

Original Article

Ipsilateral total hip arthroplasty in patient with an above-knee amputee for femoral neck fracture: a case report

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Abstract: There is limited literature about the outcomes of total hip arthroplasty (THA) as a surgical option for above-knee amputees. Here, we described one case of femoral neck fracture with above-knee amputation. Two-year follow-up revealed an excellent clinical and radiological outcome. The main challenge of THA posed by the amputation was control of the lower extremity. We recommend inserting a pin at the greater trochanter of the femur to improve control of traction or rotation.

Keywords: Above knee amputation, total hip arthroplasty, greater trochanter

Introduction

Femoral neck fracture is common in the elderly and is associated with impaired mobility, excess morbidity and mortality, and loss of independence [1]. Clinically, there is controversy in treatment of femoral neck fractures [2, 3]. An increasing number of surgeons believe that total hip arthroplasty (THA) has more advantages than internal fixation and semi-hip arthroplasty in the treatment of older patients with displaced femoral neck fractures, as THA may lead to significantly fewer major method-related hip complications, lower reoperation rates and better functional outcomes compared with other managements [2-4].

For patients with lower limb amputations, THA is also suggested as a surgical option for osteoarthritis in the hip joints or femoral neck fracture [5, 6]. Few investigations have reported THA in lower limb knee amputees [6-8]. Salai *et al.* [7] investigated a small group of 5 patients with below-knee amputation who underwent THA after a displaced subcapital fracture of the femur. Three patients were operated on after failed fixation of the fracture, and 2 were operated on as a primary procedure. All 5 patients

resumed their pre-fracture level of activity and mobilization with no deterioration during follow-up. Mak *et al.* [8] reported a case of an 84 year-old man with a transtibial amputation who underwent an ipsilateral THA, and the patient showed significant improvement in gait and range of movement in the hip without any pain 3 months postoperatively. The two studies reported patients with below-knee amputations. However, there is limited literature about the outcomes of THA as a surgical option for above-knee amputees.

Altered anatomy in above-knee amputees presents greater technical challenges to the surgeons, such as a reduced lever arm for dislocation/relocation, the amount of remaining bone length, and bone fragility due to bone density loss. Previously, Leonard *et al.* [6] reported a case of a young man with above-knee amputation who underwent an ipsilateral total hip replacement because of hip arthritis. Follow-up at five years revealed an excellent clinical and radiological outcome. Here, we described one case of femoral neck fracture with above-knee amputation. The unique aspects of the case and technical difficulties are highlighted.



Figure 1. The preoperative X-ray of femoral neck fracture.

Case report

Human studies were approved by the appropriate ethics committee and performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its subsequent amendments. One male patient, 67 years old, fell accidentally on January 14, 2009. He felt pain in right hip and was unable to wear artificial limbs to stand up and walk. He had a history of right above-knee amputation with mid right thigh amputation in 1962 because of trauma. The patient wore prostheses after amputation. On examination, his right hip was irritable. There was tenderness in the greater trochanter and groin area. Right thigh stump showed deformity with flexion or internal rotation, and there was axial percussion pain. X-ray of the right hip showed right femoral neck fracture (**Figure 1**). According to X-ray film measurements, the right femur stump was about 16 cm in length.

THA was performed four days after his admission. Under general anesthesia, the patient was positioned in the left lateral position. A posterior surgical approach was used and one Steinmann pin was inserted at the greater tro-

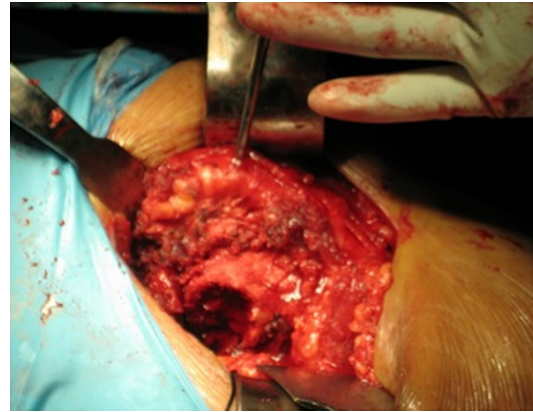


Figure 2. The Steinman pin in the trochanter major during surgery.

chanter (**Figure 2**) to facilitate dislocation/relocation and to optimize rotational control of the stump. The hip was replaced by a biological type of total hip (Zimmer Co., USA), with the prosthesis handle 140 mm in length. The patient received postoperative antibiotics and anticoagulant therapy. On the fourth day after surgery, review of the X-ray showed the prosthesis in good position (**Figure 3**). The patient was discharged in the seventh day after surgery. Three weeks after surgery, the patient began rehabilitation program wearing artificial limb, including gait retraining, progressing on to stair practice and endurance training.

