



Two-stage revision for periprosthetic joint infection of the hip: Culture-negative versus culture-positive infection



Asep Santoso^a, Kyung-Soon Park^{b,*}, Young-Rok Shin^b, Hong-Yeol Yang^b, Ik-Sun Choi^b, Taek-Rim Yoon^b

^a Department of Orthopaedic and Traumatology, Prof. Dr. R. Soeharso Orthopaedic Hospital, Faculty of Medicine, Sebelas Maret University, Solo, Indonesia

^b Center for Joint Disease, Chonnam National University Hwasun Hospital, Jeonnam, Republic of Korea

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ABSTRACT

Introduction: Negative culture findings are common in periprosthetic joint infection (PJI) of the hip.

Methods: Retrospective study was performed to total 84 patients which divided into two groups: culture-negative (n: 27) and culture-positive (n: 57).

Results: The reimplantation rate was 96.3% and 91.2% in the culture-negative and culture-positive groups, respectively. The overall infection control rate was 92.6% and 82.4% in the culture-negative and culture-positive groups, respectively.

Conclusion: Two-stage revision resulted a comparable outcome for the treatment of culture-negative periprosthetic joint infection of the hip compared to the culture-positive group

1. Introduction

Periprosthetic joint infection (PJI) is one of the most serious and difficult complications following hip arthroplasty.¹ Several procedures are available for the management of PJI of the hip, including debridement, one-stage revision, two-stage revision, and resection arthroplasty.² Of these, two-stage revision is considered the gold-standard and is the most popular procedure.³ Both the diagnosis and treatment of PJI of the hip can create significant difficulties for the managing surgeon.⁴ Accurate identification of the causal pathogen is very important for successful treatment, but unfortunately, pathogen identification in PJI of the hip is often difficult, and negative culture results are common,^{4,5} making the treatment of PJI of the hip more challenging. The negative culture findings often result in an uncertain diagnosis, and it is difficult to choose the appropriate antibiotics. Here we compared the treatment outcomes of two-stage revision arthroplasties for culture-negative versus culture-positive PJI of the hip.

2. Material and methods

Between January 2010 and May 2015, there were 94 hips (94 patients) diagnosed with PJI which were treated with the two-stage revision technique. Ten patients were lost to follow-up and were excluded

from the study. The remaining 84 cases were divided into 2 groups: culture-negative (n: 27) and culture positive (n: 57). Among the ten excluded patients, two had negative and 8 had positive culture results. The mean age of participating patients was 67.4 years (range, 40–85 years) in the culture-negative and 67.3 years (range, 36–84 years) in the culture-positive group. The diagnosis of PJI was made based on the criteria from the workgroup of the Musculoskeletal Infection Society,⁶ wherein patients have to meet one major or more than three minor criteria. The major criteria include: the presence of a sinus tract communicating with the prosthesis and growth of the microorganism from at least two separate tissue or joint fluid specimens from the affected prosthetic joint. The minor criteria include: elevated erythrocyte sedimentation rate (ESR), elevated C-reactive protein (CRP), elevated synovial white blood cell count (WBC), elevated synovial neutrophil percentage, presence of purulence in the affected joint, isolation of a microorganism in one culture of tissue or fluid, and more than 5 neutrophils per high-power field on histopathologic examination. Cultures were obtained from both preoperative aspiration and intraoperative periprosthetic tissue with at least 2 weeks period of free antibiotic state for patients who received previous antibiotic treatment. Three or more intraoperative specimens were obtained from areas representative of inflammation during each surgical procedure. Every specimen was sent for aerobic, anaerobic, fungal, and acid-fast bacilli cultures. Culture

* Corresponding author at: Department of Orthopedic Surgery, Center for Joint Disease at Chonnam National University Hwasun Hospital, 322, SeoYang-Ro, Hwasun-Eup, Hwasun-Gun, Jeonnam, 519-809, Republic of Korea.

E-mail addresses: asepsantoso@gmail.com (A. Santoso), chiasma@hanmail.net (K.-S. Park), x-file0826@hanmail.net (Y.-R. Shin), yhy1226@naver.com (H.-Y. Yang), iksunchois@gmail.com (I.-S. Choi), tryoon@jnu.ac.kr (T.-R. Yoon).

