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Surgical outcome of bipolar hemi-arthroplasty in displaced femoral neck fracture using cemented versus cementless prosthesis

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Abstract

Background: Femoral neck fractures account for over 90% of hip fractures, occurring in roughly identical proportions with high morbidity and mortality in the elderly population. Hemiarthroplasty contributes to early ambulation and good functional recovery. Femoral neck fractures treated via cemented hemiarthroplasty may be less prone to periprosthetic fracture and prosthetic loosening whereas some cases of uncemented implants yield the same clinical results as cemented implants when used to treat displaced femoral neck fractures. To this purpose we evaluated surgical outcome of bipolar hemiarthroplasty in displaced femoral neck fracture using a cemented versus cementless prosthesis.

Methods: This prospective study was conducted at a single tertiary care center between January 2005 and December 2009. All the patients included in this study were ambulatory prior to the fracture. End points noted in this study includes Proportion of participants developing complications, operative time, postoperative pain, duration of hospital stay and time taken to resume normal work was also evaluated. Postoperative pain was assessed using visual analogue scale (VAS) at 24 hours and 48 hours post-operatively. Descriptive statistical analysis has been carried out in the present study. SPSS 15.0 Statistical software was used for the analysis of the data and Microsoft word and Excel have been used to generate tables etc. Results on continuous measurements were presented as Mean ± SD and categorical data as actual numbers and percentages. Unpaired t test, ANOVA and Chi-square test were used to test significance between two groups. P value is considered to be significant when it is less than 0.05 ($P < 0.05$).

Results: A total of 44 patients underwent bipolar hemi-arthroplasty for displaced femoral neck fracture. 24 had cemented and remaining 20 received cementless prosthesis. The cemented and cementless groups did not differ significantly in terms of patient age, gender, number of major co-morbidities, and pre-fracture ambulatory status. The cemented group had significantly longer operating time (95±18 vs. 81±18 minutes, p=0.017, t test) and greater intra-operative blood loss (371±154 vs. 290±147 ml, p=0.024, t test) than the cementless group, but the difference was not significant in terms of the need for blood transfusion and postoperative blood loss (closed suction drains). The length of hospital stay, functional outcome in terms of post-operative ambulatory status, and post-operative complications were similar in both groups. The one-year mortality was similar between the cemented and cementless groups (11/96 [11.5%] vs. 13/111 [11.7%]). After a mean follow-up period of 2.4 (range, 2–4.2) years, 75 patients in the cemented and 89 patients

in the cementless groups were available for review. Postoperative thigh pain was significantly higher in the cementless group (p=0.023).

Conclusion: Cementless hemiarthroplasty is preferred over cemented hemiarthroplasty because of reduced operating time and intra-operative blood loss. It was associated with increased postoperative thigh pain, but functional outcomes, complications, and mortality were similar between the 2 groups.

Keywords: Femoral neck fractures, Cemented Hemiarthroplasty, visual analogue scale (VAS)

Introduction

Femoral neck fractures account for over 90% of hip fractures, occurring in roughly identical proportions with high morbidity and mortality in the elderly population. [1-2] Hemiarthroplasty using modular head partial prostheses is a common surgical procedure used to treat elderly patients with femoral neck fractures. These prostheses can be inserted with or without bone cement. [3] Hemiarthroplasty contributes to early ambulation and good functional recovery. [4] Management of a displaced femoral neck fracture is currently determined by the mobility and functional demands of the patient. Femoral neck fractures treated via cemented hemiarthroplasty may be less prone to periprosthetic fracture and prosthetic loosening and Cementing the prosthesis also affords more secure fixation and may result in less postoperative mid-thigh pain and a reduced long-term revision rate. [5] Taylor et al [6] and Stavrakis et al [7] studies have suggested that cemented hemiarthroplasty reduces the risk of residual pain and affords better functional results. Whereas Khan et al [8] and Gjertsen et al [9] studies found that uncemented implants yield the same clinical results as cemented implants when used to treat displaced femoral neck fractures. To this purpose we evaluated surgical outcome of bipolar hemiarthroplasty in displaced femoral neck fracture using a cemented versus cementless prosthesis.

