

Original research article

**COMPARISON OF FUNCTIONAL OUTCOME IN
UNCEMENTED AND CEMENTED BIPOLAR
HEMIARTHROPLASTY IN DISPLACED FRACTURE NECK
OF FEMUR IN ELDERLY AGE GROUP**

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Abstract

Background: Uncemented bipolar hemiarthroplasty for displaced femoral neck fractures, may not have the same clinical outcomes as cemented ones. A hemiarthroplasty with uncemented and cemented bipolar prosthesis was compared for fracture neck of femur.

Methods and Materials: This was a Longitudinal Ambispective observational study which included patients aged more, than 60 years admitted with displaced fracture neck of femur admitted. These patients were subsequently treated with cemented (group BA) or uncemented prosthesis (group B) for displaced fracture neck of femur since 2019, and then followed up for one year. Those patients aged less than 60 years, with history of polytrauma, pathological fracture, compound fracture were excluded from the study.

Results: Mean Post-operative day in group A was 3 days while in group A was 4 days, with no significant statistical difference. We found that by 6 months, 10 in group B while 15 in group A showed good results, while at the end of 12 months, 6 in group A and 4 in group B showed good results. Overall, better HHS scores were found in patients with group A, although not statistically significant.

Conclusion: The HHS at the end of 6 and 12 months was observed better in patients with uncemented prosthesis. With overall 56% patients showing fair results, which was statistically significant.

Keywords: Intramedullary nailing, bipolar prosthesis, intertrochanteric fracture

Introduction

Femoral neck fractures are common and dangerous. As populations grow and life expectancies rise, these fissures become more widespread. Femoral neck fractures typically occur at 81 years old. Femoral neck fracture risk is 13-22% for men and 40-50% for women ^[1]. Epidemiologic study has indicated insufficient sunlight, physical exercise, smoking, osteoporosis, and corticosteroid usage as femoral neck fracture risk factors ^[2]. Due to better health care and higher life expectancies, this fracture has become more common. A hemiarthroplasty or total hip arthroplasty is used to repair displaced femoral neck fractures in people over 60, depending on their activity level ^[3]. Some studies propose uncemented prosthesis for femoral neck fractures due to lesser blood loss, operation time, and embolism ^[3]. Others prefer cemented prostheses for fracture neck of femur therapy because they lessen thigh pain, allow early mobilisation, and limit prosthetic loosening. Uncemented bipolar hemiarthroplasty for displaced femoral neck fractures may not have the same clinical outcomes as cemented ones ^[4]. Hence, the present study compares the two prosthesis and their outcomes with complications.

Methodology

This was a Longitudinal Ambispective observational study which included patients aged more than 60 years admitted with fracture of femoral neck (displaced) admitted. These patients were subsequently treated with uncemented or cemented bipolar hemiarthroplasty for displaced fracture neck of femur since 2019, and then followed up for one year. Those patients aged less than 60 years, with history of polytrauma, pathological fracture, compound fracture were excluded from the study.

Follow up

After 6 and 12 months, follow-up was done. To check implant displacement, X-rays were admitted with displaced neck of femur fractures. A full medical history was taken, including mode of injury, grade of living before the accident, and co morbidities. Clinical examination and radiographs were also done. All patients received Buck's traction with enough weight to reduce limb shortening and pain, and NSAIDs were provided.

X-rays include pelvis with both hips in AP, AP with damaged limb in internal rotation, and lateral hip view. Radiographs identified fractures, graded osteoporosis, and measured femur canal diameter. Patients were screened for medical issues that could worsen if cementing was recommended during surgery. After being warned of the risks, patients and attendees gave written consent before the surgery. Intravenous antibiotics were given an hour before surgery. Affected limb was prepped. All surgeries were performed in an operating room using aseptic techniques. General or spinal anaesthesia. Based on surgeon preference, lateral or posterior approach was recommended. The procedure was carried canal diameter, cement contraindications, etc. Blood loss and oxygen pulse oximeter and ECG changes throughout femur canal preparation were monitored intraoperatively. Patients were checked in every six weeks, three months, six months, and twelve months. Each clinical follow-up was guided by the Harris Hip Score and radiography. Follow-up radiographs checked for implant loosening, protrusion, and dislocation.

Results

The study included a total of 50 study participants divided in two groups. The mean age was found to be higher in group B than in group A, this showed no significance.

In this study, the male to female ratio as 1:1.8, with statistical insignificance.

In our study we concluded that most of the patients were males in both the groups with the mean average age of 68-70 years. Majority of the patients had grade 5 and 6 of living. Patients treated with uncemented prosthesis showed better Harris hip score with lesser blood loss, while other parameters including, hemodynamics, operative time, complications were incomparable. In the present study, mean time required for cemented prosthesis was 1.6 hrs while that for uncemented prosthesis was 1.3 hrs. Although the time taken for uncemented prosthesis was slightly less than cemented prosthesis, it was not found to be statistically significant. In our study we did not encounter any complication related to prosthesis or in general complications. The hemodynamic parameters including blood pressure was statistically indifferent between two groups. While maximum number of patients in both the groups belonged to grade 5 and grade 6 of living. Mean Post-operative day in patients with group A was 3 days while in group B was 4 days, with no significant statistical difference. We found that by 6 months, 10 patients in cemented group while 15 patients in group B showed good results, while at the end of 12 months, 4 patients in group A and 6 patients in group B showed good results. Overall, better HHS scores were found in patients with group B, although not statistically significant.

