

COMPARATIVE STUDY OF FRACTURE NECK OF FEMUR TREATED WITH UNIPOLAR AND BIPOLAR HEMIARTHROPLASTY

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ABSTRACT: OBJECTIVES: This study has been carried out to compare the functional outcome of intracapsular fracture neck of femur treated with unipolar (Austin Moore prosthesis) and bipolar prosthesis. **METHODS:** Fifteen out of thirty patients with displaced fracture of femoral neck treated with unipolar prosthesis and other fifteen of patients treated with bipolar prosthesis from August 2012 to January 2015 in the Department of Orthopedics, Government medical college, Ananthapuram. Functional outcome was assessed and compared using Modified Harris hip score and radiological assessment with a follow up of one year. **RESULTS:** Two groups of patients with mean age 72.2 years in AMP and 65.3 years in bipolar were evaluated and the mean hip score of unipolar was 82.6±8.72 and bipolar was 86.17±8.12 respectively. **CONCLUSION:** Functional outcome with mean Modified Harris hip score is better in Bipolar group than unipolar (Austin Moore prosthesis). Complications like painful hip, acetabular erosion, periprosthetic fractures are more in unipolar group. Hence bipolar prosthesis is better in elderly patients with fracture neck of femur.

KEYWORDS: Austin Moore prosthesis, Bipolar prosthesis, hemiarthroplasty, Modified Harris Hip score.

INTRODUCTION: Fracture of the femoral neck is a common injury. With increasing life expectancy worldwide, the incidence of this fracture is on rise and it is estimated that the incidence of the fracture of hip annually is around 4.5 million by the year 2050.⁽¹⁾ Femoral neck fractures constitute approximately 50% of all hip fractures. The partially displaced Garden III fracture and the fully displaced Garden IV fracture referred to as displaced femoral neck fractures and constitute approximately 70% of the femoral neck fractures.⁽²⁾ In elderly patients, internal fixation with cancellous screws is one of the treatment options. Failure of internal fixation due to complication like avascular necrosis of femoral head and nonunion of femoral neck make way for the Replacement of femoral head is the best mode of treatment for displaced femoral neck fracture. Hemi arthroplasty is procedure in which head is replaced by prosthesis. Hemi arthroplasty may be unipolar or bipolar (in which the head is fixed to the stem) or bipolar (in which there is an additional polyethylene bearing between the stem and the endoprosthesis head component). The second articulation in a bipolar arthroplasty would increase the range of motion and decrease wear on the native acetabulum.

Compared with unipolar hemiarthroplasty, bipolar femoral head replacement has advantages, including low dislocation rate, increased range of motion, lower incidence of hip pain and good Harris hip score.

Moore and bohlman^(3 & 4) introduced hemi arthroplasty in 1940 for tumour of femoral head.

Bateman and Gilbert designed bipolar prosthesis in 1974. Due to wide usage of bipolar prosthesis in the recent past, there exists a need for its functional assessment in comparison to Austin Moore Prosthesis.

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MATERIALS AND METHODS: The present study is of intracapsular fracture neck of femur in elderly patients above the age of 60 years, treated with hemiarthroplasty using uncemented unipolar Austin-Moore's prosthesis (AMP) in 15 patients and bipolar endoprosthesis in 15 patients in the department of Orthopaedics at government medical college and general hospital in Ananthapuramu.

This is prospective study of hemiarthroplasty with Austin Moore prosthesis and bipolar prosthesis. Study evaluated after six weeks, three months and 12 months and compared using modified Harris hip score and radiographs.

INCLUSIVE CRITERIA: Patients with fracture neck of femur gardens type III & type IV Patients above the age of 60 years.

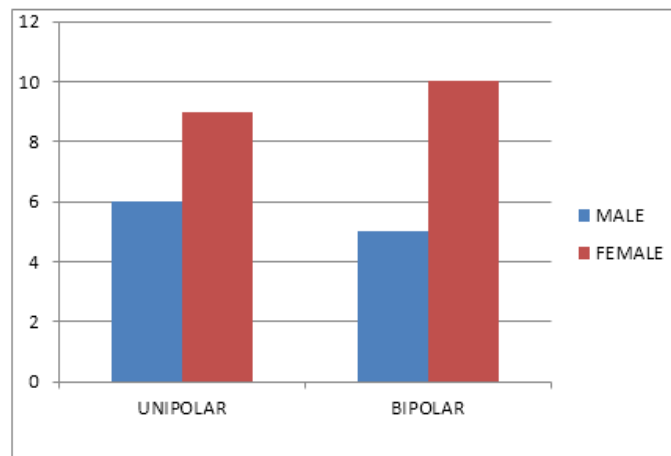
EXCLUSIVE CRITERIA: Degenerative arthritis cases and comorbidity patients.

