



## Retrospective Analysis of Functional Outcome of Patients Treated with DHS Fixation and Bipolar Hemiarthroplasty in Unstable Intertrochanteric Femur Fractures

Authors

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### ABSTRACT

**Purpose:** To compare functional outcome between DHS fixation and bipolar hemiarthroplasty in patients with unstable intertrochanteric fractures.

**Methods:** A retrospective clinical study in which patients who were admitted and operated at Charitable Hospital, Mumbai from July 2012 to July 2014 and were followed up regularly at intervals post surgery with clinical and radiological assessment. The data which was maintained in case record register was analyzed in terms of operative time, post operative recovery (weight bearing, pain etc), Harris hip score, complications of bipolar hemiarthroplasty as compared with Dynamic Hip Screw (DHS) fixation.

**Results:** Post operative mobilization was significantly better ( $p = 0.003$ ) in hemiarthroplasty patients as compared to fixation. Early and late post operative Harris Hip Score was significantly better ( $p = 0.02$ ) in arthroplasty group of patients. Post operative complications were significantly higher in patients treated with fixation ( $p = 0.02$ ) than with hemiarthroplasty. The mean operative time was significantly less ( $p = 0.001$ ) in patients treated with hemiarthroplasty.

**Conclusion:** we conclude that hemiarthroplasty may be a better option in patients with unstable intertrochanteric fractures as compared to DHS fixation

**Keywords:** Dynamic Hip Screw; hemiarthroplasty; intertrochanteric femur fracture: Harris Hip Score.

### Introduction

Intertrochanteric fractures are common problem in the elderly population and are associated with high rate of morbidity and mortality. Management of unstable intertrochanteric (Evans type III or IV and AO/OTA type 31-A2.2 and 2.3) fractures is a challenge because of difficulty obtaining anatomical reduction.

In the past, fixed nail plate devices used for the fixation of these fractures had high rates of cut-out and fracture displacement. Subsequently, a sliding hip screw was used with much success and

became the predominant method of fixation. Complications such as head perforations, excessive sliding leading to shortening, plate pullout, and plate breakage continued to be a problem especially with the unstable type of fractures<sup>1,2</sup>. Osteoporosis and instability are one of the most important factors leading to unsatisfactory results<sup>3</sup>. Also in these elderly patients with unstable osteoporotic fractures, a period of restricted mobilization 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 intertrochantric fractures. Endoprosthetic replacements have been shown to achieve early rehabilitation and good long-term results<sup>4,5</sup>. However, an ideal treatment method is still rather controversial because of poor quality of bone mass, comorbid disorders, and difficulty in rehabilitation.

## Methods

This is a comparative retrospective study in which patients were admitted and operated at B.Y.L. Nair Charitable Hospital, Mumbai from July 2012 to July 2014 and were followed up regularly at intervals post surgery with clinical and radiological assessment.

Data was collected from medical record section of B.Y.L. Nair Charitable Hospital, Mumbai without mentioning identification or address of patient. All patient data has been maintained in a case record register in the department.

The data was analyzed in terms of operative time, postoperative recovery (weight bearing, pain etc), harris hip score, complications of bipolar hemiarthroplasty as compared with Dynamic Hip Screw (DHS) fixation.

The Harris Hip Scoring system was also used to assess the degree of pain, range of motion, functional ability and absence of deformity.

The score is reported as: <60 = failed result, (60 – 69) poor, (70 – 79) fair, (80 – 89) good, (90 -100) excellent

The inclusion criteria were age of 60 years and above, femoral intertrochanteric fracture confirmed on antero-posterior and lateral hip radiographs and qualify as unstable fracture i.e.

Evans type 3, 4, 5. Patient had to be ambulatory prior to fracture, though they may have used an aid like a cane or a walker.

The patients who were excluded had associated major injuries of lower extremity, any infection around the affected hip (soft tissue or bone), ones having stable intertrochanteric fractures (Evans type 1, 2), Reverse oblique type and subtroc-anteric fractures

*Statistical method:* Descriptive statistics were performed by analysis of continuous, ordinal, qualitative and/or nominal variables. Statistical tests used for analysis were Mann Whitney test, Pearson Chi Square test and Fischer exact test.

