

# Total Hip Replacement in Adults with Neglected Femoral Neck Fractures Through Posterior Approach: A Case Report

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## ABSTRACT

**Introduction:** Osteoarthritis (OA) is the degenerative joint disease. The most common symptom is knee pain that gradually develops and gets worse with movement. The presence of OA may increase the likelihood of falls, an independent risk factor for hip fracture. Femoral neck fractures in the elderly are linked to low-energy falls which correlated with OA as the comorbidity. Hip fracture risk is doubled in patients with a clinical diagnosis of knee OA. Given the poor prognosis and inconsistent results recorded following various surgeries, femoral neck fracture is still regarded as an unresolved fracture. The two main side effects of femoral neck fractures are avascular necrosis of the femoral head and nonunion or neglected fracture. The risk of femoral head avascular necrosis has led to the widespread use of arthroplasty in older individuals. There are two varieties, including total hip arthroplasty and hemiarthroplasty.

**Case Presentation:** A 74 years old female patient complained knee pain on both side in the last three years, and worsen at the past 6 months, she felt the pain worse on the left knee. The patient was diagnosed with neglected displaced left femoral neck fracture and bilateral knee osteoarthritis

(OA). The patient was treated with total hip arthroplasty (THA) through posterior approach.

**Discussion:** THA is recommended for patients with symptomatic pre-injury OA because untreated pre-existing OA that was restricting the patient's mobility before the injury could have an adverse effect on their ability to recover after hip fracture surgery. Post-surgery, the patient's clinical condition was good with no other symptoms except mild pain.

**Conclusion:** Femoral neck fractures commonly occur in elderly women. Pre-existing osteoarthritis reduces mobility, increases the patient's likelihood to experience femoral neck fracture. Total Hip arthroplasty (THA) is a better choice for better long-term outcomes. Posterior approach seems to be a better option than direct anterior approach.

**Keywords:** femoral neck fracture, osteoarthritis, elderly women, total hip arthroplasty, posterior approach

## INTRODUCTION

The group that grows the fastest in the world is the geriatric population, which is comprised of people 65 and older. Knee osteoarthritis (OA), commonly known as degenerative joint disease, is frequently

brought on by wear-and-tear and articular cartilage loss that occurs over time. Osteoarthritis is frequently a disabling condition that worsens over time. Knee pain that gradually develops and gets worse with movement, knee stiffness and swelling, discomfort after extended periods of sitting or sleeping, and pain that gets worse with time are common clinical symptoms. The presence of OA may increase the likelihood of falls, an independent risk factor for hip fracture (1,2).

On the other hand, hip fracture prevalence and age-specific incidence rates have both been reported to have significantly increased globally (3). According to reports, the 1-year death rate following hip fracture ranges from 13 to 36%, with a mean value of 25%; some of this increased mortality is attributable to comorbidity. Most of hip fracture patients are elderly, and many of them may also have additional serious comorbidities. Knee OA is a serious medical condition that limits elderly people's ability to carry out daily tasks. Hip fracture risk is doubled in patients with a clinical diagnosis of knee OA. Numerous etiologies for this relationship have been put up, including higher severity of sustained falls and increased body sway in people with knee OA (4). Approximately half of the elderly patients who were formerly independent become partially dependent, and finally a third become completely dependent. One of the most frequent traumatic injuries in older people and one that is linked to high death rates and functional loss is the hip fracture, which includes femoral neck fracture (FNF) (5). Up to 80% of FNF are displaced, and more than 50% are intracapsular. Femoral neck fractures in the elderly are linked to low-energy falls. Women account for 70% of all hip fractures. Age exponentially raises the chance of hip fracture (6).

Arthroplasty is now regularly performed on elderly patients due to the risk of femoral head avascular necrosis (7). The method of

treatment for older patients with displaced femoral neck fractures is determined by the patient's age and baseline level of activity. When deciding on the best possible treatment, it is important to take into account factors including the fracture's pathological etiology, any prior symptoms of osteoarthritis, the patient's physiological age, and the fracture displacement (8). Hemiarthroplasty may be performed on people who are less active. Total hip arthroplasty is used to treat those who are more active. The decision between total hip arthroplasty (THA) and hemiarthroplasty (HA) is still up for debate when the joint line is intact. When compared to a hemiarthroplasty, total hip arthroplasty is more resilient, but it also entails a higher risk of dislocation (9).

