

Medial Migration of the Lag Screw in Gamma Nailing System: A Case Report

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Abstract

Medial lag screw migration in Gamma nail system is an uncommon complication. In 92-year-old woman, the medial lag screw migration into the pelvic with nonunion of trochanteric fracture at 4 months after the osteosynthesis. The computed tomography scan did not reveal intestinal organs injury by the protruded screw and the removal of the implant eased her right hip pain. During the operation, the lag screw migration by the incorrect engagement of the set screw outside of the groove on the lag screw was observed, which was considered the reason. To avoid such a hazardous complication in Gamma nail system for trochanteric fracture, correct engagement of the set screw into the groove on the lag screw should be confirmed after tightening the set screw.

Keywords: Trochanteric fracture; Gamma nail; Lag screw; Set screw; Medial migration

Introduction

The treatment of trochanteric fracture with Gamma nail has been recognized as a common method [1] and comparatively good outcomes were reported. Despite of this, some complications were reported [2,3], where the protrusion of the lag screw into the hip joint is the most common. In addition, femoral fractures at the distal end tip of the nail, femoral head rotation and a medial migration of the lag screw into pelvic also have been described. Among those, there is little publication reporting a medial migration of the lag screw into pelvic and its pathogenesis has been unclear [2-9]. We reported a failed case showed the medial migration of the lag screw and discussed its pathogenesis by analyzing the components of Gamma nail system after removal.

Case Report

A 92-year-old female patient who could barely walk by a single crutch sustained a traumatic trochanteric femur fracture (AO B2) (Figure 1). Operation was performed at the initial hospital with 125-degree Gamma 3 nail with a 95-mm lag screw (Stryker, Tokyo, Japan) two weeks after the injury. Postoperative radiographs demonstrated an acceptable anatomic reduction and the proper implant positioning (Figure 2). Intra- and postoperative course was uneventful: The range of motion exercises and full weight bearing were proceeded and the patient was discharged at 3 months after the surgery.

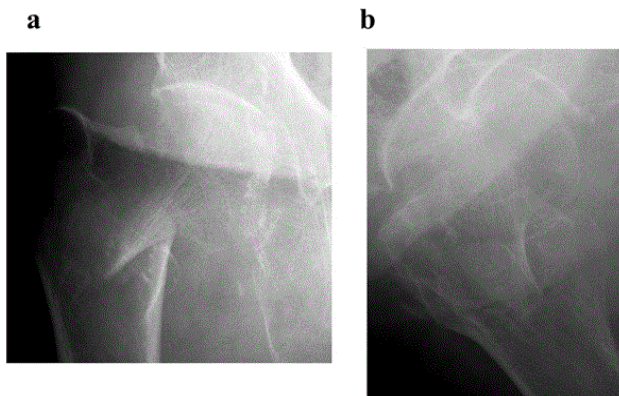


Figure 1: AP (a) and axial (b) radiographs of the right hip at the injury.

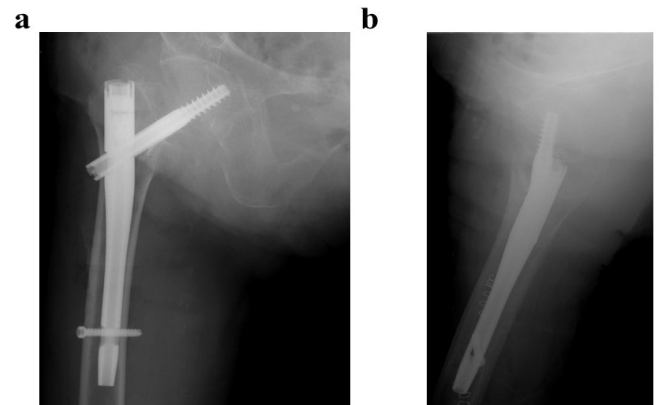


Figure 2: AP (a) and axial (b) radiographs of the right hip after the operation. Internal fixation was performed using a Gamma nail.

