**ABSTRACT**

**Background:** Intertrochanteric (IT) fractures are common in elderly & frequently compounded by osteoporosis & comminution at fracture site. Hence hemiarthroplasty may offer prognostic advantages over internal fixation in management.

**Objective:** to analyze the role of primary hemi-arthroplasty in cases of unstable osteoporotic IT femur fractures in elderly and its comparison with proximal femoral nail.

**Methodology:** 35 elderly cases of unstable IT fracture were enrolled. 17 patients were managed with hemi-arthroplasty and 18 were managed with PFN. 4 participants were lost to follow up. Remaining 31 patients were followed up for average of 8 months and evaluated for intraoperative/postoperative parameters.

**Observations:** Mean HHS at 6 weeks for prosthesis and fixation group were 84.3 and 74.8; and at 6 months were 84.5 and 74.8 respectively.

**Conclusion:** cemented modular hemiarthroplasty is a viable option to treat IT fractures & may be considered in elderly patients of osteoporotic unstable intertrochanteric fractures.

**KEYWORDS:**

Intertrochanteric Fracture, Hemiarthroplasty, Internal Fixation

**INTRODUCTION:**

Hip fractures are common in elderly. Intertrochanteric fractures account for half of all hip fractures in elderly. These were broadly divided into stable and unstable fractures by Evans (1). Unstable intertrochanteric fracture account for approximately 50 to 60 % of all inter-trochanteric Fractures (1). The goal of management of these fractures is to restore mobility, safely and efficiently while minimizing risk of medical complications and technical failure. They are notoriously tricky from management point of view. Ideal treatment method is still controversial because of the poor quality of bone mass, comorbid disorders, and difficulty in rehabilitation of these patients. Osteoporosis & comminution at the fracture site are particularly worrisome factors while contemplating internal fixation (2). Hence, in search of better alternative, hemi-arthroplasty is being propagated.

The purpose of this study is to analyze the role of primary hemi-arthroplasty in cases of unstable osteoporotic intertrochanteric femur fractures in elderly and its comparison with proximal femur nail.

**MATERIALS & METHODS:**

- **Study Design:** Prospective comparative study
- **Study Duration:** 2 years (January 2015- December 2016)
- **Study Setting:** Department of Orthopaedics of a tertiary care government hospital

**Inclusion criteria-**

- Intertrochanteric fractures unstable type
- (AO/OTA (3) types- A 2.2 and A 2.3)
- Singh’s Index (4)- Grades I, II, III & IV
- Above 70 years

**Exclusion criteria-**

- Patients who are non-ambulatory before surgery.
- Comorbid psychiatric disorder.
- Associated fractures which might affect the functional outcome
- History of osteoarthritis in hip joint.
- Pathological fractures

**Instruments used-**

- Internal Fixation: Standard proximal femur nail
- Hemiarthroplasty: Collared modular bipolar prosthesis

35 cases of unstable IT fracture with osteoporotic bone were included in our study as per admission sequence & mentioned selection criteria and randomised them in to 2 groups using alternative method of randomisation.

**Groups created:**

**Group 1:** Patients managed with cemented modular bipolar hemiarthroplasty

**Group 2:** Patients managed with PFN (proximal femoral nail)

17 patients were managed with hemi-arthroplasty and 18 were managed with PFN.

Diagnosis of intertrochanteric fracture was made by clinical and radiological examination. Anteroposterior x-ray of pelvis with both hips with ipsilateral hip in 15 degree internal rotation and lateral view of the hip with thigh taken with 100 % magnification. The X-rays were evaluated by at least two senior surgeons. Skin traction was applied to the injured limb for immobilization and pain Relief in ward. Pre-operative blood investigations (Hb/CBC, Serum Electrolyte, KFT, LFT, RBS, blood grouping) were done. Physician fitness was taken for the surgery and suitable anaesthesia. Plain X-ray was taken post operatively and evaluated. All the routine pre- & post-operative protocols were adhered to in each case.

Informed consent in vernacular language was taken from patient for the surgical procedure, suitable anaesthesia and participation in the study. Ethical clearance was granted by the Institutional Ethics Committee.

**RESULTS:**

Of the total 35 participants, 2 from each group were lost to follow up. Remaining 31 patients were followed up for an average duration of 8 months (from 6 to 12 months) and evaluated in detail regarding intraoperative and postoperative parameters.

Fifteen patients from bipolar group & 14 patient from fixation group were from 70-80 age group and 4 from fixation and 2 from bipolar were from 80-90 age group. There were 24 males (68.5%) and 11 females (31.4%) in our study with 6 females and 11 males in hemiarthroplasty group and 5 females and 13 males in fixation group. There were 29 patients with fall as mode of injury and 6 patients with Road Traffic Accident (RTA) as mode of injury. In both groups fall was by far the major cause.