We describe an elderly female patient with neglected left femoral neck fracture and bilateral knee osteoarthritis Kellgren-Lawrence grade IV with intact joint line that was treated total hip arthroplasty (THA). The patient was undergoing THA through posterior approach and had a replacement of acetabulum and femoral components. The patient was informed that data concerning the case would be submitted for publication, and she provided consent.

## **CASE PRESENTATION**

A 74 years old female presented with knee pain on both side since three years ago, and worsen at the past 6 months, she felt the pain worse on the left knee. She could sit on the bed without hip pain but could not walk. Two years ago, she felt pain on her left hip and difficulty to move after she slipped in front of her house with sitting position. Before the fall accident, the patient was already felt pain on the both side of the knee. After the accident, she went into a hospital and was planned to have a surgery but she could not make it due to her hypertension. The patient said that after the accident, she usually only lies down on the bed, with minimal activities.



Figure 1. Physical Examination.

On her physical examinations, we found deformity with angulation at her left hip region, 3 cm of leg length discrepancy, and also active but limited range of motion at hip, knee and ankle due to pain and stiffness. No swellings were found. At the knee region (both left and right), we found deformity with angulation, 3 cm of leg length discrepancy with swelling. Tenderness was found on the anterior side, with palpable dorsalis pedis artery, capillary refill time under 2 seconds, and 99% of oxygen saturation. Range of motion of knee and ankle were active but limited due to pain and stiffness. For the diagnostic assessment, imaging studies

demonstrated a displaced left femoral neck fracture with bilateral hip osteoarthritis and osteopenia. The patient was diagnosed with neglected left femoral neck fracture and bilateral osteoarthritis Kellgren-Lawrence grade IV. The joint line was still intact. After discussion of both the short-term and long-term risks and complications of surgical intervention, give the patient's age, lifestyle, and occupation, we proceeded with total hip arthroplasty (THA). The THA was done with posterior approach due to our concerns about significant leg length discrepancy (LLD) and stiffness of the knee.



Figure 2. X-ray examination before total hip arthroplasty surgery.

During the operation, the patient was in the right lateral decubitus position, and the posterior approach incision was done. Posterior capsulotomy and fibrous excision were done, and then we did an internal rotation of the hip. We did an extraction of head femur fracture. An evaluation on the acetabulum was done and we found intact cartilage acetabulum in all areas. For the implantation of acetabular component, we did a reaming on the acetabulum until 54 in size with 15-degrees inclination and 45-degrees abduction. The trial was done and

then we cemented acetabular cup with size 48/28. For the implantation of femoral component, we did a reaming on femoral medullary canal until 2 in size, and then did the trial and evaluated the limb's length and stability (through flexion, extension, adduction and telescoping). The procedure followed by cementing femoral stem with size #2 and femoral head. Limb's length and stabilization were good on evaluation. The amount of blood loss during the surgery was 300 cc.

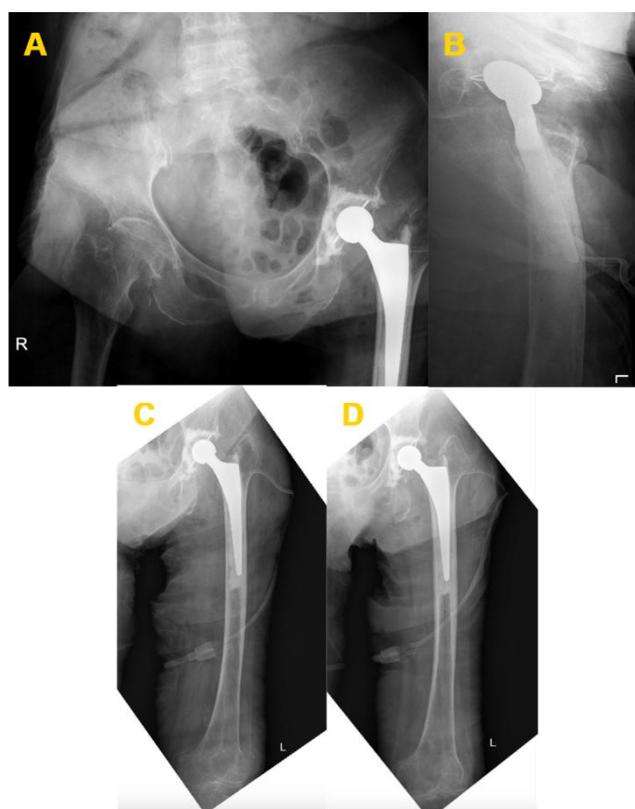


Figure 3. X-ray post total hip arthroplasty (THA).

