

Comparative study in surgical outcome of intracapsular fracture neck of femur in active elderly patients treated with hemiarthroplasty with Austin Moore's and Bipolar prosthesis

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ABSTRACT

Fracture neck of femur is most commonly encountered fractures in elderly population. Hemiarthroplasty is generally considered to be the treatment of choice in most active elderly patients. However, there is inadequate evidence to support the choice between unipolar or bipolar prosthesis. This study was conducted to analyze the outcome regarding pain, hip function, complication and acetabular erosion in patients randomly selected and treated with Austin Moore's or Bipolar hemiarthroplasty in our setup. The study included total of 40 patients (17 males and 23 females) with intracapsular neck of femur fractures with mean age of 67 years (55-85 years). 20 patients each were treated with Hemiarthroplasty using Austin Moore's and Bipolar prosthesis. The patients were followed up at intervals of 2 weeks, 6 weeks, 24 weeks and 1 year after the operation and evaluated clinically and radiologically. There were no significant differences between the groups regarding complication. The Harris hip score were 81.95% (SD – 2.99) in Austin Moore's hemiarthroplasty and 79.15% (SD – 2.94) in Bipolar hemiarthroplasty (p= 0.812), whereas acetabular erosion was 20.05% in Austin Moore's hemiarthroplasty and 5% in Bipolar hemiarthroplasty (p= 0.758) with no mortality seen during 1 year follow up. The intracapsular neck of femur fracture in active elderly patients treated with Austin Moore's hemiarthroplasty had better outcome regarding pain and hip function whereas high acetabular erosion compared to patients treated with Bipolar hemiarthroplasty though the difference is statistically insignificant.

Keywords: Intracapsular neck of femur fracture, Austin Moore's hemiarthroplasty, Bipolar hemiarthroplasty.

INTRODUCTION

Fracture neck of femur is most commonly encountered fractures in elderly population.¹ These fractures are usually sustained from trivial trauma such as tripping on a stair or stumbling on a carpet. Early mobilization of patient by operative method usually succeeds in avoiding complications, arising from prolonged immobilization and restoring function and painless hip.^{1,2} There are various treatment modalities for these fractures which includes internal fixation, hemiarthroplasty and total hip replacement. Earlier these fractures were treated by immobilization in plaster spica, but there were high incidence of non-union. Later, internal fixation devices came into practice, like Knowles pins, screws and Smith-Petersen nail. However, there were complications like non-union and avascular necrosis of the femoral head.^{1,3} Later arthroplasty came into practice which is considered the optimal treatment for elderly patients with displaced neck of femur fractures and produces satisfactory results.^{3,6} However, whether arthroplasty or internal fixation is the primary treatment for intracapsular femoral neck fractures in active elderly patients remains a subject for debate.⁷ There is no consensus on the treatment of choice with respect to internal fixation, unipolar or bipolar hemiarthroplasty, and total hip replacement.¹ The treatment

goals for intracapsular femoral neck fractures are early return to a satisfactory functional status and minimization of mortality, morbidity and the need of reoperation.¹

We aimed to compare outcomes of surgical management of intracapsular fracture neck of femur in active elderly by hemiarthroplasty with Austin Moore's and Bipolar prosthesis regarding pain, hip function, complication and acetabular erosion.

MATERIALS AND METHODS

The study included total of 40 patients admitted in Nepal Medical College Teaching hospital from September 2010 to October 2012 with intracapsular fracture neck of femur who was treated with hemiarthroplasty with Austin Moore's and Bipolar prosthesis. The 17 males and 23 females had a mean age of 67 years (55 - 85 years). The patients were selected randomly for the choice of implant. Out of 40 patients, 20 were treated with Bipolar prosthesis (Males – 9, Females – 11) and 20 were treated with Austin Moore's prosthesis (Male – 8, Females – 12). More number of cases was in the age group of 61 to 70 years (44.4%). All the patients were operated on through a modified Moore or Southern approach and received antibiotics. The patients were followed up at intervals of 2 weeks, 6 weeks, 24 weeks and 1 year. During the follow

up, these patients were evaluated clinically by Harris hip score and radiologically for acetabular erosion. Postoperatively, full weight bearing was allowed with the help of physiotherapists as per standard protocols. The statistical software used was SPSS 20.0.

RESULTS

During follow up we did not come across major complications, However there was 1 case of fracture extension to shaft region, 3 patients developed superficial wound infection, treated with oral antibiotic therapy and no mortality seen.

The patients were evaluated by modified harris hip scoring system, among them 81.95 % (SD- 2.99) and 79.15% (SD – 2.94) patients had good results in Austin Moore's and Bipolar hemiarthroplasty group respectively (p = 0.812).

There were high incidences of pain in the Bipolar Hemiarthroplasty group compared to Austin Moore's hemiarthroplasty group at 1 year follow up. At 6 months (p=0.06) while the difference at 1 year was not significant (Table-1).

The functional activity was better in Austin Moore's hemiarthroplasty group 80.15 % (SD – 3.82) compared to 75.05 % (SD – 3.39) in Bipolar hemiarthroplasty group (p=0.64).

There was less limb length discrepancy in Austin Moore's hemiarthroplasty group compared to Bipolar hemiarthroplasty group. 0.5 to 1 cm and >1 cm limb length discrepancy in Austin Moore's hemiarthroplasty were 42.9% (SD – 3.47) and 3.6% (SD – 2.54) (p = 0.818) respectively whereas 45.05 % (SD – 3.13) and 19.25 % (SD – 2.89) (p = 0.919) respectively in bipolar hemiarthroplasty group.

