

## Original Research Article

# Short term results of modular bipolar hemiarthroplasty for the treatment of neglected trochanteric femur fracture in the elderly

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## ABSTRACT

**Background:** In rural India because of native practitioner culture people tend to neglect orthopaedic injuries and often present late to the hospitals. Bipolar hemiarthroplasty for neglected intertrochanteric fractures of the femur in the elderly yields good clinical results in terms of early postoperative ambulation. This will have a direct effect on the general condition and postoperative rehabilitation.

**Methods:** Sixteen patients with proximal extracapsular femoral fractures presented average 10.4 weeks late from the day of injury, were treated with modular bipolar hemiarthroplasty. There were 11 men and 5 women, with mean age of 72.8 years (range: 65–83 years). Primary cemented bipolar hemiarthroplasty was performed using the Hardinge lateral approach in a lateral decubitus position. Harris hip score was used for the clinical evaluation of the patients.

**Results:** Clinically, the Harris hip score at the last follow-up ranged from 92 to 59, with a mean value of 81.7. Postoperative radiographs showed a good position in all patients. 1 patient developed complication during cementing and 1 case came with dislocation. No case of infection, acetabular erosion, periprosthetic fracture or implant loosening was reported in this study.

**Conclusions:** Primary cemented bipolar hemiarthroplasty is a good choice in elderly patients with neglected intertrochanteric fractures of the femur.

**Keywords:** Hemiarthroplasty, Fracture, Trochanter, Elderly

## INTRODUCTION

By 2050 the number of hip fractures will be about 6.26 million.<sup>1</sup> An increase in these fractures is on the rise due to the increased life expectancy of the people and osteoporosis. The mechanism of trauma of hip fractures in elderly is mostly a trivial trauma.<sup>2</sup> Osteosynthesis with various methods is the standard form of treatment for hip fractures. However unstable fractures in elderly with associated osteoporosis often make osteosynthesis difficult.<sup>3</sup> The operative treatment methods have come a long way from fixed nail plate devices to modern

intramedullary nailing systems. The implant related complications have reduced considerably with introduction of modern implants.

Introduction sliding hip screw considerably reduced complications related to fixed nail plate devices like high rates of cut-out and fracture displacement.<sup>3-7</sup> However complications such as head perforations, excessive sliding leading to shortening, plate pull-out, and plate breakage continued to be a problem especially with the unstable type of fractures.<sup>8-10</sup> Osteoporosis and instability are the most important factors leading to unsatisfactory

results.<sup>11,12</sup> Also in these elderly patients with unstable osteoporotic fractures, a period of restricted mobilisation is suggested which may cause complications like atelectasis, bed sores, pneumonia, and deep vein thrombosis. Thus fracture stability, bone strength, and early rehabilitation determined the final results in cases of intertrochanteric fractures. Intramedullary interlocking devices have shown reduced tendency for cut-outs in osteoporotic bones and also have better results in cases of unstable intertrochanteric fractures.<sup>13,14</sup> However, the role of the intramedullary devices in unstable osteoporotic and severely comminuted intertrochanteric fractures is still to be defined. However, an ideal treatment method is still rather controversial because of the poor quality of bone mass, comorbid disorders, and difficulty in rehabilitation of these patients.

Various forms of hip arthroplasties are being increasingly used for such fractures. Hip arthroplasty have also shown to achieve early rehabilitation of the patient and good short to mid term results.<sup>15,16</sup> However, an ideal treatment method is still rather controversial because of the poor quality of bone mass, comorbid disorders, and difficulty in rehabilitation of these patients. The main aim of treatment in elderly with hip fractures is early mobility as prolonged dependence makes such patients prone to life threatening complications. Hip arthroplasty definitely has advantage of early mobility thus helps in preventing post-operative complications.

In rural India because of culture of native practitioners (Desi bone setters) people often present late to the hospital. In such situations even for simple fractures a surgeon can't follow the standard protocol and has to take out of box decisions. This study was done to evaluate the results of modular bipolar hemiarthroplasty in such patients who being bed ridden for months had disuse limb osteoporosis on top of age related senile osteoporosis. Further in such patients prolonged post-operative immobilisation can't be risked as it can have life threatening complications.

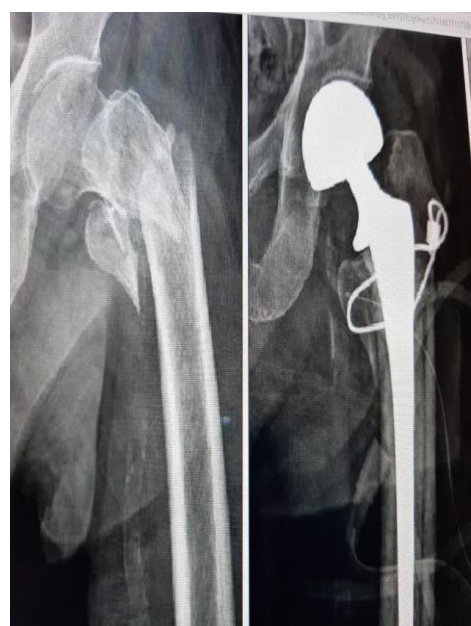
## METHODS

Between June 2017 and December 2018, a series of 16 patients who underwent cemented bipolar hemiarthroplasties at the department of Orthopaedics Pt. Jawahar Lal Nehru Government Medical College Chamba, HP, India for neglected intertrochanteric fractures were followed up prospectively for a period of atleast 1 year. These patients were all above 65 years of age and were independently mobile. Exclusion criteria were patients with compound intertrochanteric fractures, polytrauma patients, patients who were <65 yrs of age and patients who were unfit for surgery.

