



SHORT TERM FUNCTIONAL OUTCOME OF TRANSCERVICAL NECK FEMUR FRACTURE MANAGED WITH BIPOLAR HEMIARTHROPLASTY

Orthopaedics

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ABSTRACT

Background: Femoral neck fractures are commonly seen in elderly people. Hemiarthroplasty remains the most common modality of treatment with bipolar prosthesis, which claimed to have a lower incidence of complications. Hence the present study was undertaken to evaluate the functional outcome of intracapsular fracture of femoral neck with cemented or uncemented bipolar prosthesis in elderly Indian population. **Method:** Total 43 elderly patients were enrolled and operated after being put into lateral decubitus position by the lateral approach or posterior approach of Moore. Modified harris hip score (HHS) was used for analysis of functional outcome, X ray for radiological and patients' pain was assessed by VAS scoring and finally all three parameters compiled and analyzed. **Results:** The mean age of patients was 68.58 years. Majority of patients had Garden grade III (62.79%) and right sided hip fractures (72.09%). Most of the patients were managed using cemented prosthesis (74.41%) with 45mm prostheses (44.18%). On immediate post-operative assessment, 39 of the 43 patients had fair outcome. At 6 and 12 weeks, 36 and 39 patients respectively had good outcome by HHS. At 6-month follow-up, 30 patients had good outcome while 11 patients had excellent outcome and one patient was died. There was significant decrease in the VAS score till 6-month follow-up. 40 of the 43 patients had a stable stem fixation while 3 patients showed signs of unstable fixation. **Conclusion:** Patient with fractures of the femoral neck get more pain free interval and more rapid return to unassisted activity after bipolar hemiarthroplasty with an acceptable complication rate.

KEYWORDS

Femoral neck fractures; Elderly; Hemiarthroplasty; Bipolar prosthesis; Harris hip score; VAS score

INTRODUCTION

Femoral neck fractures occur most commonly in elderly and are uncommon in patients under the age of 60 years.¹ Most patients give a history of low energy fall as the cause of injury. In 2-3% of patients there is no history of trauma or fall and the injury may be pathologic or a stress fracture due to osteoporosis. The prevalence of femur neck fractures has increasing with increased incidence of osteoporosis, difficulty vision in elderly, poor neuro muscular coordination, life style changes, sedentary lifestyle, improvement in life expectancy. Our treatment goals for femoral neck fractures are rapid return to a satisfactory functional status with minimization of mortality, morbidity and the need for re-operation.²

There is still a dilemma over either internal fixation or arthroplasty in the treatment of fracture neck of femur in middle age group. The first efforts on treating hip fractures is mainly concentrated on maintaining alignment of fracture fragments by skin traction and closed reduction. The reduction was maintained by long term traction, spica casts or internal fixation. However, despite proper anatomic alignment of fracture and most rigid fracture fixation, many patients failed to regain good functional outcome. Non-union of the fracture site, avascular necrosis of the femoral head and the degree of fracture comminution affected results in most of the patients. Nonanatomic reduction and inadequate fixation cause prolonged disability, pain, immobility and repeated surgical procedures.³ It is because of these inherent problems, replacement of femoral head and neck became the treatment of choice of many orthopedic surgeons in elderly people to avoid complications of recumbence.

Unipolar prosthesis is mostly used in developing countries. It should be reserved for active elderly and very limited patients. In India, bipolar prosthesis is slowly replacing unipolar prosthesis in elderly patients, because of the advantage of bipolar than unipolar like less post operative pain, good results, good range of movements & cost effectiveness. Though, Primary total hip replacement is being preferred at many tertiary centers in India. Still it's not popular in government hospitals due to high cost and majority of the patient doing well with hemiarthroplasty, because of it bipolar hemiarthroplasty is

one of the good option in active elderly group in our country. Still long term follow up results not available in literatures.⁴ Our study is mainly focus on better understanding of problems and results of bipolar hemiarthroplasty for femur neck fracture.

