International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 14, No. 3, March 2025 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_14.3.2025.43

ORIGINAL RESEARCH

Outcome of total hip arthroplasty in neck of femur fracture in elderly

[1]Dr. Vishu Trivedi, [2]Dr. Sachin Samaiya, [3]Dr. Dhruv Lashkare

[1]3rd year PG, [2]Professor, [3]Assistant Professor, Department of Orthopaedics, RKDF Medical College Hospital and Research Centre, Bhopal, India

Corresponding author
Dr. Vishu Trivedi
3rd year PG, Department of Orthopaedics, RKDF Medical College Hospital and Research Centre, Bhopal, India
Email: vishutrivedi18@gmail.com

Received: 29 January, 2025 Accepted: 26 February, 2025 Published: 09 March, 2025

ABSTRACT

Background and Purpose: Femoral neck fractures in the elderly are frequent, represent a great health care problem, and have a significant impact on patient's life. If not treated early and adequately they can lead to prolonged immobility which in turn can either cause co-morbidities like pressure sores, constipation, deep vein thrombosis, pulmonary embolism, depression, muscle and joint stiffness or make it difficult for patient to regulate pre-existing diseases such as diabetes and hypertension which are rather common in old age group. Reconstruction options used for hip Arthroplasty include unipolar hemiarthroplasty, bipolar hemiarthroplasty and total hip Arthroplasty (THA). Total hip Arthroplasty (THA) is one of the most consistently successful surgeries performed in orthopaedics. THA provides reliable outcomes in terms of pain relief, functional restoration, and overall improved quality of life. The purpose of this article is to contemplate the outcomes of total hip Arthroplasty (THA) in fracture neck of femur. **Method and materials:** All the patients were treated with total hip Arthroplasty with Moore approach**.** 30 patients of age >60 years underwent THA due to fracture neck of femur. Harris hip score (HHS) and Visual analogue scale (VAS) was used to assess the outcome on follow up after a minimum of 6 months. **Conclusion:** The use of THA in patients of age ≥60 years of age described here yielded favorable results and a relatively low rate of complications. On follow up after 6 months there was significant increase in Harris Hip score and patients were able to carry out their day to day activity.

INTRODUCTION

Neck of femur fractures are common injuries, especially seen in the elderly and are usually associated with low energy falls.[1] As per a report of 2019, incidence of Neck of femur fracture in India was 129 per 100,000 people of age above 50 yrs.[2] Most of the blood supply to the head of the femur is provided by the medial and lateral circumflex branches of the profunda femoris artery, which is a branch of the femoral artery (the profunda femoris is the deep artery in the upper thigh). These medial and lateral circumflex femoral arteries form a ring around the neck of the femur, and from this ring, numerous small arteries extend to supply blood to the femoral head.[3] This arterial supply is susceptible to disruption due to various reasons such as chronic steroid use, chronic alcohol use, coagulopathy and trauma. Displaced fracture neck of femur is highly associated with avascular necrosis due to damage of arterial supply; this is the reason why arthroplasty is preferred over internal fixation in cases of displaced neck of femur fracture.

The Aim of this paper is to determine the outcome of THR used to treat neck of femur fracture in elders.

ANATOMY

The hip joint is a ball and socket joint formed by articulation of the head of the femur and the acetabulum of the pelvis. The primary function of the hip joint is to provide dynamic support to the weight of the trunk while facilitating force and load transmission from the axial skeleton to the lower extremities, allowing mobility. [4]

The hip joint allows for movement in three axes. The center of all three axis is at the femoral head. Due to the depth of the acetabulum and its fibrocartilaginous collar called Labrum it encompasses 66% to 81% of femur head, which accounts for Hip joint's stability. [5]

