Impact of Rehabilitation in a complex case of Intertrochanteric fracture in geriatric – A Case Report

Abstract

Pertrochanteric 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 is seen between 2:1 and 8:1. Patients with femoral neck fractures are usually in their latter years. The dynamic screw approach is used to treat intertrochanteric fractures. The patient is then begun on medical treatment, which often consists of analgesics. An 88year old male patient with left intertrochanteric fracture was diagnosed on x-ray after a fall in toilet. Following the event, the patient had immediate physical therapy, which included strengthening exercises, thoracic expansion exercises, and breathing exercises. According to the case study, a physiotherapy treatment technique resulted in considerable and gradual improvement of functional goals.

Keyword: Intertrochanteric fracture of femur, Dynamic hip screw (DHS), physiotherapeutic rehabilitation.

Introduction

Pertrochanteric femoral fractures are the most prevalent fractures in the senior population and are classified as trochanteric femoral fractures. Extra capsular fractures of the greater and lesser trochanters can occur. Extra capsular fractures of the greater and lesser trochanters are a possibility. The gluteus medius, gluteus minimus, obturator internus, piriformis, and vastus lateralis all insert at the greater trochanter, which also acts as the origin of the vastus lateralis. The iliacus and psoas major, collectively known as the iliopsoas, insertion point for the lesser trochanter. From the posteromedial aspect of the femur shaft to the posterior region of the femoral neck, the calcar femorale is a vertical wall of thick bone. This structure is significant because it determines the stability of a fracture (1). In comparison to femoral neck fractures, the large metaphyseal region has a more abundant blood supply, which contributes to a higher union rate and less osteonecrosis (2). These fractures, like all hip fractures, have a high morbidity and mortality rate. Intertrochanteric fractures account for roughly half of all fractures that occur each year, totaling 280,000. By 2040, it is expected to increase by 500,000 (4). The female-to-male ratio varies from 2:1 and 8:1 in the United States. The majority of patients with femoral neck fractures are older (5). Early operation and the use of internal fixation apparatus can reduce mortality and morbidity and improve functional end results in the group of stable intertrochanteric fractures. Skeletal traction can result in more rapid union, less complication, and generally good functional end results in the case of an unstable intertrochanteric fracture. We believe that this is the best treatment option for this group (6). The study enrolled a total of 186 cases, with 115 men and 71 women participating. In all cases, surgical procedures were carried out, and a Gamma 3 intramedullary nail was placed in the medullary cavity (7). Surgical site infection (SSI) is a difficult complication after intertrochanteric fracture surgery, but there has been no large sample size study to investigate its incidence and risk factors. The purpose of this study was to look into the occurrence and risk factors of SSI after intertrochanteric fracture surgery. A total of 1941 patients who underwent intertrochanteric fracture surgery between October 2014 and December 2018 were included in the study. Demographic information, surgical variables, and preoperative laboratory indexes were obtained from a prospective database and compared to hospital records. The optimal cutoff value for quantitative data was discovered using receiver operating characteristic analysis. To analyses the risk factors, univariate and multivariable analyses were performed. In total, 25 patients (1.3%) developed SSI, with 22 (1.1%) developing superficial infection and 3 (0.2%) developing deep infection. Gender (odds ratio 2.64, P =.024), time to surgery>4 days (OR 2.41, P =.046), implant (intramedullary or extramedullary devices) (OR 2.96, P =.036), and ALB35 g/L (OR 2.88, P =.031) remained significant factors after multiple variables were adjusted. Finally, the incidence of SSI after intertrochanteric fracture surgery was 1.3 percent, with 1.1 percent for superficial infection and 0.2 percent for deep infection. Gender, surgery time >4 days, implant

(intramedullary or extramedullary devices), and ALB<35 g/L were independent risk factors for the rate of SSI (8).

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 bought to the hospital after an hour by the relatives. X ray was done and diagnose 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.

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

Table 1: Timeline Of Presentations Of Case

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.

On Examination: Bilateral gastrocnemius tightness was present identifies by Silfverskiold 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.

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

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°

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

Investigation:

Figure 1: X-ray of Internal fixation of Intertrochanteric fracture of femur (lateral view)

Figure 2: X-ray of Internal fixation of Intertrochanteric fracture of femur (anteroposterior view)

Management

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

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.

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.

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.

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°

TABLE 3: Pre and Post -Operative Ranges For Affected Lower Limb

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

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 (9)

. Dynamic hip screw with minimal invasive technique has found to be cost effective and with the most effective functional outcome(10).

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(11). 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 (12). 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.

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.

References

1. A Case Report of Fractured Tibia with Improved Outcomes Through Early Physiotherapy Approach | Bioscience Biotechnology Research Communications [Internet]. [cited 2021 Nov 15]. Available from: https://bbrc.in/a-case-report-of-fractured-tibia-with-improved-outcomes-through-early-physiotherapy-approach/

2. Karakus O, Ozdemir G, Karaca S, Cetin M, Saygi B. The relationship between the type of unstable intertrochanteric femur fracture and mobility in the elderly. J Orthop Surg. 2018;13(1):1–5.

3. Sharma A, Sethi A, Sharma S. Treatment of stable intertrochanteric fractures of the femur with proximal femoral nail versus dynamic hip screw: a comparative study☆. Rev Bras Ortop. 2018;53:477–81.

4. Yang Y, Lin X. Epidemiological features of 877 cases with hip fraction. Zhonghua Liu Xing Bing Xue Za Zhi Zhonghua Liuxingbingxue Zazhi. 2014;35(4):446–8.

5. Darware M, Naqvi WM. A case report on Physiotherapy rehabilitation accelerating the recovery of older patient with anterior cruciate ligament reconstruction. 2020;6.

6. Clawson DK. Intertrochanteric fracture of the hip. Am J Surg. 1957;93(4):580–7.

7. Babar TK, Bele AW, Singh NC, Qureshi MI, Kovela RK, Kulkarni CA. A Case Report of Comminuted Patella Fracture with Open Reduction. J Pharm Res Int. 2021 Oct 2;1–5.

8. Incidence and risk factors of surgical site infection after intertrochanteric fracture surgery: A prospective cohort study - Zhao - 2020 - International Wound Journal

9. Attum B, Pilson H. Intertrochanteric Femur Fracture. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 [cited 2021 Oct 25]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK493161/

10. Kandel PR, Pathak L, Singh GP, Baral R. Minimal invasive dynamic hip screw fixation for intertrochanteric fractures of femur. J Univers Coll Med Sci. 2016;4(1):26–31.

11. McDonough CM, Harris-Hayes M, Kristensen MT, Overgaard JA, Herring TB, Kenny AM, et al. Physical Therapy Management of Older Adults With Hip Fracture: Clinical Practice Guidelines Linked to the International Classification of Functioning, Disability and Health From the Academy of Orthopaedic Physical Therapy and the Academy of Geriatric Physical Therapy of the American Physical Therapy Association. J Orthop Sports Phys Ther. 2021;51(2):CPG1–81.

12. Leland NE, Lepore M, Chang SH, Wong C, Freeman L, Crum K, et al. Delivering high quality hip fracture rehabilitation: the perspective of occupational and physical therapy practitioners. Disabil Rehabil. 2018 Mar;40(6):646–54.