After the surgery, on the left hip region, there was a dry dressing without seeping with 1 cm of leg length discrepancy. A drain was planted with 40 mL of blood production within 5 hours post-surgery. Tenderness was found with positive ankle dorsal flexion and plantarflexion. For the pain management, the anesthesiologist put an epidural with bupivacaine 0.1% and 1 mg of morphine in the 10 mL volume every 12 hours, 500 mg of paracetamol every 6 hours peroral and 400 mg of ibuprofen every 8 hours peroral. For

other treatments, the patient was given ceftriaxone 1 gram every 12 hours intravenously, 0.4 mL of lovenox subcutaneously. The patient was restricted to do flexion, adduction and internal rotation, and we monitored the patient's vital signs and drainage production every 24 hours. On the radiology examination, it was found 37.31mm/36.3mm of leg length, 24.05mm/25.88mm horizontal center of rotation, 44.47mm/43.1mm vertical center of rotation, 40.40° of acetabular inclination

(Normal: 30-50°), 14.44° of acetabular anteversion (Normal: 5-25°), and neutral of femoral stem position according to the femur axis. Therefore, after surgery the leg length discrepancy was reduced to 1 cm.

One day post-surgery, the patient was examined for any symptoms and signs. The post-surgery pain was under control with 2-3 of visual analog scale (VAS), and other symptoms were denied by the patient. On the physical examination, the dressing was dry without seeping with 1 cm of leg length discrepancy. The drain was still placed with blood production of 130 mL within 20 hours post-surgery. Ankle dorsal flexion and plantarflexion were positive. Total knee arthroplasty (TKA) is planned to be carried out after the patient has finished recovering from THA surgery. The patient was discharged after 3 days post-surgery and having an outpatient visit every week for one month.

## **DISCUSSION**

Knee osteoarthritis (OA), commonly known as degenerative joint disease, is frequently brought on by wear-and-tear and articular cartilage loss that occurs over time. Osteoarthritis is frequently a disabling condition that worsens over time. Knee discomfort is frequently the main complaint when patients visit their doctor (2). Knee OA is linked to stiffness and pain in the joints, loss of balance, restricted movement, and functional reliance. These characteristics have all been shown to be risk factors for falls in older persons (10). While hip fractures frequently occur at slower walking speeds and straight onto the hip; this sort of fall may be more frequent in individuals with knee pain. Hip fracture risk is doubled in patients with a clinical diagnosis of knee osteoarthritis. Numerous etiologies for this relationship have been put up, including higher severity of sustained falls and increased body sway in people with knee OA (4). Falls risk and bone health are two key risk factors for hip fracture. With muscle atrophy, alterations in gait, and impaired joint proprioception perhaps serving as

mediators, the presence of knee OA may increase the likelihood of falls, an independent risk factor for hip fracture (1). The patient in our case report complained about knee pain on both side since three years ago with history of fall about 2 years ago, and the knee pain worsen at the past 6 months, she felt the pain worse on the left knee. The patient also experienced deformity with angulation at her left hip region, 3 cm of leg length discrepancy, and also active but limited range of motion at hip, knee and ankle due to pain and stiffness. Since the patient have bilateral OA from three years ago, the pain and stiffness from OA were likely to increase the chance of femoral neck fracture. The patient fell in front of her house two years ago and the femoral neck fracture took place.

Femoral neck fractures in the elderly are linked to low-energy falls. The cause of femoral neck fractures in younger individuals is typically secondary to high-energy trauma, such as falls from a great height or car accidents. Femoral neck fractures are more likely to occur in women, who also have limited mobility and low bone density (9). As in our case report, the patient was a 74 years old female patient who had femoral neck fracture due to low energy fall. The patient had risk factors such as female gender, elderly and low energy trauma or fall. The low energy trauma has a link to osteoarthritis (OA) due to the pain on the both knee before the fall accident. The fracture made the grade of the OA had increasing; therefore, the patient felt the knee pain worsen in the past 6 months.

