

Lateral Decubitus Position for Hip Fracture Fixation in a Knee Disarticulation Amputee (Case Report)

Abstract

Femoral neck fracture is one of the most disabling affections in older patients. The usual surgical position in fixation of femoral neck fracture is the supine position on radiolucent fracture table. A technique of placing the patient in lateral decubitus position has been reported. This report describes this position in a patient with prior knee disarticulation. A 40-year-old man with a right hip fracture (Pauwels I, Garden II) fracture with a previous knee disarticulation secondary to extensive tibial trauma underwent close reduction and internal fixation in left lateral decubitus position. The knee and hip joint were flexed to 45° securely on the Mayo stand. Then, the patient's affected limb was lifted, and a pillow - pad was placed under it. This position was supported by two side supports -one on the back and one on back of trunk. Improving C-arm accessibility and adjustment, leading to reduction of contaminating, a more accurate lateral view of the proximal femur, decreasing the risk of reduction loss, optimizing the workflow, and more suitability in complex patients are the benefits seen in this case. On the other hand, increasing total surgical time, and harder fluoroscopy adjustments were the challenges. In this patient with prior disarticulation, lateral decubitus position for femoral neck fracture showed promising intra and post-operative results.

Keywords: Femoral neck fractures, Patient positioning, Disarticulation, Knee.

Accepted: 36 days before printing

Hasan Barati, MD, Mojtaba Baroutkoub, MD, Amir Barzanouni, MD, Ali Keipourfard, MD, Ali Ghozatfar, MD

Orthopedics and Trauma Surgery
group, Faculty of medicine, Shahid
Beheshti University of medical
sciences, Tehran, Iran.

Introduction

Femoral neck fracture is among the most disabling injuries occurring in the elderly population. It accounts for approximately 45% of all proximal femoral fractures. With the progressive aging of societies, its incidence continues to rise⁽¹⁾. Depending on the patient's age, comorbidities, bone mineral density, and level of daily activity, the surgical management options for elderly patients range from closed or open reduction with internal fixation to arthroplasty or hemiarthroplasty. However, in certain younger patients under 50 years of age, internal fixation remains the preferred choice. The primary surgical goals in this age group include prevention of nonunion and osteonecrosis, as well as preservation of the femoral head^(2,3).

The most common surgical position for proximal femoral procedures is the supine position on a fracture or radiolucent table. Other reported positions include the lateral decubitus and prone positions on a radiolucent table^(4,5). In 2023, Pisoudeh et al. introduced a novel surgical positioning technique in two young patients with subtrochanteric fractures, in which the patient was placed in a lateral decubitus position on a radiolucent table with anterior and posterior supports. The uninjured leg was flexed at a 45-degree angle, and a large cushion was positioned beneath the injured limb. The C-arm was placed on the contralateral side of the surgeon, perpendicular to the long axis of the table⁽⁶⁾. The present report describes the surgical technique, positioning details, potential advantages and challenges, intraoperative lateral imaging accuracy, and postoperative outcomes in a 40-year-old man with a femoral neck fracture. The procedure employed the lateral position proposed by Pisoudeh et al. in a unique case of a patient with a prior knee disarticulation.

Corresponding Author:
Hasan Barati, MD
Email address:
dr.barati363@gmail.com

Case report

Preoperative Evaluation

A 40-year-old man presented to the hospital with severe lateral hip pain following a low-height fall. Radiographs and computed tomography confirmed a nondisplaced femoral neck fracture (Figure 1 and 2). No signs of associated hip joint injury or avascular necrosis were identified. Due to the patient's intense pain and muscular rigidity, a complete assessment of the hip joint was not feasible, although a noticeable limitation in the range of motion was observed in all directions. Two years prior to this admission, the

patient had undergone knee disarticulation due to severe tibial trauma and was ambulating with a transtibial prosthetic limb. Consequently, vascular and neurological evaluation of the affected limb was not feasible. The patient reported that before the recent trauma, he had full range of motion of the hip joint and was able to bear full weight on the affected limb. The patient was admitted 24 hours before surgery. Following induction of general anesthesia, his position was changed from supine to left lateral decubitus (Figure 3). A Mayo stand was placed beneath the patient's left lower limb (the sound limb), and both the hip and knee were safely flexed to approximately 45 degrees over the stand.



Figure 1: Preoperative anteroposterior radiograph of the right hip showing a nondisplaced femoral neck fracture



Figure 2: Preoperative coronal CT scan demonstrating a nondisplaced fracture of the right femoral neck.



Figure 3: Patient positioning before surgical preparation in the operating room.

The right lower limb (the injured side) was then carefully elevated, and a cushion and soft pad were positioned underneath it to ensure alignment with the trunk, prevent pressure injury, and minimize muscle contraction. Once the legs were positioned, the lateral decubitus posture was stabilized using two side supports placed at the posterior and anterior aspects of the trunk. Since the fracture was nondisplaced, no reduction maneuver was required. Before skin preparation and draping, the adequacy of alignment was confirmed fluoroscopically. After verifying proper patient positioning, the right lower limb was prepared and draped from the iliac crest to the distal end of the prosthetic limb, and the incision site was marked. A 5-cm longitudinal incision was made just below the greater trochanter. A guide pin (K-wire) was first inserted from the same region beneath the trochanter into the inferior portion of the femoral neck along the tension side. Two additional guide pins were then placed parallel to the first, in the central and superior regions of the femoral neck. Drilling was performed over the guide pins using a cannulated drill bit. Fixation was achieved with three 6.5-mm titanium cannulated screws (lengths: 100 mm, 100 mm, and 105 mm) and two washers. All steps were performed under fluoroscopic guidance. To obtain an anteroposterior (AP) view of the right hip, the C-arm was positioned posterior to the patient, with its arm adjusted in a "C"

configuration. For lateral imaging, the device was kept in the standard zero-degree position without additional angulation. In this setup, the contralateral limb, being flexed, did not obstruct visualization of the injured hip (Figure 4).

