



## A Study on Internal Fixation Versus Primary Hemiarthroplasty in Unstable Intertrochanteric Fractures in Elderly Patients.

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### ABSTRACT

DHS may result in cut-out, instability, & delayed weight bearing. For unstable osteoporotic trochanteric fractures, hemiarthroplasty can transfer axial load from hip to middle femur. Between 2012 & 2013, 20 patients underwent hemiarthroplasty using a cemented bipolar prosthesis. 30 patients underwent internal fixation using a DHS. There were no significant differences between 2 groups in terms of sex, age, fracture type, Singh index, follow-up period, rate of complications and functional evaluation after 6 months. Hemiarthroplasty patients were allowed full weight bearing significantly earlier. Among hemiarthroplasty, 2 infections, 1 foot drop, 1 dislocation and among internal fixation group, complications were 2 lag screw cut outs, 2 nonunions, 1 avascular necrosis, 2 deep seated infections. Harris hip score in hemireplacement was 83% and 71% in fixation. To allow earlier postoperative weight-bearing & to avoid excessive collapse at the fracture site, prosthesis is a good option. In unstable IT fractures, early complications are less with hemiarthroplasty.

**KEYWORDS :** internal fixation; unstable fractures; primary hemiarthroplasty; early ambulation, limb length discrepancy

### INTRODUCTION

Unstable intertrochanteric fractures are one of those mysteries which become more and more mysterious with advancing knowledge and better implants. The following study aims to study the results of primary hemireplacement in unstable intertrochanteric fractures and compare it with conventional methods of fixation.

### MATERIALS AND METHODS

This is a prospective study of 50 cases of unstable intertrochanteric fractures, treated with primary replacement (hemi or total) or fixation. Between February 2012 and December 2012, fifty patients with an unstable comminuted intertrochanteric femoral fracture (AO/OTA type 31A2.2, A2.3, A3.1, A3.2, A3.3) were enrolled in the study. Written and informed consent of each of the patients was taken. The majority of patients fell at home.

### INCLUSION CRITERIA:

- >60 years of age.
- unstable IT femur fracture type
- 31- A2.2 and 31- A2.3 (AO/OTA classification)
- Reverse oblique
- Displaced greater trochanter (lateral wall fractures)
- Patient must be ambulatory before sustaining injury

### EXCLUSION CRITERIA:

- Chronically debilitated and bed ridden patients.
- Compound fracture
- Medically compromised patients- ASA grade iv & v
- Local infection
- Stable fracture

At our institute, after stabilization of vitals, ruling out other major organ trauma with thorough history and general examination, local examination was done which included tenderness at fracture site, distal pulsations and movements. X rays were taken. IV analgesics, Böhler Brown splint with 30 degrees of abduction, and skin traction were given in ward. The fracture was then classified and patients were

treated by either fixation using a DHS or PFN, or using cemented bipolar prosthesis.

Patients were divided in each group randomly and 25 were treated with a hemiarthroplasty and 25 were treated with a conventional method of fixation dynamic hip screw (DHS). Hemiarthroplasty was performed in lateral decubitus position using Moore's posterior approach. Joint was approached through the fracture without detaching short external rotators. A neck cut was then taken roughly about 1-2 cm above the lesser trochanter depending upon the amount of comminution. The lesser trochanter was found as a separate fragment and was reconstructed using ethibond sutures. Greater trochanter was reconstructed either using steel wires along with tension band wiring or with a reconstruction plate. The gluteus medius, greater trochanter, and the vastus lateralis apparatus were maintained in continuity as a stable lateral sleeve. Cementing was done using the second generation cementing technique (with use of restrictor and pulse lavage system in a retrograde manner using a cement gun) and the implant was inserted in 15-20 degrees of anteversion. Low-molecular-weight heparin was given to avoid deep venous thrombosis and continued for 5 days. Hip was kept in abduction with help of a pillow. Patients were allowed to sit on chair from second postoperative day. Protected and partial weight bearing with walker was started on second postoperative day. Gait training was given with walker and patients were allowed weight bearing as tolerated.

Internal fixation was performed under C-arm fluoroscopy in a supine position. Most of the patients were operated with a dynamic hip screw. Greater trochanter was fixed using ethibond sutures, and the wound was closed. Suction drains were removed after 48 hours. Patients were encouraged to rehabilitate actively in bed. Patients were examined postoperatively at 6 weeks, 3 months, 6 months, and 1 year. At each follow-up visit, a clinical-radiological examination was done and the patient was evaluated using the Harris hip score (HHS). Anteroposterior and lateral radiographs of the hip were analyzed at each follow-up to note evidence of loosening. Bony union was determined by clinical and radiological examinations in an out-patient clinic.

