

A Hospital Based Assessment of the Radiological Outcome of Total Hip Arthroplasty in Displaced Fracture Neck of Femur: An Observational Study

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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, ESICMCH, Bihta, Bihar, India for 2 years, Total 200 patients were treated with total hip replacement.

Results: Total 200 patients treated with total hip replacement for displaced fracture neck of were included in this study. Out of 200, 144 patients were male and 56 female, most of the patients in were above 50 year and followed by 40-50 year. Majority of the patients had involved right side 64% as compared to left side 36%. Patients scored 55% excellent, 26% good, 9% fair and 10% patients scored poor according to Harris hip score. Acetabular cup inclination is an important component of radiological evaluation. The results in our study were as follows: Normal (30-45 degrees) – 148 (74%), Vertical (> 45 degrees) - 32 (16%), Horizontal cup (<30 degrees) - 20 (10%). 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

Dislocation is one of the most frequent complications of total hip arthroplasty (THA), with an incidence of 0.2–10% in primary surgery [1,2] and up to 28% in revision cases. [3,4] It is still the first reason for early THA revision and the second reason for revision at any time. [5-8] Particularly, dislocation is the most frequent complication when THA is performed to treat displaced fractures of the femoral neck. [9] Dislocation increases mortality in elderly patients undergoing THA, with a mortality rate of 65% compared to 10% without this complication. [10] THA instability has a multifactorial etiology, and its treatment might be challenging. Patient-related risk factors include old age, female gender, previous hip surgery,

neurological diseases (e.g., dementia and Alzheimer's), neuro-muscular diseases (e.g., Parkinson's, stroke sequelae and myopathies), spino-pelvic abnormalities (e.g., previous spinal disorders and surgery), cognitive impairment during hospitalization and the pathology for which surgery is indicated, namely hip fractures. [11,12]

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.

Although Moon et al [13] carried out a long-term follow-up study of salvage THA in patients with femoral neck fracture after failure of internal fixation, the sample size of patients collected is not large enough. Therefore, a large cohort study with the mid-long term follow-up study is needed to further determine the efficacy and complications of salvage THA. Moreover, little is known about whether outcomes differ substantially between older and younger patients. Young patients make up 3% of patients with femoral neck fracture [14] and they are usually the result of high-energy violent injury. [15]

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, ESICMCH, Bihta, Bihar, India for 2 years. Total 200 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. 13 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	144 (72)
Female	56 (28)
Age in years	
Below 40 years	0
40-50 years	50 (25)
Above 50	150 (75)
Cemented/uncemented	
Cemented	110 (55)
Uncemented	90 (45)
Side	
Right	128 (64)
Left	72 (36)

Total 200 patients treated with total hip replacement for displaced fracture neck of were included in this study. Out of 200, 144 patients were male and 56 female, most of the patients in were above 50 year and followed by 40-50 year. Majority of the patients had involved right side 64% as compared to left side 36%.

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

Harris hip score	N%
Excellent (90-100)	110 (55)
Good (80-89)	52 (26)
Fair (70-79)	18 (9)
Poor (<70)	20 (10)

Patients scored 55% excellent, 26% good, 9% fair and 10% patients scored poor according to Harris hip score.

Table 3: Complications

Complications	N%
Acetabular Cup inclination	
Normal (30-45 degrees)	148 (74)
Vertical (> 45 degrees)	32 (16)
Horizontal cup (<30 degrees)	20 (10)
Femoral Stem Position	
Central	144 (72)
Valgus	32 (16)
Varus	24 (12)
Subsidence	6 (3)
Migration of Acetabular cup	4 (2)
Heterotropic ossification	12 (6)
Dislocation	8 (4)

Acetabular cup inclination is an important component of radiological evaluation. The results in our study were as follows: Normal (30-45 degrees) – 148 (74%), Vertical (> 45 degrees) - 32 (16%), Horizontal cup (<30 degrees) - 20 (10%). 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 heterotropic ossification was noted in 6 hip, i.e., 6% incidence who underwent THA. Out of 100, 7 patients with class II heterotropic 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. [15]

John C and W.H. Harris [16] (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 [17] (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.

Total 200 patients treated with total hip replacement for displaced fracture neck of were included in this study. Out of 200, 144 patients were male and 56 female, most of the patients in were above 50 year and followed by 40-50 year. Patients scored 55% excellent, 26% good, 9% fair and 10% patients scored poor according to Harris hip score. Majority of the patients had involved right side 64% as compared to left side 36%. Zicat and Engh [18] (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).

Acetabular cup inclination is an important component of radiological evaluation. The results in our study were as follows: Normal (30-45 degrees) – 148 (74%), Vertical (> 45 degrees) - 32 (16%), Horizontal cup (<30 degrees) - 20 (10%). 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. Heterotopic Ossification is seen on x-rays only 3 weeks post operatively, following THA and well defined in 6 months. [19-22] The incidence of heterotrophic ossification ranges from 5% to 90% in various literatures. [23] 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 [24] (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.

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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