Estimated intraoperative blood loss was approximately 50 mL.

The total operative time was 10 minutes from patient preparation to incision, and 80 minutes from skin incision to wound dressing.

Postoperative Details

Following surgery, the patient was instructed to maintain a non-weight-bearing protocol for two months, similar to standard management for patients with nondisplaced femoral neck fractures without amputation⁽²⁾.

Due to the right knee disarticulation, he was also advised to wear his prosthetic limb during this period to reduce gravitational stress on the hip joint and minimize compensatory leaning toward the contralateral side while standing.

The patient was advised to avoid weight bearing on the operated limb for two months postoperatively, followed by partial weight bearing with the use of his prosthesis and a walker for an additional month. At the three-month follow-up, radiographic evaluation demonstrated signs of bone union (Figure 5).

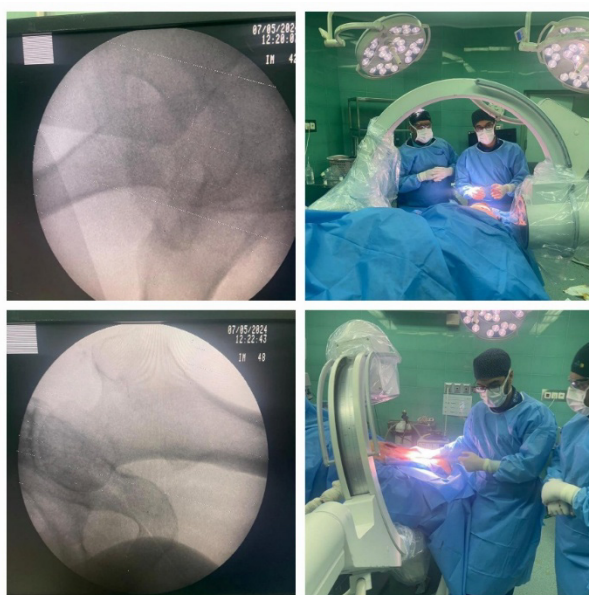


Figure 4: Intraoperative fluoroscopic images showing the anteroposterior and lateral views of the hip, as well as the positioning of the C-arm during the procedure.



Figure 5: Three-month postoperative radiograph showing fixation of the femoral neck fracture with three screws and evidence of partial bone healing.

The patient reported no significant complications, and functional recovery was assessed as satisfactory. Preoperatively, the patient's visual analog scale (VAS) score was 9, which decreased to 1 at three months postoperatively. Additionally, the Harris Hip Score was reported as 83.

Discussion

This report describes the surgical management of a unique case of a young patient with a nondisplaced femoral neck fracture and a history of knee disarticulation. The novel lateral decubitus positioning used in this case provided the surgeon with easier access to the injured site. Although femoral neck fractures are more common in older adults, their treatment in young and active patients—particularly those with a prior knee disarticulation—requires meticulous planning. The lateral positioning technique recently described by Pisoudeh et al. offers intraoperative advantages over traditional fracture table approaches⁽⁶⁾. The total operative time in this case was 90 minutes, which is longer than the durations reported by Shuang G. Yan et al.⁽⁷⁾. However, the patient preparation time in this case was shorter compared with single- and dual-C-arm groups reported by Hee Lee et al.⁽⁸⁾. It is important to note that this report describes a single case, and surgical times may vary depending on fracture complexity and surgeon experience. This positioning approach can be applied in patients with below-knee amputations or hip/knee flexion contractures⁽⁶⁾. A major advantage of this position is the reduced risk of contamination of the surgical field during C-arm imaging. In procedures performed on a fracture table, optimizing intraoperative C-arm imaging can be challenging and increases the risk of contamination for both the sterile field and the surgeon. In the lateral decubitus position described here, the C-arm can be adjusted freely without obstructing the surgical field, minimizing contamination risk. Furthermore, in this patient, lateral views of the proximal femur were obtained without repositioning the injured limb, simply by adjusting the C-arm angle, resulting in superior lateral visualization compared with fracture table techniques. This approach also reduces the risk of loss of reduction, particularly in displaced fractures, and limits contamination of the surgical site. Additionally, it optimizes surgical workflow, keeping the C-arm outside the sterile field without interfering with the surgeon's movements or

position. Despite the improved lateral visualization, fluoroscopic imaging may be more challenging for some surgeons. These results cannot be generalized; although surgical outcomes were excellent, surgeon comfort and visibility compared with other positions may vary. To date, studies using this new positioning technique are limited to case reports. Furthermore, given the patient's prior lower-limb amputation, patient-reported outcome measures (PROMs) may differ from those of individuals with intact lower limbs.

Conclusion

The lateral decubitus position in patients with a history of knee disarticulation demonstrated promising intraoperative and postoperative outcomes for femoral neck fracture fixation.

Acknowledgement

The authors would like to thank the Clinical Research Development Unit of Imam Khomeini Hospital, Mazandaran University of Medical Science Sari, Iran for their support cooperation and assistance throughout the period of study.

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