All patients were operated through a southern approach, and received antibiotics. Postoperatively, full weight bearing was allowed with the help of physiotherapists as per their compliance. The patients were assessed post operatively based on Modified Harris hip score at intervals of six weeks, three months, and one year. Sequential radiographs were compared to assess diminishing joint space, acetabulum erosion.

	UNIPOLAR	BIPOLAR
Average age	72 YEARS	65 YEARS

Table 1

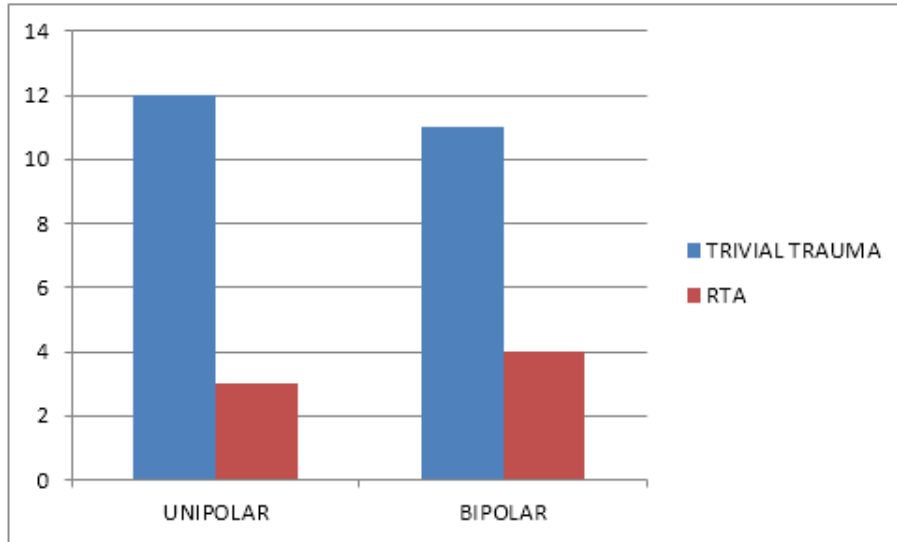
SEX	UNIPOLAR	BIPOLAR
MALE	06(40%)	05(33.3%)
FEMALE	09(60%)	10(66.7%)



GRAPH 1

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MODE OF TRAUMA	UNIPOLAR	BIPOLAR
TRIVIAL TRAUMA	12(80%)	11(73.3%)
RTA	03(20%)	04(36.7%)



GRAPH 2

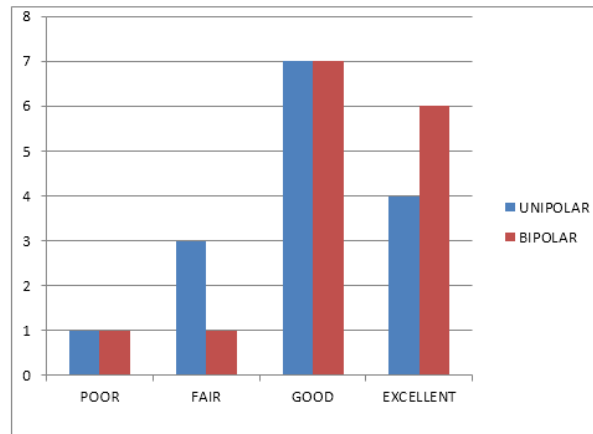
	UNIPOLAR	BIPOLAR
AVERAGE TIME OF OPERATION	40min	50min
AVERAGE BLOOD LOSS	1.2 UNITS	1.2 UNITS

Table 2

MODIFIED HARRIS HIP SCORE	UNIPOLAR	BIPOLAR
POOR (60%-69%)	1(6.7%)	1(6.7%)
FAIR (70%-79%)	3(13.3%)	1(6.7%)
GOOD (80%-89%)	7(46.7%)	7(46.6%)
EXCELLENT (90%-100%)	4(33.3%)	6(40.0%)
Mean	82.6±8.7	86.17±8.1

