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Original Article

Intravenous drug abuse is a risk factor in the failure of two-stage treatment for infected total hip arthroplasty

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Abstract Reinfection after two-stage revision hip arthroplasty (RHA) is still a complex issue. Only few studies revealed the factors affecting the success rate in the treatment of periprosthetic hip infection (PHI), especially risk factors. A retrospective study was conducted using records of 30 patients underwent two-stage RHA for infected total hip arthroplasty (THA). Treatment was defined as successful if a patient did not need any reoperation or invasive procedure such as image-guided drainage during the two years after reimplantation. Treatment was defined as failure if any surgery or invasive procedure or long-term antibiotic suppression was considered necessary to control infection. Four patients had infection recurrence defined as failed and three of them had intravenous drug abuse. Twenty-six patients had no infection recurrence at the end of follow-up and one of them had intravenous drug abuse but quitting after surgery. We suggest that once adequate cleaning up achieved, risk of reinfection may be little even in immunocompromised patients with RHA because of relative less old age than

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those with revisional total knee arthroplasty. Patients of the reinfection group were younger and non-obese with adequate nutritional status. We may consider intravenous drug abuse could take a great toll on health and lead to reinfection. Finally, we suggest performing the gold-standard two-stage reimplantation technique to manage cases with infection, educating drug abusers regarding the risk of surgical failure, and implementing a quitting program at least 1 year before the index surgery.

Introduction

Infection rate after primary total hip arthroplasty (THA) is estimated to be less than 1%—3% and increases to 4%—6% in revision THAs [1—5]. However, infection remains one of the most devastating complications and often requires multiple reoperations [6,7]. Thus, the treatment goal is to restore clinical function by eradicating infection. Two-stage revision hip arthroplasty (RHA) is the most popular method, and even standard treatment in the United States and around the world [7,8].

Reinfection after two-stage RHA is a complex issue, with occurrence estimated at 9%—20% [9—11]. Steps of two-stage RHA include implant removal and eradication of the infected tissue, followed by delayed reimplantation of the prosthesis after six weeks of systemic antibiotic therapy with antibiotic-containing cement spacer and no clinical, serological or radiographic evidence of infection.

Although two-stage revision can reduce the likelihood of infection, it involves both the risk of complications and a massive financial burden [12]. In the first stage, when the fixed prosthesis is removed, bone stock loss and even fracture may occur [3]. During the interval period, spacer dislocation, acute kidney injury, allergy and even bone marrow suppression have been reported [13—15].

Many studies have explored the risk factors associated with recurrent infected total joint arthroplasty and total knee arthroplasty. However, relatively few have reported the factors affecting the success rate of treating periprosthetic hip infection (PHI). Factors associated with PHI recurrence include organism virulence, resistant organism, obesity and poor patient health [16]. In our observation, cases with recurrent infection all seemed to involve intravenous drug use. Therefore, we conducted a retrospective review of hospital records to determine the incidence of reinfection after two-stage RHA and to identify the risk factors associated with reinfection.

Material and methods

A retrospective study was conducted using records from January 2001 to March 2012 at our institution. The study was approved by Institutional Review Board of authors' institute to conduct this retrospective study. Due to no written informed consent given by participants was required by the Institutional Review Board, the patient records/information was anonymized and de-identified prior to analysis. All patients diagnosed with PHI who received two-stage RHA with more than two years of follow up were included. The study had no exclusion criteria. A total of 30 patients were identified. The two-stage RHA included the first-stage resection followed by the second-stage reimplantation. Adequate follow-up was defined as a minimum of two years (mean = 3 years; range 2—11 years). The mean age of patients at the time of presentation of infection was 47.3 years (range, 22—67 years); 18 (60%) were male. The mean body mass index (BMI) was 25.3 (range, 19.3—36.3 kg/m^2). A PHI was diagnosed if the patient had at least one of the following conditions [17—19]: (1) the presence of purulence around the prosthesis, (2) cutaneous sinus tract communicating with the joint, (3) positive tissue or fluid culture from the joint pre- or intraoperatively, (4) acute inflammation of the tissue surrounding the prosthesis in the histopathological finding or (5) elevated serology inflammatory markers (C-reactive protein [CRP] >5 mg/dL, erythrocyte sedimentation rate [ESR] > 20 mm/h) with obvious clinical symptoms and signs of infection [20].

The included patients with PHI underwent our reimplantation protocol from two experienced hip specialists (CHC and JKC). The first stage comprises resection of the implants, with debridement of the infected joint and placement of an antibiotic-containing cement spacer. The spacer was static and mixed with 2.5 g Vancomycin and 4 g Meropenem per 40 g of cement. Intravenous antibiotic therapy for six weeks followed the resection. Then regular blood tests including white blood cell counts, CRP and ESR were regularly arranged on each monthly follow-up. If the clinical physical examination and serology showed eradication of infection after 3 months without antibiotics treatment, reimplantation was performed. In the RHA, the prosthesis was fixed without cement after adequate debridement. The intraoperative pathology was arranged to confirm the eradication of infection before prosthesis implantation. Outpatient follow-up appointments were scheduled for each patient for a minimum of two years.

The cases were divided into two groups according to the results: a failure group and a success group. Treatment was defined as successful if a patient did not need any reoperation or invasive procedure such as image-guided drainage during the two years after reimplantation. Treatment was defined as failure if any surgery or invasive procedure or long-term antibiotic suppression was considered necessary to control infection.

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