Comparative study between standard dynamic hip screw (DHS) and cemented bipolar arthroplasty in trochanteric fracture of femur in elderly patients

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ABSTRACT

The study included the clinical and Roentenographic result obtained with Bipolar arthroplasty as a primary treatment of Trochanteric fractures of femur compared with those who had been treated by internal fixation with dynamic hip screw in elderly patients. This study was conducted on 50 cases. In our study, Bipolar hemi-arthroplasty was associated with better functional outcomes than those reported with the use of internal fixation. Patients were able to perform their normal activities within a month and they showed progressive improvement in the first three months. All patients demonstrated good functional achievement in spite of their advanced age. We concluded that Bipolar hemi-arthroplasty gives better results than internal fixation in unstable intertrochanteric fractures in elderly osteoporotic patients. We noted that Bipolar hemi-arthroplasty permits rapid recovery with early weight-bearing, and maintenance of a good level of function with little risk of mechanical failure.

Keywords: Inter-trochanteric femoral fractures, Primary bipolar arthroplasty, Dynamic hip screw, Internal fixation, Elderly femoral fractures

INTRODUCTION

A hip fracture in elderly patients represents a disturbing and potentially ominous landmark in their personal health history. For the health care system and to a society in general, intertrochanteric fractures and femoral neck fractures represents an epidemic disease.

Incidence wise, trochanteric fractures are 57% of total fractures around the hip joint. The incidence of intertrochanteric fractures appears to be increasing, due to increased age longevity in the world’s population. Gallagher et al reported eight fold increase in intertrochanteric fracture incidence in men over 80 years and a 5 fold increase in women over 80 years. Lawton et al reported that intertrochanteric hip fractures patients are biologically older than those who sustain a femoral neck fractures.

The aim of fracture treatment now-a-days is not only anatomical realignment but to promote early mobilization of the limb and joint. The restoration of early functional activity in rigidly fixed fracture accelerates bony union, preserves muscle tone and enhances joint function to normal range, avoids complications of prolonged immobilization and helps to retain mental composure and psychological well-being. Dynamic hip screw is a lag screw which is bio-mechanically superior to various compression hip screw systems developed during recent years. The sliding mechanism secures interfragmentary contact even if resorption of fracture ends occur.

But regardless of the method of fixation of the IF, the incidence of general complications with internal fixation have remained high in elderly patients.

In an attempt to early rehabilitate the patient and lessen the duration of recumbency, concept of bipolar and development of synthetic bone cement was a major...
breakthrough in treatment of trochanteric fractures, which reduced the complication of implant failure.

Present study was conducted to compare the results of bipolar arthroplasty and dynamic hip screw fixation of intertrochanteric extracapsular fracture in elderly people.

**MATERIAL AND METHODS**

The present study was conducted on 50 patients of extracapsular fractures of femur above the age group of 50 years who were admitted in the Department of Orthopaedics, attached to Govt. Medical College, Patiala. In 25 cases bipolar prosthesis was used and in other 25 cases DHS was used.

Surgery was done either under spinal, epidural or general anaesthesia. In addition to this, pre-operative evaluation also included proper selection of instruments and implants required for surgery. Decision about Bipolar arthroplasty was taken on the table, in those cases where articular cartilage was found normal were taken for bipolar arthroplasty.

Posterior approach was used in all cases for bipolar arthroplasty. Cemented Femoral stem was used in all cases. Once the prosthesis was fixed the broken trochanter and calcar were fixed by the wire cables where required.

In DHS group patient was put on the spica table, closed reduction was done. Proper reduction was confirmed by C-Arm examination by taking antero posterior and lateral views. Internal fixation was done with dynamic hip screw and side plate under guidance of image intensifier.

Appropriate antibiotics were given post-operatively. Drain removed after 48 hours and stitches were removed on 11th day. Quadriceps exercise was started 24 hours post-operatively. The patient was discharged from the hospital within two to three weeks of operation and allowed to walk with the help of crutches or walker. Patient was asked to report to the outpatient department for follow up. Each time patient was examined clinically and radiologically for the evidence of union and for any complication.

Harris Hip Score and Modified Merle’d Aubigne and Postel hip rating system, described by Salvati et al (1972) was used for evaluation for the results.

**RESULTS**

In this study, there were 38% female patients and 62% male patients. Patterns were similar in both the groups. In the DHS group mean age was 62.32 years, while in BIPOLAR group mean age was 69.16 years.

Minor trauma was cause of fracture in 64% in bipolar group but only 40% in DHS group. In our study, 60% cases were operated within 7 days of admission. Delay in rest was mostly because of associated medical conditions.

In BIPOLAR group 24 patients 96(%) were allowed full weight bearing within 4-6 weeks of operation. While in DHS group it took patients 12-16 weeks for full weight bearing.

Results were scored as per Salvati and Wilson criteria, having a maximum score of 40.