Outpatient visit and telephone follow-up were performed at two years after surgery. The patient reported greater flexion range of motion of the right hip in a natural position increased compared with that before the surgery. The hip flexion gradually improved with functional exercise. The patient had no apparent proprioceptive and kinesiological changes in the amputated leg. At the six-month follow-up visit after surgery, right hip flexion was approximately 10 degrees. Two years postoperatively, hip joint activities were not limited. He felt no pain on the right hip, and walked unrestricted wearing artificial limbs. Review of X-ray showed that the prosthesis was in good position after two years (**Figure 4**).

Discussion

THA has been increasingly applied for the treatment of femoral neck fracture recently, especially for the elderly and patients with fewer

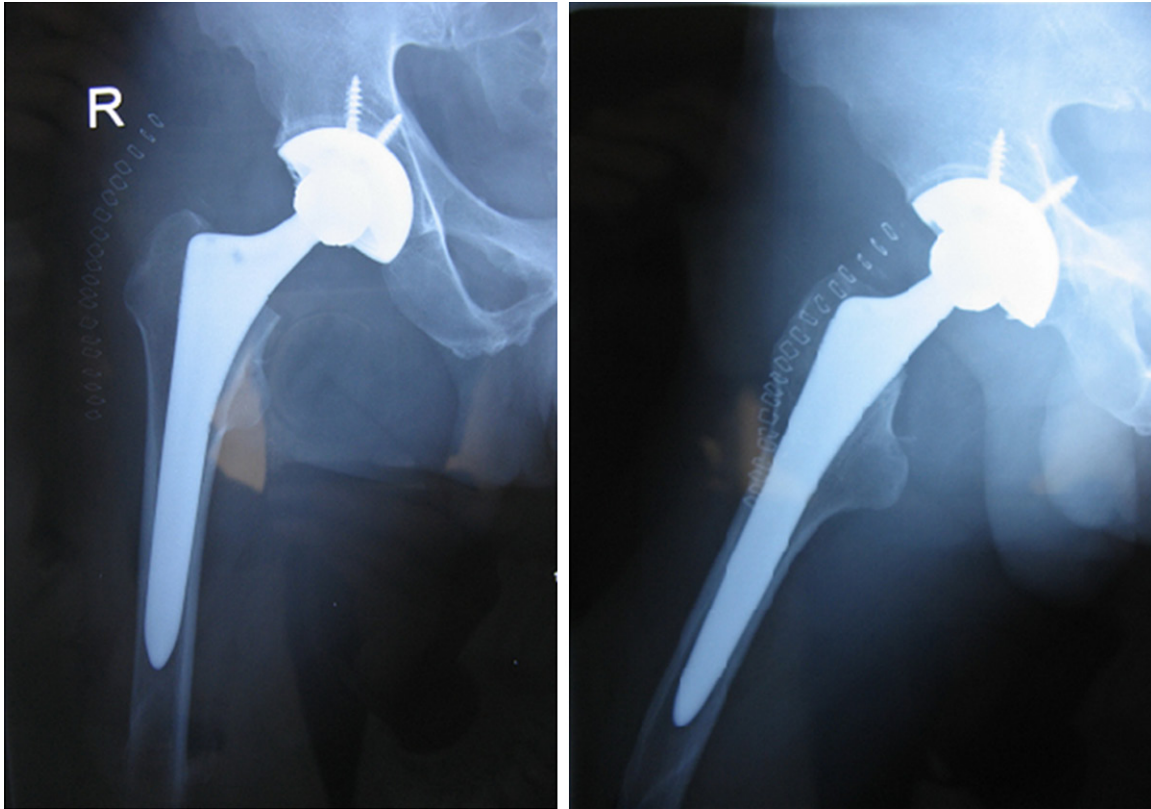


Figure 3. The X-ray of the hip at four days post operation.

daily activities, because it can recover hip function and significantly reduce postoperative complications. Nevertheless, above-knee amputee patients in need of ipsilateral THA present with additional challenges regarding their altered anatomy. In order to reduce postoperative complications and improve hip function, we decided to do THA in the patient. Considering that the right femur stump was only 16 cm below, we chose the biotypes prosthesis as the surgical femoral prosthesis. The use of an uncemented stem may avoid cementation problems and allow for optimal implant positioning.

The main problem in this present case was absence of anatomical signs of distal lower extremity and lack of traction arm. Previously, Leonard *et al.* [6] inserted Steinmann pin in the distal femur stump assisting surgery. Differently, we inserted Steinmann pin into the greater trochanter of the hip. This construct was not only convenient for intraoperative traction of the right thigh stump, but also reduce the difficulty of incision exposure, thus increasing the ease

of the surgery. Compared with Steinmann pin in the distal femur stump, Steinmann pin at the greater trochanter was much easier and also decreased infection risk.

