

Original research article

Comparison of Cemented versus uncemented Bipolar hemiarthroplasty in subcapital fracture neck femur

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ABSTRACT:

Background: In this study, our aim was to compare functional outcome of the elderly patients undergoing cemented and uncemented bipolar hemiarthroplasty, in displaced subcapital femur neck fracture. As treatment of choice is still debated.

Methods: This prospective study was carried out in patient having fracture neck femur and were scheduled for surgery at Department of Orthopedics, Government medical College & Sir T. Hospital, Bhavnagar. Two groups were made, one group had patients who underwent cemented bipolar hemiarthroplasty surgery and other group had patients who underwent uncemented bipolar hemiarthroplasty surgery. Surgeon notes were studied for intra operative complications. Post operative complications, Visual Analogue scale score (VAS) and Harris hip score (HHS) were noted postoperatively in follow up visits.

Results: There were 25 patients including both the groups. Clinical and demographic variables were same in both the groups. Operative time was more in cemented bipolar hemiarthroplasty and blood loss was more in the cemented. Mean VAS score was little better in cemented and uncemented bipolar hemiarthroplasty group at the end of one and three months follow up. Functional outcome was good in cemented group at the end of six months period.

Conclusion: Operative time and blood loss was little more in cemented bipolar hemiarthroplasty as compared to uncemented bipolar hemiarthroplasty, otherwise functional outcome on VAS score and HHS was good in cemented group at the end of six months.

Keywords: uncemented bipolar hemiarthroplasty, cemented bipolar hemiarthroplasty, displaced neck femur fracture.

Introduction:

Hip fractures are common in elderly patients, current annual incidence is 0.2 to 3.8 persons per 1000 per year, and this is gradually increasing as the life expectancy is increasing. At present this public health problem is in rising trend and has been projected to rise to 4.5 million hip fractures per year worldwide, as the elderly population rises. Treatment of choice for femur neck fracture in elderly patient is still debatable, and cemented versus uncemented bipolar hemiarthroplasty, which is optimal treatment in elderly is under scrutiny. Few studies, suggest that cemented bipolar hemiarthroplasty patients have less pain and better functional outcome. But, has more intra operative time, blood loss and chances of cement related complications. Recent studies suggest that uncemented bipolar hemiarthroplasty gives equally good results in less operative time and no cement related complications. In this

study, our aim is to study intra operative and post operative variations, and functional outcome of cemented and uncemented bipolar hemiarthroplasty surgery performed in our department.

Materials:

Study design and sampling

This prospective study was done in Department of Orthopedics, Government medical College, and Sir T. Hospital. Bhavnagar, between March 2016 to March 2020. Patient aged 50 years or more having displaced subcapital femur neck fracture and those willing and fit for surgery were included in our study. Exclusion criteria were, unfit for surgery, having previous hip pathology like osteoarthritis of hip, avascular necrosis of femur head, patient with previous hip infection and bedridden patient before fracture neck of femur. Two groups were made, one group of patients who underwent cemented bipolar hemiarthroplasty and second group had uncemented bipolar hemiarthroplasty surgery. Patient were not randomized and before surgery patient had consulted the surgeon and were found fit to undergo surgery. Patients were informed about the purpose of study and informed consent was taken before inclusion in study. Study commenced after approval of ethical committee of the college.

Surgical procedure:

All the procedures were done under regional anaesthesia, in lateral position using modified Gibson's approach. Curved incision was taken distal to posterior superior iliac spine and was extended distally and laterally over upper third of thigh, skin and subcutaneous tissue was cut, gluteus medial was split, short external rotators were tied with vicryl no.1 and elevated from trochanter, capsule incised, head extracted, neck prepared using oscillating saw, rasping was done. In case of cemented bipolar hemiarthroplasty cement restrictor was introduced and syringe gun was used to introduce bone cement (cement consists of poly methyl methacrylate) from distal to proximal and proximal closed cavity was created using silicon restrictor. Proper size of stem was then introduced and then modular bipolar head fixed. In case of uncemented prosthesis pre-Op proper templating is done and accordingly rasping of medullary canal is done and exact size of stem is introduced, then modular bipolar head is fixed. After that head is reduced in acetabular cup. Short external rotators are tied to trochanter making drill holes in trochanter. Soft tissue closure is done. Proper intravenous antibiotics is given for 5 days. Patient is made ambulatory with walker after 24 hours. Negative suction drains are kept for 48 hours. First 15 days patient has to walk with walker, next 15 days with walking stick and then without any support. Regular hip exercises were taught and advised to continue it at home for six weeks. At each follow up patient were evaluated using Visual Analogue scale score and Harris hip score for regular interval till six month duration.

Results:

During the study period, the patients which were ineligible were removed from the study. In total 25 cases were studied, 14 patients were in cemented group and 11 patients were in uncemented group. In the uncemented group four patients lost follow up and thus a total of 11 patients were included in the final analysis. In the cemented group, one patient lost follow up and thus a total of 14 patients were included in final analysis. Demographic and clinical variables were similar in both the study groups. In both the study groups the most common age group was

61 to 70 years. Average age of the patient in this study was 64.8 years. The average age of patients operated by cemented hemiarthroplasty was 67.4 years and that of uncemented hemiarthroplasty was 61.6 years (Table 1).

