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PRIMARY BIPOLAR ARTHROPLASTY IN TREATMENT OF UNSTABLE INTERTROCHANTERIC FRACTURES IN ELDERLY PATIENTS

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ABSTRACT

The aim of the present study is to find out which of these treatment options can lead to the best clinical and functional outcomes. Ten patients admitted to Hospital with a diagnosis of unstable intertrochanteric fractures of femur are selected. Preoperative and operative data was retrieved from inpatient hospital files. Postoperative radio clinical data at follow up visits was collected from outpatient department files. Functional outcomes were assessed with use of Harris hip score. The main clinical measures were early postoperative full weight bearing, postoperative complications and functional outcome. The time to full weight bearing, the rate of postoperative complications and functional outcome. The time to full weight bearing, the rate of postoperative complications, and the functional outcomes was significantly better in the cemented bipolar arthroplasty group. The results indicate that cemented bipolar hemiarthroplasty is of choice in freely mobile elderly patients above seventy years of age with an intertrochanteric femoral fracture.

Keywords: *Unstable Intertrochanteric Fracture of Femur, Cemented Bipolar Arthroplasty for Treatment of Unstable Intertrochanteric Fracture*

INTRODUCTION

Bartu *et al.*, (1985) mentioned that Intertrochanteric fracture in the elderly patient is a frequent problem and is becoming more common as the proportion of elderly people in the population increases. Jenson (1981), Sexson and Lehner (1987) and White (1987) reported that unstable intertrochanteric fracture in the elderly patient is associated with high rate of mortality as much as 20 per cent during the first postoperative year. Excessive collapse, loss of fixation, and cut-out of the lag screw resulting in poor function remain problems associated with internal fixation of unstable intertrochanteric fracture in the elderly patient with osteoporotic bone. To allow earlier postoperative weight-bearing and to avoid excessive collapse at the fracture site, some surgeons have recommended prosthetic replacement for the treatment of unstable intertrochanteric fractures was reported by Bross *et al.*, (1991), Harwin *et al.*, (1990), Green *et al.*, (1987) and Rodop *et al.*, (2002). The purpose of the present study is to evaluate the functional and clinical outcomes of cemented bipolar arthroplasty as a primary treatment for unstable intertrochanteric fracture in the elderly patient.

MATERIALS AND METHODS

This study is approved by the KBN Hospital in Gulbarga. 10 patients admitted with the diagnosis unstable intertrochanteric femur fracture according to AO-ATO classification of intertrochanteric fractures as per the Association for Osteosynthesis/Orthopedics Trauma Association (1996) are selected. These patients are all above sixty years of age and are independently mobile before the fracture. Patients less than sixty years old, patients with pathological fractures, patients with a previous contra lateral hip fracture and patients with stable fractures and intact lesser trochanters were excluded. Data was collected from inpatient hospital files and out-patient Department upon follow up. Pre-operative data included: Age, sex, fracture type, and preoperative co-morbid medical problems. Peri-operative data included type of anesthesia, operative time, amount of blood loss, number of units of blood transfused, and duration of hospital stay. Postoperative data included time to full weight bearing, postoperative complications such as pulmonary problems, urinary tract infection, deep vein thrombosis, cardiac problems, infection

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(superficial and deep), pressure sores, All surgical procedures were performed by the same surgical team as soon as the condition of the patient was stabilized, usually within forty-eight hours after admission.

Preoperative templating of radiographs of the fractured side and contra lateral side was performed to determine the approximate size and position of the stem and the approximate femoral head. The operations were performed using the transgluteal lateral approach in a lateral decubitus position. The femoral head and neck were osteotomized at a level determined by preoperative templating of the uninjured side and by the use of trial femoral components to help find the appropriate level. Meticulous care was taken to preserve the integrity of the greater trochanter, abductor muscles, and all the vascularized bone fragments.

The femoral medullary canal was then reamed to appropriate stem size and diameter. Trial reductions were performed to determine the exact length that will provide the desired tension and tissue balancing of the abductor muscles and equal leg length.

Careful restoration of neck length, offset and version to maximize stability of the hip joint was also performed during trial. The definitive femoral stem was cemented into the femoral canal use of so-called second-generation techniques (medullary lavage, use of an intramedullary cement plug, hand-mixing of cement, use of a cement gun to deliver the cement in a doughy state in a retrograde fashion and to insert antibiotic-impregnated cement in all patients). Small calcar bone fragments were reduced over the medial aspect of the femoral stem below the stem collar during insertion.

As for large calcar bone fragments, they were reduced with the help of cement. Other cases needed medial calcar bone reconstruction in the form of U-shaped autograft fashioned from the removed head and neck to fit around the medial portion of the femoral stem. Any protrusion of cement between reduced bone fragments was cleaned out. The greater trochanter was reduced and stabilized using tension band wiring technique after hip reduction or just sutured near the prosthesis.

The gluteus medius muscle and vastus lateralis muscle were sutured to their anatomical locations using anchor sutures if necessary.

Fascia Lata was tightly closed over a suction drain. The use of prophylactic antibiotics was second generation cephalosporins (1 gram) and amikacin (500 mg) were given at the induction of anesthesia and continued for 6 doses postoperatively. Pain killers were given as needed. Patients in the bipolar arthroplasty were ambulated full weight bearing on the third postoperative day with the aid of a physiotherapist. After discharge from hospital, patients were followed at six weeks; at three, six, and twelve months; and yearly thereafter for radiological control and functional evaluation using the Harris Hip score at each visit.

