



Case report

New acetabulum bone formation after 10-years impaction bone graft and cemented acetabular cup lead to simple revision-THA with cementless acetabular cup: A case report

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ABSTRACT

Background: Secondary hip osteoarthritis with acetabular bone defect is still a challenging case in hip arthroplasty surgery. The incidence of revision total hip arthroplasty is estimated to be between 10% and 15% in 10 years. Simple revision cementless acetabular cup after a prior complex cemented-THA rarely performed.

Case presentation: A case of aseptic loosening with prosthesis dislocation after THA was reported in a 54 year-old female patient. The patient had prior surgery of THA 10 years ago due to secondary post-traumatic hip osteoarthritis with acetabular bone defect. At the first surgery, cemented acetabular cup with acetabular bone grafting was performed to fill the defect. A complete new acetabulum bone formation was encountered at 10 years after the surgery which lead to simple revision THA with primary cementless acetabular cup. Excellent functional outcome was also reported at the final follow-up after revision THA.

Conclusion: This case showed that the potential of bone healing of the acetabulum cannot be underestimated. Therefore, it is suggested to always put an adequate bone graft to manage acetabular bone defect in THA surgery and a new acetabulum bone formation can be expected.

1. Introduction

Total hip arthroplasty (THA) delivers satisfactory and long-term functional results treating several pathology of hip joint. The number of THA is increasing each year in Indonesia. The 10-year surgical revision rate is estimated to be between 10% and 15% [1–3]. The increasing frequency of primary THA procedures leads to an increase the number of revision surgery [2]. The acetabular cup loosens more frequently than the femoral stem [4]. Acetabular cup loosening is frequently accompanied by bone abnormalities that must be repaired after surgery [5]. Packing with a morselized, compressed, or structural bone allograft, implantation of an acetabular reinforcement ring, or the use of a custom-made porous metal cup are just a few options [6]. Packing the lesion with a cryopreserved bone allograft is one of the reference procedures, and it is associated with good survival and osseointegration rates [6–8].

This paper reported a case of new acetabular bone formation after 10-year acetabular bone grafting. The patient has been informed before this publication. The work has been reported in line with the SCARE criteria. [9]

2. Case report

We reported a case of a 54-year-old female who complained of left groin pain. She had a 17-year-old history of hip pain due to post traumatic osteoarthritis. Primary THA was performed with cemented Charnley total hip arthroplasty along with bone graft to address the acetabulum bone defect. After 5 years of follow-up, the patient has had no complaints, has been able to perform full weight-bearing walking without the use of an assistive device.

Based on serial radiograph during the follow-up period,

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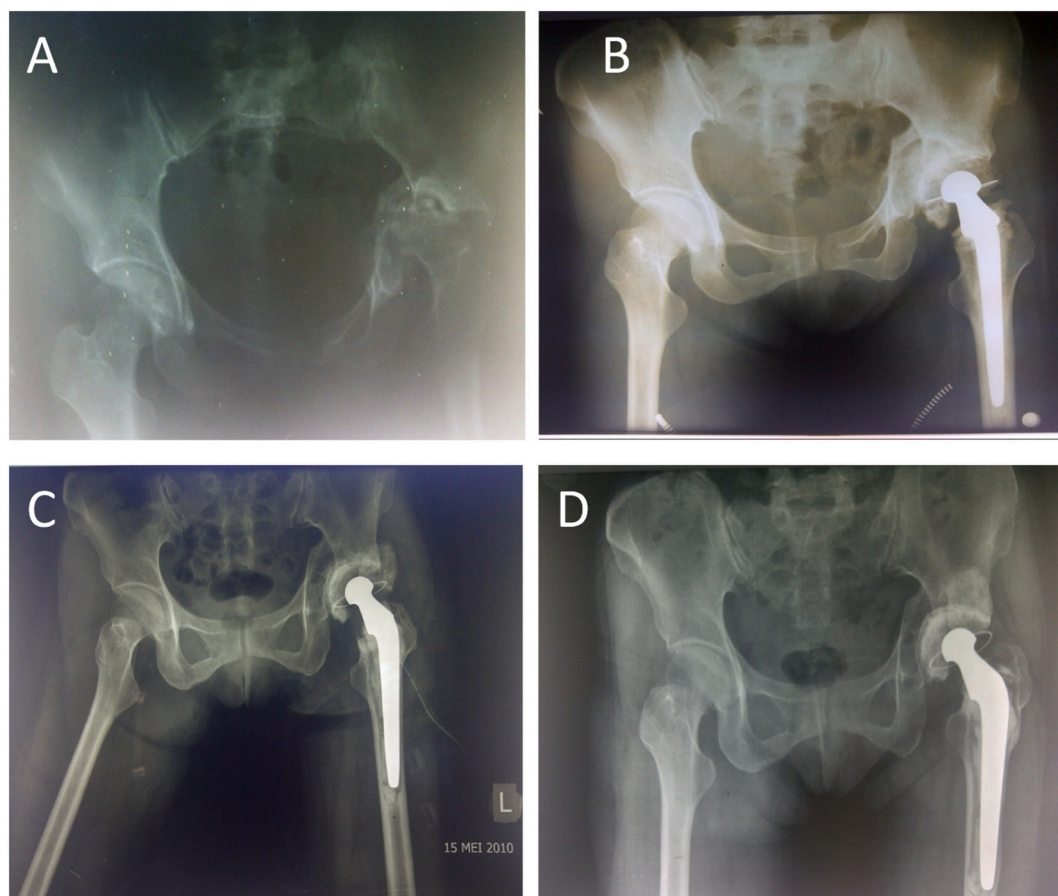