Table 1

Age Distribution

Age (yrs.)	Cemented	Uncemented	Total
50 – 60	04 (16%)	03 (12%)	07 (28%)
61 – 70	04 (16%)	07 (28%)	11 (44%)
71 – 80	04 (16%)	01 (04%)	05 (20%)
> 80	02 (8%)	00	2 (8%)

There were more males as compared to females in both the study groups. (Table 2)

Table 2

Sex distribution

Sex	Cemented	Uncemented	Total
Male	08 (32%)	08 (32%)	16 (64%)
Female	06 (24%)	03 (12%)	09 (36%)

Fall on a flat surface (slippery surface on wet tiles) was the most common mode of injury. Admission to surgery time was less than 7 days in more than 60% in both the groups. None of the patient underwent surgery after 14 days of admission. Mean intra operative time was found significantly higher among patients in the cemented group (average 93 minutes versus 76 minutes). Average blood loss was more in cemented bipolar hemiarthroplasty as compared to uncemented bipolar hemiarthroplasty. (Table 3)

Table 3

Operative details

Details	Cemented	Uncemented
Mean duration of surgery	93 mins	76 mins
Required blood transfusion	35%	25%
Average stay in hospital	12.1 days	11.4 days

Average stay in hospital was almost similar in both the cases (12.1 days versus 11.4 days). In the cemented group, only two patient had infection and one had infection in uncemented group. (Table 4)

Table 4

Complications

Complication	Cemented	Uncemented	Total
Immediate			

Fracture	00	00	00
Thromboembolism	01	00	01
Nerve palsy	00	00	00
Dislocation	00	00	00
Infection	02	01	03 (12%)
Dermal necrosis	00	00	00
Late			
Infection	00	00	00
Loosening	00	00	00
Dislocation	00	00	00
Periprosthetic fracture	00	00	00

Mean VAS score at the end of six months was significantly higher among patient in the uncemented group. In this study 80% of patients had mild to moderate pain and only 20% patients had moderate to severe pain. It was observed 46% patients operated by uncemented bipolar hemiarthroplasty had moderate to severe pain and none of the patients operated by cemented bipolar hemiarthroplasty had similar pain. (Table 5)

Table 5

Pain scale (VAS)

	Score	Cemented	Uncemented	Total
Mild to moderate	00	00	00	00
	01	00	00	00
	02	03	00	03
	03	04	01	05
	04	04	00	04
	05	03	05	08
Total		14(56%)	06(24%)	20(80%)
Moderate to severe	06	00	05	05
	07	00	00	00
	08	00	00	00
	09	00	00	00
	10	00	00	00
Total		00	05(20%)	05(20%)

HHS in our study, 56% had good hip score, 32% had fair hip score and only 12% had poor hip score. Poor hip score was observed in one patient in cemented group, and 2 patients in uncemented group. None had excellent HHS. Average HHS for all patients was 78.6. The average HHS for cemented group was 79.7 and

that for uncemented was 77.09. There is no significant difference in total Harris hip score of two groups. (p=0.478). (Table 6)

Table - 6

Total Harris Hip Score

Score	Cemented	Uncemented	Total
Poor < 70	1 (4%)	2 (8%)	3 (12%)
Fair (70 - 79)	5 (20%)	3 (12%)	8 (32%)
Good (80 - 89)	8 (32%)	6 (24%)	14 (56%)
Excellent (90-100)	-	-	-

P value = 0.478

Discussion:

Displaced femur neck fracture is one of the most common hip fractures and hemiarthroplasty is the gold standard treatment for elderly patients. Cemented bipolar hemiarthroplasty provides more secure fixation and may result in less post operative morbidity. Risk of loosening is less, thus revision rate is less. Cementing can cause cardiac arrhythmia and cardio respiratory complication, due to cement monomer and pressurisation can cause pulmonary embolism. Moreover, revision of cemented prosthesis is a difficult task. While uncemented prosthesis can avoid such adverse effects, it is much more expensive. In our study, operative time was significantly higher in cemented group and blood loss was also more. Similar to our results, a pooled analysis by Ning et al also showed an increased operative time and more blood loss with cemented hemiarthroplasty in comparison with uncemented hemiarthroplasty, which was statistically significant. Furthermore, patients in the cemented group had less pain at first and six months follow up in our study. In similar study conducted in 2008 by M. I. Parker, G. Prior, K. Guruswamy concluded more pain in case of patients operated with uncemented prosthesis as compared to cemented ones at 2 years follow up (P=0.002). The other aspects of HHS namely lump, support, distance walked, sitting, entering public transport, climbing stairs, putting shoes and socks, absence of deformity and range of motion showed no significant difference (p=0.478) between cemented and uncemented group. The complication, morbidity and mortality rates among the two groups were similar only three patients developed infection. Painless hip is associated with high mobility. However, we found the functional outcome to be similar among this two study groups at six months follow up post operatively. There are a few limitations of our study. First, this is not randomized controlled study. Second, the functional outcome and complication rates also depend on the surgical team and post operative care provided to the patients. So the results of present study might not be applicable to other surgical centres.

Conclusion:

In our patient population, cemented group had longer operative time and more blood loss, with 2 patient having infection and one patient having thromboembolism if cementing done early and more operative time leads to infection. However, pain score on the VAS score were significantly lower at first and sixth month follow up. Functional

outcomes were not significantly different between the two study groups. Multi centric randomized controlled study are required to support the results of our study.

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