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A novel fluoroscopy positioning for proximal femoral fixation in the lateral decubitus position

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ABSTRACT

The aim of this technical report is to minimize the difficulties in obtaining the lateral femoral views using fluoroscopy, while fixing the proximal femur in the lateral decubitus position and to present a new scope and patient positioning. The lower leg is slightly flexed from the hip and knee. The detector is prepared with the detector on top, the detector is tilted approximately 40 degrees toward the cranial side so that the fluoroscopy rays are perpendicular to the femoral neck. In this way, superposition of the contralateral limb is prevented, the femoral neck is selected clearly, and the positioning of the screw can be clearly understood. This positioning provides easy to obtain a full side view on conventional mid-supported surgical tables and prevents the superposition of the other extremity. Loss of time can be prevented with this technique.

Keywords: C-arm, proximal femoral nailing, trochanteric fracture.

The incidence of osteoporosis and proximal femoral fracture (PFF) of the geriatric population has been increasing with the increasing population in the world and the prolongation of life span.[1,2] Osteosynthesis is seen as the first choice in the patient group who can tolerate surgical intervention. Proximal femur nail (PFN) and dynamic hip screw (DHS) are often used for this purpose. Reduction of the fracture and placement of the lag screw in the most appropriate position play an important role in the success of both methods.[3] To meet these conditions, it is necessary to obtain an appropriate anteroposterior (AP) and lateral fluoroscopy view.

Although the supine position on the traction table is often preferred in proximal femur fracture surgery, the advantages of the lateral decubitus position (LDP) have also been reported recently.[4] Easier access to the trochanteric region, the possibility of lengthening the incision, the lack of preoperative set-up, easy reduction and short operation time have made the lateral decubitus position a common alternative.[4]

However, most studies mentioning the advantages of LDP have argued that it is difficult to obtain lateral fluoroscopy images.[5] Although there are studies on reduction in the literature, there is a limited number of studies about the ideal fluoroscopy and patient position on the lateral hip radiography to obtain the appropriate image. In this technical note, a fluoroscopy and patient position in which a clear image could be obtained without disturbing fracture reduction in the lateral decubitus position in proximal femur fractures was described.

CASE REPORT

A 78-year-old female patient who had a left-sided proximal femur fracture one year ago was taken to surgery for a right-sided reverse oblique

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Figure 1. A lateral fluoroscopy view with full superposition of both hips in full lateral fluoroscopy position.

intertrochanteric fracture. Following anesthesia, the pelvis of the patient was placed in the lateral lying position, with her pelvis corresponding to the mid-table support and the surgical side of the patient on top. In the routine side view, the prosthesis present in the other extremity was superposed with the side to be operated, the fluoroscopy beam source was very close to the lower support of the table, and the fluoroscopy rays were not perpendicular to the femoral neck (Figure 1).

The patient was informed that data from the case would be submitted for publication and gave her consent.

In the method we describe, the lower leg is flexed slightly from the hip and knee. The C-arm detector is prepared with the detector on top, the detector is tilted approximately 40 degrees toward the cranial side and the fluoroscopy rays are perpendicular to the femoral neck (this angle is further reduced in

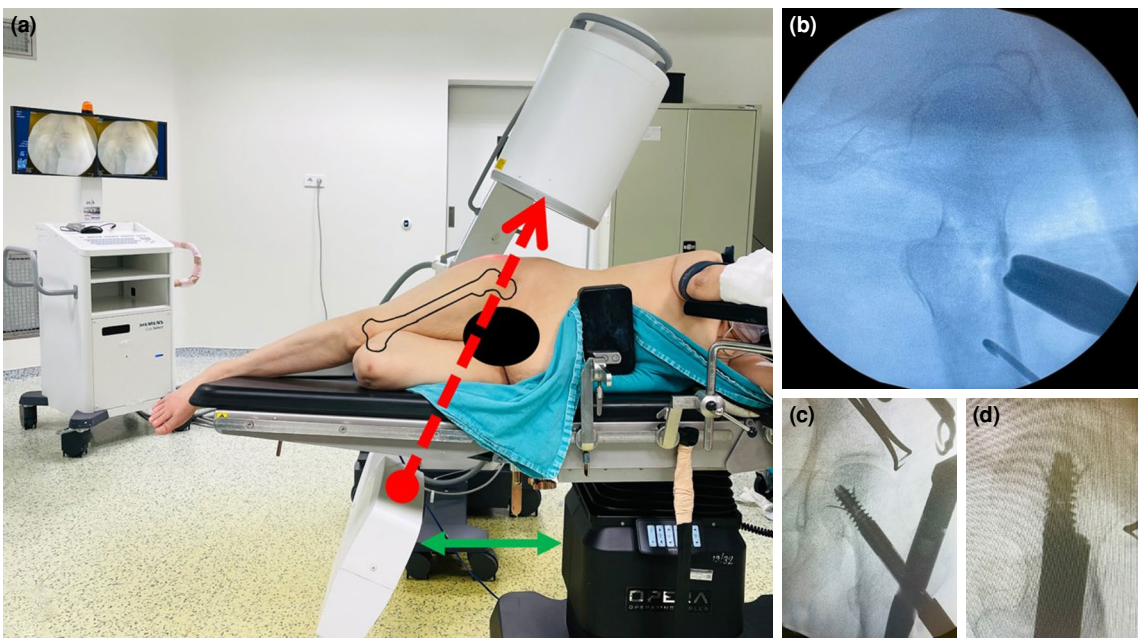

Figure 2. (a) A photograph showing that the working range under the table increases, when the head is tilted in the coronal plane and the rays are perpendicular to the femoral neck. **(b)** A lateral view obtained **(c, d)** anteroposterior and lateral views obtained at the end of the surgical procedure.

patients with obesity). To obtain a full lateral view of the proximal femur, rotation is performed in the sagittal plane, as well as the hip anteversion of the patient.

In this way, superposition of the contralateral limb is prevented, the femoral neck is selected clearly and the positioning of the screw can be clearly understood (Figure 2).

DISCUSSION

In elderly patients with proximal femur fractures, osteosynthesis with PFN or DHS is performed.[6-8] It has been shown that most of the complications are due to not fixing the proximal femur in the proper position.[3,9] In order for the screw to be placed in the appropriate position, it is necessary to obtain appropriate fluoroscopy images. This problem stands out clearly in LDP.[5] Sonmez et al.[5] reported lateral radiographs were difficult to obtain in LDP, although they did not describe a technique. In some of the studies, the lateral view is obtained in the position in which the hip is brought to approximately 90° of flexion and 30 to 40° of abduction.[6] However, forcing the hip to this position may cause loss of the reduction. The method we describe herein allows the reduction to be preserved more comfortably, since no forceful movements are made on the hip. In 2010, Bishop and Rodriguez[4] reported the positioning in the sagittal plane as much as the femoral anteversion to visualize the proximal femur to the full side, but did not make a suggestion in the coronal plane. It has been reported that the hip appears to be smaller than the superposed images, when the C-arm detector is on top of the upper hip in the lateral decubitus position. In the method we describe, since the rays pass through the femur shaft level of the other extremity, there is no other hip joint superposition. When the other lower extremity is flexed, superposition of the shaft is also avoided. As Bishop and Rodriguez[4] described, inclining in the sagittal plan, as well as anteversion, provides the achievement of the full side view.

In conclusion, this positioning provides easy to obtain a full side view on conventional mid-supported surgical tables and prevents the superposition of the other extremity. Loss of time can be prevented with this technique, whose standards are determined, and the deterioration in reduction can be prevented, since no extra movement is made to the leg.

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