MATERIALS AND METHODS

This prospective observational study was conducted in total 43 elderly patients above 60 years of age who were ambulatory with or without support pre-injury, patients with transcervical neck femur fracture who have been operated with bipolar hemiarthroplasty in Tertiary Care Hospital. Non-ambulatory patients' pre injury, patients with associated fractures that may affect the final outcome and pathological fractures were excluded from the study.

After obtaining informed consent, patients were admitted to the ward, a detailed history was taken. In depth, clinical assessment was carried out in each case. In all patients preoperatively Buck's traction with appropriate weight was applied, to the fractured lower limb for relieving pain, preventing shortening and to avoid unnecessary movements of the injured limb and at fracture site. Oral or parental NSAIDs were given to relieve the pain. Preoperative AP radiographs of the affected hip joint of pelvis with both hips were taken for all the patients, keeping the fractured limb in 15 internal rotations to bring the neck parallel to X-ray film. Routine blood investigations, blood grouping and typing, urine routine, RBS, serum urea, creatinine, HbsAg, HIV, chest x-ray, ECG, were done in all cases. Necessary and adequate treatment was given for those associated with co-morbidity before taking them to surgery. Certain therapeutic exercises were taught preoperatively to the patients which had to be continued postoperatively, such as deep breathing exercises, static quadriceps exercises, ankle movements. Intravenous antibiotics and tetanus immunization were given an hour before the surgery. The limb was prepared from nipple to knee including perineum and back.

All patients were operated after being put into lateral decubitus position by the lateral approach or posterior approach of Moore. Surgical options were based on the patients' general condition and pre-injury mobility status. Patient undergoing cemented hemiarthroplasty,

the stem was cemented in place using 1st and 2nd generation cementing techniques. The prosthesis was positioned manually. Checking of the amount of blood loss in the surgery was done by Swab weighing method and estimating the volume of blood loss in the suction container. However, it does not include loss on to drapes. After suturing the capsule the external rotators were sutured, the wound was closed in layers over a suction drain, which was removed at the first change of dressing after 48 hours.

In case of spinal anaesthesia, foot end elevation was given depending on the patient's postoperative blood pressure. Every half an hour blood pressure, pulse rate, temperature, and respiratory rate was monitored for the first 24 hours. The use of pharmacologic prophylaxis for prevention of deep vein thrombosis has been adopted as per ACCP guidelines as a standard of care for treatment of these patients. Whenever necessary, postoperative blood transfusion was given. Intramuscular analgesics were given as per patient's compliance; intravenous antibiotics were continued for 5 days followed by oral antibiotic for another 9 days. Both the lower limbs were kept in abducted position, with a pillow in between both the legs till mobilization was done. Drain removal was done after 48 hours. Check radiograph was taken after 48 hours. Patients were made to sit up on the second day, encouraged to perform static and dynamic quadriceps exercise, standup with support (walker), on the first or second day, and were allowed to full weight bear and walk with the help of a walker depending on his/her pain tolerance and were encouraged to walk thereafter. Sitting cross-legged and squatting were not allowed. Suture removal was done on the fourteenth postoperative day. The patients were assessed for any shortening or deformities if any and discharged from the hospital. Patients who had infection and bedsores were treated accordingly before discharging them from the hospital.

Modified harris hip score was used for analysis of the functional outcome for all the patients. Which includes pain, limp, walking with support, distance walked, public transportation, use of stairs, put on shoes and socks, absence of deformity, range of motion. And graded as < 70: poor, 70 to 79: fair, 80 to 89: good, 90 to 100: Excellent. X ray – anteroposterior view with internal rotation of 15 – 20 degrees was taken for all the patients and analyzed for radiological parameters like joint space, any subluxation, acetabular changes, Stability of stem and stem subsidence based on which grading was done. Patients' pain was assessed by Vas scoring and graded as mild, mod, severe between 0 to 10. Finally all three parameters compiled and analyzed.