The deformity of more than 30 degree fixed flexion deformity and Adduction or abduction of more than 10 degree were 32.05 % (SD – 3.34) and 25.35% (SD – 3.66) (p = 0.677) in Austin Moore's hemiarthroplasty and Bipolar hemiarthroplasty group respectively due to residual calcar, non compliance of patient during rehabilitation and late presentation causing resorption of neck.

The range of motion was statistically insignificant in both the Austin Moore's hemiarthroplasty and Bipolar hemiarthroplasty group (p < 0.001 for both group) (Table-2).

Table-1: Range of motion after hemiarthroplasty in both group after 1 year follow up

	Austin Moore's	Bipolar
Flexion (>50°)	96.57%	93.24%
Extension (>30°)	93.24%	92.56%
Abduction (>25°)	76.59%	73.26%
Adduction (>25°)	72.56%	71.8%
Internal Rotation (>20°)	76.64%	75.96%
External Rotation (>20°)	73.26%	73.26%

The acetabular erosion was more in Austin Moore's hemiarthroplasty group which were 20.05% (SD – 2.37) compared to 5% (SD – 2.07) (p= 0.758) in Bipolar hemiarthroplasty. Acetabular erosion seen in Bipolar hemiarthroplasty (5%) may be due to repetitive stress from the metal implant on the acetabular cartilage or polyethylene built in bearing joint is barely functioning after few months because inner joint becomes fixed and act as a unipolar prosthesis.

DISCUSSION

The aim of treatment for intracapsular neck of femur fractures patients is to return to preinjury mobility status as early as possible.^{1,2} The surgical options for hip fractures include internal fixation, hemiarthroplasty and total hip replacement. Hemiarthroplasty is considered the optimal treatment for active elderly patients with intracapsular neck of femur fractures^{3,5} and produce satisfactory results.^{3,6} Internal fixation has a high rate of non union and is inferior to hemiarthroplasty.^{1,3} Hemiarthroplasty using the Austin Moore's remains a popular choice.⁸ Bipolar prosthesis enables reduction of acetabular wear and increase in prosthesis life and function.^{9,10} Compared to unipolar hemiarthroplasty, bipolar hemiarthroplasty confers better^{9,12} or similar¹³ outcomes as well as better pain relief and function¹⁴ it is therefore recommended for active patients.^{3,9,12} Total hip replacement as a primary treatment has also been considered, its results are variable.^{5,15-19} Post operative mortality is high in elderly patients undergoing surgery for intracapsular femoral neck fractures.²⁰

Calder *et al* published the results of a study including 250 patients, all aged 80 years or more, with a 1.5–2-year follow-up. A higher proportion of patients returning to their preinjury condition were found in the Austin Moore's hemiarthroplasty group, but no other differences were found.²¹

Table-1: Incidence of pain after hemiarthroplasty in both group during 1 year follow up

Pain	Austin Moore's hemiarthroplasty			Bipolar hemiarthroplasty		
	3 month	6 month	1 year	3 month	6 month	1 year
No pain	-	-	-	-	-	-
Mild Pain	-	50.0%	30.0%	-	20.0%	38.46%
Moderate pain	63.34%	46.66%	26.66%	26.66%	46.66%	36.15%
Severe pain	36.66%	3.34%	3.3%	60.0%	3.33%	5.38%
Totally disabled	-	-	-	13.34%	-	-

Raia *et al* reported the results of a study including 115 patients randomised to Austin Moore's hemiarthroplasty or Bipolar hemiarthroplasty. At the one-year assessment there were no significant differences between the groups in terms of surgical complications and functional outcome.²²

Baker *et al* reported acetabular erosion in 21 out of 32 patients treated with a unipolar hemiarthroplasty after a mean follow-up of 39 months, giving an overall rate of acetabular erosion of 66%.²³ In our study 81.95% (SD-2.99) patients had good results in the Austin Moore's hemiarthroplasty group and 79.15% (SD-2.94) in Bipolar hemiarthroplasty group ($p = 0.812$). 80.15% patients treated with Austin Moore's hemiarthoplasty and 75.05% patients treated with Bipolar hemiarthroplasty came walking easily with sticks in there follow up ($p = 0.64$). There was high incidence of pain and limb length discrepancy in patients who were treated with Bipolar hemiarthroplasty. There was statistically insignificant difference in range of movement in both the Austin Moore's and Bipolar hemiarthroplasty groups ($p < 0.001$ in both group). 20.05% patients had acetabular erosion in Austin Moore's hemiarthroplasty whereas only 5% had acetabular erosion who were treated with Bipolar hemiarthroplasty ($p=0.758$). There was 1 case of iatrogenic fracture extension to shaft region, 3 patients had developed superficial infection and there was no mortality during 1 year follow up.

The intracapsular neck of femur fracture in active elderly patients treated with Austin Moore's hemiarthroplasty had better outcome regarding pain and hip function whereas high acetabular erosion compared to patients treated with Bipolar hemiarthroplasty though this difference is statistically insignificant during the 1year follow up.

Our study was limited by the lack of randomization in selecting patients leading to selection bias and short series, so further study is needed with a proper patient selection and large series with long term follow up for definitive opinion regarding the superiority of Austin Moore's hemiarthroplasty or Bipolar hemiarthroplasty in intracapsular neck of femur fractures.

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