

## A Hospital Based Radiological Outcome Assessment of Total Hip Arthroplasty in Displaced Neck of Femur Fracture

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Received: 04-09-2022 / Revised: 13-09-2022 / Accepted: 20-10-2022

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Conflict of interest: Nil

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### Abstract

**Aim:** The Purpose of the study was to assess the Radiological outcome of Total Hip Arthroplasty in Displaced fracture Neck of femur.

**Methods:** The present study was conducted in the Department of Orthopaedics, institute of medical sciences BHU, Varanasi, Uttar Pradesh, India for 1 year, Total 100 patients were treated with total hip replacement.

**Results:** Total 100 patients treated with total hip replacement for displaced fracture neck of were included in this study. Out of 100, 35 patients were male and 15 females, most of the patients in were above 50 year and followed by 40-50 year. Majority of the patients had involved right side 60% as compared to left side 40%. Patients scored 56% excellent, 26 good, 8% fair and 10% patients scored poor according to Harris hip score. Acetabular cup inclination is an important component of radiological evaluation. It was measured in the antero-posterior X-ray. The results in our study were as follows: Normal (30-45 degrees) - 17(77%), Vertical (> 45 degrees) - 3 (14%), Horizontal cup (<30 degrees) - 2 (9%). The ideal position of stem of femoral component is central. In this study we had 72% central, 16% each in valgus and 12% varus position.

**Conclusion:** The results from this study showed that Total Hip Arthroplasty gave better results in displaced Intracapsular Neck of femur Fracture radiologically. Also, there was no loosening of Acetabular component or migration of acetabular cup and cup position was normal in 75% cases. Femoral stem position was Neutral in 72% of cases with no vertical subsidence and no femoral component loosening.

**Keywords:** Total hip arthroplasty, Radiological outcome, Neck of femur fracture

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### Introduction

Intracapsular fractures of the proximal femur form a major share of fractures in the elderly. [1] Osteoporosis, co-

morbidities, increased incidence of trivial trauma increases the incidence and complicates the treatment of these

fractures. This high incidence is due to weak bones and increased incidence of trivial trauma. People in this age group suffer from numerous illnesses that can aggravate the morbidity following fractures and complicate the treatment of these fractures. The treatment goal is to return the patient to his or her pre-morbid status of function. Increase in the average lifespan and improved medical facilities have greatly increased the incidence of these fractures.

Management of femoral neck fractures in elderly patients has been controversial. Femoral neck fractures have been considered 'unsolvable fractures' in the older era of orthopedics due to the high rate of associated complications, which include nonunion and avascular necrosis of the femoral head, among others. Presently, there are multiple surgical treatment options (cannulated screws, dynamic hip screw systems, blade plates, hemi and total hip arthroplasty) available. Intracapsular extent of the fracture, tenuous blood supply to the femoral head going through the neck and difficulty in maintaining fracture reduction have been cited as reasons for failure of fixation. [2-4]

Hip replacement arthroplasty (partial or total) is emerging as the most viable treatment option. [5-8] Total hip replacement (THR) is established in osteoarthritis and rheumatoid arthritis and has also been used as primary procedure for displaced fractures of the femoral neck. [9] The major drawback has been the fear of dislocation, reported to occur in 11% (0 to 18). There have been few randomised controlled trials which have compared internal fixation (IF) with THR. Despite a relatively high dislocation rate, particularly in patients with cognitive impairment, [10] THR is recommended as the primary treatment because of the low rate of reoperation and better immediate function of the hip.

The treatment of displaced Neck of Femur fracture in elderly patients is highly controversial. In Hemiarthroplasty there is more chance of Non-union and high rate of bone wear leading to revision surgery. Therefore nowadays Total Hip Arthroplasty (THA) is primarily done to prevent such complications. The goal of THA is to provide full functional state for the patient as swiftly as possible. THA is a challenging surgery done for displaced fracture neck of femur which has good functional as well as radiological outcome. The outcome of THA is usually assessed functionally as well as radiologically. Radiological assessment is equally important for the long term survival of the THA prosthesis. Important factors to consider in choosing any treatment modality are intrinsic, viz. patient age, general medical condition, type of fracture; and extrinsic, viz. availability of facilities and socio-economic status.

The Purpose of the study was to assess the Radiological outcome of Total Hip Arthroplasty in Displaced fracture Neck of femur.

### **Materials and Methods**

The present study was conducted in the Department of Orthopaedics institute of medical sciences BHU, Varanasi, Uttar Pradesh, India for 1 year. Total 100 patients were treated with total hip replacement.

### **Inclusion Criteria**

1. Displaced Intracapsular Neck of Femur Fracture
2. Patients 45-60 years of age
3. Non-union Neck of Femur

### **Exclusion Criteria**

1. Young patients
2. Pathological femur fractures.
3. Associated with other Lower limb fractures
4. Patients with neuromuscular disorders
5. Infections

In our study, we decided to evaluate the radiological outcome of both cemented and uncemented THA. We used Posterior approach in all the cases of THA and we used the second generation cementing techniques for cemented THA. Radiographic evaluation includes Loosening of the acetabulum and femoral components, Inclination of Acetabular cup, Stem position of femoral component, Vertical subsidence, Migration of the Acetabular cup and Heterotopic Ossification. Modified Harris hip score was used for clinical and functional evaluation of patients.<sup>13</sup> Plain X-ray pelvis with both hips and proximal femur—AP view and X-ray of the

operated hip lateral view for radiological evaluation.