Materials and methods

This prospective study was conducted at a single tertiary care center between January 2005 and December 2009. Study protocol was approved by Institutional Ethical committee and obtained patient informed consent. Both male and female patients aged ≥60 years whom were undergoing bipolar hemiarthroplasty for displaced femoral neck fracture using a cemented or cementless prosthesis were included. Patients with a pre-existing Hip abnormality requiring total hip replacement or a pathological fracture secondary to malignant disease were excluded. All the patients included in this study were ambulatory prior to the fracture. All patients underwent a detailed clinical examination, blood investigations and pre anesthetic workup before surgery. Data on age, gender, number of associated co morbidities such as diabetes mellitus, congestive heart failure, cardiac arrhythmias, ischemic heart disease, previous cerebrovascular accident, renal disease, Parkinson's disease, hypertension, chronic obstructive pulmonary disease, and the need for ongoing anticoagulation , and pre-fracture ambulatory status which was classified as (1) non-ambulant or wheelchair bound, (2) ambulant with assistance, (3) ambulant with walking aids, and (4) independent was also recorded. End points noted in this study includes Proportion of participants developing complications, operative time, postoperative pain, duration of hospital stay and time taken to resume normal work was also evaluated. Postoperative pain was assessed using visual analogue scale (VAS) at 24 hours and 48 hours post-operatively. It is a scale from 0 to 10, where 0 is no pain and 10 is the worst pain ever.

Statistical analysis

Descriptive statistical analysis has been carried out in the present study. SPSS 15.0 Statistical software was used for the analysis of the data and Microsoft word and Excel have been used to generate tables etc. Results on continuous measurements were presented as Mean±SD and categorical data as actual numbers and percentages. Unpaired t test, ANOVA and Chi-square test were used to test significance between two groups. P value is considered to be significant when it is less than 0.05 ($P < 0.05$)

Results

A total of 44 patients underwent bipolar hemiarthroplasty for displaced femoral neck fracture. 24 had cemented and remaining 20 received cementless prosthesis. There were 31 males and 13 females. The mean age of the patients was 63±4 years. Majority, 38 patients were having 0-2 co-morbidity and remaining 6 were having more than two co morbidities. The cemented and cementless groups did not differ significantly in terms of patient age, gender, number of major co-morbidities, and pre-fracture ambulatory status (Table-1). The cemented group had significantly longer operating time (95±18 vs. 81±18 minutes, p=0.017, t test) and greater intra-operative blood loss (371±154 vs. 290±147 ml, p=0.024, t test) than the cementless group, but the difference was not significant in terms of the need for blood transfusion and postoperative blood loss (closed suction drains). The length of hospital stay, functional outcome in terms of post-operative ambulatory status, and post-operative complications were similar in both groups. There was one intra-operative fracture during insertion of the implant in the cementless group. There were 3 deaths within 72 hours of operation: one died of acute myocardial infarction in each group, and one died of respiratory failure in the cemented group. One patient in the cementless group required revision surgery for a peri-prosthetic fracture sustained 6 months postoperatively following a fall. The one-year mortality was similar between the cemented and cementless groups (11/96 [11.5%] vs. 13/111 [11.7%]). After a mean follow-up period of 2.4 (range, 2–4.2) years, 75 patients in the cemented and 89 patients in the cementless groups were available for review. Postoperative thigh pain was significantly higher in the cementless group (p=0.023). 19 patients were lost to follow-up and 24 patients had died after a mean of 1.4 years. According to telephone interviews with family members, the operated hips were minimally symptomatic at the time of death.

Discussion

Operating time and blood loss have been reported to be significantly greater in patients with cemented hemiarthroplasty, but these are not associated with increased mortality or morbidity, whereas thigh pain is reported to be significantly greater in patients with cementless hemiarthroplasty.6,10 70% of patients with cementless hemiarthroplasty suffer from disabling thigh pain.19 Residual pain is higher in those treated with cementless implants.20,21 Regaining mobility at postoperative one year is reported to be better after cemented arthroplasty (p=0.005),20 although the rates of postoperative complications and early mortality are similar between the 2 groups,6 as is the Harris Hip Score[10] (functional outcome) at one year.12 Cementation is associated with increased risks of cardiac arrhythmias and respiratory complications caused by embolism of marrow content forced into the circulation or the toxic effect of the cement. An increased risk of severe embolic events and impaired pulmonary function was reported during cemented total hip arthroplasty.22 However, cementless implants are associated with complications such as thigh pain, stress shielding, and a higher risk of periprosthetic fracture.8,13 In

elderly patients, bone quality is generally poor; this can lead to poor bony in growth and inability to achieve a congruent fit, both of which preclude an initial rigid fixation that is important for cementless implants.23 Our results are comparable with standard studies of bipolar hemiarthroplasty performed for fracture neck femur by Raghvendra et al [11] in which 80% of the patients achieved either an excellent or a good result with cemented total hip arthroplasty.

