

Radiological outcome of total hip arthroplasty in displaced fracture neck of femur**Kushagra***Senior Resident, Department of Orthopaedics, Shri Krishna Medical College and Hospital, Muzaffarpur, Bihar, India***Received: 09-07-2020 / Revised: 22-09-2020 / Accepted: 28-10-2020****Abstract**

Aim: to assess the Radiological outcome of Total Hip Arthroplasty in Displaced fracture Neck of femur. **Materials and Methods:** This prospective observational study was carried out in the Department of Orthopaedics at Shri Krishna Medical College and Hospital Muzaffarpur, Bihar, India from December 2017 to March 2019. Total 100 patients were patients treated with total hip replacement. 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. Plain X-ray pelvis with both hips and proximal femur-AP view and X-ray of the operated hip lateral view for radiological evaluation. **Results:** Out of 100, 75 patients were male and 25 female, most of the patients in were above 50 year and followed by 40-50 year. Patients scored 48% excellent, 28% good, 10% fair and 14% patients scored poor. The acetabular cup inclination 80 neutral, 12 vertical and 8 horizontal positions were seen. We had 78 central, 12 each in valgus and 10 varus position. There were 2 subsidences and 1 migration seen and Class II heterotopic ossification was noted in 6 hips, i.e., 6 % incidence that underwent THA. We had 3 case of dislocation (3%). The dislocation occurred during the 2nd month of the surgery at home. **Conclusion:** The results of this study shows that Total Hip Arthroplasty gave better results in Displaced Intracapsular Neck of femur fractures radiologically.

Keywords: polytrauma, hospital stay, complications, DVT

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Introduction

Total hip arthroplasty (THA) is a very common procedure in orthopedic surgery[1]. Total hip arthroplasty is often indicated to relieve pain and increase range of motion in patients with arthritis and other collagen diseases[2]. Postoperative hip dislocation is one of the major complications and has been reported in 0.5 to 10.6 % of patient after primary THA[3,4]. Surgical technique and approach as well as implant selection, implant positioning, patient education and patient-related factors have an impact on the incidence of dislocations. Total hip replacement is one of the most successful and cost-effective

interventions in orthopedic surgical field[5]. Hip replacements have transformed the lives of hundreds of thousands of people regardless of the underlying etiology[6]. Total hip arthroplasty is an operation to restore motion and stability to a joint and function to the muscle, ligaments and other soft tissue structures that control the joint. Implanting an artificial head and socket to replace the degenerated head, fractured head exerted such a profound social impact and enjoyed such a dramatic early success. Various immediate and long term complications may compromise this procedure, but it still remains the greatest boon available to orthopedic patients, and has proved to be the greatest advancement in the field of orthopaedic surgery in the twenty first century[7]. The role of arthroplasty for an acute displaced femoral neck fracture is still a matter of debate[8]. There is ongoing controversy about the relative merits of different types of arthroplasty among specific groups of patients. There is a group of surgeons, which favour THR for acute displaced femoral neck fractures but on the other

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hand, another group of surgeons do not favour this. Paucity of quality data provides an opportunity for extension of this debate. Based on Andrew Whaley and Daniel et al criteria (JBJS 83A 2001)[9] radiological assessment of acetabular components in uncemented acetabulum is done and defined loosening when Migration of > 2mm in horizontal /vertical direction, Rotation of implant, Screw breakage or more than 1mm radiolucent line in all zones. Loosening in cemented acetabular components is assessed in 3 zones defined by De Lee and Charnley criteria (Clin Orth op, 121,174)[10] which manifest as radiolucent line between cement-bone and cement-cup interface, distribution, thickness and progression of these lines, tilting and bulk migration of the socket in relation to the bone in X-rays. Acetabular cup inclination[11] was measured by AP radiograph by 2 lines, one is trans-ischial line and other line parallel to opening of acetabular component, and grouped in to Normal (30-40°), Vertical (>45°) and Horizontal cup(<30°) alignment. Femoral stem position is determined as Varus, Valgus or Centre based on angle made by the lines drawn from mid points of transverse diameter of shaft of femur and the stem of the femoral component at 1cm, 3cm and 5cm from the tip of femoral stem. Heterotopic ossification was graded according to the Brooker et al[12] classification in to Grade I-IV, with Grade IV being Ankylosis.

Observations and measurements were evaluated using the X-ray pelvis with both hips- AP view and X-ray AP/lateral view of the operated hip during post op, 4 weeks and then 5-6 months once follow up.

Material and methods

This prospective study was carried out in the department of Orthopaedics at Shri Krishna Medical College and Hospital Muzaffarpur, Bihar, India from December 2017 to March 2019, after taking the approval of the protocol review committee and institutional ethics committee. After taking informed

consent detailed history was taken from the patient or the relatives if the patient was not in good condition. Total 100 patients were patients treated with total hip replacement.

Inclusion Criteria

- Displaced Intracapsular Neck of Femur Fracture
- Patients 50-60 years of age and above
- Non-union Neck of Femur

Exclusion Criteria

- Young patients
- Pathological femur fractures.
- Patients with neuromuscular disorders
- Infections
- failed cancellous screw fixation
- Intertrochantric fractures and associated acetabular fractures

Methodology

In our study we have decided to evaluate the radiological outcome of both cemented and uncemented THA. We used a 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 - AP view and proximal femur-AP view and X-ray of the operated hip lateral view for radiological evaluation.

