



Case report

Disassembly of the inner head of a bipolar hip prosthesis

Tsuyoshi Toyota, MD^{*}, Hiroshi Horiuchi, MD, PhD, Yoshiyuki Nakamura, MD, Ikuya Yamazaki, MD, Tsutomu Takizawa, MD, PhD

Department of Orthopedic Surgery, Nagano Matsumuro General Hospital, Nagano, Japan

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ABSTRACT

We report an extremely rare case of inner head displacement from the stem of a bipolar hip prosthesis (BHP). An 88-year-old woman underwent BHP implantation for right femoral neck fracture. However, severe right hip joint pain occurred 12 days after surgery. A plain radiogram film revealed displacement of the inner head from the neck of the stem, accompanied by sinking of the stem. At reoperation, the inner head was disassembled from the stem, and Vancouver type A1 fracture was confirmed. Disassembly may have been caused by the pumping phenomenon or micromovement of the stem due to periprosthetic fracture. To our knowledge, this is the first report about disassembly of the BHP inner head, probably due to periprosthetic fracture.

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Introduction

In patients with a bipolar hip prosthesis (BHP), dislocation of the prosthesis from the acetabulum is occasionally observed, but there have been very few reports about disassembly of the components. Although there have been some cases involving disassembly of the outer and inner heads, it is rare for the inner head to become displaced from the stem. Here, we report an extremely rare case of inner head displacement from the BHP stem, which was associated with sinking of the stem due to fracture.

Case history

An 88-year-old woman underwent surgery for a trochanteric fracture of the left femur 2 years earlier at another hospital, after which she was almost independent for activities of daily living and walked with a stick. Then, she fell at home and presented to our department with difficulty in moving due to right hip pain. A right femoral neck fracture (Garden class IV) was diagnosed. A BHP was implanted via the posterolateral approach under general

anesthesia on hospital day 4, using a Multipolar bipolar cup and a Trabecular Metal cementless stem (Zimmer Biomet, Warsaw, IN). During surgery, an obvious femoral fracture could not be identified when the stem was inserted, and the metal head (−2.0 mm and 22 mm diameter) of the prosthesis was gently impacted along the axis of the trunnion once after being assembled. After impaction, we confirmed the safety of the head. All prostheses were produced by Zimmer Biomet.

Then, reduction of the hip joint was performed, and the posterior joint capsule was repaired as completely as possible. There were no problems related to surgery (Fig. 1). The patient was mobilized on the next day and commenced walking with full weight bearing.

However, at 12 days postoperatively, she developed severe pain in the right hip joint when lying in the right lateral decubitus position after walking. A plain radiogram film revealed displacement of the inner head of the BHP from the neck of the stem as well as sinking of the stem by about 8 mm relative to its postoperative position (Fig. 2). Tomographic imaging and computed tomography scanning (Fig. 3) confirmed displacement of the inner head of the prosthesis from the stem. It was considered that closed reduction would be impossible, so reoperation was performed 2 days later (14 days after initial surgery). The posterior joint capsule showed no significant changes from the initial operation, without any new damage. The bipolar cup was removed and carefully checked, revealing no foreign bodies or macroscopic damage to the inner head, polyethylene bearing, or neck of the stem. However, a

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^{*} Corresponding author. 183 Matsumuro-cho Matsumuro Nagano-shi, Nagano 381-1231, Japan. Tel.: +81 90 7016 4456.