For rehabilitation program for THA patients, a great emphasis was made on the intense postoperative training targeting hip abductors [9, 10]. However, amputee, unlike normal patients, cannot begin weight-bearing walk at early stage. Because of wearing prosthetics, amputee patients have longer rehabilitation exercise time than normal patients. In this case, the patient was encouraged to begin rehabilitation program wearing artificial limb, including gait retraining, progressing onto stair practice and endurance training. Collectively, this patient had an excellent clinical and radiological outcome at two years postoperatively.

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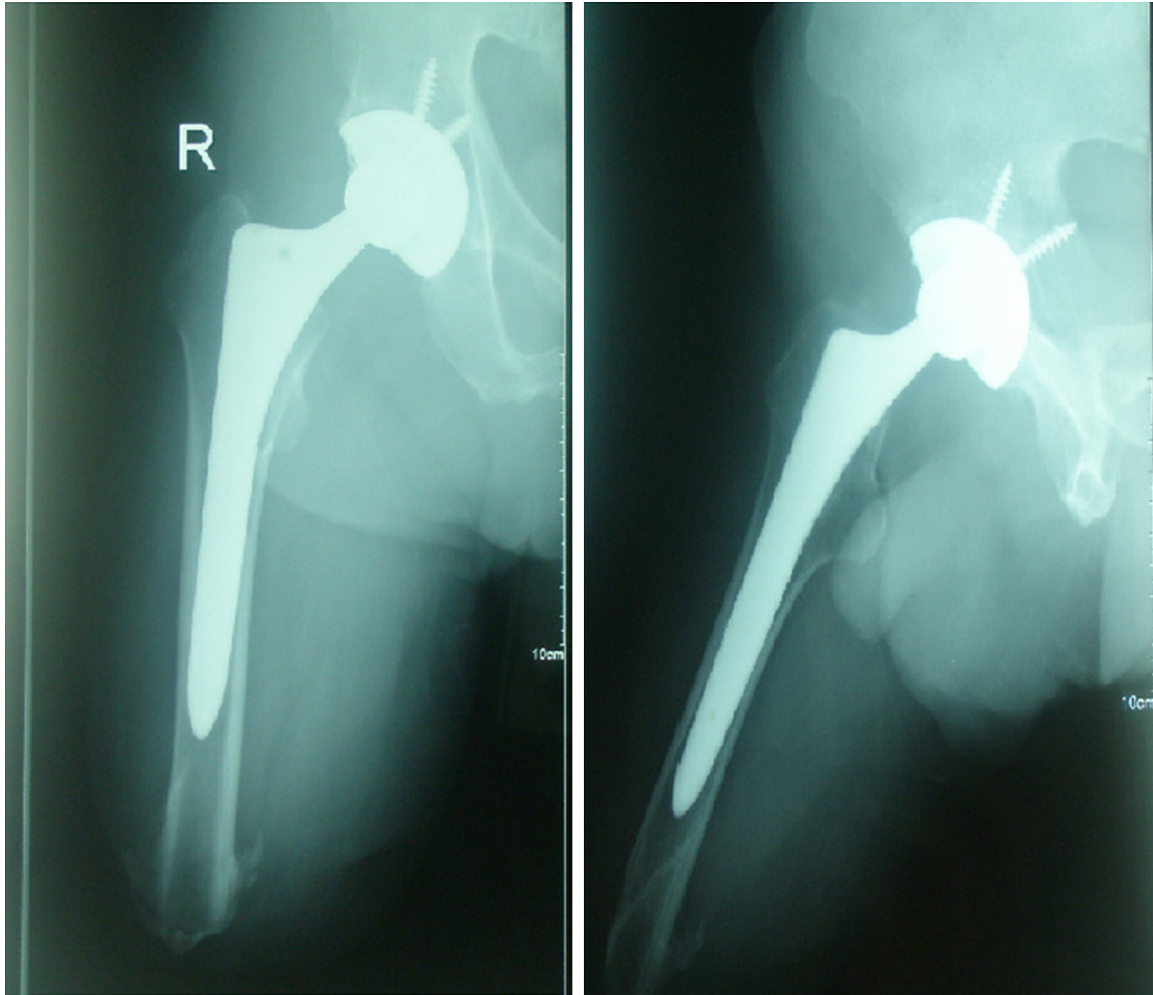


Figure 4. The X-ray of hip at two years post operation.

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Disclosure of conflict of interest

None.

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