



Impact of Rehabilitation in a Complex Case of Intertrochanteric Fracture in Geriatric – A Case Report

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Authors' contributions

This work was carried out in collaboration among all authors. Authors SN and MVJ conceptualized and took the case, authors MVJ and DP designed the methodology and implication of treatment, author MVJ assisted in documenting the case. Authors SN, MJ and DP wrote the manuscript. All authors read and approved the final manuscript.

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Case Report

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ABSTRACT

Peri-trochanteric femoral fractures are among the most prevalent fractures in the aged population. Injury and trauma are the leading causes of intertrochanteric fractures. The intertrochanteric aspect of the femur is made up of dense trabecular bone and lies between the greater and lesser trochanters. The female to male ratio for sustaining these fractures is seen between 2:1 and 8:1. Patients with femoral neck fractures are usually in geriatric age group. The dynamic screw approach is used to treat intertrochanteric fractures surgically. An 88-year-old male patient with left intertrochanteric fracture, diagnosed on x-ray after a fall in toilet was operated and was referred immediately for physical therapy, which included strengthening exercises, balance retraining, and breathing exercises. According to the case study, a physiotherapy treatment technique resulted in considerable and gradual improvement of functional goals.

Keywords: *Intertrochanteric fracture of femur; dynamic hip screw (DHS); physiotherapeutic rehabilitation.*

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1. INTRODUCTION

Pertrochanteric femoral fractures are the most prevalent fractures in the geriatric population and are classified as trochanteric femoral fractures. Extracapsular proximal femur fractures that occur between the greater and lesser trochanters are known as intertrochanteric fractures. Between the larger and lesser trochanters lies the intertrochanteric aspect of the femur, which is made up of thick trabecular bone. The calcar femorale is a solid bone wall that runs from the femur shaft's posteromedial aspect to the femoral neck's posterior section. The stability of a fracture is determined by its structure. When compared to the femoral neck, the wide metaphyseal area has a better blood supply, resulting in a higher union rate and less osteonecrosis [1]. The most frequent kind of hip fracture is a femur intertrochanteric fracture, which is mainly caused by mild falls in elderly people with osteoporosis. Due to the increased average life expectancy of elderly persons, the number of femur intertrochanteric fractures is on the rise. Furthermore, mere plain radiography may be insufficient to diagnose these fractures, necessitating detailed radiographic interpretation and physical examination [2]. Internal fixation, either intramedullary (nails) or extramedullary (screws or plates), is the most common surgical therapy for intertrochanteric fractures. Internal fixation procedures have been shown to provide instant pain relief, quick mobilization, expedited rehabilitation, and the ability to maintain independence [3]. The current treatment standard is internal fixation and early mobilization. Bone quality, fragment geometry, reduction, implant type, and implant location are all factors that affect the mobility and strength of implant assemblies. Only the quality of the reduction, as well as the implant's selection and location, are within the surgeon's control. Extra medullary devices, such as DHS, and intramedullary devices, such as PFN, are the two types of implants used to treat intertrochanteric fractures. For intertrochanteric fractures, the DHS with side plate assembly is the most widely utilised device. It's a non-collapsible fixation device that allows the proximal fragment to collapse or rest on the fixation device in search of a stable location [4]. PFN is the most recent implant used to treat intertrochanteric fractures. This implant is a cephalomedullary device with various potential advantages, including being intramedullary, effective load transfer, and a shorter lever arm, which results in less stress transfer and fewer implant failures. In light of

these circumstances, the purpose of this study is to evaluate the results of DHS and PFN in the surgical therapy of intertrochanteric fractures depending on the type of fracture, implant choice, patient condition, and bone [5]. As above case seen, there are a variety of physical therapy categories and techniques that may be used to treat a patient with this sort of fracture. Manual techniques, strengthening, proprioception, gait or ADL training, motor stimulation equipment, and analgesia are some of the methods used in rehabilitation, which can be done at home or in a clinic. At 7 and 13 weeks following surgery, recovery of walking speed and ability, postural stability, lower-limb muscular power, and discomfort [6]. At 7 and 13 weeks following surgery, recovery of walking speed and ability, postural stability, lower-limb muscular power, and discomfort. At 7 and 13 weeks following surgery, recovery of walking speed and ability, postural stability, lower-limb muscular power, and discomfort [7].

1.1 Clinical Presentation

An 88-year-old man presented with a history of a fall while descending the stairs, which resulted in an injury to the lateral aspect of his left hip region on 30/09/2021. Patient gave a history of immediate occurrence of swelling and inability to move the affected left lower extremity, along with pain when initiating any a movement. Then he was brought to the hospital after an hour by the relatives. X ray was done and the patient was diagnosed with two part displaced intertrochanteric femur fracture. On 6th October 2021 he was managed with open reduction internal fixation with Dynamic hip screw and then patient was referred to physiotherapy for rehabilitation.

