Case Report

A preformed temporary antibiotic-loaded cement spacer for the treatment of destructive septic hip arthritis: a case report

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ARTICLE INFO

Article history:
Received 23 December 2008
Received in revised form 7 April 2009
Accepted 8 April 2009

Corresponding Editor: William Cameron, Ottawa, Canada

Keywords:
Antibiotic-loaded spacer
Hip infection
Septic arthritis
Total hip arthroplasty
Two-stage surgery

ABSTRACT

Preformed spacers have proved to be effective in the two-stage revision of infected total hip replacements. In the treatment of septic arthritis of the hip, the use of a temporary device has occasionally been described, but the implantation of a preformed antibiotic-loaded spacer has not yet been reported. A 71-year-old man with a destructive Staphylococcus aureus septic arthritis of the hip joint was admitted to hospital. Given the persistence of local infection regardless of all antibiotics and the worsening of joint damage, an aggressive surgical treatment including early placement of a preformed temporary spacer loaded with antibiotics was performed. Two months later an uncemented total hip replacement was successfully implanted. Two years after surgery the patient had a complete functional recovery with no signs of recurrence. The advantages of a preformed device include an effective and predictable local release of antibiotics and a mechanically tested resistance that allows early partial weight bearing and immediate joint mobilization.

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1. Introduction

Primary septic arthritis in an adult is a rare, but potentially devastating disease, the knee being the most commonly affected joint. Several risk factors, including diabetes, rheumatoid arthritis, steroid therapy, alcoholism, chronic liver or kidney disease, cancer, malnutrition, and immune deficiencies, are associated with septic arthritis of the hip joint.1

Two-stage revision with the use of an antibiotic-loaded acrylic cement spacer is a well-established procedure in the management of chronically infected total hip replacement (THR).2-5 The effectiveness of a temporary spacer in the treatment of hip and knee septic arthritis has occasionally been reported.1,6-8

We describe the first case of destructive septic arthritis of the hip joint that was managed successfully by means of a two-stage THR using a preformed cement spacer.

2. Case report

A 71-year-old male was admitted to the rheumatology department of our local hospital because of the onset of increasing pain in his right hip. Symptoms had started one month earlier with a diffuse arthritis after a febrile episode. Laboratory tests revealed a C-reactive protein level of 18.2 mg/l, an erythrocyte sedimentation rate of 101 mm/h, and a serum white blood cell count of 14.9 × 10⁹/l. An acute arthritis caused by parvovirus B19 was diagnosed (serological studies detected IgM antiparvovirus) and successfully treated with intravenous administration of immunoglobulins. At this time, no additional assessment was carried out in order to rule out possible septic arthritis.

In the following weeks the patient complained of a worsening right hip pain, and pelvis radiographs showed early degenerative changes. An ultrasound exam demonstrated an articular fluid, and aspiration yielded a methicillin-sensitive Staphylococcus aureus (MSSA). Physical examination showed an irritable hip joint and inability to bear weight on the affected limb. Moreover, conventional radiographs showed a rapidly progressive destruction of the right hip (Figure 1). Unfortunately, an orthopedic evaluation was not requested at this stage, and a conservative treatment was undertaken by means of six-week administration of intravenous antibiotics (ceftriaxone 2 g once daily for two weeks followed by a four-week treatment with rifampin 600 mg daily).

Given the persistence of local infection regardless of all antibiotics and the worsening of joint damage, an orthopedic consultation was obtained and surgical treatment was planned. The hip was explored via an anterolateral approach. After resection of the femoral head, meticulous debridement of all inflammatory tissues was performed on the acetabular rim. An industrial preformed temporary spacer (Spacer-G®², Tecres S.p.A., Sommacampagna, Verona, Italy) was inserted in the femoral canal...
The device consists of a cylindrical stainless steel rod coated with bone cement supplemented with gentamicin sulfate (1.9 g, 1.8% w/w) and vancomycin (2 g, 2.5% w/w). The persistence of the MSSA infection was confirmed through microbiological cultures. The patient received organism-specific intravenous antibiotics (teicoplanin 600 mg daily) for two weeks after surgery, followed by oral administration of amoxicillin–clavulanate (1 g three times daily) for a further four weeks.

