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Study of functional outcome of cemented modular Bipolar Hemiarthroplasty in Intracapsular fracture neck femur in elderly

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Abstract

Introduction: The fracture neck of femur is one of the most common fractures in the elderly. The time-tested unipolar prosthesis is being slowly replaced by bipolar prostheses, which are claimed to have a lower incidence of complications. In the last two decades, bipolar replacements of the femoral head have gained popularity for treating femoral neck fractures. This study was conducted to analyse the results of the surgical management of the fracture neck of femur using cemented modular bipolar hemiarthroplasty.

Objective: To assess and analyse the results of the management of fracture neck of femur with cemented modular bipolar hemiarthroplasty.

Methodology: The present study was a prospective study of 22 cases of fracture neck of femur admitted to Navodaya Hospital, attached to Navodaya Medical College, Raichur, between the study period of Sept 2019 to May 2021. Cases were selected according to inclusion and exclusion criteria, i.e., patients with intra-capsular fracture neck of femur above the age of 50 yrs. Medically unfit patients and patients not willing for surgery were excluded from the study. Follow up was done after 6 weeks and for further at 3 months, 6 months, 9 months, and 1 year.

Results: In our series of 22 cases there were 7 males and 15 females, with a maximum age of 85 yrs, minimum age of 55yrs. There was a slight predominance of left sided fractures when compared to the right. The mean duration of hospital stay was 22 days. At the final one year follow up assessment with Harris Hip Score 8 patients (36.36) achieved 'Excellent' result, 11 patients (50%) achieved 'Good' result, 2 patients (9.09%) achieved 'fair' result and 1 patients (4.54%) achieved 'poor' result. In our series, at the end of final follow-up, there was no evidence of loosening, radiolucent zones, distal migration or subsidence of prosthesis.

Conclusion: We conclude that bipolar cemented modular hemiarthroplasty produces good functional outcomes with minimal complications for displaced intracapsular femoral neck fractures and has several advantages; these results are comparable to the other studies. However long term results using cemented modular bipolar hemiarthroplasty needs further study for a longer period in a larger sample.

Keywords: Bipolar hemiarthroplasty, neck of femur fracture, bipolar prosthesis

Introduction

Femoral neck fractures account for nearly half of the hip fractures, with the vast majority occurring in elderly patients after simple falls [1-3]. The incidence of these fractures is expected to double in the next twenty years and triple by the year 2050 [4]. The prevalence of the fracture also doubles for each decade of life after the fifth decade [5]. Femoral neck fractures in the elderly are associated with high morbidity and mortality [6]. Surgical management of femoral neck fractures remains controversial. [7] Current treatment options are reduction and internal fixation, hemiarthroplasty, and total hip arthroplasty. Since displaced intracapsular, femoral neck fractures have a significant risk of nonunion and avascular necrosis, prosthetic replacement is often recommended in ambulatory, elderly Patients [8-15].

Thomson in 1954 and Austin Moore in 1957 introduced unipolar hemiarthroplasty. The fixed-head hemiarthroplasty is associated with high acetabular erosion and protrusion rates, which affect the clinical results and make revision to total hip arthroplasty difficult [16]. These complications have led many surgeons to choose a bipolar design. The theoretical advantage of bipolar hemiarthroplasty is to decrease acetabular erosion and wear and their associated

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symptom [17]. Initially, the bipolar prostheses were of non-modular design followed presently by the modular prostheses. The modular nature of the prosthesis allows for neck length adjustment with interchangeable stems.

Future conversion to total hip replacement is easier with a modular prosthesis because only the acetabular component needs to be added. With the superiority of prosthetic replacement over internal fixation in the elderly being well established, primary Total Hip Replacement (THR) is being offered in the developed world as a treatment option for these fractures. Bipolar hemiarthroplasty thus appears to be the best option for fracture neck femur in the elderly in our population. These prostheses can be inserted with or without bone cement [18]. A few studies show how uncemented implants yield the same clinical results as cemented implants when used to treat displaced femoral neck fractures [18, 19, 20]. Nonetheless, the postoperative rate of prosthesis loosening is higher after uncemented hemiarthroplasty." For decades, the optimal treatment choice has been debated, and whether cemented is better than uncemented hemiarthroplasty remains uncertain. Many studies have suggested that Cemented hemiarthroplasty reduces the risk of residual pain and affords better functional results [18, 21]. However, not much literature is available about its long-term results.

The aim of the current study is to prospectively follow-up the cemented modularbipolar prosthesis with respect to pain, mobility, stability and to analyse the complications pre-operative and post-operative like infection, DVT, acetabularerosion, loosening and dislocation in intracapsular fracture of the femoral neck.

Materials and methodology

This is a prospective study conducted at the Department of Orthopaedics at Navodaya Medical College, hospital & research centre, Raichur. For this study, we selected 22 patients between September 2011 and October 2020 and followed them up for a minimum of 1 year.

Inclusion criteria

1. Male and female patients of age 50 years and above.
2. Displaced intracapsular fracture of the neck of the femur with adequate calcar.
3. Non-union of intracapsular fractures of the neck of femur in elderly patients.
4. Avascular necrosis of femoral head secondary to a fractured neck of femur.

Exclusion criteria

1. Extra capsular fractures of the neck of femur.
2. Fracture of the neck of the femur in younger patients.
3. Any other patients associated with any other ipsilateral or contra lateral fracture of and lower extremities.
4. Patients with arthritic changes involving the acetabulum.
5. Pathological fractures
6. Patient suffering from neurological disorders.
7. The patient is medically unfit for surgery.
8. Patient not willing for surgery.