Table 3

MEAN MODIFIED HARRIS HIP SCORE



GRAPH 3

COMPLICATIONS	UNIPOLAR	BIPOLAR
SUPERFICIAL INFECTION	1(6.7%)	1(6.7%)
DEEP INFECTION	1(6.7%)	-
PAINFUL HIP	2(13.3%)	1(6.7%)
ACETABULAR EROSION	1(6.7%)	-
PERIPROSTHETIC FRACTURE	1(6.7%)	1(6.7%)
INTRA OPERATIVE FRACTURE	-	1(6.7%)
LIMB DISCREPANCY MORE THAN 2 cm	1(6.7%)	1(6.7%)



Fig. 1: Preoperative x-ray of fracture



Fig. 2: Post op x-ray of unipolar



Fig. 3 & 4: Post op x ray of bipolar



Fig. 5: X-ray of intraoperative fracture in bipolar prosthesis

RESULTS: patients who had unipolar prosthesis were older in comparisons with bipolar prosthesis (72.2 vs 65. 3). Female patients were 19(63.3). Average length of stay at hospital was similar in both groups. All cases were analyzed based on modified Harris hip score (pain, limp, distance walked, staircase climbing, put on shoes and socks, sitting, limb length discrepancy and range of motion). Total score was gradient as excellent, good, fair and poor (Table III).

Complications were recorded which were more in unipolar group (Table iv), one case periprosthetic fracture (6.7%) occurred after two months of surgery and was treated with plating. In Bipolar prosthesis group, one case of introperative fracture (6.7%) occurred and treated with stainless steel wire encirclage. In both cases patient immobilized for twelve weeks. One case of acetabular erosion recorded in unipolar group. One case of superficial infection occurred in each group which was controlled with antibiotics.

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DISCUSSION: Comparison between 15 cases of Unipolar hemiarthroplasty and 15 cases of Bipolar hemiarthroplasty for fracture neck of femur in elderly patients over one year period has shown that patient with bipolar prosthesis had better functional outcome in terms of range of motion and daily activities. Mean Modified Harris Hip score was better with bipolar group.

Lunceford jr.⁽⁵⁾ found pain following hemiarthroplasty may be due to infection, improper prosthetic seating, tissue reaction, improper size of femoral head, and metallic erosion. Limping is common complaint of hemiarthroplasty, due to alteration of abductor mechanism. In our study, we found 2 cases (13.3%) of pain with unipolar group when compared to 1 case (6.7%) of bipolar group.

Whittaker et al⁽⁶⁾ reported in a series of 160 hemiarthroplasty cases, the rate of joint spacing in a 5 year study was 64 %with unipolar prosthesis.

YAMAGATA ET AL⁽⁷⁾ in their classical study, reviewed 1001 cases of hip hemiarthroplasty, there were 682 unipolar and 319 bipolar cases. Patients undergoing bipolar arthroplasty exhibited higher hip scores and lower acetabular erosion compared to the unipolar replacement. In our study, one case of acetabular erosion found in unipolar group.

D'Arcy and devas⁽⁸⁾ reported incidence of dislocation following prosthetic replacement ranging from 0.3% to 10%. Sikroski and barrington⁽⁹⁾ reported dislocation rates of 10% in the unipolar prosthesis. BLEWITT AND MORTIMORE⁽¹⁰⁾ reviewed cases of dislocation in a series of hemiarthroplasties. Recurrent dislocation can be related to component malalignment or improper soft tissue tension. Posterior approach is associated with higher dislocation rate. In our study, we didn't find any dislocation.

Skala-rosenbaum et al⁽¹¹⁾ observed that the prosthesis migration depended on the position of the head, C E angle and position of the prosthetic stem in the medullary canal. In our study, we didn't find any case with Prosthesis migration.

Cornell et al⁽¹²⁾ reported that Patients with bipolar prosthesis did better on walk tests and had better range of motion at 6 months.

CONCLUSION: The clinical outcomes regarding hip function in bipolar group is better than the unipolar group (Austin Moore prosthesis). The complications were lower with bipolar hemiarthroplasty. Hence, bipolar arthroplasty is better in elderly patients with fracture neck of femur.

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