At one month after the discharge, the patient suddenly complained severe pain in her right hip without any traumatic episodes. On her visit to our hospital, the radiograph showed the nonunion of the fracture with the medial migration of the lag screw into the pelvis (Figure 3), where the lag screw was almost completely free from the nail and protruded into the pelvis. The computed tomography scan and clinical examination did not reveal any injuries of internal organs (Figure 4). Removal of the nail including the lag screw was performed: The set screw was loosened and deviated from the groove on the lag screw, which was confirmed by the trail we made by tightening the set screw before the removal of it (Figure 5). Subsequently, her hip pain was

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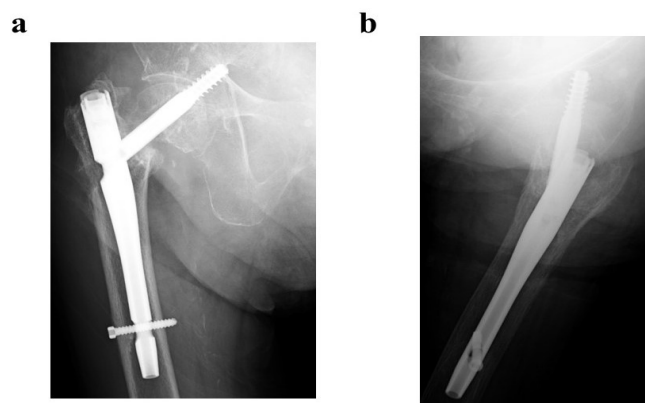


Figure 3: AP (a) and axial (b) radiographs of the right hip at the four months after the operation. The lag screw was almost completely free from the nail and into the pelvis.



Figure 4: Computed tomography scan four months after the operation. A computed tomography scan showed the medial migration of the lag screw in the right hip.



Figure 5: Macroscopic photograph of the lag screw. White arrow indicates the trail by the set screw at the first operation. Black arrow indicates the trail by the set screw made by tightening the set screw before removal. Both trails deviated from the groove.

eased, however, the patient and her family were not positive to have the third operation to treat the nonunion.

Discussion

Proximal femoral fractures are common injuries in elderly [1]. Intramedullary nailing is widely used for fixation of such fractures with a benefit of shorter operation time, smaller incision, immediate weight bearing after operation due to rigid mobilization. Comparatively good outcomes were well recognized, on the other hand, some complications were reported [2,3].

The common complications of this device are cut out of the lag screw into the hip joint and fracture of the femoral shaft distal to the tip of the implant. Compared to cut out the lag screw into the hip joint, the incidence of medial migration of the lag screw into the pelvis is very rare [2-9]. There are only several reports regarding medial migration after using a single screw devices in femoral head including Gamma nail [2-9], however, they could not elucidate the reason of migration. Although Werner-Tutshku et al. [10] explained “Z-effect” by double screw devices caused migration after using proximal femoral nail (PFN, Synthes, Switzerland), biomechanical force between single device and double devices are different.

We hypothesize the incorrect engagement of the set screw outside of the groove on the lag screw caused the lag screw loosening. This was supported by the report by Takasago et al. introducing the importance of the position of the set screw [11]. They cautioned that in case the surgeons could not apply the set screw correctly, the lag screw was not protected against rotation and possibility of disengagement in medial direction.

Additionally, we consider the osteoporosis by her age and low daily activities accelerated the migration of the lag screw. Lasanianos et al. reported that the osteoporotic bone of the patient and poor anatomic postoperative reduction could not offer an adequate grip to stabilize the lag screw and prevent its loosening [12]. In our case, the lag screw could not get enough grip to stabilize in the femoral head during the migration.

In conclusion, we state when we operate trochanteric fracture using Gamma 3 nail system, to confirm the correct engagement between set screw and the groove on the lag screw is essential after tightening the set screw.

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