The postoperative course was uncomplicated, and hip pain decreased dramatically after the spacer was implanted. The patient was mobilized immediately and encouraged to undertake weight bearing with crutches. Normalization of inflammatory markers was detected three weeks after surgery and persisted over time, supporting eradication of infection. An uncemented THR through the same surgical approach was performed 63 days following spacer implantation; at the time all serological parameters were negative. Intraoperative specimens were collected for microbiological examination and the cultures were all negative. A dosage of 1 g three times daily of amoxicillin–clavulanate was given intravenously for two consecutive weeks after the second stage surgery.

The patient then underwent quarterly controls including clinical assessment, standard X-rays, and laboratory findings. At the two-year follow-up no clinical or biohumoral evidence of recurrence of infection was found, and functional outcome of the THR was excellent (Figure 3).

### 3. Discussion

Several surgical options in association with systemic administration of antibiotics have been proposed to manage a septic arthritis. The standard treatment of an acutely infected hip involves joint decompression. Arthroscopic drainage of the hip has been advocated, as this has the advantage of being a less invasive procedure. Both open and arthroscopic techniques have enhanced effectiveness in the early stages of infection when the articular damage has not yet become established.

In the present case, the patient was firstly referred to our orthopedic institution approximately four months after the onset of pain. Radiological examination revealed a rapid narrowing of the...
joint space; in only a few months an extensive subchondral bone loss developed in the acetabulum. Therefore, functional prognosis of the hip joint was unfavorable and a poor clinical outcome was to be expected.

The persistence of an aggressive, antibiotic-resistant septic arthritis suggested the immediate use of a temporary antibiotic-loaded cement spacer in order to dominate the infection and accelerate functional recovery following THR. Hip spacers have proved to be an effective method in the treatment of infected joint prostheses by means of the sustained antibiotic release.²⁻³

A two-stage THR without temporary devices for the treatment of primary septic arthritis of the hip has been performed by Chen et al.¹⁰ They reported a re-infection rate of 14% and a complication rate of 36%. It is thought that the spacer could increase the infection healing rate, reducing functional impairment during the first stage of treatment. More recently, a highly successful two-stage approach to primary knee arthroplasty in infectious arthritis has been presented.⁶⁻⁸

We found three reports mentioning the possibility of using a temporary device in septic arthritis of the hip, but very little information concerning this technical option was available. Moreover, to our knowledge, this is the first paper reporting the implantation of a preformed spacer.

In 2003, Schoellner et al.¹¹ reported a preliminary experience with five individually manufactured bone cement spacers for septic hip revision. The adaptability of this mechanically tested system was emphasized and its indication in primary joint infection was discussed with no additional details.

Morshed et al.⁷ described a case of septic arthritis of the hip complicated with intrapelvic abscess following a single intra-articular injection of hyaluronic acid. The implantation of an antibiotic-impregnated cement block after unsuccessful surgical debridement and partial resection of the femoral head eradicated infection allowing the application of a hip prosthesis.

Recently, Barrett and Bal¹ focused on local sepsis that occurred spontaneously in a healthy adult, exhibiting a rapid radiographic destruction of the hip joint. The patient finally underwent placement of a temporary unspecified implant loaded with antibiotics followed by uncomplicated THR.

Spacers provide a local delivery from acrylic bone cement of highly concentrated antibiotics at the infected site. In the reported case, early application of Spacer-G promoted healing of infection, which was documented by the rapid and persistent normalization of laboratory parameters. In vitro pharmacological tests have already demonstrated the effective release of gentamicin and vancomycin from the spacer we employed.¹² Moreover, the preformed device was experimentally investigated under cyclic loading conditions, showing no risk of mechanical failure following assisted weight bearing.¹³ Consequently, a significant improvement of the patient’s quality of life was obtained during treatment of infection, enabling his functional recovery.

In conclusion, a primary uncontrolled infected hip may benefit from a two-stage arthroplasty with preformed antibiotic-loaded cement spacers. Spacer blocks provide an effective local antibiotic release allowing early partial weight bearing and preservation of the range of joint motion.

In the management of progressive and rapidly destructive, antibiotic-resistant septic arthritis of the hip joint, the use of a temporary antibiotic-impregnated cement spacer should be considered in order to enable eradication of the infection and to accelerate recovery of function following THR.

Funding

The authors did not receive any outside funding or grants in support of their research or preparation of this work.

Ethical approval

The study was carried out in accordance with the Helsinki Declaration as revised in 1989. The current work was approved by the hospital ethics committee. Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Conflict of interest

No conflict of interest to declare.

References