of a modular femoral component or by autoclaving the removed femoral component and mating this with a cemented polyethylene acetabular liner [10]. Biring et al. have also shown good results with the use of an interim articulated Prostalac hip spacer [9]. These reports showed that a temporary THA-like spacer is safe, and can achieve a good level of pain control and satisfaction for the patient. Third, a temporary THA-like spacer is useful for treating massive acetabular and femoral bone defects. In our case, antibiotic-loaded cement was used in treating massive bone defects of the acetabulum and proximal femur. This reduced dead space and soft tissue contracture, and facilitated reimplantation. Fourth, our temporary THA-like spacer was cost-effective. A prefabricated cement spacer was necessary to make large quantities of antibiotic-loaded bone cement [11]. Our method used one bag of cement in the acetabulum and one bag in the femur despite massive bone defects in both regions.

These are several limitations to this report. This method can be an onerous and time-consuming task, and a new acetabular component was needed. Moreover, this case report was retrospective in design and the follow up was short.

4. Conclusions

This use of an autoclaved antibiotic-loaded cement-coated long stem for treating an infected periprosthetic femoral fracture after revision surgery was beneficial for our patient. This method can facilitate the eradication of infection and fracture stabilization, and enables partial weight bearing without pain. Further follow up of this method is required.

Conflicts of interest

The authors have no conflicts of interest to declare.

Sources of funding

We have no sponsors involving this paper.

Ethical approval

Approval to publish this case report was waived by the institution.

Consent

We confirm that the case report has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

Authors contribution

All authors were involved in drafting the article or revising it critically for important intellectual content, and all authors approved the final version for publication. Dr. Youngwoo Kim had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design; Kim.

Acquisition of data; Kim, Kasahara, Kasahra, Kanamura.

Analysis and interpretation of data; Kim, Katsura, Kawanabe.

Guarantor

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References

[1] S. Konan, F. Rayan, A.R.J. Manketelow, F.S. Haddad, The use of interlocking prostheses for both temporary and definitive management of infected periprosthetic femoral fractures, J. Arthroplasty 26 (2011) 1332–1337, http://dx.doi.org/10.1016/j.arth.2010.11.021.

[2] A.S.E. Younger, C.P. Duncan, B.A. Masri, R.W. McGraw, The outcome of two-stage arthroplasty using a custom-made interval spacer to treat the infected hip, J. Arthroplasty 12 (1997) 615–623, http://dx.doi.org/10.1016/S0883-5403(97)90133-9.

[3] Y. Kim, C. Tanaka, H. Tada, H. Kanoe, T. Shirai, Treatment of periprosthetic femoral fractures after femoral revision using a long stem, BMC Musculoskelet. Disord. 16 (2015) 1–7, http://dx.doi.org/10.1186/s12891-015-0565-7.

[4] R.A. Agha, A.J. Fowler, A. Saeta, I. Barai, S. Rajmohan, D.P. Orgill, The SCARE statement: consensus-based surgical case report guidelines, Int. J. Surg. 34 (2016) 180–186, http://dx.doi.org/10.1016/j.ijsu.2016.08.014.

[5] C.P. Duncan, B.A. Masri, Fractures of the femur after hip replacement, Instr. Course Lect. 44 (1995) 293–304.

[6] Y. Kim, C. Tanaka, H. Kanoe, Long-term outcome of acetabular reconstruction using a Kerboull-type acetabular reinforcement device with hydroxyapetite granule and structural autograft for AAOS type II and III acetabular defects, J. Arthroplasty (2015) 6–10, http://dx.doi.org/10.1016/j.arth.2015.04.034.

[7] F.S. Haddad, S.K. Muirhead-Allwood, A.R. Manktelow, I. Bacarese-Hamilton, Two-stage uncemented revision hip arthroplasty for infection, J. Bone Jt. Surg. Br. 82 (2000) 689–694, http://dx.doi.org/10.1302/0301-620X.82B5.9668.

[8] A.A. Hofmann, T.D. Goldberg, A.M. Tanner, T.M. Cook, Ten-year experience using an articulating antibiotic cement hip spacer for the treatment of chronically infected total hip, J. Arthroplasty 20 (2005) 874–879, http://dx.doi.org/10.1016/j.arth.2004.12.055.

[9] G.S. Biring, T. Kostamo, D.S. Garbuz, B.A. Masri, C.P. Duncan, Two-stage revision arthroplasty of the hip for infection using an interim articulated Prostalac hip spacer: a 10- to 15-year follow-up study, J. Bone Jt. Surg. Br. 91 (2009) 1431–1437, http://dx.doi.org/10.1302/0301-620X.91B11.22026.

[10] G. Etienne, B. Waldman, A.D. Rajadhyaksha, P.S. Ragland, M.A. Mont, Use of a functional temporary prosthesis in a two-stage approach to infection at the site of a total hip arthroplasty, J. Bone Jt. Surg. Am. 85–A (Suppl) (2003) 94–96.

[11] B. Magnan, D. Regis, R. Biscaglia, P. Bartolozzi, Preformed acrylic bone cement spacer loaded with antibiotics: use of two-stage procedure in 10 patients because of infected hips after total replacement, Acta Orthop. Scand. 72 (2001) 591–594, http://dx.doi.org/10.1080/000164701317269003.