

MANAGEMENT OF FRACTURE NECK FEMUR WITH CEMENTED AND UNCEMENTED HEMIARTHROPLASTY IN ELDERLY PATIENTS- COMPARISON OF OUTCOME THEREOF

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Abstract:

Management of displaced fracture neck of femur in elderly patients with cemented hemiarthroplasty is controversial. Uncemented prosthesis in fracture neck of femur is getting popularity now a days.

Aims And Objectives:- To evaluate the efficacy of cemented and uncemented bipolar hemiarthroplasty in management of fracture neck femur.

Material And Methods:- It is a multicentre Prospective Study conducted between 2015 to 2017 on 19 patients of displaced fracture of neck femur between the age group of 60 to 68 years, out of them 12 were female and 7 were male patients. Patients were divided into two groups Group A consists of 9 patients managed with Cemented Bipolar prosthesis. Group B consists of 10 patients managed with uncemented bipolar prosthesis.

All patients were operated by posterior approach and discharged on 11th postoperative day and were followed up at the end of 6 weeks, 12 weeks and 1 year. During follow up period, during each visit clinical and radiological evaluation was made. Functional outcome was assessed by using modified Harris Hip score.

Result:- Mean score of patients who were managed by uncemented hemiarthroplasty was 81.4% and for cemented Arthroplasty it was 86.5%

Conclusion:- This study implies that functional outcome of cemented hemiarthroplasty was better than the uncemented hemiarthroplasty though the operative time and blood loss was more among the cemented group but it had led to major complications.

Keywords: Fracture neck of femur, functional outcome, hemiarthroplasty.

Introduction:

Risk of femoral neck fractures among males and females do not have significant difference. The life time risk of fracture neck of femur is 9% in a female aged 50 years and above and it rises to 12% at 70 years and 18% by 90 years. Majority

of these fractures occur in older patients caused by a trivial fall from standing position¹. Unprotected precarious blood supply to femoral head inhibits healing leading to avascular necrosis of femoral head². Controversies continue regarding their optimal treatment, including the choice of implant and fixation method³⁻⁵.

Internal fixation had a high failure rate resulting in non-union and avascular necrosis. These complications were addressed with the advent of hemiarthroplasty of the femoral neck.

Hemiarthroplasty is accepted as optimum treatment for displaced femoral neck fractures in most elderly patients⁶. A Cemented hemiarthroplasty has been used in the majority of cases in most countries, but uncemented prosthesis is gaining popularity.

Cementing has potential pathological adverse side effects like cardiac arrhythmias and cardio-respiratory collapse. Fatal complications are caused either by embolism from marrow contents forced into circulation or by a direct toxic effect of the cement⁷.

Clark et al found a transient but significant reduction in cardiac output and stroke volume for those receiving cemented prosthesis⁸.

In uncemented prosthesis, bone quality is of importance, this is generally poor in elderly patients Laporte et al stated two relative contraindications for uncemented total hip prosthesis:- Interference with bone in- growth and inability to achieve a congruent fit, both of these preclude establishment of rigid initial stability⁹. As of today very few studies had compared the Cemented and uncemented prosthesis for hemiarthroplasty in India and so this study would throw some light on the advantages and disadvantages between these two methods.

Aims And Objectives:

To evaluate and compare the efficacy of cemented and uncemented bipolar hemiarthroplasty prosthesis in patients with femoral neck fractures.

Exclusion Criteria:

1. Patients with medical morbidities.
2. Patients with associated injuries.

Material And Methods:

A Prospective multicentre Study was conducted during

2015 to 2017 in Department Of Orthopedics. All the patients with isolated femoral neck fractures between the age group of 60 to 68 years were included in the study. Total 19 patients were included in the study and divided into two groups:- Group A had 9 patients which received cemented prosthesis. Group B had 11 patients which received uncemented prosthesis.

All the patients were subjected for pre-anaesthetic evaluation and adequate amount of blood were arranged for the surgery. Patient was then subjected to surgery under appropriate anaesthesia. Patients underwent a bipolar hemiarthroplasty with either a Cemented or uncemented prosthesis.

The arthroplasties were performed through a posterior approach with the patient in a lateral decubitus position using spinal anaesthesia.

Post operative management:- Following protocol was adopted:-

- Post operative ICU care.
- Hip is positioned in approximately 15 degree abduction.
- Monitoring of Vitals and adequate blood transfusion.
- Antibiotics and DVT prophylaxis.
- Pain management by NSAIDs.
- Suture removal on the 11th postoperative day.

All the patients were discharged after stitches removal and were counselled to avoid squatting, cross leg sitting and to avoid strenuous activity. Static quadriceps strengthening exercises were started and patients were made to sit up on the bed from the 1st post operative day and were allowed to walk with walker.

