INDIAN JOURNAL OF ORTHOPAEDICS July 2006 Volume 40 : Number 3 : P. 154-156

Results of cemented bipolar hemiarthroplasty for fracture of the femoral neck – 10 year study

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Background: One of the most common treatments of displaced fracture of femoral neck in elderly is bipolar hemiarthroplasty.

Method: Two hundred and seventy patients of displaced fracture of femoral neck were treated by bipolar hemiarthroplasty. The Mean age of the patients at the time of surgery was 69.80 years.

Results: Follow up ranged between 12 months and 120 months. There were 8 cases each of acetabular erosion and protrusion with 10 cases of femoral stem loosening. Eight cases had post operative dislocation requiring open reduction. Eighteen patients got revision surgery to total hip replacement. The overall incidence of DVT/PE was 9.9% which declined after regular use of low molecular weight heparin. Eleven patients had post operative infection. There were 54.2% excellent results, 21.0% good results, 10.7% fair and 3.7% poor results.

Conclusion: Elderly patients with displaced fracture of neck femur are able to ambulate early after Cemented bipolar hemi arthroplasty. The complication rate is low, the component survival long and pre injury functional status is restored in majority of patients.

Key-words: Displaced fracture femoral neck; cemented bipolar hemiarthroplasty.

Introduction

In geriatric population femoral neck fractures is one of the most common injuries. Prevalence of these fractures has further increased with improvement in life expectancy. The goal of treatment of these fractures is restoration of prefracture function without associated morbidity. But treatment of displaced femoral neck fractures in elderly has been controversial¹⁻³. Open reduction and internal fixation of these fractures in elderly has poor outcome including high rate of non – union and avascular necrosis ^{1,4}. Introduction of single piece unipolar metal prosthesis in 1950's, to replace the femoral head offered an alternative form of treatment^{5,6}. The problems encountered were acetabular erosion and loosening of stem giving rise to pain. In spite of these, superiority of prosthetic replacement over internal fixation was well established⁷. There is controversy at present whether to do hemiarthroplasty, bipolar or otherwise or primary THR in these cases. One of the aims of this study is to see whether bipolar hemiarthroplasty meets desired end result. As the bipolar hemiarthroplasty being quicker leading to lesser morbidity and low rate of dislocation which is quite common after primary THR in fracture of neck femur.

Bateman in 1974 introduced the prosthesis which had mobile head element and had additional head surface to allow movement within the acetabulum⁸. This led to reduced wear of acetabular surface and the prosthesis. The main aim to reduce immobilization and make patient walk early, with improved survival of implant is clearly met by this bipolar prosthesis.

Materials and method

A total of 271 bipolar hemiathroplasty were done at authors' institution between Jan, 1993 and Dec, 2003 for displaced fracture of femoral neck. Few cases of nonunion and pathologic fracture due to metabolic neoplastic causes were also included in the study. This retrospective study was done looking into patient hospital record file, operative notes and progress sheet. At the end of study 75 patients had died while 196 patients were alive. Attempt was made to call all living patients to the hospital and evaluated them for pain and functional status. Radiographs of hip was obtained for each of them and compared with the first post operative X-ray. Few of these patients who could not come to our hospital were interviewed by telephone and their X-rays were requested by post. For the patients who were not alive interview of the relatives was done to know patients functional status and cause of death. First and last X-ray of these patients was requested by post. There were 133 fractures in the right hips and 138 fractures in the left hips. Total 144 fractures occurred in women and 127 fractures in male. Four patients had bilateral hemiarthroplasty and their first surgery was done in another hospital. These hips were not included in the study.

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The oldest patient was 95 years old and the mean age being 69.80 years. However there was one case operated at the age of 24 years having pathological fracture due to fibrous dysplasia which was considered non reconstructable.

All cases were operated by Moore's posterior approach and done by consultants in the department. A total of 117 Indian prostheses (INOR modular) and 154 imported prostheses (Depuy Johnson, Zimmer & Sulzer) were used. All prostheses were of modular design with femoral component cemented.

The outer cup size was measured preoperatively on Xrays and again on table with measuring gauge and trial reduction was done. Between 1994 and 1997 in 58 hips manual (1st generation) cementing technique was used. After 1997 pressurization and medullary canal plug (bone or Harding restrictors), were used in 213 cases. Preoperative prophylactic antibiotic was used in most patients. Before 1999 low molecular heparin was not used but later on it was routinely used. Post operatively dressing and drain removal was done after 48hrs and then ambulation was started with walker. Check X-ray was taken in all patients. Stitch removal was done at 12-14 days. Patients were called at 6 weeks postoperatively to repeat the X-rays. All patients were advised follow up every 6 months with X-ray or earlier in case of complaints. Follow up X-rays were assessed for acetabular protrusion, cartilage erosion, femoral component subsidence and loosening. Acetabular protrusion was determined by measuring medialization of the acetabular line compared with the normal hip or the first postoperative X-ray. Kohler or ilioischial line was used as reference. Acetabular cartilage erosion was determined by measuring change in thickness of acetabular cartilage as compared to first post operative radiograph or of the normal hip joint. Seven zones of Gruen et al were used to measure radiolucencies at prosthesis cement or cement bone interface. Distance between lesser trochanter and prosthesis collar was used to measure femoral component subsidence as compared to first postoperative X-ray.

Results were graded according to criteria keeping in patient's functional status during follow up in mind.