**RESULTS AND OBSERVATIONS (table 1)**

| Parameter                 | Hemireplacement | Fixation   | Significance |
|---------------------------|-----------------|------------|--------------|
| Incision length           | 11.92 cm        | 8.36 cm    | YES          |
| Average blood loss        | 352 ml          | 154 ml     | YES          |
| Operative time            | 93.6 min        | 77.8 min   | NO           |
| Day PWB starts            | 2.91 days       | 32 days    | YES          |
| Time to FWB               | 30 days         | 70 days    | YES          |
| Duration of hospital stay | 12.92 days      | 10.84 days | NO           |
| Mean harris hip score     | 83              | 71         | YES          |
| Shortening                | 0.34 cm         | 1.28 cm    | YES          |
| No. Of revision surgeries | 2 (11.76%)      | 5(17.85%)  | YES          |
| Mortality                 | 3(15%)          | 2(6.67%)   | NO           |

All the cases were followed up for a period ranging from 1 month to 2 year with an average of 13 months.

The functional results were evaluated on the basis of Harris hip scoring system. There was no statistical significance considering parameters of age, sex, side involved, presence of medical comorbidities, injury-surgery interval, and duration of hospital stay. Patients of hemireplacement group were significantly better in terms of pain, limping, use of support for walking, sitting and stair climbing. ( $p < 0.05$ ) However, patients of both the groups avoided public transport.

There were 3 immediate postoperative complications in hemireplacement group which included 1 foot drop, and 2 deep seated infections. In fixation group, 1 patient had lag screw cut out and one patient had deep seated infection. There was no significant difference between immediate postoperative complications though skin incision, operating time, and blood loss were significantly higher in hemireplacement group. 1 patient had dislocation of the bipolar prosthesis on postoperative day 14. Among the others, there were 4 lag screw cut-outs and 2 implant failures with non-union, which had to be revised by doing implant removal and hemi-replacement. The rate of delayed complications was also significantly higher in fixation group. ( $p < 0.05$ )

In hemireplacement group, only 1 patients required revision surgery (open reduction of dislocation), whereas in fixation group, 6 patients needed revision surgery. The revision surgery rate for fixation group was significantly higher ( $Z = 2.19$ ,  $p < 0.05$ ) than hemireplacement group. Of 25 patients of hemireplacement group, 1 patient was lost to follow-up. 5 patients had died by the end of 1 year, giving a mortality rate of 20.83%. In fixation group, out of 25, 1 patient was lost to follow up and 6 patients had undergone revision surgery. 4 patients died during the course of 1 year. So mortality rate for fixation group was 22.22%. Mortality rate was almost similar in both the groups. ( $Z = 0.13$ ,  $p > 0.05$ )

**DISCUSSION**

Management of unstable osteoporotic intertrochantric fractures in elderly is challenging because of difficult anatomical reduction due to poor bone quality. Fixation usually involves prolonged bed rest or limited ambulation, to prevent implant failure secondary to osteoporosis. This results in higher chances of complications like pulmonary embolism, deep vein thrombosis, pneumonia, and decubitus ulcer. On the other hand, using hemireplacement, patients bear weight immediately, they are encouraged to walk and limit bed rest. Moreover, elderly patients, who are often unable to co-operate with partial weight-bearing required after an internal fixation accept full weight-bearing more easily.

In elderly patients, because of osteoporosis, most of the fractures which occur are of a highly comminuted type. Majority of our patients were elderly patients who had significant medical disorders which increased the time required for pre operative fitness. So as orthopaedic surgeons, we must provide them a treatment option which allows fastest rehabilitation with minimum comorbidities as well as providing fracture fixation. Hemireplacement provides very early rehabilita-

tion as compared to fixation, without increasing the number of complications. Our study has been compared to KS Sanchet et al, Shin yoon Kim et al, Kayali et al, and Haentjen et al.

Harris hip score was evaluated at 1, 3, 6, and 12 months in both groups. The score was significantly higher ( $p \text{ value} < 0.05$ ) in hemireplacement group at all the evaluations. This implies that rehabilitation was significantly faster in patients with hemireplacement. At 1 year, group I had 83.42 (70 to 93) and group II had 70.5 (38 to 86). Group 1 had 3 (15.7%) excellent, 11 (57.9%) good, and 5 (26.3%) fair results. Group 2 had 2 (14.28%) good, 6 (42.85%) fair and 6 (42.85%) poor results. In present series one patient had posterior dislocation. Patient was uncooperative and probably excessive flexion-adduction of the hip led to dislocation of the prosthesis. Open reduction was done and abduction bar POP was given for 3 weeks. Weight bearing started on 42nd post operative day. Harris hip score was 70 on 12 month follow up.