Statistical analysis

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2010) and then exported to the data editor page of SPSS version 19 (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics included computation of percentages and means.

Results

Table 1: Demographic profile of the study population

Variables	Number	Percentage
Gender		
Male	75	75
Female	25	25
Age		
Below 30 years	Nil	Nil
50-60years	20	20
Above 60	80	80
Cemented/uncemented		
Cemented	60	60
Uncemented	40	40
Side		
Right	55	55
Left	45	45

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

Harris hip score	Number	Percentage
Excellent (90-100)	48	48
Good (80-89)	28	28
Fair (70-79)	10	10
Poor (<70)	14	14

Table 3: Complications

Complications	Number	Percentage
Acetabular cup inclination		
Normal (30-45 degrees)	80	80
Vertical (> 45 degrees)	12	12
Horizontal cup (<30 degrees)	8	8
Femoral stem position		
Central	78	78
Valgus	12	12
Varus	10	10
Subsidence	2	2
Migration of Acetabular cup	1	1
Heterotopic ossification	6	6
Dislocation	3	3

Discussion

Total hip arthroplasty, or surgical replacement of the hip joint with an artificial prosthesis, is a reconstructive procedure that has improved the management of those diseases of the hip joint that have responded poorly to conventional medical therapy. Current evidence suggests that traditional total hip replacements last more than 10 years in more than 90% of patients. More

than 90% of patients report having either no pain or pain that is manageable with use of occasional over-the-counter medications. The large majority of hip replacement patients are able to walk unassisted (i.e. without use of a cane) without any limp for reasonably long distance[8]. Like any major surgical procedure total hip replacement is associated with certain medical and surgical risks. Although major complications are

uncommon, they may occur. John C and W.H. Harris (JBJS 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% (8 hips) had osteolytic lesions of the pelvis and less than 1% (1 hip) had an osteolytic lesion that necessitated bone grafting [14]. Engh C.A. Jr et al [15] (JBJS 1997) reported in his series, 174 hips were followed for a minimum of 10 years. 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. The other 3 hips were not revised because they were not causing any symptoms. The average duration between the index operation and the diagnosis of loosening was 7.8 years. In our study there was no Loosening of the acetabulum and femoral components. This procedure is riddled with a large number of long-term complications ranging from dislocations including recurrent dislocations. Primary endoprosthetic replacement has been advocated to improve survival by eliminating fracture fixation and healing problems and by allowing early mobilization. Conventional treatment for fracture neck of femur, grade 1 and 2, is open reduction and internal fixation, whereas that for grade 3 and 4 is still controversial. Regarding functional outcome, our study showed that hip replacement for patients in non traumatic groups had better outcome as indicated by better Harris hip score than the traumatic group. We had 3 cases of dislocation (3%). The dislocation occurred during the 2nd month of the surgery at home. The patient was treated by open reduction and trochanteric osteotomy. Another study observed an increased rate of dislocation following posterior approach. His study shows dislocation rate of 2.8% following posterior approach. His findings are in concordance with our observations [16]. Philips studied incidence rates of dislocation along with other parameters after elective total hip replacement and observed dislocation rate of 3.9% [17]. The incidence of dislocation was highest during the immediate postoperative period but remain elevated throughout the first three postoperative months. The normal acetabular cup inclination is 30° to 45°. In our study 80 neutral, 12 vertical and 8 horizontal positions were seen. The ideal position of the stem of the femoral component is central. In this study we had 78 central, 12 each in valgus and 10 varus positions. Varus position of the stem may lead to complications such as anterior thigh pain and

periprosthetic fractures. Till the most recent review the femoral stem position has not changed in any patients. In this study there were 2 subsidences and 1 migration seen. It is seen on x-rays only 3 weeks post operatively, following THA and well defined in 6 months [18-20]. The incidence of heterotrophic ossification ranges from 5% to 90% in various literatures [21,22]. In our study 6 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. The increased distribution of bone debris or marrow elements locally could lead to the stimulation (jbjs 73-A: 191-193, Feb 1991) In a study by William J. Maloney and William H. Harris, (1991 JBJS) the incidence of heterotopic ossification in an uncemented group and a hybrid group were compared. 65 uncemented and 70 hybrid (uncemented acetabular component and cemented femoral component) total hip replacements with minimum follow up of 1 year were reviewed. In the group who had uncemented hip replacement, there was a statistically significant increase in the incidence of heterotopic ossification. No relationship between the age of patient and formation of new bone was established. In our study we had 1 case of heterotopic ossification that underwent uncemented conversion THR. In a study by Ravikumar et al [23] (JBJS) they reviewed a total of 134 uncemented hips with an 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 6 hips, i.e., 6 % incidence who underwent THA.

Conclusion

The results of the present study concluded that that on radiological examination the total hip arthroplasty gave better results in displaced intracapsular Neck of femur fracture and further long term review is essential with larger samples to generalize the findings. This study opens new vistas for future research.

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