Fig. 1. Preoperative radiograph prior to first THA (A), Immediate postoperative radiograph after primary THA (B), 5 years follow-up (C), 9 years follow-up (D).

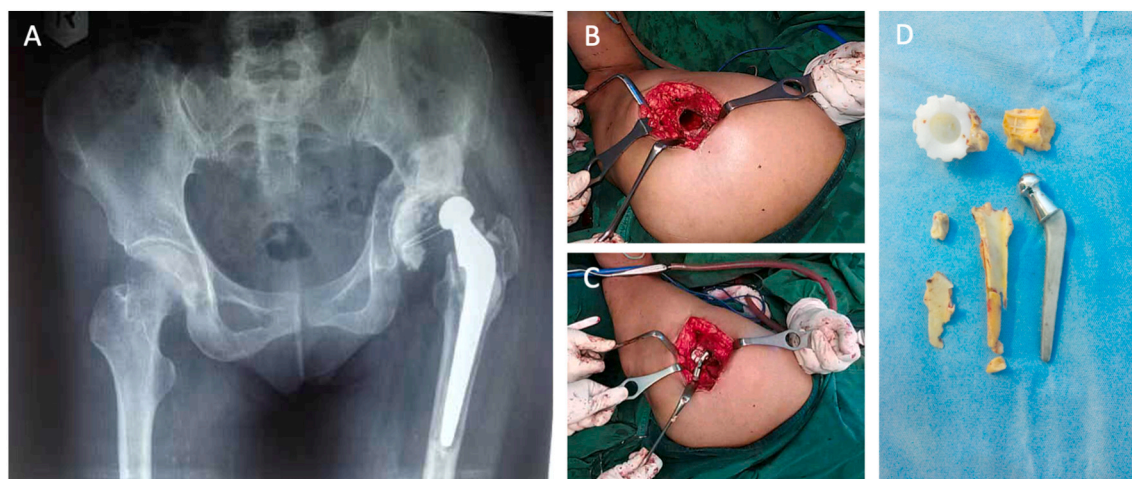


Fig. 2. Preoperative radiograph prior to revision-THA (A), intraoperative figures showed removal of the prior implant (B), after insertion of the new femoral stem (C), the previous Charnley prosthesis (removed) (D).

postoperative radiograph reveal bone healing at the acetabulum (Fig. 1. A-D). Ten years after the first THA, the patient fell down and suddenly complained of pain on her left hip during walking. Physical examination of the left hip joint revealed good surgical scar on the posterolateral side of the hip joint with no sign of infection. There was restriction of hip movement on the left side. There are no further issues, medicine allergies, or unpleasant reactions from the previous surgery for the patient. Laboratory test revealed normal results. Posterior dislocation of the prosthesis, and aseptic loosening of the cup and stem were seen on

the pelvis radiograph (Fig. 2.A). Furthermore, complete bone union was also observed on the left acetabulum (Fig. 2.A). The patient was scheduled for revision THA after receiving informed consent regarding the surgical technique and potential risks.

3. Surgical technique

The surgery was conducted in the right lateral position under spinal anesthesia. Surgery was performed with posterolateral approach. First,