Table 1: Clinical characteristics between Seton vs. Fistulectomy.

Clinical Parameters	**Cemented (n=24)**	**Cementless (n=20)**	**P value**
Age in years	61.57±9.67	64.8±5.4	P >0.05
Gender (M/F)	16/8	15/5	P >0.05
Co morbidities (0-2/>2)	15/9	13/7	P >0.05
Pre fracture Ambulatory status	14/6/4/0	10/7/3/0	P >0.05
Chronicity of disease (days)	16.2±5.4	12.8±3.4	P >0.05
Operation Time in min	81.57±7.67	64.8±8.8	P <0.05
Median units of blood replaced (Units)	2	2	P >0.05
VAS 24 hours	3.25±0.83	1.52±1.19	P <0.05
VAS 48 hours	1.58±0.76	0.72±0.92	P <0.05
Duration of hospital Stay in days	11.89±0.83	9.65±1.5	P <0.05
Complications			
Intra-operative fracture	0	0	P >0.05
Dislocation	2	1	P >0.05
Deep vein thrombosis	0	0	P >0.05
Pulmonary embolism	0	0	P >0.05
Wound infection	3	2	P >0.05
Pneumonia	2	2	P >0.05
Urinary tract infection	2	2	P >0.05
Pressure sores	1	1	P >0.05
Postoperative periprosthetic fracture	1	0	P >0.05
Post operative ambulatory status	4/8/8/4	5/9/6/0	
WC/A/AW/I = wheelchair bound or non-ambulant/ ambulant with assistance/ ambulant with walking aids/ independent.			

Conclusion

Cementless hemiarthroplasty is preferred over cemented hemiarthroplasty because of reduced operating time and intra-operative blood loss. It was associated with increased postoperative thigh pain, but functional outcomes, complications, and mortality were similar between the 2 groups.

Conflict of interest: None

References

1. Handoll HH, Cameron ID, Mak JC, Finnegan TP. Multidisciplinary rehabilitation for older people with hip fractures. Cochrane Database Syst Rev. 2009; 4:CD007125.
2. Dahl E. Mortality and life expectancy after hip fractures. Acta Orthop Scand. 1980; 51(1): 163-70.
3. Hay M, Gottschalk F. Cemented versus uncemented hip replacement for fracture

of the hip. Disabil Rehabil. 2005; 27(18–19):1151–1155.
4. Bhandari M, Devereaux PJ, Tornetta P, 3rd, et al. Operative management of displaced femoral neck fractures in elderly patients. An international survey. J Bone Joint Surg Am. 2005;87(9):2122–2130.
5. Parker MJ, Gurusamy K. Arthroplasties (with and without bone cement) for proximal femoral fractures in adults. Cochrane Database Syst Rev. 2006; 3:CD001706.
6. Taylor F, Wright M, Zhu M. Hemiarthroplasty of the hip with and without cement: a randomized clinical trial. J Bone Joint Surg Am. 2012; 94(7):577–583.
7. Stavrakis TA, Lyras DN, Psillakis IG, et al. Fractures of the femoral neck treated with hemiarthroplasty. A comparative study. Folia Med (Plovdiv). 2009; 51(4):34–39.
8. Khan RJ, MacDowell A, Crossman P, et al. Cemented or uncemented hemiarthroplasty for displaced intracapsular femoral neck fractures. Int Orthop. 2002; 26(4):229–232.
9. Gjertsen JE, Lie SA, Vinje T, 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.
10. Harris WH. Traumatic arthritis of the hip after dislocation and acetabular fractures: treatment by mold arthroplasty. An end-result study using a new method of result evaluation. J Bone Joint Surg (Am)1969;51((4)):737–55.
11. TS Raghvendra, BS Jayakrishna Reddy, Jithuram Jayaram. Management of Fracture Neck of Femur with Cemented Bipolar Prosthesis. Indian Journal of Clinical Practice, Vol. 24, No. 9, February 2014.867-871.