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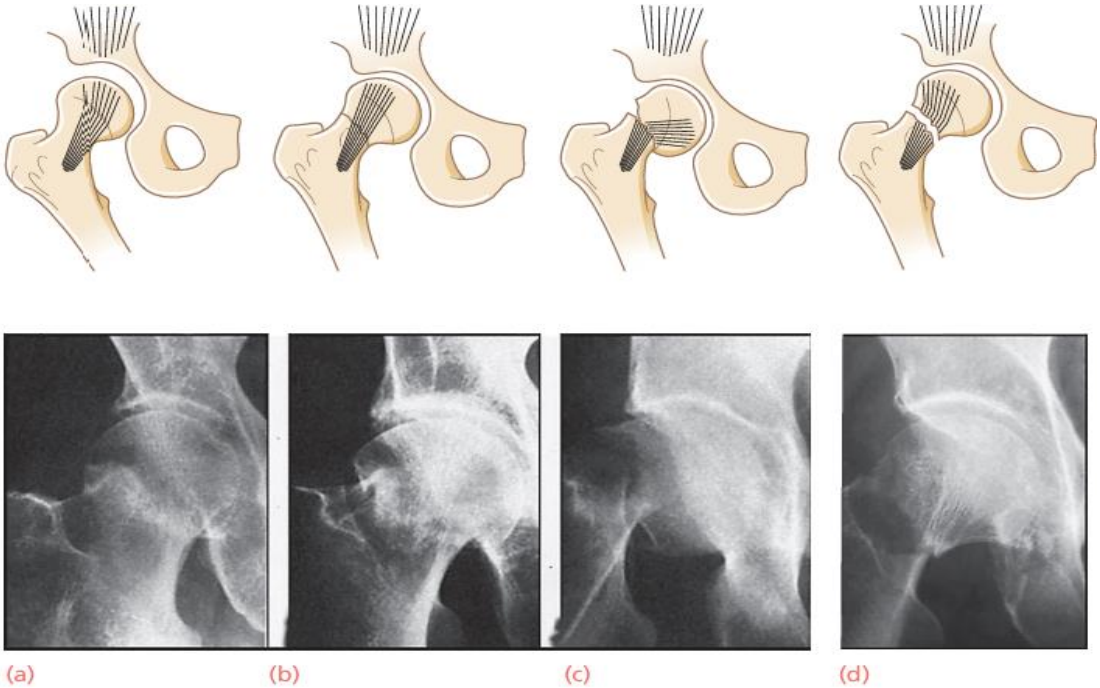
Classification

Garden Classification



a) **Stage I: incomplete fracture (so-called abducted or impacted hip fracture) – the femoral head in this case is in slight valgus.**

b) **Stage II: complete fracture without displacement.**

c) **Stage III: complete fracture with partial displacement – the fragments are still connected by the posterior retinacular attachment; the femoral head trabeculae are no longer in line with those of the innominate bone.**

d) **Stage IV: complete fracture with full displacement – the proximal fragment is free and lies correctly in the acetabulum** so that the trabeculae appear normally aligned with those of the innominate bone.[6]

MATERIALS AND METHODS

30 Patients of age >60 years who had displaced neck of femur fracture were considered. They were treated with total hip arthroplasty using Moore's approach.

Inclusion criteria

- Age: >60 years.
- Gender: Garden Type 3 and 4 fractures.
- Patients with recent (4 weeks old) trauma.

Exclusion criteria

- <60 years age
- Un-displaced fractures {Garden type 1st and 2nd}
- Patients with any medical contraindication to major surgery.
- Patients with lower than normal life expectancy because of cancer, severe inflammatory disease or cardiopulmonary disease.
- Patients of polytrauma.

Investigation

Routine blood tests, radiographic exams, and other necessary assessments for anaesthetic fitness were conducted.

Follow up

Patients were post operatively followed up at **1 month; 3months; 6months** after THR. Assessment was done by Harris hip score and Visual analogue scale for functional outcome as well as pain free mobilization respectively.

APPROACH

Moore's approach also known as Southern approach

After spinal anesthesia, the patient is laid in lateral position on normal side.

A 10 to 15 cm incision is made centered on the posterior aspect of greater trochanter beginning with an incision 6 to 8cm above and posterior to the posterior aspect of greater trochanter. Part of the incision that runs from this point to posterior aspect of trochanter is in line with fibers of gluteus maximus. Curve the incision across the buttock, cutting over posterior aspect of trochanter and continue down along the shaft of femur. The fascia lata is incised on lateral aspect of femur to uncover the vastus lateralis. Fascial incision is lengthened superiorly in line with skin incision and the fibers of gluteus maximus are split in line by blunt dissection.

The short external rotators are tagged using stray sutures and detached 1cm from insertion on the femur.

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The Capsule is incised with an L or T-shaped incision and tagged with stray sutures.

The Hip is flexed, adducted and internally rotated to dislocate the hip posteriorly. [7]

RESULT

Table I - AGE-

AGE of patients (years)	Total
60 – 70	12 (40%)
70- 80	16 (53.3%)
>80	2 (6.6%)

Table II- Garden Class

Class 3	13 (43.3%)
Class 4	17 (53.3%)

Mean blood loss intra operatively was 600 ml (range 450 - 750 ml)
Mean surgery time – 77.5 minutes
Mean hospital stay - 3.8 days

Table III- Complication

Complications	Total
Dislocation	2 (6.6%)
Infection	1 (3.3%)
DVT	1 (3.3%)

Table IV- Mean Harris Hip Score over follow up

Months	Mean HHS
1	72.8
3	79.2
6	88.2

Table V- Comparison of Mean Hip score when neck of femur fracture treated with different modality

