

# Role of Primary cemented Bipolar hemiarthroplasty for comminuted unstable intertrochanteric fractures in elderly patients.

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**Abstract-** Management of unstable intertrochanteric femur fractures in elderly provides various challenges. Our study takes into account 20 patients with unstable intertrochanteric femur fractures treated with primary cemented bipolar hemiarthroplasty rather than the traditional internal fixation procedures. All results obtained showed a favorable outcome with respect to early mobilization, reduction in hospital stay and prevention of comorbidities related to prolonged bed rest post operatively.

**Index Terms-** Cemented Bipolar Hemiarthroplasty, intertrochanteric fractures, elderly

## I. INTRODUCTION

Fractures of weight bearing joints are common especially in the setting of the increasing prevalence of osteoporosis and osteopenia in India.(1)(2) Hip joint fractures in particular are common in patients > 65 years of age(3) and form a large percentage of orthopedic emergency ward admissions. It is estimated that more than 50% of osteoporotic hip fractures will occur by the year 2050(4) Thus, the need to assess the success and efficacy of the treatment modalities of these fractures is imperative.

Treatment of intertrochanteric (IT) fractures has changed extensively over time. The choice of treatment also depends on whether a fracture is stable or unstable(5), age(6) and presence of comorbidities such as rheumatoid or osteoarthritis (7). The spectrum of surgeries includes - internal fixation, hemiarthroplasty, total hip arthroplasty. Though internal fixation is preferred for younger patients who are healthier with good bone stock, Osteosynthesis is fraught with number of complications in older patients with poor bone stock and extensive comminution at the fracture site due to osteoporotic bones(8)(6). Further comparisons have been made comparing unipolar vs. bipolar hemiarthroplasty, cemented vs. uncemented hemiarthroplasty, internal fixation vs. total hip arthroplasty and the likes(9). For unstable IT fractures, since the fracture line is in the posteromedial wall or the greater or lesser trochanter in unstable fractures, it increases the risk of complications(10). Therefore, the ideal choice for treatment of these fractures which will one that allow earliest possible full weight bearing to prevent complications associated with recumbence(11).

In this study we present our experience with the use of cemented bipolar hemiarthroplasty in the treatment of patients aged > 60 years with unstable intertrochanteric fractures.

## II. MATERIALS AND METHODS

We conducted a retrospective review of all patients admitted to MMIMSR, Mullana Ambala with unstable intertrochanteric fractures between Jan 2017 and December 2018. This study was approved by the ethics committee at MMIMSR.

### *Data collection*

Patient demographics such as age, sex, side and mode of injury of patient were collected from patient medical records. We also collected data regarding length of hospital stay, duration to full weight bearing and any surgical complications. Pre-operative X-Rays were done and the Boyd and Griffin Classification was used to classify the fractures.

### *Statistical analysis*

We used descriptive statistics to summarize patient demographics and post-operative outcomes. We report mean values for age, duration of stay and time to weight bearing. All statistical analysis was performed on Microsoft excel (2007, Microsoft Corporation, U.S.A)

### *Operative technique*

A preoperative Pelvis with B/L Hip X-ray AP and lateral views was done for templating and determination of appropriate size of stem, head and femoral offset. All procedures were performed within 24 hours of admission by the same surgical team after due clearance from the Department of Anaesthesia at MMIMSR.

The Modified Gibson posterolateral approach was utilized in lateral decubitus position. After proper exposure the femoral cut was made with extra precaution to avoid injury to the greater trochanter. Reaming of appropriate size of the femoral canal was done and trail reductions were performed. After determination of exact length, offset, and version cemented stem was introduced into the medullary canal and fixed with meticulous second generation cementing techniques. Head component of appropriate size was fixed and the hip was reduced. Medial bone loss was reconstructed using cement mantle. Calcar Prosthesis was used in 1 case with a 1.5 month old IT femur fracture with severe bone loss. The unstable greater trochanter was reduced and fixed either with an encirclage wire or sutured with the help of Ethibond No 5 sutures. Short external rotators were sutured and incision was closed in layers.

Post-operative DVT prophylaxis was given in the form of Ecosprine 150 mg tab as per the ACCP criteria to all the patients. Postoperative X-rays were obtained. Sutures were removed 2 weeks post op and patients discharged with a detailed post-operative hip replacement rehabilitation protocol.

On the 1<sup>st</sup> post-operative day, patients were allowed full weight bearing ambulation with the help of a walker. A follow up protocol of 6 weeks, 3 months, 6 months and 1 year were followed for all 20 patients in our study. Serial radiographs and Harris Hip Score was used for clinical evaluation at each follow up.