Patients were followed up at the end of 6 weeks, 12 weeks and one year. During each visit functional outcome was assessed by using modified Harris Hip score which is a 100 point score which measures pain, gait, functional activity, deformity and range of motion. It is graded as score <70 as poor, 70 to 79 as fair, 80 to 90 as good, 90 to 100 as excellent. The radiological assessment was done for assessing the signs of loosening, migration of prosthesis and implant failure. Data were entered and analysed by statistical analysis. Mean and standard deviations were calculated for all parametric variables and comparison of the functional outcome between two groups was analysed using Chi-Square test.

Results:

The age of the study subjects ranged between 60 to 68 years. Time duration during fracture and surgery was 6 to 8 days. Taking into consideration of the five factors namely pain,

gait, functional activity, deformity and range of motion we calculated the modified Harris Hip score for all the patients during the time of follow up and it was compared with their baseline score.

Table 1- Functional Outcome measurement between the two groups by using modified Harris Hip score

Type of Hemiarthroplasty	Baseline score	End of 6 weeks	End of 3 months	End of 12 months	P Value
Cemented	78.3	74.2	79.8	86.5	<0.0001
Un-Cemented	77.6	76.8	78.2	81.4	0.03

Table 2 Functional Outcome of the study subjects at the end of 1 year

Modified Harris Hip score	Un-Cemented	Cemented	P value
Excellent (90-100)	0	1	
Good (80-89)	4	6	< 0.001
Fair (70-79)	6	3	
Poor (<70)	0	0	

Table 3 Radiological assessment of the study subjects at end of 1 year

Radiological feature	Un-Cemented	Cemented	P Value
Varus deformity	1	0	
No Abnormality detected	9	9	<0.001
Total	10	9	

It is seen from the Table 1 that during their first follow up there was a slight reduction in the score in both the groups but in subsequent follow up the score had shown a statistically significant improvement in both the groups. But when comparing between the two groups for majority of the patients who had Cemented Arthroplasty had their modified Harris Hip score in the range of good compared to the patients who had uncemented hemiarthroplasty and the difference was found to be statistically significant ($P < 0.5$) Table 2. There was no radiological abnormality detected during follow up period among the patients who underwent cemented hemiarthroplasty whereas

1 (9.1%) patient in uncemented hemiarthroplasty group showed a varus deformity (Table 3)

Table 4: Functional outcome measurement between the two groups by using modified Harris hip score during the follow-up period

P value derived by using Chi-square test

Discussion:

In our study majority of patients were 60 years and above with mean age of 65 years with female preponderance, mainly due to osteoporosis prevalent in female population which is main risk factor for fracture neck of femur which in turn is more common among females. Khan et al¹⁰ and Santini et al¹¹ also noted the same age group and sex.

Among the available surgical procedure hemiarthroplasty is more preferred¹². Hemiarthroplasty can be performed with both unipolar and bipolar prosthesis but bipolar prosthesis is commonly used as it causes less erosion and protrusion in acetabulum.

Recently some studies have assessed the indications for performing hemiarthroplasty with or without use of cement which had different results.

Majority of our study patients sustained the injury due to a trivial trauma and it was almost in par with the study done by T S Raghvendra et al²³.

In the current study it was proven that intraoperative blood and the duration of surgery was more among the cemented group than the uncemented group which was found to be statistically significant and similar type of results was also shown in the studies done by Haidukewych et al¹⁶ and Drinker and Murray¹⁷.

Deep vein thrombosis, pulmonary emboli, fat emboli and displacement of fracture of femoral neck are few post-operative complications reported in the previous studies which was more common among cemented hemiarthroplasty but in our study we did not experience any kind of these complications^{15,18,19}. As per modified Harris Hip score we found the hip score was 86.5 among the cemented group and it was 81.4 in the uncemented group

at the end of 1 year and the difference was found to be statistically significant and many of the studies previously done are almost at par with our study^{10,18,20,21}.

Radiological assessment in the present study had shown that 1 patient in the uncemented group had developed varus deformity whereas in the cemented group none of the patients had developed and a similar type of result was also observed in a study done by Jameson S S et al²² in which he found reoperation was warranted among the uncemented group than the cemented group.

Conclusion:

Inference of this study reveals that functional outcome of cemented hemiarthroplasty was better than the uncemented hemiarthroplasty though the operative time and blood loss was more among cemented group, but it had not led to any major complications.

References:

1. Peter J O'Brien, Robert N. Meek, Piotr A. Blackhut and Henry M. Broekhuysse. "Fractures of the neck of femur". Chapter 42 in Robert W. Bucholz and James D. Heckman (Eds), Rockwood and Green's. Fracture in Adults, 5th edition, Lippincott Williams and Wilkins, Philadelphia, 2001, 1731-1773.
2. Berry DJ. Epidemiology: hip and knee. *Orthop Clin North Am.* 1999;30:183-190. doi: 10.1016/S0030-5898(05)70073-0.
3. Fallon KM, Fuller JG, Morley-Forster P. Fat embolization and fatal cardiac arrest during hip arthroplasty with methylmethacrylate. *Can J Anaesth.* 2001;48:626-629. doi: 10.1007/BF03016194.
4. Garellick G, Malchau H, Herberts P. The Charnley versus the Spectron hip prosthesis: clinical evaluation of a randomized, prospective study of 2 different hip implants. *J Arthroplasty.* 1999;14:407-413. doi: 10.1016/S0883-5403(99)90095-5.
5. Laupacis A, Bourne R, Rorabeck C, Feeny D, Tugwell P, Wong C. Comparison of total hip arthroplasty performed with and without cement: a randomized trial. *J Bone Joint Surg Am.* 2002;84:1823-1828.
6. Lu-Yao GL, Keller RB, Littenberg B, Wennberg JE. Outcomes after displaced fractures of the femoral neck: A meta-analysis of one hundred and six published reports. *J Bone Joint Surg Am* 1994;76:15-25.
7. Donaldson AJ, Thomson HE, Harper NJ, Kenny NW: Bone cement implantation syndrome. *Br J Anaesth.* 2009;102(1):12.
8. Clark DI, Ahmed AB, Baxendale BR, Moran CG: Cardiac output during hemiarthroplasty of the hip. A prospective, controlled trial of cemented and uncemented prostheses. *Journal of Bone and Joint Surgery Br* 2001, 83(3):414
9. LaPorte DM, Pont MA, Hungerford DS. Proximally porous-coated ingrowth prostheses: limits of use. *Orthopedics* 1999, 22(12):1154-60.
10. Khan R, Parker M J, Crawford J, Pryor G A. Hemiarthroplasty versus internal fixation for displaced intracapsular hip fractures in the elderly. *J Bone Joint Surg.* 2002; 84-B;1150-5
11. Santini S, Rebecato A, Bolgan I, Turi G. Hip fractures in elderly patients treated with bipolar hemiarthroplasty: comparison between cemented and cementless implants *Journal of Orthopaedics and Traumatology.* 2005. June, Volume 6, Issue 2, pp 80-87
12. Dorr LD, Lewonowski K, Lucero M, Harris M, Wan Z. Failure mechanisms of anatomic porous replacement I uncemented total hip replacement. *Clin Orthop Relat Res.* 1997;334:157-167.
13. Parker MI, Pryor G, Gurusamy K. Cemented versus uncemented hemiarthroplasty for intracapsular hip fractures: A randomised controlled trial in 400 patients. *J Bone Joint Surg Br.* 2010;92(1):116-122. doi:10.1302/0301-620X.92B1.22753.
14. Gjertsen JE, Lie SA, Vinje T, Engesaeter LB, Hallan G, Matre K, et al. More re-operations after uncemented than cemented hemiarthroplasty used in the treatment of displaced fractures of the

- femoral neck: an observational study of 11,116 hemiarthroplasties from a national register. *J Bone Joint Surg Br.* 2012;94(8):1113– 1119. doi:10.1302/0301- 620X.94B8.29155.
15. TS Raghvendra, BS Jayakrishna Reddy, JithuramJayaram. Management of Fracture Neck of Femur with Cemented Bipolar Prosthesis. *Indian Journal of Clinical Practice*, 2014. Vol. 24, No. 9, pp- 867-71.
 16. Haidukewych GJ, Israel TA, Berry DJ. Long-term survivorship of cemented bipolar hemiarthroplasty for fracture of the femoral neck. *ClinOrthopRelatRes.* 2002;(403):118-26.
 17. Drinker H, Murray WR. The universal proximal femoral endoprosthesis. A short-term comparison with conventional hemiarthroplasty. *J Bone Joint Surg Am.*1979;61(8):1167-74.
 18. Luo X, He S, Li Z, Huang D. Systematic review of cemented versus uncemented hemiarthroplasty for displaced femoral neck fractures in older patients. *Arch Orthop Trauma Surg.* 2012;132(4):455– 463. doi:10.1007/s00402-011- 1436-9.
 19. Rahme E, Kahn SR, Dasgupta K, Burman M, Bernatsky S, Habel Y, et al. Short-term mortality associated with failure to receive home care after hemiarthroplasty. *Canadian Med Assoc J.* 2010;182(13):1421–1426. doi:10.1503/cmaj.091209.
 20. Azegami S, Gurusamy KS, Parker MJ (2011) Cemented versus uncemented hemiarthroplasty for hip fractures: a systematic review of randomised controlled trials. *Hip Int*21: 509–517.
 21. Lo WH, Chen WM, Huang CK, Chen TH, Chiu FY, et al. (1994) Bateman bipolar hemiarthroplasty for displaced intercapsular femoral neck fracture: uncemented versus cemented. *ClinOrthopRelat Res*302: 75–82.
 22. Jameson SS, Jensen CD, Elson DW, Johnson A, Nachtsheim C, Rangan A. Cemented versus cementless hemiarthroplasty for intracapsular neck of femur fracture--a comparison of 60,848 matched patients using national data. *Injury.*2013 Jun;44(6):730-4.