Preoperative data included: age, sex, side, fracture type (stable or unstable) and mode of injury and time of delay. Post-operative data included time to full weight bearing, average hospital stay and complications. This study was

approved by the institutional ethics committee. All the patients provided written informed consents.

All surgical procedures were performed by the same surgical. The operation was performed by using the Hardinge lateral approach in a lateral decubitus position. The femoral head and neck was removed. 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 the appropriate stem size and diameter. Trial reductions were performed to determine the exact length that would provide the desired tension and tissue balancing of the abductor muscles and an 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 with the 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). The lesser trochanter was not removed. Any protrusion of cement between reduced bone fragments was cleaned out. The greater trochanter was reduced and stabilized by using the tension band wiring technique after hip reduction or it was just sutured near the prosthesis whenever required (Figure 1). Patients were ambulated full weight bearing on the first post-operative day. They were followed up at 6 weeks, 3 months, 6 months and 12 months. Clinical evaluation was done according to Harris Hip score (HHS). Anteroposterior radiographs of the hip were analyzed at each follow up to note any evidence of loosening. All the patients were followed up for at least 1 year.



**Figure 1: Unstable trochanteric fracture fixed with bipolar hemiarthroplasty.**

## RESULTS

Total 16 cases were included in the study with 11 men and 5 women. All the patients had unilateral injury. 10 patients had right side and 6 had left side injury. The average age of the study group was 72.7 years (range: 65 to 83 years). The average delay from the day of injury to day of surgery was 10.4 weeks (range: 6 to 17 weeks). The mean admission period was 9 days (range: 5–16 days). One patient developed severe hemodynamic abnormalities during cementing who needed prolonged post-operative ICU care. 12 cases were able to ambulate independently without support, whereas 4 cases were able to ambulate with assistance. Clinically, the average HHS at the last follow-up was 81.7, ranged from 92 to 59. 3 (18.73%) cases rated the results as excellent (91–100), 8 (50%) as good (81–90), 3 (18.7%) as fair (71–80), and 2 (12.5%) as poor ( $\leq 70$ ) (Table 1).

**Table 1: Demographic and clinical data of the patients (n=16).**

Variable	Values
Men (%)	11 (68.75)
Women (%)	05 (31.25)
Average age in years	72.7
Average delay in surgery (in weeks)	10.4
Average hospital stay in days	9
Average HHS at final follow up	81.7
No. of patients with intraoperative complications (%)	01 (0.19)
No. of cases with postoperative complications (%)	01 (0.19)



**Figure 2: Stable trochanteric fracture fixed with bipolar hemiarthroplasty.**

Post-operative radiographs showed a good position in all patients (Figure 2). One case reported with dislocation 12 days after surgery (patient tried to sit on Indian

commode) for which open reduction was done. No case of infection, implant loosening, acetabular erosion or significant limb length discrepancy was reported.

## DISCUSSION

Treatment of hip fractures has come a long way from conservative methods to present day advances surgical methods. These surgical methods have drastically reduced the mortality and morbidity rates in elderly with hip fractures.<sup>17,18</sup> Osteosynthesis with various methods is the standard treatment for inter-trochanteric fractures as the consensus is to preserve the normal bone by open reduction and internal fixation.<sup>19</sup>

Arthroplasty is a less frequently used alternative, although it has distinct advantages regarding early mobilisation which is not possible with osteosynthesis in elderly with unstable trochanteric fractures with osteoporosis.<sup>20</sup> Arthroplasty avoids some complications of internal fixation like malunion, non-union etc. Various studies of internal fixation of both stable and unstable intertrochanteric hip fractures reported a failure rate between 6 and 32%.<sup>21,22</sup>

Bipolar hemiarthroplasty has distinct advantages over unipolar implants regarding acetabular wear, protrusion, loosening, and dislocation. With time hemiarthroplasty Stems were reconfigured, more in line with total hip replacement designs, to decrease component loosening. Inner bearing motion was introduced to reduce acetabular wear and dislocation rates. Tronzo claimed to be the first to use long, straight-stemmed prosthesis for the primary treatment of intertrochanteric fractures.<sup>23</sup> since then a number of studies have been published about role of various types of hip arthroplasties in trochanteric fractures in elderly.<sup>24-26</sup> Modularity allowed for sizing to improve stability. In the management of unstable intertrochanteric fractures, the choice of bipolar hemiarthroplasty prosthesis raised a new question: which stem design should be used? The deficient proximal medial femur is one of the challenges encountered during surgery. It is either to be augmented with calcar replacement prosthesis or the calcar has to be reconstructed. Several investigations have reported good to excellent functional results with the use of calcar replacement femoral prosthesis.<sup>27</sup>

The mean HHS at the final follow up in our study was 81.7 which is comparable to number of published studies.<sup>28-30</sup> Fen et al in their study have compared the results of bipolar hemiarthroplasty with total hip arthroplasty in proximal femur fractures and found comparable results between the two.<sup>31</sup>

We reported 1 case of infection, 1 case of intraoperative cement related complication and 1 case of dislocation in our study. No case of acetabular erosion, LLD, periprosthetic fracture or implant loosening was reported in our study. Fewer complications in our study could be

related to small sample size and short follow up. Besides 4 out of 16 fractures were of stable type. These results are similar to those obtained by Chan et al, who reported revision surgery in only one patient.<sup>32</sup> However, in a study by Elmosry et al, both complication rates as well as revision rates were much higher.<sup>33</sup> They reported the need for revision surgery in four (9.8%) patients and complications such as stem loosening and subsidence, infection, dislocation, bleeding peptic ulcer, and intraoperative fracture of the femur.

Our study has a drawback of smaller sample size and short follow up. However our aim was to present short term results only as most of the hip fracture related complications in the elderly are reported in the first year only.

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