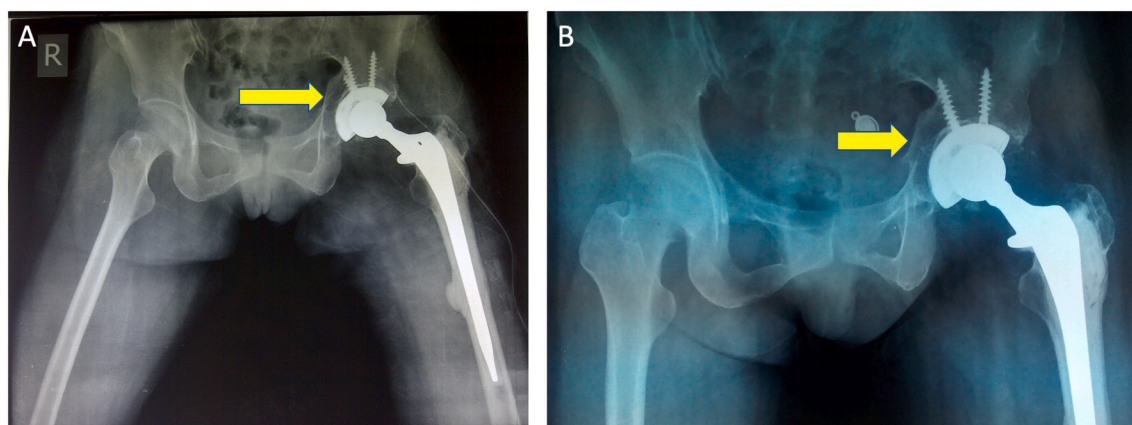


Fig. 3. Postoperative X-ray after simple revision THA with cementless acetabular cup and cemented femoral stem – yellow arrow (A) (B). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

the prior implant had to be removed (Fig. 2B, C, D). A cementless acetabular cup (Trilogy[®] acetabulum system, Zimmer, USA) can be applied with three screws with no significant difficulty and no additional bone graft was needed (Fig. 3A, B). Femoral long stem 170 mm (VerSys[®] femoral system, Zimmer, USA) was used for femoral revision. Cephalosporin antibiotics and ketorolac injections were provided as part of the postoperative care. The patients were subjected to a standard rehabilitation procedure.

4. Discussion

Total hip arthroplasty (THA) is one of the most effective procedures in the field of orthopaedic [10]. It has established itself as the gold standard treatment for the end-stage hip disease, with outstanding clinical outcomes and long-term survival. Despite this, the frequency of failures continues to rise as the number of THAs increases and the indications for hip replacement expand. Over the next two decades, projection models estimate an increase in demand for revision arthroplasties [2]. Symptomatic aseptic loosening, failure of fixation, infection, wear, osteolysis, and instability are all reasons for acetabular revision. Asymptomatic patients with increasing osteolysis, significant wear, or bone loss that could jeopardize a future reconstruction may benefit from revision [11].

Acetabular revision is the most difficult element of hip surgery for the arthroplasty surgeon. The loss of acetabular bone stock and the state of the soft tissues make it difficult to achieve the basic principles of hip replacement. A hemispherical uncemented cup, screw fixation, and morselised bone grafting can be used to treat acetabular bone deficiencies in which the implant makes contact with more than 50% of the host bone [12]. Slooff et al. were the first to describe the use of impaction bone allograft in conjunction with a cemented acetabular component in revision THA. The survival rate was 94% using aseptic loosening as the outcome over a minimum of ten years (mean 11.8 years) [13]. Wedemeyer et al. with other investigations, found that Slooff's cemented allograft approach had a poor survival rate [14]. Type III defects with coupled cavitory and segmental bone loss accounted for the majority of failures [15]. In addition, long-term follow-up revealed progressive radiolucency in the bone-cement mantle as well as a decrease of component stability [16]. In our recent case, the patient previously received morselised impaction auto bone graft from the femoral head and cemented acetabular for an acetabular defect. During 9 years follow-up, the well-structured new acetabulum formation was obtained (Fig. 2D).

Kavanagh et al. evaluated 165 cemented revision hip arthroplasties that were followed for at least two years. If the revision was done for acetabular loosening, the probable loosening rate of the revised

acetabular component was 25%, and the incidence of symptomatic loosening was over 50%. Early results from Callaghan et al. were comparable, with 34% of acetabular loosening at two to five years [17]. In our recent case, symptomatic aseptic loosening with dislocation occurred 10 years after the first THA with good acetabular bone stock [Fig. 2A], which then converted to a simple revision THA with the use of primary cementless acetabular cup.

5. Conclusions

This case showed that the potential of bone healing of the acetabulum cannot be underestimated. Therefore, it is suggested to always put an adequate bone graft to manage acetabular bone defect in THA surgery and a new acetabulum bone formation can be expected.

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Ethical approval

The paper has been approved by Hospital Ethical committee.

Consent

Informed consent to the patient has been performed prior to this publication.

Author contribution

Nur Rahmansyah: Writing the paper, English checking.
Asep Santoso: Perform surgery, concept, and writing the paper.
Iwan Budiwan Anwar: Perform surgery and manuscript review.
Tangkas SMHS Sibarani: Manuscript review.
Ismail Mariyanto: Manuscript review.

Research registration

None.

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Declaration of competing interest

None.

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