Discussion

Cement pressurization raises intramedullary pressure and, particularly in patients with numerous comorbidities, can result in severe bone cement implantation syndrome and fat embolism. Intramedullary stresses, embolization, and circulatory instability are all decreased with cementless implantation^[6-10]. Our prospective study compared the two treatment modalities based on blood loss, blood pressure, patient grade of living, Harris hip scores, day of ambulation, treatment time, and complications. Blood loss was significantly lower in uncemented implant prosthesis patients. Grosso *et al.*'s retrospective analysis yielded comparable results^[11]. In the present study, the mean patient age was 81 years, and the minimum follow-up was 2 years. Group A lost 325 mL more blood than the group B (255 mL) ($p = 0.02$). In the group B (2.5%), periprosthetic femoral fractures occurred at a considerably higher rate than in the group A (0.4%). In this investigation, mean operation time did not differ across groups. In patients aged 83 and older, Figved *et al.*^[12] compared two types of tapered-wedge implants for hemiarthroplasty over 1 year follow-up. The uncemented group had much shorter surgeries and reduced blood loss. Complication rates were same. One cemented implant patient's blood pressure dropped significantly during cementing. Within 24 hours of operation, this patient died. Another cemented patient died within 72 hours of surgery from heart failure during wound closure. At 3 and 12 months, Fracture rate and outcomes were similar. Kumar *et al.*^[13] examined the duration of surgery, blood loss, and complications in six randomised controlled trials that contrasted cemented versus uncemented hemiarthroplasty for fractures of the femur neck. Our study evaluated joint function based on post-operative ambulatory mobility and HHS. There was no statistically significant difference in the groups' VAS or Harris hip scores, according to

Merli *et al.* (2014). For the cemented cohort, a significant difference was found in the duration of operation (97.63 minutes against 60.83 minutes) and blood loss (298.67 ml versus 181.83 ml). Another study, by Wender Figved *et al.*,^[13] indicated no differences in HHS, movement, analgesic use, or location. JaimoAhn, Li-Xing Man *et al.*^[15] found comparable surgical mortality, overall morbidity and pain comparing the two cohorts. Deangelis JP *et al.*^[16] found that cemented and uncemented femoral components in non-pathologic displaced femoral neck fractures have equal 6-month functional outcomes. The 30-day, 60-day, and 1-year follow-ups showed no clinically or statistically significant variations in death rates, disposition, or ambulation aid. Taylor *et al.*^[17] conducted a prospective randomised controlled trial, in which they observed that the uncemented group had 18 postoperative periprosthetic femoral fractures (22.5%) and the cemented group had 1 (1.3%) (p, 0.05). Subsidence was 22% in the uncemented group and 1.3% in the cemented group (p, 0.05). Two valuable evaluation studies found that cemented group patients had less pain three months after surgery and better mobility six months later. Group A and B had 23.6% and 34.4% residual pain 6 months following surgery. In certain investigations, problems, intraoperative and postoperative fractures, and subsidence were more likely in the uncemented group, but the mean visual analog scale was significantly different.



Fig 1: Group A



Fig 2: Group B

Table 1: Blood loss in the present study

Variables	Cemented group		Un-cemented group		t-value	p-value
	Mean	Std. Dev.	Mean	Std. Dev.		
Blood loss (in ml) present study	416.40	84.96	372.08	64.02	2.0832	0.0426*

*p<0.05.

Table 2: Harris Hip score at 6 months and 12 months

Harris HIP scores	Cemented group	%	Un-cemented group	%	Total	%	Chi-square	p-value
6 months								
Poor	5	20.00	3	12.00	8	16.00	17.75	0.0001*
Fair	15	60.00	10	40.00	25	50.00		
Good	3	12.00	8	32.00	11	22.00		
Excellent	2	8.00	4	16.00	6	12.00		
12 months								
Poor	4	16.00	2	8.00	6	12.00	22.87	0.0001*
Fair	16	64.00	10	40.00	26	52.00		
Good	3	12.00	9	36.00	12	24.00		
Excellent	2	8.00	4	16.00	6	12.00		

Conclusion

The mean operating time for cemented hemiarthroplasty was more than uncemented hemiarthroplasty, even though it was statistically insignificant between the groups. Mean time required for full weight bearing mobilisation found between both the groups was insignificant. Blood loss observed was more in patients with cemented prosthesis as compared to uncemented group and was statistically significant. The Harris hip score at the end of 6 and 12 months was observed better in patients with uncemented prosthesis. With overall 56% patients showing fair results, which was statistically significant.

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