In the Bipolar group, 21 cases (84%) showed score of 32 or more after evaluating the results from the laid down criteria, 4 cases (16%) showed score 24-31 none below 24. The mean score was 35.6.

In the DHS group, 17 cases (68%) showed score of 32 or more after evaluating the results from the laid down criteria, 7 cases (28%) showed score 24-31 and one below 24. Mean score was 33.36.

Mean Harris hip score at final follow up was 83.2 in bipolar group and 80.4 in DHS group.

In our study cut out was seen in 2 cases (8%), avascular necrosis was seen in 4% of cases (1 patient). Superficial infection was seen in 3 cases in DHS group and in one case of Bipolar group. DHS group showed more complications with Deep vein thrombosis in 2 patients, both were treated by medical therapy, one patient showed chest infection and bed sores were seen in 2 patients (8%). The difference between the groups was significant.

**DISCUSSION**

The incidence of all hip fractures is approximately 80 per 100,000 persons and is expected to double over the next 50 years as the population ages 6.

The standard treatment of extra capsular fracture neck femur is operative. The operative treatment is credited with less deformity, a reduced length of hospital stay and early rehabilitation. Mortality rate of 34.6% have been reported for trochanteric fractures treatment with traction only, against 17.5% for those, treated by operative methods 7.

A debated topic in trauma surgery is the type of operation and the short- and long-term results of reduction and fixation of unstable trochanteric fractures. Many methods for treating intertrochanteric fractures (IF) have been developed, from medial displacement osteotomy 8 and condylocephalic intramedullary Ender nailing 9, to use of the more modern sliding hip screw and cephalomedullary nails (such as the gamma nail)10, external fixators 11 and their variants.
Jensen et al (1980) reported a series of 1071 patients with unstable trochanteric fractures which were treated by McLaughlin or Jewett Nail Plate, the sliding screw plate or the condylocephalic nailing according to Enders. Sliding screw plate fixation was found to be the only suitable fixation method for unstable trochanteric fractures because of a low failure rate, a low re-operation rate and the possibility of secondary impaction without disturbing the fracture union.16

O’Brien et al (1995) compared the efficacy of the gamma nail (GN) to the dynamic hip screw (DHS) in the management of intertrochanteric hip fractures. One hundred and one patients with 102 fractures. In this study the DHS was associated with a lower risk of local complications and should still be considered to be the implant of choice for patients with intertrochanteric fractures17.

These studies show DHS is gold standard for internal fixation in intertrochanteric fractures.

But regardless of the method of fixation of the IF, the incidence of general complications ranges between 22% and 50%.18,19. Complications are also related to the recovery time after surgery, such as immobility, bed rest, physical therapy and weight bearing20. Local complications (such as cutting out of the fixation devices from the femoral head, nonunion, shortening and external rotation of the limb, varus neck shaft angle deformity)21,22 are also considerable, as is mechanical failure of the fixation or loosening of the reduction in the postoperative period. The main causes of mechanical failure are comminuted or unstable fractures and osteoporotic bone. In the elderly, the coexistence of unstable, comminuted fractures with osteoporosis worsens the prognosis21-23.

Due to high failure rate and complications associated with internal fixation, many authors have used hemiarthroplasty and total hip arthroplasty as primary treatment of these fractures.

Grimsrud et al (2005) reviewed 39 consecutive patients with unstable three and four part intertrochanteric hip fractures who were treated with cemented bipolar hip arthroplasty. One dislocation and one deep infection occurred. They concluded unstable three and four part hip fractures can be treated with a standard femoral stem prosthesis and cerclage cabling of the trochanters. The technique allowed safe early weight bearing on the injured hip and had a relatively low rate of complications in the series24.

Zhang et al (2005) evaluated the clinical effect of bipolar long-stem prosthetic replacement on the treatment of comminuted intertrochanteric fracture of hip in the elderly osteoporotic patients. Bipolar long-stem prosthetic replacement for the treatment of comminuted intertrochanteric fractures in the elderly osteoporotic patients proved to be a suitable alternative. Patients had better prognosis, early full-weight bearing, rapid rehabilitation and fewer complications in this study25.

Various other studies showed similar results26-29.

In our study cut out was seen in 2 cases (8%), superficial infection was seen in 3 cases in DHS group and in one case of Bipolar group. DHS group showed more complications with Deep vein thrombosis in 2 patients, both were treated by medical therapy, one patient showed chest infection and bed sores were seen in 2 patients (8%). The difference between the groups was significant.

It took 3-4 times longer for patients in DHS group as compared to patients in bipolar group to return to unassisted daily activities.

We concluded that Bipolar hemi-arthroplasty gives better results than internal fixation in unstable intertrochanteric fractures in elderly osteoporotic patients. We noted that Bipolar hemi-arthroplasty permits rapid recovery with early weight-bearing, and maintenance of a good level of function with little risk of mechanical failure.

REFERENCES