



# Simultaneous Bilateral Fracture of Femoral Neck in Korea: A Case Report

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Unilateral femoral neck fractures are common and their incidence is increasing. However, simultaneous bilateral femoral neck fractures are rare. Although cases of simultaneous bilateral femoral neck fractures have been reported, most were caused by strong muscle contractions during electroconvulsive therapy. Simultaneous bilateral femoral neck fractures caused by a simple fall are an extremely rare injury; therefore, limited literature is available, and no case has been reported in Korea. We report herein a case of simultaneous bilateral femoral neck fractures caused by a simple fall. An 83-year-old woman visited the emergency department with bilateral hip joint pain and gait disturbance, which developed 1 day after a fall. Tenderness and severe limitation in left hip joint range of motion and mild limitation in right hip joint range of motion were observed on a physical examination. A Garden type IV femoral neck fracture in the left hip joint and a Garden type I femoral neck fracture in the right hip joint were observed on plain radiography. She underwent right screw fixation and left bipolar hemiarthroplasty 2 days after admission. The patient could walk using a walker 4 weeks postoperatively. Bone union in the right femoral neck was observed at the 3 month follow-up. No specific findings were observed at the left hip hemiarthroplasty site.

**Key Words:** Femoral neck fractures, Hemiarthroplasty, Injury mechanism

Femoral neck fractures occur far more commonly in the elderly, and the number of cases is projected to increase up to three-fold in the near future<sup>1)</sup>. However,

the incidence of simultaneous bilateral femoral neck fractured is extremely rare, although there have been reports about simultaneous bilateral femoral neck fractures during epileptic convulsions, electroconvulsive therapy, or after major trauma. Simultaneous bilateral femoral neck fractures are even rarer after a simple fall, and few cases have been reported. We describe herein the case of an 83-year-old woman who had simultaneous bilateral femoral neck fractures following a simple fall.

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## CASE REPORT

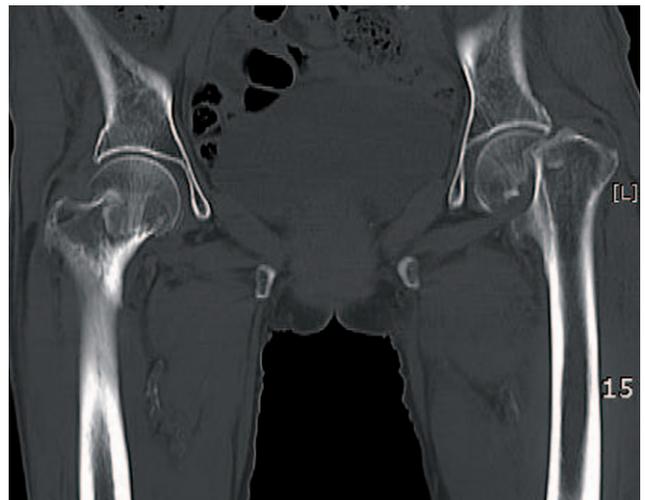
An 83-year-old woman was admitted to our hospital through the emergency department with a chief complaint of pain in both hip joints, which had developed after a simple fall the previous day. The patient was unable to

bear weight or walk on either hip. She had a history of hypertension, diabetes mellitus, and asthma. However, she had never taken corticosteroids or bisphosphonates and had no problems ambulating prior to the fall. Tenderness was detected in the left hip joint with the leg extended and externally rotated and limited range of motion was observed. Tenderness and slightly limited range of motion was observed in the right hip joint. The anterior-posterior radiography view showed a Garden type IV femoral neck fracture on the left and a Garden