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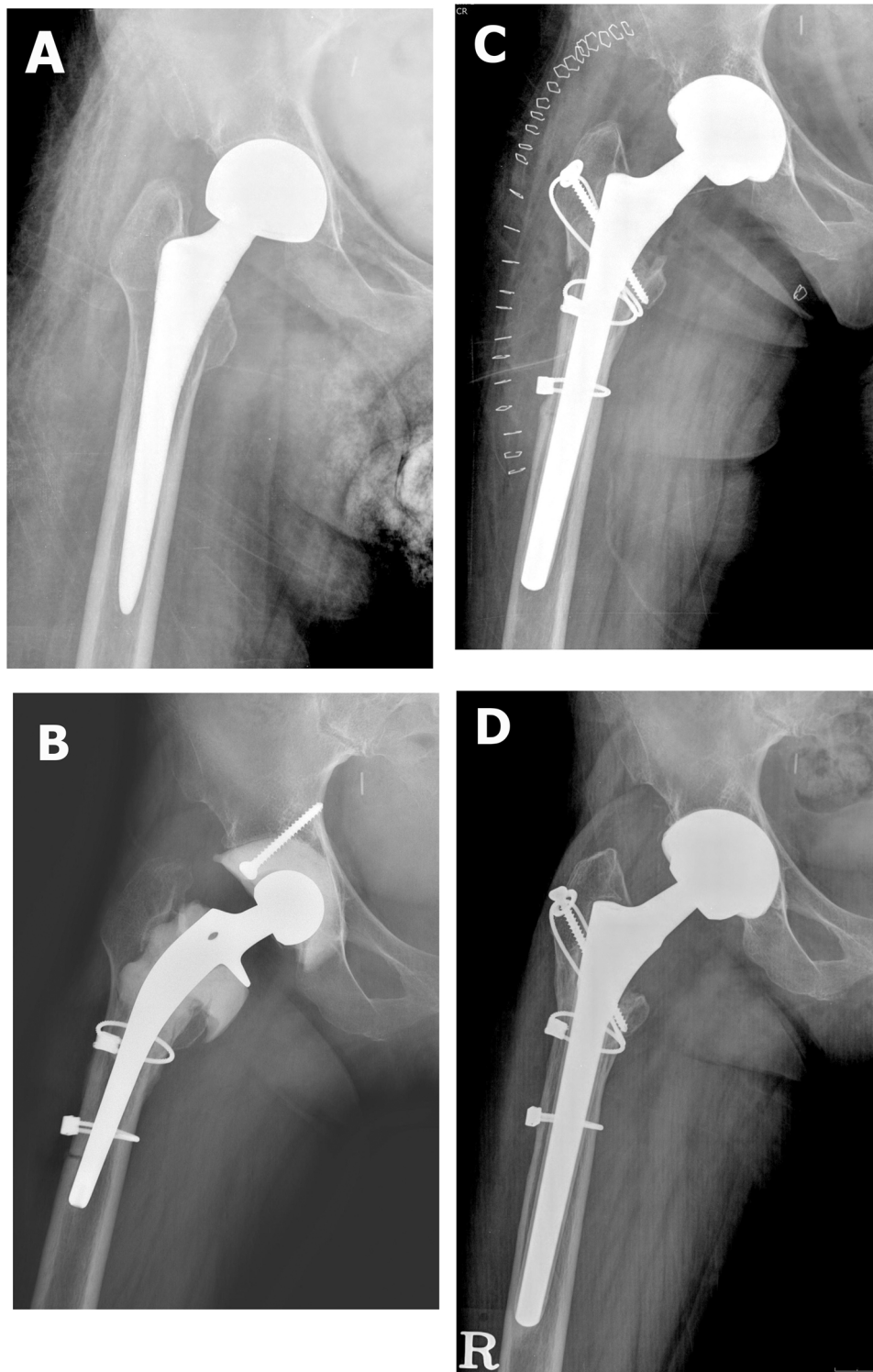


Fig. 1. (A) Radiograph of a 68-year-old female (culture-negative group) who experienced right periprosthetic joint infection after receiving a bipolar hip hemiarthroplasty 5 years prior; (B) An extended trochanteric osteotomy was required to remove the femoral component in the first stage surgery, then an articulating antibiotic cement-spacer was inserted; (C) The second stage surgery was performed approximately 4 months after the first stage surgery; (D) Anteroposterior pelvic radiograph at her 2-year follow-up visit.

period was 7 days for aerobic and anaerobic bacteria, and 1 month for fungal and acid-fast bacilli. Culture results were presumed to be negative when none of the obtained specimens yielded a positive finding.

2.1. Surgical procedure

The first stage surgery consisted of drainage, sinus excision, removal

of the prosthesis, and thorough debridement of all infected tissues. If needed, the femoral component was removed by an extended trochanteric osteotomy (ETO) and fixed with wire and/or cable. This procedure was followed by the implantation of a spacer containing antibiotic-loaded cement. Smaller, presterilized prostheses retrieved from previous patients were used to provide an endoskeleton for the spacers. The femoral prostheses were implanted with a collar of

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