E-mail address: driveyourdreams0817@yahoo.co.jp



Figure 1. Anteroposterior radiograph film obtained immediately after implantation of the right bipolar hemiarthroplasty. There are no obvious abnormalities.

fracture line was identified trending in the axial direction toward the lesser trochanter, and sinking of the stem was observed (Fig. 4), leading to a diagnosis of Vancouver type A1 fracture around the stem. Sinking of the stem had occurred without rotation, and it was still fixed firmly with no notable instability. Therefore, wiring of the fracture site was done using a Dall-Miles cable (Stryker, Mahwah, NJ). We tried ± 0 -mm inner head at the trial of reposition. However, it was so tight for extension of the hip, so we recognized that an inner head of -2.0 mm was suitable. Then, a new Zimmer metal inner head (-2.0 mm and 22 mm diameter, same size as the initial surgery) and bipolar cup were fitted to the stem, after carefully confirming that there were no foreign bodies, blood, or fatty tissue in the neck or within the operating field (Fig. 5). At revision, we did not see any evidence of impingement of outer head and greater trochanter. It indicates that the impingement-related stem subsidence has not occurred.

The removed bipolar cup and inner head were sent to Zimmer Biomet for inspection, but no foreign materials or breakage were found, and there was no obvious defect of the product.

The patient was restricted to non-weight-bearing walking on the affected limb for 1 week postoperatively and then was gradually transitioned to partial weight bearing, with full weight bearing

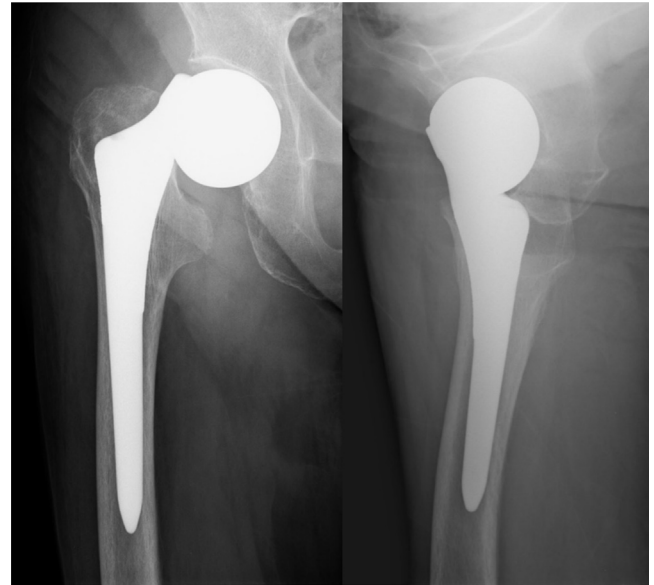


Figure 2. Displacement of the inner head from the neck of the stem. Sinking of the stem compared with the primary surgery was also observed.

from 4 weeks after surgery. She recovered well and is ambulatory with a walking stick. No displacement of the inner head, stem sinking, or progression of the fracture has been observed on follow-up radiogram films.

The patient gave informed consent to publication of this report, and this case report was approved by the institutional review board of our hospital.

Discussion

The BHP was developed to reduce stress on the acetabular component and is composed of an outer head, inner head, and stem. Dislocation of the outer head from the acetabular roof is one of known complications associated with the BHP although it is uncommon. Disassembly of BHP components is even rarer [1]. To the best of our knowledge, there are only 2 previous cases of inner head displacement in patients with a BHP, including one reported by Shiga et al. [2] and one by Fukuda et al. [3].

According to Asgian et al. [4], greater force is required for the disruption of the inner head from the stem neck than that causing disassembly of the outer head and inner head, which may explain why displacement of the inner head from the trunnion is very rare in BHP.

However, when we reviewed previous reports of inner head displacement, we found that it had occurred in the absence of strong external force. Shiga et al. [2] reported a patient who sustained a trochanteric fracture by falling out of bed after BHP implantation for femoral neck fracture. She underwent open reduction and internal fixation with exchange of the inner head. Difficulty with ambulation occurred at 1 month postoperatively, and an investigation revealed displacement of the inner head. Fukuda et al. [3] reported a patient who underwent revision for stem malalignment after BHP implantation. Then they reused the inner head from the initial operation. Displacement of the inner head occurred subsequently although the patient had been bedridden for approximately 2 years postoperatively.

Our patient was lying in the lateral position when the inner head was displaced, and there was no obvious trauma with only slight

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