The blood supply of the femoral head is severely impacted by a femoral neck fracture, which is directly correlated with the degree of trauma and fracture displacement. The two most common side effects of femoral neck fractures are nonunion and avascular necrosis (AVN) of the femoral head. Femoral head AVN is also linked to the development of the intracapsular hematoma. Resorption at the fracture ends makes the nonunion (NU), which causes the femoral neck to significantly shorten (11). In our

patient, the knee region (both left and right), we found deformity with angulation, 3 cm of leg length discrepancy with swelling.

For the diagnostic assessment, the emergency orthopedic and traumatology department must perform radiological examinations, such as plain films (anterior-posterior or AP pelvis, AP dan lateral hip and lateral femur, AP and lateral knee), computed tomography (CT) to classify the fracture pattern or delineate a subtle fracture line. Magnetic resonance imaging (MRI) is not generally used in the acute setting but can be used to evaluate for femoral neck stress fractures (9). In our patient, the patient had X-ray examinations and we found displaced left femoral neck fracture with bilateral hip osteoarthritis and osteopenia.

Early mobilization is the ultimate goal of treating hip fractures, which often require for surgical operations to repair or replace the joint. As the most common type of hip fractures, femoral neck fracture (FNF) can be treated with internal fixation (ORIF), hemiarthroplasty (HA), or total hip arthroplasty (THA) (3). Age, fracture type, functional and mental state, and medical comorbidities are taken into consideration while choosing an operation (6). In the displaced FNF elderly, THA and HA are frequently used. The advantages of HA usually have shorter operating times, less blood loss, lesser technical demands, lower financial burdens, and a lower dislocation rate. THA contributes to improved hip function, decreased acetabulum erosion, and a lower rate of revision (12). The presence of radiologic signs of osteoarthritic degeneration of the affected hip joint has been linked with hemiarthroplasty (13). THA is recommended for patients with symptomatic pre-injury OA because untreated pre-existing OA that was restricting the patient's mobility before the injury could have an adverse effect on their ability to recover after hip fracture surgery (8). On this case report, the patient was treated with THA due to better long-term outcomes for the patient. Post-surgery, the patient's clinical condition was good with no

other symptoms except mild pain with 2-3 VAS score.

When compared to the posterior approach (PA) for displaced femoral neck fracture, doing THA via the direct anterior approach (DAA) offers comparable advantages in terms of medical and surgical results. The DAA may, however, result in lower 1-year death rates, presumably as a result of increased early ambulation capacity, a key indicator of long-term mortality (14). More DAA patients were climbing stairs normally and walking freely at 6 weeks. There were no significant differences at later time points (15). Malek et al. showed the rate of re-operation in the DAA group was 3.0% compared with 1.0% in the posterior approach group. (16). The great exposure of the hip joint and flexibility to extend proximally into the pelvis or distally down the femur as necessary to obtain the best reconstruction, implant location, and fixation are some of the key benefits of PA. (17). Güler showed that THA in lateral decubitus position is more superior than supine position intraoperatively. His study showed fewer blood loss, surgery time and length of incision in lateral decubitus position (18). In our case, we used the posterior approach total hip arthroplasty due to better long-term outcomes for the patient. And after the surgery was done, the leg length discrepancy (LLD) was reduced from 3 cm to 1 cm.

On the post-surgery care, the patient must receive proper pain management and multifactorial interventions to reduce complications and promote successful care (6). The patient was given epidural as primary pain management with bupivacaine 0.1% and 1 mg of morphine in the 10 mL volume every 12 hours, and also 500 mg of paracetamol every 6 hours peroral and 400 mg of ibuprofen every 8 hours peroral. The patient was also restricted to do flexion, adduction and internal rotation, and we monitored the patient's vital signs and drainage production every 24 hours.

Following a total knee replacement (TKR), patients with knee osteoarthritis have a higher chance of developing a hip fracture.

This risk fluctuates according on the patient's clinical stage of disease, which is determined by the time before surgery: after being lowered prior to surgery, it is highest for one to two years after TKR and only returns to normal after three years (4). Our patient had the total hip arthroplasty (THA) first to reduce the chance of hip fracture incidence (femoral neck fracture in particular) if TKR was done first before THA.

## CONCLUSION

In conclusion, femoral neck fractures commonly occur in elderly women. Pre-existing osteoarthritis reduces mobility, increases the patient's likelihood to experience femoral neck fracture from low-energy fall. Total Hemiarthroplasty (THA) is a better choice for better long-term outcomes. Posterior approach seems to be a better option than direct anterior approach. Further research about the link between osteoarthritis and femoral neck fractures need to be discussed further.

## Declaration by Authors

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