Follow UP

At the time of discharge, the patients were asked to come for follow-up after 6 weeks and for further follow-up at 3 months, 6 months, 9 months, and 1 year. At follow-up, a detailed clinical examination was conducted systematically. A clinical evaluation will be performed using the Harris Hip score.

Results

The study involved 40 patients with intracapsular intertrochanteric fractures treated with cemented modular bipolar hemiarthroplasty. Data was collected with respect to history, clinical examination, and radiological examination. Among these 22 patients, 7 (31.8%) were male and 15 (68.2%) were female. Out of 22 patients, 34 were due to simple fall, 2 were due to road traffic accidents and 4 were due to giddiness. All of them were closed injuries. 15 patients had the trans-cervical fracture type, 5 patients had the basicervical fracture type, and 2 patients had the sub-capital fracture type.

Table 1: Demographic and preoperative data.

Number of patients	22
Male	7
Female	15
Type of fracture	
Trans-cervical	15
Basicervical	5
Sub-capital	2

Table 2: Post-operative complications.

Mortality	0
Superficial infection	4
Deep infection	0
Pulmonary complication	0
Urinary tract infections	0
Cardiovascular complications	0
Deep vein thrombosis	0
Prosthetic/Fixation Failure	0
Limb shortening	3

Table 3: Functional outcome @ 3 weeks.

	No. of patients	Percentage
>90	0	0
80-90	7	31.8
70-80	11	50
<70	4	18.2

Table 4: Functional outcome @ 3 months.

Harris Hip Score		No. of patients	Percentage
Good	80-90	8	36.4

Table 5: Functional outcome @ 6 month.

Harris Hip Score		No. of patients	Percentage
Excellent	>90	6	27.3
Good	80-90	9	40.09
Fair	70-80	6	27.3
Poor	<70	4	4.54

Table 6: Functional outcome @ 9 month.

Harris Hip Score		No. of patients	Percentage
Excellent	>90	8	36.4
Good	80-90	10	45.5
Fair	70-80	3	13.6
Poor	<70	1	4.54

Table 7: Functional outcome @ year.

Harris Hip Score		No. of patients	Percentage
Excellent	>90	8	36.4
Good	80-90	11	50
Fair	70-80	2	9.1
Poor	<70	1	4.54

Case -1



Flexion

Straight leg raising

Sitting cross leg

Case II





Flexion

Straight leg raising

Sitting cross leg

Discussion

Femoral neck fractures, one of the most common injuries in the elderly, have always presented great challenges to orthopaedic surgeons. Femoral neck fractures account for nearly half of all hip fractures, with the vast majority occurring in elderly patients after simple falls [1-3]. Femoral neck fractures in the elderly are associated with high morbidity and mortality [6]. Surgical treatment of femoral neck fractures is one of the most common procedures performed by orthopaedic surgeons. However, the optimal treatment remains controversial.⁷ It is now the general feeling that reduction and internal fixation should be reserved for younger patients in whom, if needed, revision surgery may be done at a later date. Primary prosthetic replacement should be considered in older patients who are active and need early mobilization. The concept of dual bearing surfaces offers considerable advantages. It results in sharing of motion at the two surfaces and hence a reduction of net wear at either surface, thus reducing erosion at the acetabular joint interface. In addition, the total range of motion of the joint is increased. In India, the technically demanding procedure of total hip replacement lacks universal application and the hemi-replacement procedure needs to have continued application to fill the lacuna produced by deficient resources and finances.

In this context, we undertook the present study to evaluate the functional outcome of hemiarthroplasty in the fracture neck of the femur using a cemented bipolar prosthesis, keeping in view the living condition of an average Indian. In our study, the majority of the patients were between 60-70 years old. Other authors report similar age distributions. Saxena & Saraf [23] (1978) had an age distribution of 45-90 years (mean 66 years); Mukherjee & Puri [24] (1986) 65 years. In our study, females were affected more than males (Choudhari & Mohite [25]. 1987). The majority of the patients (68.2%) had trans-cervical fracture. In our study, 4 patients (18.2%) had superficial wound infection, and 3 patients had limping and shortening.

The majority of the patients (68.2%) had trans-cervical fractures. In our study, 4 patients (18.2%) had superficial wound infection, and 3 patients had limping and shortening.

In our study, there were no late postoperative complications like loosening, dislocation, erosion, secondary osteoarthritis, protrusion acetabuli, or periprosthetic fracture in our patients. The final results at final follow-up after cemented modular bipolar hemiarthroplasty in our series were analysed by the modified Harris hip scoring system. In our series, 6 (27.27%)

patients had excellent results with a Harris Hip Score of more than 90, 10 (45.45%) patients had good results with an 80 to 90 score, 5 (22.72) had fair results with a score of 70 to 80 and 1 (4.54%) had poor results with a score < 70. The difference between excellent and good results is minimal, and therefore they can be grouped together as satisfactory (good) results.

Conclusion

Accordingly, we believe that cemented modular bipolar hemiarthroplasty is the treatment of choice for freely mobile elderly patients above 50 years of age with intracapsular femoral neck fracture. Postoperative full weight bearing after hemiarthroplasty spares the postoperative complications of non-weight bearing after internal fixation. Yet hemiarthroplasty in these cases is a surgically demanding technique. Bad surgical technique may lead to prolonged operative time, a high incidence of deep infection, dislocation, and poor radiological and functional outcome. The long-term results using cemented modular bipolar hemiarthroplasty need further study for a longer period in a larger sample.

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