### Follow Up

1. Prospective patients were reviewed regularly and at 6 weeks, 3 months, 6 months, 1 year and then yearly follow up.
2. Retrospective study patients were reviewed every yearly.
3. Patients were assessed radiologically using X ray Antero-posterior view of Pelvis with both Hips and Antero-posterior and Lateral view of operated Hip.

### Results

**Table 1: Demographic profile**

Gender	N%
Male	70 (70)
Female	30 (30)
Age in years	
Below 40 years	0
40-50 years	24 (24)
Above 50	76 (76)
Cemented/uncemented	
Cemented	56 (56)
Uncemented	44 (44)
Side	
Right	60 (60)
Left	40 (40)

Total 100 patients treated with total hip replacement for displaced fracture neck of were included in this study. Out of 100, 70 patients were male and 30 female, most of the patients in were above 50 year and followed by 40-50 year. Majority of the patients had involved right side 60% as compared to left side 40%.

**Table 2: Clinical and functional evaluation of study subjects using Harris hip score**

Harris hip score	N%
Excellent (90-100)	56 (56)
Good (80-89)	26 (26)
Fair (70-79)	8 (8)
Poor (<70)	10 (10)

Patients scored 56% excellent, 26 good, 8% fair and 10% patients scored poor according to Harris hip score.

**Table 3: Complications**

Complications	N%
<b>Acetabular Cup inclination</b>	
Normal (30-45 degrees)	75 (75)
Vertical (> 45 degrees)	15 (15)
Horizontal cup (<30 degrees)	10 (10)
<b>Femoral Stem Position</b>	
Central	72 (72)
Valgus	16 (16)
Varus	12 (12)
Subsidence	3 (3)
Migration of Acetabular cup	2 (2)
Heterotopic ossification	6 (6)
Dislocation	4 (4)

Acetabular cup inclination is an important component of radiological evaluation. It was measured in the antero-posterior X-ray. The results in our study were as follows: Normal (30-45 degrees) - 17(77%), Vertical (> 45 degrees) - 3 (14%), Horizontal cup (<30 degrees) - 2 (9%). The ideal position of stem of femoral component is central. In this study we had 72% central, 16% each in valgus and 12% varus position.

There were 3% subsidence and 2% migration seen and Class II heterotopic ossification was noted in 6 hip, i.e., 6% incidence who underwent THA. Out of 100, 7 patients with class II heterotrophic ossification was seen. The bone marrow and debris escape when uncemented femoral implant is used however there is less chance for this when cemented implant is used. We had 5 case of dislocation. The dislocation occurred during the 2nd month of the surgery at home.

### Discussion

Hip fractures in the elderly patient group result in implications in medicine, rehabilitation, psychiatry and healthcare economics. Conservative treatment is fraught with all the complications of prolonged recumbency viz. chest infections, formation of pressure sores and disuse osteoporosis. Non-operative

management may be preferable for non-ambulatory, institutionalized patients with marked dementia who experience minimal discomfort within the first few days after the injury. Such patients' "return to pre-injury level of function" is better accomplished without surgery. However, early mobilization is essential to avoid the associated complications. The number of patients falling into this category is usually quite small. [1]

John C and W.H. Harris [11] (1999) presented a series of 188 Harris-Galante porous coated acetabular components that were followed for an average of 122 months. The hips were evaluated with Judet radiographs as well as anteroposterior and true lateral radiographs. 4% (8hips) had osteolytic lesions of the pelvis and less than 1% (1hip) had an osteolytic lesion that necessitated bone grafting. Engh C.A. Jr et al [12] (1997) reported in his series, 174 hips were followed for a minimum of 10years. A total of 7 acetabular components, i.e., 4.02% of the 174 hips were radiographically loose. 4 patients of the 174 hips had symptomatic loosening of the acetabular cup, and the cup was revised eight, nine, ten and 12 years after index arthroplasty.

Zicat and Engh [13] (JBJS 1995) studied 51 cemented and 71 uncemented hips for

evidence of osteolysis. The mean duration of follow up was 105 months. The rate of acetabular osteolysis in the patients who had a cup that had not been inserted with cement was not as high as that associated with cups that had been inserted with cement. The rate of acetabular osteolysis was 18% (13 of the 71 hips) in the uncemented hips with localized and expansile osteolysis pattern. In contrast, the rate of acetabular osteolysis in cemented hips was 37% (19 of 51 hips).

Heterotopic Ossification is seen on x-rays only 3 weeks post operatively, following THA and well defined in 6 months. [14-16] The incidence of heterotrophic ossification ranges from 5% to 90% in various literatures. [17] In our sequence 1 patient with class II heterotrophic ossification seen. The bone marrow and debris escape when uncemented femoral implant is used however there is less chance for this when cemented implant is used.

In a study by Ravikumar et al [18] (JBJS) they reviewed a total of 134 uncemented hips with average follow up of 83 months. Based on Brooker classification Heterotopic ossification was rated as Brooker Class I in 68 hips, Class II in 17 hips, Class III in 3 hips and Class IV in 2 hips, i.e., 50.7% in Class I, 12.7% in Class II, 2.2% in Class III and 1.5% in Class IV. In our study Class II heterotopic ossification was noted in 1 hip who underwent THA. [19]

### Conclusion

The results from this study showed that Total Hip Arthroplasty gave better results in displaced Intracapsular Neck of femur Fracture radiologically. Also there was no loosening of Acetabular component or migration of acetabular cup and cup position was normal in 75% cases. Femoral stem position was Neutral in 72% of cases with no vertical subsidence and no femoral component loosening. Conversely, long term review is essential to assess the

exact mechanisms of polyethylene wear, defect in locking, separation of the liner and pelvic osteolysis.

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