Table 1. Timeline of presentations of case

Date of Injury	30/09/2021
Date of admission	06/10/20021
Date of operation	12/10/2021

1.2 Clinical Findings

On Observation: Patient was in supine lying position with hands by the side, left lower extremity was slightly externally rotated with knee in extension and ankle in 10 degrees of plantar flexion with a pillow between the two legs. The stitches on the lateral aspect were covered with gauze and bandage.

On Palpation: The distal pulses (Dorsalis Pedis artery and posterior tibial pulse) were palpable indicating no vascular insufficiency. Grade 2 tenderness on lateral aspect of thigh at suture site was present. Mild swelling was present on the ankle.

test which indicated a reduced range of ankle dorsiflexion with complete knee extension than with knee flexed.

Pain: On Numeral pain rating scale pain was 7/10 in supine lying and 9/10 in long sitting.

On Examination: Bilateral gastrocnemius tightness was present identifies by Silfverskiold

Range of motion: The ranges for left hip could not be assessed due to pain.

Table 2. Pre-rehabilitation ranges for knee and ankle ranges

Joint	Right side	Left side
1. Knee flexion	0°-100°	0-30°
2. Knee extension	100°-0°	30°-0°
3. Ankle dorsiflexion	0°-15°	0°-10°
4. Ankle plantar flexion	0°-30°	0°-25°

1.3 Investigation



Fig. 1. X-ray of Internal fixation of Intertrochanteric fracture of femur (lateral view)



Fig. 2. X-ray of Internal fixation of Intertrochanteric fracture of femur (anteroposterior view)

1.4 Management

The treatment protocol considering the age of the patient was tailor made and the surgical procedure done for the management.

1.4.1 Treatment week: Post- operative day 1 to a week

Educating the patient and the caregivers about the precautions to be taken including avoiding adduction, internal rotation and weight bearing of the affected extremity. Elevation of the limbs with the help of 2 pillows to keep the limb at the or slightly above the level of heart when swelling is seen on the lower limbs. Expected time of recovery to achieve functional level of muscle strength and ranges are told. Active range of motion of hip and knee flexion and hip abduction were initiated to prevent post-operative stiffness followed by isometric exercises of the quadriceps and glutes without holds. A total of 50 repetition progressed to 100 by the end of first week was the goal.

1.4.2 Treatment week: Post- operative day 7 to 4th week

Passive ranges and weight bearing on affected extremity without an assisted device was still restricted. Along with all the previous active range of motion exercises and isometrics bed side sitting to achieve 90 degrees of knee flexion was initiated. A hold of 5 seconds was added to the isometric exercise which was progressed to 10 second by the end of the week.

1.4.3 Treatment week: Post- operative week 4th

Active assisted range of motion was now initiated for hip and knee to improve the range of motion along with all the active range of motion exercises. Isometrics of hamstrings, quadriceps and glutes with 10 seconds hold with a frequency of 100-150 repetition throughout the day were initiated. In bed side sitting mild manual

resistance to dynamic quadriceps exercise and unilateral bridging with holds was initiated with a dosage of 50 repetitions throughout the day. Ambulation with a walker was also initiated 10 m thrice a day. Patient was taught breathing exercises and sensitization to dyspnea while ambulating to avoid early fatigue.

Outcome measure: Lower Limb functional test-Scale used to improve mobility in disability in the elderly patient.

Pre-minimum score – 28/80
Post-minimum score – 56/80

2. DISCUSSION

Extra capsular proximal femur fracture is the most common in elderly and the management depends upon the ambulatory status of the individual. The non -operative management is the first choice only when the patient is non ambulatory or is at a high risk of pre operatively [8]. Dynamic hip screw with minimal invasive technique has found to be cost effective and with the most effective functional outcome [9].

Exercise rehabilitation plays an important role for early recovery after operative procedures, which begins with management of pain. Electrical muscle stimulation in a study conducted by Christine m et al was used to strengthen the quadriceps and manage pain [10]. A study conducted suggested that high quality care in hip fracture should include training with education, reinforcement of precautions and limiting weight bearing till the fracture line is stable. Home exercise programme should continue till a minimum of 6 months post -operative to maintain the long term integrity of the joint [11]. A summary of all the aspect that should be considered both during inpatient rehabilitation and outpatient are as follows: prevention of fear of fall with strength, balance and endurance training. Assessing environmental factors, to modify the activities of daily living and appropriate assistive device prescription.

Table 3. Pre and post -operative ranges for affected lower limb

Joint	Pre - rehabilitation	Post-rehabilitation
Knee flexion	0°-30°	0°-95°
Knee extension	30°-0°	95 °-0°
Ankle dorsiflexion	0°-10°	0°-15°
Ankle plantar flexion	0°-25°	0°- 30°

3. CONCLUSION

Proper strength, balance, and endurance training should be emphasised throughout inpatient and outpatient rehabilitation to reduce the risk and anxiety of falling following hip fractures. Rehabilitation directly impacts patient's functional dependency post operatively. Therefore early rehabilitation to regain and retrain, the strength and muscles respectively is beneficial.

CONSENT

Patient was informed about the study and informed consent was taken from the patient.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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