CASE REPORT

Periprosthetic joint infection treated via bone cement and without the removal of hardware

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ABSTRACT

Periprosthetic joint infection (PJI) is a challenging complication with a frequency of 0.5–3%. The patient's age, recurrent surgeries, and comorbid systemic diseases increase the risk of infection. Although the current approach in the treatment of PJI is a two-stage revision; sometimes, removing all the implants can lead to more serious complications. PJI's complications are increase in the time of surgery, loss of blood volume, and increase in the amount of bone loss. Infected soft tissue and dead bone tissue debridement must be made in all cases. One of our cases had bone defects due to recurrent hip arthroplasty revisions. Our case that was given PJI treatment by covering the well-fixed components with bone cement and removing only the mobile parts was discussed in line with the literature.

Key words: Bone cement, partial revision, periprosthetic joint infection

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INTRODUCTION

Although periprosthetic joint infection (PJI) is rare, its treatment is quite difficult. Two-stage revision surgeries are recommended, especially in late term and chronic infections.[1] However, removing all the implants makes surgery harder and causes serious bone defects. Especially in patients who have previous serious bone defect due to recurrent revision or tumor, it can cause the total loss of the existing bone.[2] We presented a case that was treated by leaving the well-fixed components and covering them with cement which included antibiotics to minimize these kind of complications.

CASE REPORT

A 59-year-old female patient was admitted to our clinic for PJI after surgeries at different centers including hemiarthroplasty, total hip arthroplasty [Figure 1a], and finally total hip revision arthroplasty [Figure 1b] due to femoral neck fracture. On admission, direct graph [Figure 1b] and blood examinations were assessed (hemoglobin: 13.6, white blood cell count: 12.92, erythrocyte sedimentation rate [ESR]: 48, and C-reactive protein [CRP]: 282) and a two-stage revision was planned. Intraoperative extensive apses were observed. All necrotic bone and infected soft tissues were removed and radical debridement was performed. Soft tissues were sent from neighboring implant areas for microbiological culture analysis. Since acetabular cup was well fixed and it had a thin cortical continuity around, only screws and polietilen insert were removed not to cause additional bone defect. Since the femoral stem was too long and seemed well fixed to the bone, the femoral stem was not removed by the surgeon. All the implants left were covered with cement (40g Implantcast) mixed with antibiotics (teicoplanin 400 mg Sanofi-Aventis) [Figure 2a and b]. In tissue culture analysis, there was no reproduction; however, due to high infection markers and intraoperative apses appearance, infectious diseases' specialist started teicoplanin 800 mg/day (Targocid 400 mg Sanofi-Aventis). The second stage of revision was performed after ESR, and C-RP controls were seen to become normal at the end of 8 weeks [Figure 2c].

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DISCUSSION

Nearly, 0.5–3% PJI is observed after primary hip arthroplasty whereas 3–15% PJI is observed after revision hip arthroplasty.[3] When micro-organisms reach the surgical area, they reproduce fast and form a biofilm layer by adhering to the open surfaces of implants. In early period of infections, pressure washing and debridement are partly successful. However, in late and chronic infections, the microorganism is protected from both host defense mechanisms and local or systemic antibiotic treatment since it expresses biofilm layer. The accepted approach in late-term PIJ is two-stage revision surgery.[4] Two-stage revision surgery includes removing all implants and revising with new implants through soft tissue debridement and antibiotic spacer after the infection has been removed. However, removing both well-fixed implants makes the surgery more complicated and may cause serious bone defects.[5]

The spacer applied can be prepared in intraoperative bone cement or it can be readily provided. While fixing spacers well to the bone, they will increase their functionality and will cause additional bone losses while removing them. Spacers to be used and implants to be used in the second phase of revision are quite expensive, and they will increase surgical expenses.[6,7]