OBSERVATIONS AND RESULTS

A total of 43 patients were enrolled in the study of them 23 were males and 20 were females. The mean age of the patients was 68.58 years, ranged from 52 to 79 years. Table 1 shows the demographic details of enrolled patients. The most common mode of injury noted in the patients was fall leading to injury (40), while 3 patients suffered injury due to road traffic accident.

Table 1: Demographic profile of enrolled patients

Demographic Data		No. of Patients (%)
Age group (years)	51 to 60	03 (6.97%)
	61 to 70	27 (62.79%)
	71 to 80	13 (30.23%)
	Mean age	68.58±5.77
Sex	Male	23 (53.48%)
	Female	20 (46.51%)

Out of 43 patients, 17 did not have any co-morbidity. Most common co-morbidity reported were diabetes mellitus and hypertension as depicted in figure 1.

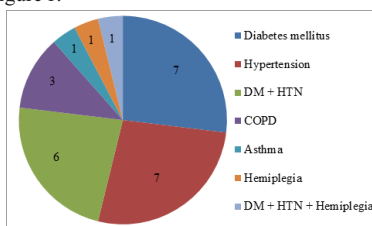


Figure 1: Co-morbidities noted in the study

According to the Garden classification of hip fractures, majority of the patients had grade III hip fractures (62.79%) and most of these

(72.09%) had right sided hip fractures. The most of the patients were managed using cemented prosthesis (74.41%) and in 44.18% of the cases 45 mm prostheses were used (Table 2).

Table 2: Fracture grade and side as well as their management

Parameters		No. of Patients (%)
Grade of fracture	Grade 2	05 (11.62%)
	Grade 3	27 (62.79%)
	Grade 4	11 (25.58%)
Side of Fracture	Right	31 (72.09%)
	Left	12 (27.90%)
Type of Prosthesis	Cemented	32 (74.41%)
	Uncemented	11 (25.58%)
Size of prosthesis	39 mm	01 (2.32%)
	41 mm	04 (9.30%)
	43 mm	16 (37.20%)
	45 mm	19 (44.18%)
	47 mm	03 (6.97%)

The mean duration of surgery was 107.9±11.61 minutes, ranged from 90 to 130 minutes. The mean blood loss was 368.8±47.46 ml with ranged 280 to 460 ml. Majority of the patients had weight bearing on the 2nd day post-surgery (22/43). 18 of the patients did weight bearing on day 1 while the remaining 3 patients did weight bearing on day 3. A total of 9 patients reported postoperative complications as shown in figure 2.

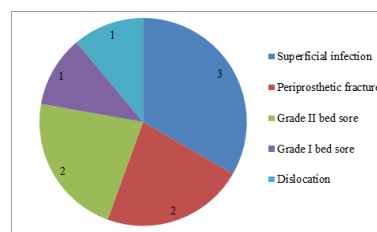


Figure 2: Postoperative Complications

On immediate post-operative assessment, 39 of the 43 patients had fair outcome. At 6 and 12 weeks of post-operative assessment, 36 and 39 patients respectively had good outcome by Harris Hip Score. At 6-month follow up, 30 patients had good outcome while 11 patients had excellent outcome. One patient was died at 6-month follow-up, (Table 3).

Table 3: Functional Outcome by Harris Hip Score

Time of Assessment	Outcome	Number of patients
Immediate Post-op	Fair	39
	Good	04
6 weeks	Fair	07
	Good	36
12 weeks	Fair	04
	Good	39
6 months	Death	01
	Fair	01
	Good	30
	Excellent	11

There was significant decrease in the VAS score till 6-month follow up, (Figure 3), as assessed by repeated measures ANOVA test ($p < 0.05$). 40 of the 43 patients had a stable stem fixation while 3 patients showed signs of unstable fixation.