Amongst group 2, there were 2 (8%) complications in immediate postoperative period, one of which was lag screw cut-out. The patient was osteoporotic and had to be revised by doing implant removal and cemented bipolar prosthesis. The patient had deep infection and died after 25 days of septicaemia. Another patient had deep seated infection (4%), which responded to debridement. Osteoporosis is a major risk factor responsible for fixation failure due to back out of implant, cut through of lag screw through head of femur, and loss of reduction due to poor purchase in bone. Total 6 patients in group II (24%) had implant failure of which there were 4 lag screw cutouts (16.7%) and 2 non-unions (7.3%). All of them required revision surgery in the form of implant removal and hemireplacement. A revision takes a significant toll on an average elderly patient with associated medical illnesses, and gives poor results because of associated morbidity of 2 surgeries. In our study, there were no increases in medical comorbidities in group II as compared to group I with delayed ambulation. But patient's feeling of wellbeing and confidence were gained with early ambulation. Cross leg sitting and squatting was not recommended in group I which was a concern for the Indian people life style as these are frequently used in daily living.

Unstable intertrochantric fracture had inherited tendency for difficult reduction due to fracture geometry and muscle pull, and excessive collapse lead to shortening of limb which in turn increase postoperative limp and poor functional outcome. Limb shortening was 0.34 cm in group I and 1.28 cm in group II. There was significant difference in the mean limb length of both the groups, ( $p \text{ value} < 0.05$ ), which explains worse functional outcomes in fixation group in terms of limping.

Considering our experience, we believe that, in classifications more than A2 in elderly osteoporotic patients, bipolar hip replacement along with reduction of the greater trochanter are valid alternatives to the standard treatment of open reduction and internal fixation. As bipolar hip replacement represents more invasive surgical techniques compared to other fixation techniques, a higher risk of intra operative complications is expected, but not observed. Besides, the rapid mobilization of these patients, in association with the reduced bed rest, decreases the morbidity of these patients. Though the difference between the mortality rates is not significant, ( $p \text{ value} > 0.05$ ), there was still a higher mortality among fixation group, which can be attributed to prolonged immobilization, and increased number of revision surgeries in a patient. Potential long-term problems associated with prosthetic replacement, such as loosening, acetabular erosion, stem failure, late infection, and late dislocation, may yet occur and require a long term followup.

**CONCLUSION**

Though the total number of patients in the present study is relatively less and follow up period is also small, it appears that: To allow earlier postoperative weight-bearing and to avoid excessive collapse at the fracture site, prosthetic replacement especially for the treatments of unstable inter trochantric fracture is a valid treatment option. This procedure offers faster recovery and rehabilitation with little risk of mechanical failure and enables the patient to maintain a good level of function beginning in the immediate post operative period. It also avoids a revision surgery in elderly patients with medical comorbidities thereby decreasing morbidity to a great extent. Late complica-

tions with the prosthesis use are still matter of debate and require a long term follow up and big sample size.

## REFERENCES

1. George W. Wood 2: General Principles Of Fracture Management; Campbell's Operative Orthopedics Vol.3, 10th international edition, 2003. | 2. David G. La Velle: Fractures Of Hip; Campbell's Operative Orthopaedics Vol.IU, 11th International Edition, 2003. | 3. Bucholz RW, Heckman JD, Koval KJ, Zukerman JD. Rockwood and Green's fractures in adults. 6th ed. Philadelphia: Lippincott Williams and Wilkins; 2005. | 4. Kulkarni GL, Kulkarni M, Kulkarni S. Intertrochanteric fractures. Indian J Orthop 2006;40(1):16-23. | 5. Kyle RF, Ellis TJ, Templeman DC. Surgical treatment of intertrochanteric hip fractures with associated femoral neck fractures using a sliding hip screw. J Orthop Trauma 2005;19(1):1-4. | 6. Shin-Yoon Kim, M.D.; Yong-Goo Kim, M.D.; and Jun-Kyung Hwang, M.D., a prospective randomized trial, performed at the Department of Orthopedic Surgery, Kyungpook National University School of Medicine, Daegu, South Korea in 2005. | 7. Indian Journal of Orthopedics-2010; volume-44; page:428-34; Primary hemiarthroplasty for unstable osteoporotic intertrochanteric femur fractures in the elderly: a retrospective case series; KH Sancheti, PK Sancheti, AK Shyam, S Patil, Q Dhariwal, R Joshi; Sancheti Institute of Orthopaedics and Rehabilitation, Pune, Maharashtra, India. | 8. Hoppenfeld's Surgical Exposures in Orthopaedics, 3rd Ed. 2003 - The Anatomic Approach | 9. Turek's Orthopaedics - 6th Ed. | 10. Journal of Orthopaedic Surgery 2006;14(3):240-4; Treatment for unstable intertrochanteric fractures in elderly patients: internal fixation versus cone hemiarthroplasty; C Kayali, H Agus, S Ozluk; Second Clinic of Orthopaedics and Traumatology, Tepecik Education and Research Hospital, Izmir, Turkey; C Sanli, Gazi State Hospital, Samsun, Turkey. | 11. Treatment of unstable intertrochanteric and subtrochanteric fractures in elderly patients. Primary bipolar arthroplasty compared with internal fixation. By P. Haentjens, P P Casteleyn, from the department of orthopaedics and traumatology, acadenic hospital, Brussels. |