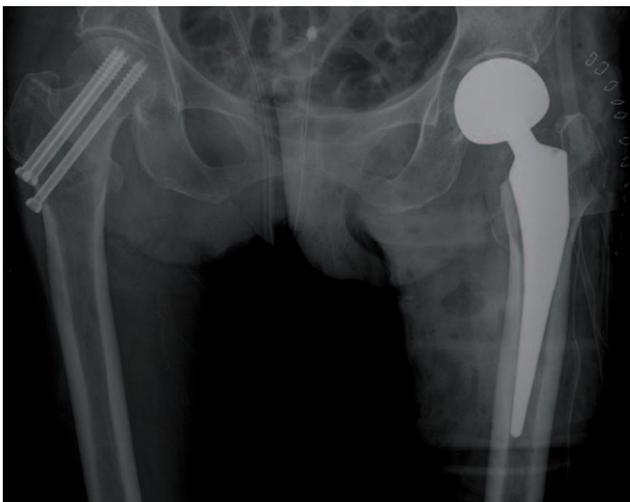
type I femoral neck fracture on the right (Fig. 1). These fractures were verified on computed tomography scans of the hip joints (Fig. 2). The patient underwent surgery 2 days after admission. *In situ* pinning was performed for the right side under general anesthesia, using three cannulated screws without reduction in a supine position. Then, her posture was changed to a lateral position to carry out a bipolar hemiarthroplasty (Fig. 3). She moved around in a wheel chair and continuously exercised with a continuous passive motion machine 4 weeks after surgery, after which she ambulated using a weight-bearing orthosis. The 3 month follow-up X-ray revealed bone union of the right femoral neck and



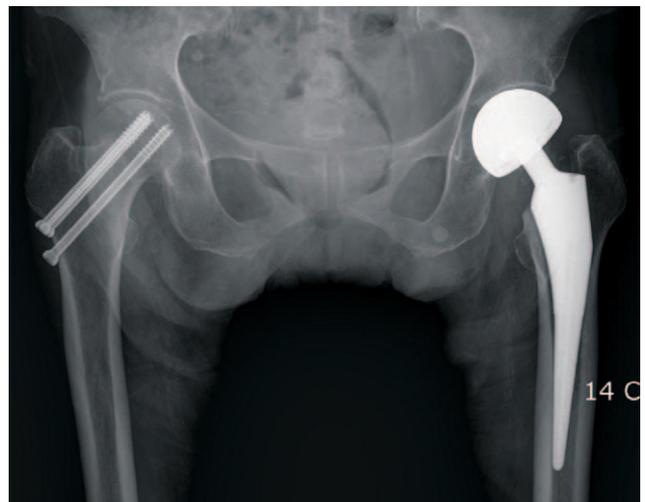
**Fig. 1.** Anteroposterior radiograph of the pelvis shows bilateral femoral neck fractures. Garden type I fracture of femoral neck on the right hip and a Garden type IV fracture of the femoral neck on the left hip.



**Fig. 2.** Bilateral femoral neck fractures were confirmed by computed tomography.



**Fig. 3.** Anteroposterior radiograph of the pelvis shows bilateral femoral neck fractures treated surgically (*in situ* screw fixation of the right hip and bipolar hemiarthroplasty of the left hip).



**Fig. 4.** Follow-up X-ray shows bone union of the right femoral neck and no specific lesions such as stem loosening or subsidence in the left hip 3 months postoperatively.

nothing unusual or abnormal was found in the area of the bipolar hemiarthroplasty on the left side (Fig. 4).

## DISCUSSION

Simultaneous bilateral femoral neck fractures do not occur commonly. Such fractures have been considered the result of powerful muscular contractions induced by electroconvulsive therapy<sup>2)</sup>. However, this injury has also been associated with massive trauma, electrical injury, and primary or secondary bone diseases. A few cases have been reported in the elderly after simple falls. Sood et al.<sup>3)</sup> reported fracture cases of elderly patients without any underlying disease due to a simple fall. Csotye et al.<sup>4)</sup> reported that a 35-year-old woman, without any particular medical history, had bilateral femoral neck fractures due to transient osteoporosis without trauma while pregnant.