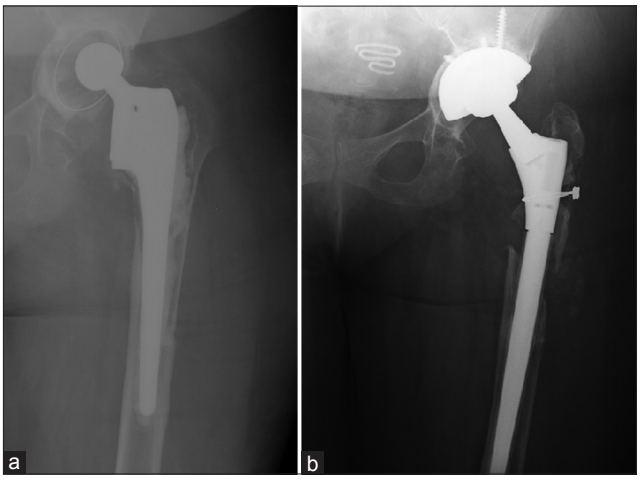

Figure 1: (a) Total arthroplasty (b) infected revision arthroplast

Since our case was a middle-aged woman with a long-life expectancy, we tried to show maximum attention to protect the existing bone stock. Although extensive apses were observed, we saw that both acetabular and femoral component was well fixed to the bone. Predicting that removing implants after radical soft tissue and necrotic bone debridement would increase bone defect, we preferred to remove only the mobile parts. We covered the remaining implants with bone cement that we prepared by adding antibiotics on it.

In the course of freezing, bone cement gives off 70–90° of heat and adheres tight to the implant. We think that these properties of cement can influence the micro-organisms on the implant. By covering the implant with cement and with the help of soft tissue debridement, the bacteria and biofilm amount was minimized. Bone cement separates the implant surface from the environment and also maintains the local antibiotic amount in a high dose with the help of the antibiotic it includes. In the controls of our case, we saw that C-RP and ESR decreased fast.

With this method, we decreased the surgery time, loss of blood volume, and bone defects. Since the existing implants were not removed, a stabile spacer was used during the treatment. Since only the mobile components were removed in the second stage of the revision, the treatment cost was less. No re-infection or comorbid complication was seen in the 1st postoperative year.

In a similar partial two-stage revision hip arthroplasty study conducted by Ekpo *et al*., they reported success in 17 (89%) of 19 patients.[8]

More extensive *in vitro* studies showing which mechanisms take infection under control by covering implants in

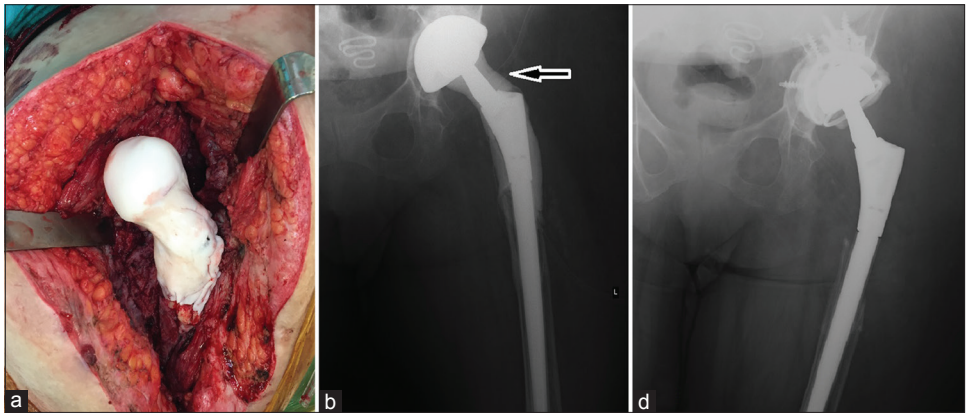

Figure 2: (a) Bone cement covered in intraoperative view (b) early postoperative X-ray covered bone cement (c) after treatment of infection on revision arthroplasty

periprosthetic infection and higher numbers of long-term follow-up studies are needed.

CONCLUSION

This process can be preferred in removing periprosthetic infections in which implants are well fixed.

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Conflicts of interest
There are no conflicts of interest.

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