Grade 1 – No pain and limp or same as preoperative status of walking.

Grade II – Slight pain on extended walk or some limp. Patient uses stick for support but are able to walk without it.

Grade III –Constant pain on walking and can walk only with support of stick or walker.

Grade IV - Not able to walk or bed ridden

Results

Minimum follow up of 12 months was taken in the final reporting of the results. Twenty eight patients died within first 12 months of the study of which 10 died in early post operative period. The cause of death in each case was analyzed and these cases were removed from final grading of results. Maximum follow up was 120 months with mean follow up of 48.73 months. Average time period from injury to surgery was 9.12 days and average hospitalization after the surgery was 6.85 days of. Final evaluation of the results showed 75.3 excellent to good results according to criteria used (Table I).

Table 1. Grading of Results

Grading	Frequency of	Percent	Valid	Cumulative
·	patients		Percent	Percent
Excellent	147	54.2	54.2	54.2
Good	57	21	21	75.3
Fair	29	10.7	10.7	86
Poor	10	3.7	3.7	89.7
Not evaluated (Deat	h) 28	10.3	10.3	100.0
Total	271	100.0	100.0	

Most common complication was electrolyte imbalance/ hyponatremia attributed to advanced age and medical problems. No correlation was found between time gap of injury and surgery with electrolyte imbalance and hyponatremia. All dislocations required open reduction. Closed reduction was first tried on OT table and four patients' modular head implant got dislodged (Table II). Out of 26 patients of acetabular erosion, protrusion and femoral stem loosening, 18 patients got total hip replacement done. We started using low molecular weight heparin as routine in the year 1999. Between 1994 and 1998, 20 patients had DVT and PE. Frequency reduced to 5 patients in the year 1999 and 2003.

Table II.	Comp	lications
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SN	lo Complication	Number of patients	Percentage in 271 patients
1	Acetabular erosion	8	3.0
2	Acetabular Protrusion	8	3.0
3	Femoral stem loosening	10	3.7
4	DVT/PE	26	9.6
5	Infection	11	4.1
6	Electrolyte imbalance/ Hyponatremia	38	14
7	Death in postoperative period (< 4 week	(s) 10	3.7
8	Myocardial infarction	2	.7
9	Dislocation	8	3.0

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Discussion

The treatment of femoral neck fractures in elderly has always been controversial. Scanning the literature shows various views on the treatments, some advocate internal fixation and others prosthetic replacement, whether unipolar or biopolar. Over all trend has fallen in favour of bipolar hemiarthroplasty due to early ambulation of elderly patient and less failure rate as compared to internal fixation. Lu-Yao et al in series of 106 cases found approximately threefold increase in re-operation if internal fixation was used compared to hemiarthroplasty for displaced femoral neck fractures in greater than 65 years old⁹. He had 33% nonunion and 16% avascular necrosis for patients treated with internal fixation. He found rate of re-operation was double when unipolar prosthesis is used. Lu - Yao et al further substantiated that total hip replacement is another excellent procedure but as high dislocation rate of 10.7%⁹. In our series of 271 patients the dislocation rate with bipolar hemiarthroplasty was 3%. (Table II) Further we had 3% incidence of acetabular erosion/ protrusion and 3.7% incidence of femoral loosening. Using modular design prosthesis can help us revised appropriate component if required.

We found no bearing on final results if Indian prosthesis like INOR modular or Depuy, Zimmer or Sulzer modular prosthesis were used. In first years of study we found increased incidence of DVT and PE where no low molecular weight heparin prophylaxis was used. We started using low molecular heparin after 1998 and incidence reduced dramatically. All patients who were alive and relatives of dead patients were asked about over all patients satisfication with the procedure. 67.2 % were satisfied with the procedure. Most of the patients had retained there pre operative walking status. Sixty two patients were successfully squatting although against our advice.

We conclude that bipolar hemiarthroplasty is a good method to manage displaced femoral neck fractures in elderly.

References

- Asnis SE, Wande Sgaglione L. Intracapsular fracture of the femoral neck – results of cannulated screw fixation. *J Bone Joint Surg (Am)*.1994; 76: 1793-1803
- Levine IS. Orthopaedic knowledge update trauma. Am Acad Orthop Surg. 1996; 1: 113-119
- Swiontkowski MF. Current concepts review intra capsular fractures of the hip. J Bone Joint Surg (Am).1994; 76: 129-138
- Rae PJ, Hodgkinson JP, Meadows TH, Davis DRA, Hargadon EJ. Treatment of displaced sub capital fractures with the Charnley – Hasting hemiarthroplasty. J Bone Joint Surg (Br). 1989; 71: 478 – 492
- 5. Moore AT. The self looking metal hip prosthesis. *J Bone Joint Surg* (*Am*).1957; 39: 811
- Thompson FR. Two and a half years experience with a vitallium intramedullary hip prosthesis. J Bone Joint Surg (Am).1954; 36: 489 – 500
- D' Arcy J, Devas M. Treatment of fractures of the femoral neck by replacement with the Thomson prosthesis. J Bone Joint Surg (Br). 1976; 58: 279-86
- Bateman JE. Single assembly total limp prosthesis Preliminary report. Orthop Digest. 1974; 2-15
- Lu-Yao GL, Keller RB, Littenberg B, Wennberg JE. Outcomes after fractures of the femoral neck: A meta-analysis of one hundred and six published reports. J Bone Joint Surg (Am).1994; 76: 15-25