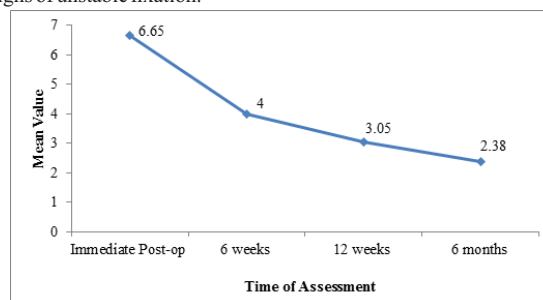


Figure 3: Change in the VAS score on follow-up

DISCUSSION

The aim of replacement surgery in fracture neck femur is early return to daily activities. This is particularly applicable to the elderly age group where complications need to be prevented. The mean age of patients in the present study was 68.58 years which is comparable with the study conducted by Bashir et al¹ and Chhabra et al⁶. The aim of assessing age is to estimate the patient's mean survival time and their ability to comply with rehabilitation protocol. Patients with hip fractures have an increased mortality rate during the first year after fracture but after one year the mortality rate is comparable to that of the general population. The results of present study showed that age of the patient had minimal influence on the final clinical result. Males were affected in higher numbers which is comparable with the study done by Sakthivel et al³. Right side more commonly affected than the left, this is similar to other study conducted by Chhabra et al.⁶ Majority of patients sustained the injury due to a trivial trauma like tripping or slipping. This is a very common occurrence in elderly population where poor vision and lack of neuro-muscular coordination is a problem. All of our patients had a displaced fracture of the neck of femur. Majority of the patients (80%) had a transcervical fracture. The anatomical type of fracture and the displacement did not have any bearing on the final function. These findings are in accordance with the study done by Adapureddi et al.⁷

The size of the prostheses used, in general matched well with the pre-operatively measured size of the head as assessed by X-rays. In 44.18% of the cases 45 mm prostheses were used. Limb lengthening (<1 cm) was observed in 2 patients (4.65%), limb shortening (<2 cm) observed in 5 patients (11.62%) post-operatively due to technical errors in the form of the prosthesis sitting proud of the calcar. The average duration of hospital stay amongst the study patients was 22 days which was similar to the previous studies.^{8,9} Out of 43 patients, 9 patients reported complications. Out of these, 3 of the patients reported superficial infection, while 2 patients each reported periprosthetic fracture, 2 grade II bed sore and 1 with dislocation. There were no other late postoperative complications like loosening, erosion, secondary osteoarthritis or protrusio acetabuli in our study. Similar complication rates were reported by other studies.^{6,10}

On immediate post-operative assessment, 39 of the 43 patients (90.66%) had fair outcome. At 6 and 12 weeks of post-operative assessment, 36 (83.72%) and 39 (90.66%) patients respectively had good outcome by Harris Hip Score. At 6-month follow up, 30 patients (69.76%) had good outcome while 11 patients (25.58%) had excellent outcome. One of the patients was found to have died at 6-month follow-up. These results are correlated with the earlier studies.^{6,11,12} Although the excellent results are comparatively less than other studies, it was found that our patients associated with comorbidities, late presentation to hospital, delay in getting the patients for surgery had influenced the outcome. With radiological parameters analysis, out of total 43 patients only 3 patients reported with instability of stem and none of them presented with stem subsidence. There was no correlation between the functional outcome and radiological outcome as well as no correlation between functional outcome and interprosthetic movements.

All the patients were also evaluated towards level of satisfaction with the procedure and their ability to return to pre-fracture level of activity, 36.36% were 'very satisfied', 45.45% were 'fairly satisfied' and 18.18% were 'not satisfied'. The level of satisfaction being a subjective assessment did not correlate well with the Harris Hip Score which was an objective assessment. The present study was not without its shortcomings. Our duration of follow-up of minimum 6 month and maximum five years is a short term study in assessing the longevity and functional endurance of the prosthesis used.

CONCLUSION

Bipolar hemiarthroplasty for fractures of the femoral neck provides freedom from pain and more rapid return to unassisted activity with an acceptable complication rate. The end functional results depend on the associated co-morbidity and optimum post-operative rehabilitation. There is no correlation between functional outcome and interprosthetic movements' also radiological outcome. Our study patients has good radiological outcome with significant interprosthetic movements and bipolar seems to be a cost effective prosthesis in active elderly individuals. Similar study on long term follow up would provide more affirmative findings.

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