Many mechanical factors should be considered in these bilateral injuries. It is impossible to determine how the fractures occur. Because simultaneous bilateral femoral neck fractures have historically mainly occurred in patients who underwent electroconvulsive therapy, it has been believed that strong muscular contractions in both hips causes this injury. Powell<sup>2)</sup> reported a case analysis of 20 bilateral femoral neck fractures and 17 patients had such fractures following electroconvulsion therapy and three due to a convulsion. They believed a correlation existed between bilateral femoral neck fractures and strong muscular contractions following electroconvulsive therapy. Moreover, strong uncontrollable muscular contractions of the proximal thigh may generate a force in the direction of the groin; thus, causing a hip injury in cases where a fracture occurred following seizure activities.

However, several more recent cases cannot be explained by this injury mechanism. For example, a femoral neck fracture may occur when the hip joint is abducted, extended, or rotated externally in children due to a fall from a bicycle with one leg stuck in the bicycle or if abduction force from a direct impact is applied to the femoral neck as the child places their legs on the ground<sup>5)</sup>.

The injury mechanism of a unilateral femoral neck fracture is that the fracture occurs by direct impact on the great trochanter as the patient falls, or a fracture may occur as the femoral neck is rotated backward by means of external rotation of the leg in a situation where the femoral head is secured by the joint capsule and iliofemoral ligament<sup>6)</sup>. In this case, the injury mechanism may not be

clear. However, patients with severe osteoporosis may have simultaneous bilateral femoral neck fractures when both hip joints are abducted and rotated externally if they suddenly fall with their legs on the ground.

The comorbidity rate in elderly patients is higher than that in younger patients, resulting in a higher mortality rate. Grisoni et al.<sup>7)</sup> reported that mortality in the elderly with simultaneous bilateral hip fractures (50%) was twice that in younger patients (25%). Sood et al.<sup>3)</sup> operated with a single-stage in the supine position without repositioning the patient to shorten total operating time. McGoldrick et al.<sup>8)</sup> performed single-stage, uncemented hemiarthroplasty in a patient with cardiovascular disease to avoid the so-called "cement-reaction". In this case, a single-stage, uncemented hemiarthroplasty was also performed. We performed closed pinning first because a hip could dislocate during repositioning to the supine position to perform closed pinning if the hemi-arthroplasty is performed first. The timing of weight bearing was determined considering the risk of re-injury, hip dislocation and metal failure. Therefore, we thought that wheel-chair ambulation up to postoperative day 28 was safe. The approaches for simultaneous bilateral femoral neck fractures including management and rehabilitation should differ from those of unilateral femoral neck fractures.

Proximal femoral fractures among the elderly are associated with high morbidity and mortality rates. In particular, morbidity and mortality may be higher in patients with a simultaneous bilateral proximal hip fractures<sup>7)</sup>. A prolonged bed-ridden state may lead to urinary tract infection, pneumonia, deep venous thrombosis, and soreness, which may be lethal. For these reasons, hip joint fracture treatment guidelines recommend surgery within 48 hours to minimize the bed-ridden period. Therefore, early diagnosis is essential and delayed diagnosis by overlooking bilateral fractures must be avoided.

No case of simultaneous bilateral femoral neck fractures has been reported in Korea until now. Elderly Korean patients typically have a lower body mass index than that of Westerners but are often burdened with calcium deficiency and may have a high osteoporosis prevalence rate. Thus, the possibility of simultaneous bilateral femoral neck fractures may not be abated due to severe bone deficits. Accordingly, clinicians should consider simultaneous bilateral femoral neck fractures, even in cases with unilateral hip joint pain and should avoid missing a bilateral manifestation. In particular, attention must be paid to patients with dementia or

unconsciousness.

This case shows that bilateral femoral neck fractures can occur after a simple mechanical fall in the elderly even in the absence of epilepsy or major trauma. Thus, the orthopedic surgeon, emergency staff, and paramedics should be aware of the risk of this injury when managing traumatic injuries in patients with dementia.

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