Image 1: showing comminuted IT fracture managed with bipolar hemiarthroplasty and GT fixed with encirclage wire



Image 2: 1.5 old month IT femur fracture with severe bone loss managed with Calcar prosthesis.



Image 3: Comminuted IT femur fracture managed with bipolar hemiarthroplasty

### III. RESULTS

Out of the 20 patients selected in our study, 12 patients were female and 8 were male with a mean age of 67.4 years. 13 sustained fracture after trivial fall at home while 7 sustained injury in a motor vehicle accident. According to the Boyd and Griffith classification, 16 patients had a Type I, 2 had Type III and 1 Type IV intertrochanteric femur fracture. One patient with trochanteric fracture (initial x ray not available) was managed at a government hospital where the operating surgeon had tried to put a sliding hip screw but somehow surgery was abandoned mid-way. She had gross posteromedial bone loss and was managed with a calcar prosthesis (Img. 2)

No reported case of any significant postoperative limb length discrepancy was recorded however 3 patients had a shortening of less than 2cm on the operated side.

No case of deep infection was observed in our study even at 12 month follow up. Mean hospital stay was 12.9 days and mean duration for full weight bearing 4.05 days. No case of prosthesis loosening was reported in our study at 12 months follow up.

At 12 months follow up Harris Hip score revealed 80 % cases were in the good to excellent category while 10 % fell into the fair category with an average HHS of 80.

### IV. DISCUSSION

Hip fractures particularly trochanteric femur fractures have become a major cause of morbidity and mortality in the elderly. The role of bipolar hemiarthroplasty in the surgical treatment of IT fractures in the Indian population has not been looked at in depth. Understanding the pros and cons of this technique is extremely crucial to improve treatment outcomes of IT fractures In Asia, particularly a 2-3 times increase in the incidence is being seen in almost every country. Unstable trochanteric fractures have shown a mortality rate of 20% in the 1<sup>st</sup> postoperative year(12). The traditional management of internal fixation when used for unstable IT in osteoporotic bone could lead to excessive collapse, implant failure, prolonged duration of immobilization and the morbidities associated with them.

In spite of the fact that several studies support union rates as high as 100% with internal fixation of stable intertrochanteric fractures, they fall short showing failure rates of 56% when it comes to unstable counterparts of the same,(13)

The severely osteoporotic nature of the elderly proximal femur along with poor capacity of bone healing tend to delay weight bearing and active mobilisation in spite of a perfectly reduced post-operative picture. The list of complications with prolonged hospital stay and a longer duration of bed rest especially in the elderly is long and grim. Thus an alternative to not just provide a good fixation but also help tackle the innumerable issues that are associated with a prolonged non ambulatory duration needed to be addressed.

The first to deviate from the traditional internal fixation and attempt a primary prosthesis in intertrochanteric femur fracture was Tronzo(14). Since then, various studies have been published comparing the advantage of primary hemiarthroplasty for IT fractures and concluded that primary cemented hemiarthroplasty when done correctly showed favorable outcomes in patients aged more than 70 years by eliminating the complications of internal fixation and faster return to ambulation.(15)

Hemiarthroplasty alleviates several of the morbidities that are associated with internal fixation for IT femur fractures.

Complications like severe collapse due to poor bone quality in elderly which could lead to a post-operative limb length discrepancy, painful limp, prolonged duration of immobilization and an overall poor quality of life are well documented.(15)

The modern bipolar hip prosthesis with advancement and understanding of the biomechanics of the hip provides several advantages of a good range of motion, rapid rehabilitation and a prolonged life without complications like loosening or wear and tear.

The results of our study were comparable to the existing recorded data. Owing to the early mobilization, there were no complications like bed sores, chest infections in any of the patients.

Fixation of the greater trochanter which was done in 8 out of the 20 cases proves to be an important step for early mobilization and favorable outcome in primary arthroplasty in unstable IT femur fractures.

Primary hemiarthroplasty when done meticulously in experienced hands not only provides a stable well fixed hip but also plays a major role in fighting potentially fatal complications related to prolonged recumbence post injury in the elderly.

## V. LIMITATIONS

Owing to the small sample size, rare complications post bipolar hemiarthroplasty like infections, loosening, peri-prosthetic fractures etc. could not be analysed in our study. Future studies comparing both internal fixation and hemiarthroplasty to address these limitations need to be done.

## VI. CONCLUSION

Old, unstable IT femur fractures when managed with cemented bipolar hemiarthroplasty have a significant role in improving patient outcomes by reducing hospital stay and aiding in early mobilization.

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