Modality	Mean hip score at follow up
Total Hip Arthroplasty	88.20
Hemiarthroplasty	85.90[8]
DHS (Undisplaced fracture)	84.20[9]
Multiple Cancellous screws (undisplaced fracture)	82.60[9]

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DISCUSSION

A fracture of the neck of the femur is a prevalent injury in elderly patients, often resulting from falls or other trauma. These fractures can be categorized based on displacement, with undisplaced fractures generally being less severe, while displaced fractures pose more significant challenges. There are several treatment options available, depending on the nature and severity of the fracture. For undisplaced fractures, cancellous screws or dynamic hip screws (DHS) can be used to stabilize the bone. In cases of displaced fractures, more advanced procedures like hemiarthroplasty, and total hip arthroplasty (THR) are considered.

Among these treatment modalities, hemiarthroplasty offers several advantages. It does not require acetabular reaming, leading to reduced blood loss and shorter surgery duration. However, total hip replacement (THR) tends to provide superior functional outcomes. This includes improved joint range of motion (ROM), reduced long-term pain, and better chances at unassisted ambulation. Furthermore, THR helps prevent the development of acetabular osteoarthritis, which is a common complication in old age and hip fractures that goes untreated.

In this study, data from 30 elderly patients (over 60 years old) with Garden grade 3 or 4 fractures were analyzed. These patients underwent THR and their outcomes were tracked. The average duration of surgery was 77.5 minutes similar to study of Papalia R et al, [10] with an average blood loss of 600 ml during the procedure which is akin to the research conducted by Sculco et al. [11] The patients were discharged after a mean hospital stay of 3.8 days similar to study of Papalia R et al. [10], indicating a relatively quick recovery time. Over the course of follow-up visits, their Harris Hip Scores (HHS) and Visual Analog Scales (VAS) for pain were recorded. These metrics showed a significant reduction in pain over a 6-month period, with many patients able to resume daily activities with minimal discomfort. Postoperative ambulation and general activity levels were comparable to those prior to the fracture, indicating a successful outcome in terms of both function and pain relief.

While there were some postoperative complications, none were deemed significant enough to undermine the positive results of the total hip replacement. One patient experienced a dislocation, which was attributed to non-compliance with post-surgical restrictions, including squatting that can increase the risk of dislocation. Another patient, an 89-year-old woman with an 8-month-old fracture, showed visible muscle atrophy around the affected hip. This atrophy may have contributed to the dislocation, as the weakened muscles could no longer provide adequate support to the hip joint. Numbers of dislocated hips were well within the limit of incidence of dislocation as described by Kunutsor SK et al. in a meta-analysis; incidence had a range of 0.12% to 16%. [12]

A case of superficial infection at the surgical site occurred in a patient who failed to attend follow-up appointments for wound care. Infection occurrence is comparable to study of David j. beau et al. [13] the infection was managed conservatively with debridement, cleaning, and appropriate antibiotic treatment. Additionally, one patient developed deep vein thrombosis (DVT), and it was noted that this individual had a history of smoking for 30 years, which is a well-established risk factor for DVT. Incidence of DVT in this study was about 3.3% while Yu X et al. in their study determined that incidence of DVT in lower limb following total hip arthroplasty can be as high as 19.78%. [14]

Despite these minor complications, the results of total hip replacement in the study cohort were overwhelmingly positive, offering substantial improvements in pain management, functional recovery, and overall quality of life for elderly patients suffering from displaced femoral neck fractures. These findings support the use of THR as an effective treatment option for elderly patients with severe hip fractures, providing both short-term and long-term benefits when performed appropriately.

CONCLUSION

Total Hip Arthroplasty (THA) for the treatment of displaced femoral neck fractures in elderly patients yields positive outcomes in terms of pain relief, functional outcome, and overall quality of life. In this study, the 30 patients treated with THA using the Moore approach exhibited a significant improvement in both Harris Hip Scores (HHS) and Visual Analog Scale (VAS) scores after 6 months, indicating effective pain management and functional recovery.

The procedure demonstrated a relatively low complication rate, with dislocations and infections being infrequent and the average surgical time and blood loss were within acceptable ranges, contributing to a quicker recovery. The mean hospital stay of 3.8 days further supports the efficient recovery associated with THA.

When compared to other treatment modalities, such as hemiarthroplasty, THA provided better functional outcomes, including improved range of motion and unassisted ambulation. Despite the risks associated with any major surgery, such as dislocation and infection, the overall results suggest that THA is a reliable and superior treatment option for elderly patients with displaced femoral neck fractures, offering long-term benefits in terms of mobility and quality of life. The findings of this study support the recommendation of THA for elderly patients with displaced fractures, provided they meet the appropriate operative and non operative inclusion criteria and are effectively managed postoperatively.

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