Out of 31 patients, 29 belonged to Singh’s Index grade 3, 5 belonged to grade 2 and 1 belonged to grade 4. Patient distribution as per AO/OTA classification of IT fracture revealed (21, 60%) of total patients were of type A2.2 and (14, 40%) were of type A2.3. Majority of A2.2 fracture types were from fixation group (16, 76%) and majority of A2.3 fracture types were from bipolar group (12, 86%).

**Conclusion:**

Observations:

- Fifteen patients from bipolar group & 14 patient from fixation group were from 70-80 age group and 4 from fixation and 2 from bipolar were from 80-90 age group. There were 24 males (68.5%) and 11 females (31.4%) in our study with 6 females and 11 males in hemiarthroplasty group and 5 females and 13 males in fixation group. There were 29 patients with fall as mode of injury and 6 patients with Road Traffic Accident (RTA) as mode of injury. In both groups fall was by far the major cause.

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As far as the intra-operative parameters go, the mean time to surgery was 15.3 days in fixation and 9.2 days in bipolar group. Average surgery time was more in bipolar group (109.1 minutes) than in fixation group (87.5 minutes) and was statistically significant (p<0.01). Intra op blood loss was more (323.5 ml) in bipolar group, than in fixation group (86.1 ml) and the difference was statistically significant using unpaired t test (p<0.001). More patients in bipolar group required blood transfusion than in fixation group. In bipolar group calcar was repaired with bone graft in 2 patients and with cement mantle in 15 patients. Out of total study population, only 2 patients had intraoperative hypotension (SBP fall greater than 30%). Both were from bipolar group.

As for post-operative parameters, out of all study population only two developed early complications like external rotation (5.8%) and superficial infection (5.8%) and both were from bipolar group. Only 3 patients developed late complications at 6 weeks. 2 developed bed sore and 1 developed lung infection and all were from fixation group.

Table 1 details postoperative true limb length discrepancy (LLD). We measured the limb length & divided patients into 3 groups as follows:
1. With discrepancy 0-1cm
2. 1-2cm
3. >2 cm.

### TABLE 1: COMPARISON OF POSTOPERATIVE LIMB LENGTH DISCREPANCY

<table>
<thead>
<tr>
<th>LLD</th>
<th>Bipolar Group</th>
<th>Fixation Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 TO 1</td>
<td>10</td>
<td>17</td>
<td>23</td>
</tr>
<tr>
<td>1 TO 2</td>
<td>6</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>More than 2</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>8</td>
<td>35</td>
</tr>
</tbody>
</table>

Limb length discrepancy was significantly higher in bipolar group than in fixation group (p<0.001). Mean time to weight bearing was more in fixation group (5.11 weeks) as compared to bipolar group (2.8 days) (p<0.001).

The mean Harris Hip Score (HHS) was significantly higher in bipolar group (84.5) than in fixation group (74.8) at 6 weeks (Fig. 1). This was due to delayed mobilisation in fixation as compared to bipolar group.

### FIGURE 1: MEAN HARRIS HIP SCORES (HHS) AT 6 WEEKS

At 6 months, the mean HHS still held on to be significantly higher in bipolar group (84.5) than fixation group (74.8) (p value <0.001).

**Figure 2** illustrates the results obtained in one prototype case, fitting all the selection criteria, managed with cemented bipolar hemiarthroplasty; with X-rays taken pre-op, immediate post-op and after 6 weeks & 6 months.

### FIGURE 2: A PROTOTYPE PATIENT MANAGED WITH MODULAR BIPOLAR HEMIARTHROPLASTY.
study used cemented prosthesis as well and got good functional results. Larsson et al (12) & Bannistor et al (13) also reported similar good outcomes with cemented bipolar hemiarthroplasty. Abdelkhaled et al (14) used cemented bipolar prosthesis with cerclage cable technique & reported improved functional outcome. The sample studied too was very similar to our study population.

So, the present study concludes that cemented modular hemiarthroplasty is a viable option to treat unstable intertrochanteric fracture neck femur in elderly with excellent early-midterm survivorship. In our study we got better results with bipolar hemiarthroplasty in functional score at mid-term follow up. Apart from this, early mobilisation in prosthesis patients significantly increases the quality of independent life. Hence, cemented modular hemiarthroplasty may be considered as a primary option in strictly selected elderly patients of osteoporotic unstable intertrochanteric fractures.

REFERENCES:
3. A.O/Orthopedic Trauma Association committee for coding and classification Fracture and dislocation Compendium; J Orthop trauma. 1996;10(1);30-35