The Harris hip score is a validated fifteen-item patient questionnaire on which scores range from 0 to 100 (<70 poor; 70-79 fair; 80-89 good; 90-100 excellent).

Antero-posterior and lateral radiographs of the affected hip were made postoperatively and at each follow up visit.

Any erosion of the acetabular cartilage with horizontal or vertical migration of the bipolar cup of >2 mm was documented. A stem was considered to be unstable when there was progressive subsidence exceeding 3mm, any change in position, or a continuous radiolucent line wider than 2mm at the bone-cement interface.

RESULTS AND DISCUSSION

Ten patients are enrolled in this study. All had unilateral intertrochanteric fracture of the hip after falling from standing position to ground level. The study group consisted of 10 patients treated with a primary bipolar arthroplasty. The average age at operation was 64.6 years (range, 60 to 85 years).

There are 4 men and 6 women. 2 patients had the A21 fracture type, 4 patients had A22 fracture type, 2 patients had A23 fracture type, and 2 patients had A33 fracture type, as presented in Table 1.

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Table 1: Demographic and preoperative data

Number	10
Age (years)	60-85
Sex (Female : Male)	6:4
AO/OTA fracture type (No. of patients)	
A21	2
A22	4
A23	2
A31	
A33	2
Medical illness (No. of patients)	10
Cardiovascular disease	6
Diabetes	6
Hypertension	5
Chronic renal failure	1

Table 2: Intra operative data

Type of anesthesia	10
Block (SA/EA)	
Operative time (min)	120
Amount of blood loss (ml)	250
Blood transfusions (units)	2
Duration of hospital stay (days)	7

The mean operative time 120 (minutes) was lesser in the bipolar arthroplasty. The mean blood loss intraoperatively 250 (ml) was high in the bipolar arthroplasty. The mean blood transfusions (number of units) required during hospital stay was 2 units in the bipolar arthroplasty. Average length of hospital stay 7 (days) was less in the bipolar arthroplasty as reveals in Table 2.

Table 3: Postoperative complications

Mortality rate	0
During hospital stay	
<6 weeks	2
6 – 24 months	0
Pulmonary complications	0
Urinary tract infection	3
Deep vein thrombosis	0
Cardiovascular complications	0
Prosthetic / fixation failure	0
Wound infection	
Superficial	1
Deep	0
Pressure sores	1

Patients with bipolar arthroplasty had less postoperative complications; pressure sores 1 (10%), pulmonary complications (0%), cardiac complications (0%), superficial wound infection 1 (10%) urinary tract infection 3 (30%).

In the radio-clinical results of 1 patients were considered unsatisfactory: one patients had restriction in the range of movement of the affected limb, there was no dislocation, no signs of femoral stem instability, or acetabular erosion with cup migration as given in Table 3.

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Table 4: Functional outcome

Follow-up period (months)	24
Time to full weight bearing (weeks)	3
Harris Hip score (100)	
3 months postoperative HHS	76
12 months postoperative HHS	85
24 months postoperative Harris HHS	92
Harris pain score at 24 months (44)	42
Return to normal daily activities (days)	35

The Harris Hip Score at 3 months postoperatively was significantly higher in patients with bipolar arthroplasty (76). (range 66-86). The Harris Hip Score at 12 months postoperatively was significantly higher in patients who underwent bipolar arthroplasty (82) (range 72-90). At 24 months, Harris Hip Score was significantly higher in patients who underwent bipolar arthroplasty 85 (range 76-90) (Table 4). The time 5 (weeks) to independent full weight bearing and return to the pre-fracture level of daily activity was significantly earlier in patients who underwent bipolar arthroplasty as mentioned in Table 4.

Harwin *et al.*, (1990) reported on fifty-eight elderly patients with osteoporosis in whom a communitated intertrochanteric femoral fracture had been treated with a bipolar Bateman-leinbach prosthesis and who were followed for an average of twenty-eight months. The average patient age was seventy-eight years, and 91% walked prior to discharge. Two patients had a nonunion of the greater trochanter. There were no deep infections, dislocations, acetabular erosions, or cases of stem loosening. Broos *et al.*, (1991) reported on ninety-four elderly patients treated with a bipolar Vandeputte prosthesis. They found that the average operating time was shorter, the mortality rate was lower, and the functional results were better in the group treated with the bipolar hemiarthroplasty.

Rodop *et al.*, (2002) reported on fifty-four elderly patients who had been treated with a bipolar Leinbach hemiprosthesis (Protek; Sulzer Orthopedics, Baar, Switzerland). A good to excellent result, as assessed with the Harris hip-scoring system, was reported in 80% of the patients. There were no dislocations or cases of stem loosening.

In the present study, the results of the hemiarthroplasty group are significantly better regarding operative time, blood loss, perioperative blood transfusion, and hospital stay.

The present study also shows that the cemented mantle used to fix the prosthesis in the femoral shaft was possibly able to transmit the stresses of weight bearing directly to the femoral diaphysis bypassing the posteromedial area of the proximal femur. In addition, calcar reconstruction had the potential advantage of improved trochanteric healing, restoration of bone stock, re-establishment of proper limb length and reduced implant cost.

Conclusion

The present study concludes that cemented bipolar arthroplasty is of choice in freely mobile elderly patients above sixty years of age with an intertrochanteric femoral fracture. Postoperative full weight bearing after hemiarthroplasty spares the postoperative complications of non weight bearing after internal fixation. Yet hemiarthroplasty in these cases is a surgically demanding technique. Bad surgical technique may lead to prolonged operative time, high incidence of deep infection, dislocation, and a poor radiological and functional outcome.

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