

Valgus Impacted Non-displaced Subcapital Femoral Neck Fracture in Elderly Patient

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Femoral neck fractures are difficult to treat and frequently come with complications. Elderly patients with femoral neck fractures are at significant risk therefore frequently receive arthroplasty. This case shares the successful treatment of an 84-year-old female with a non-displaced femoral neck fracture, fixed with the Femoral Neck System (FNS), and had her walking ability restored to the same level as before the fracture.

Fracture Classification:

AO 31B1.1

Garden II / Pauwels II

1. INTRODUCTION

The incidence of hip fractures is expected to increase substantially based on predicted changes in population demographics around the world. Hip fractures are a major public health problem, and are associated with dependency, morbidity, and mortality. By the year 2050 it is predicted that hip fractures will rise to 6.3 million per year, and to reduce the burden on the healthcare system better treatment options, in addition to prevention and better diagnosis, are recommended.¹

Treatment of non-displaced femoral neck fractures consists of internal fixation with multiple cannulated screws, pins (such as Hansson Pins), and sliding hip screws. While these options are effective, clinical

complications are not uncommon. Reoperations due to varus collapse caused by mechanical failure and loss of stability of multiple cannulated screws can occur in up to 13% of cases.² Lateral protrusion of implants resulting in patient thigh pain is experienced in 4.3% and 3.6% of cases, for multiple cannulated screws and sliding hip screws respectively.^{3,4} Sliding hip screws are more invasive compared to multiple cannulated screws and may result in a larger drop in hemoglobin levels, longer hospital stays, and increased postoperative infection rates.^{5,6} The Femoral Neck System (FNS) was designed to provide the angular stability of sliding hip screws with the minimal invasiveness of multiple cannulated screws, while reducing lateral protrusion and procedural complexity.^{7,8}

CASE REPORT

2. CASE REPORT

2.1 Pre-operative

An 84-year-old female Japanese patient presented with left sided hip pain after falling while walking. Initial x-rays indicated a non-displaced subcapital femoral neck fracture, with possible valgus impaction of the femoral neck (Figure 1). A Pauwels Type II or AO/OTA fracture and dislocation classification 31B1.1 was confirmed with 2D Computed Tomography (CT) imaging (Figure 2).



Figure 1: Pre-operative radiographs of left femoral neck

2.2 Intra-operative

The following day the patient underwent surgery to stabilize the subcapital femoral neck fracture with the FNS implant. Intraoperatively a traction table was used to position the patient and the fracture was reduced manually through traction and internal rotation to regain leg length. Alignment was checked in both the AP and Lateral views (Figure 3). While the surgical technique recommends the insertion of a femoral neck guide wire to prevent any inadvertent rotation of the femoral head, the fracture reduction appeared stable and was observed throughout to remain stable.

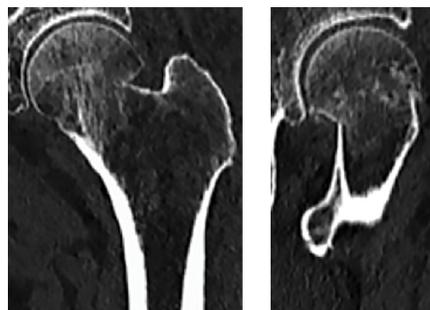


Figure 2: Pre-operative 2D CT images (coronal and sagittal)

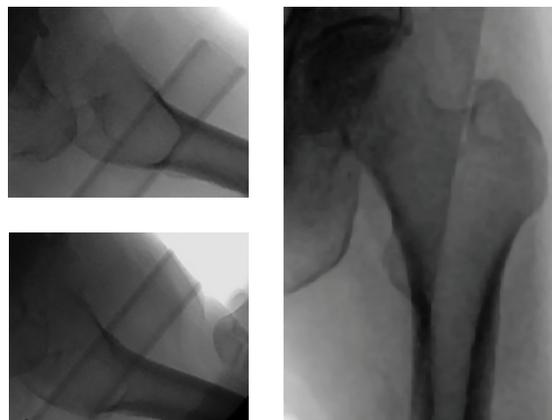


Figure 3: Intra-operative radiographs of fracture reduction with traction

CASE REPORT

A guide wire was placed centrally in the femoral neck, using a 130° angled guide, to provide implant measurement (Figure 4). The guide wire measurement device indicated a length of 92 mm from the center of the femoral head. Technique recommends rounding down (i.e. 90 mm) and remove 5 mm (i.e. 85 mm) from the value seen on the measuring device to determine the appropriate implant size, therefore an 85 mm FNS implant was used.

The bolt is inserted over the central guide wire into a pre-reamed hole. Special consideration was taken to ensure the plate was positioned along the femoral shaft, and the guide wire was subsequently removed. The antirotation-screw was inserted next, followed by the locking screw (Figure 5). If required, intraoperative compression of fragments can be applied with the use of the multifunction rod – acting as a compression instrument – which should be done after the antirotation-screw and locking screw are inserted.

2.3 Post-operative

The day after surgery the patient was able to fully weight bear during walking and had no perioperative complications at discharge (Figure 6). At the 3-month follow up the patient had no reported complications; her Harris Hip score was 84 and walking ability was restored to the same level as before the fracture.

The patient was allowed to weight bear as tolerated after surgery. Her post-operative course was uncomplicated. She was seen at 2-week, 6-week, and 3-month intervals and was noted to be pain-free and doing well. At 3 months she had completely recovered from her injury (Figure 7).

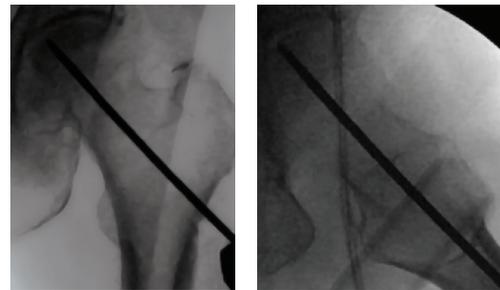


Figure 4: Intra-operative radiographs of the measuring guide wire placement

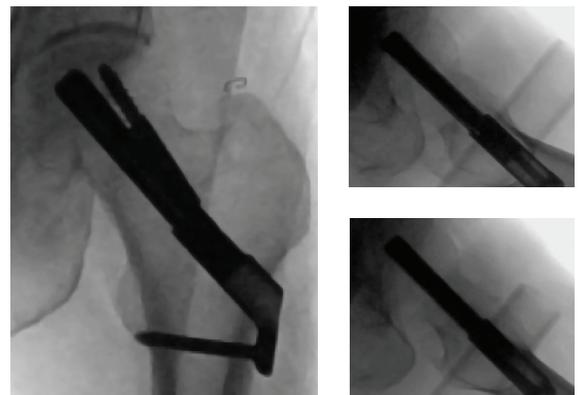


Figure 5: Intra-operative radiographs post fixation

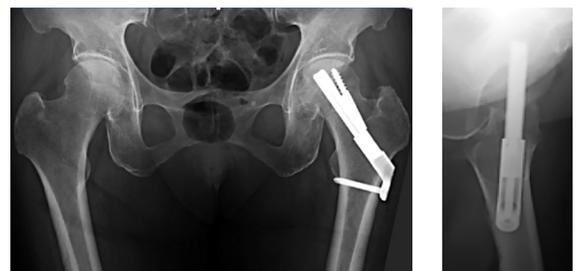


Figure 6: Immediate post-operative radiographs



Figure 7: 3-month post-operative radiographs

CASE REPORT

3. DISCUSSION

The FNS implant has a few design features that are beneficial to its clinical use. The smooth bolt maintains the fracture reduction during implant insertion and the antirotation-screw is designed to provide rotational stability; the divergence angle between the two components allows implant placement in small femoral necks. These benefits are complimented by a minimally invasive surgical technique. Early experience with FNS is favorable, and through this case the implant is suitable for the treatment of patients with non-displaced subcapital femoral neck fractures and multiple comorbidities.

4. SURGEON PROFILE



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†Benchtop testing may not be indicative of clinical performance.

Results from case studies are not predictive of results in other cases. Results in other cases may vary.



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