## Results

In this study, mean age of patients was  $73.78 \pm 6.37$  years. Maximum patients i.e. 11 patients (27.5%) were in the age group (75 – 79) years, Maximum patients i.e. 18 out of 40 (45%) belonged to Evan's type 4 classification of fracture. In Group I patients who were treated with DHS plating, 11 patients (55%) developed complications while in group II, patients treated with bipolar hemiarthroplasty, only 4 patients (20%) developed complications. This was statistically significant with ( $p = 0.05$ ).

The mean operative time of patients in group I was  $2.13 \pm 0.56$  hours as compared to  $1.63 \pm 0.32$  hours in group II patients. This difference was statistically significant as the ( $p = 0.001$ ). There was a significant improvement in Harris Hip Score at 6 weeks, 3 months and 6 months in group II patients with ( $p = 0.02$ ). Mobilization of patients in Group 2 was also very early as compared to group I.

**Table no. 1**

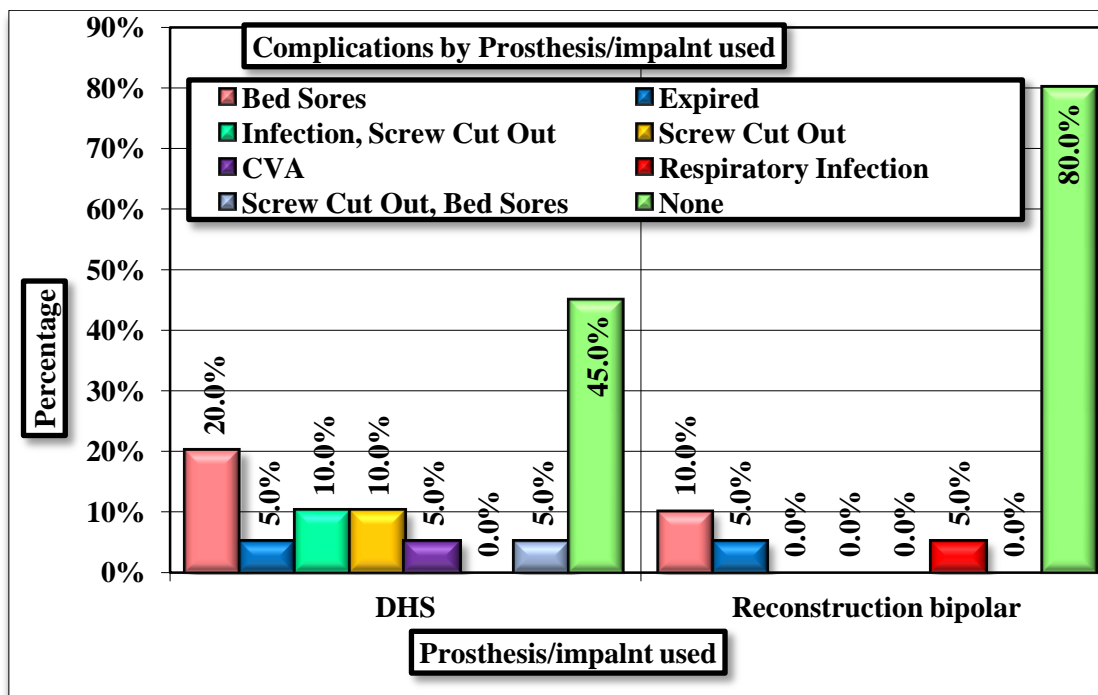
Variables	Prosthesis/impalnt used	Mean	SD	Z-value	p-value
Harris hip score-6 weeks #	DHS	49.90	10.16	-2.281	0.02258
	Reconstruction bipolar	57.63	6.35	Difference is significant	
Harris hip score-3 months #	DHS	66.00	10.52	-2.277	0.0228
	Reconstruction bipolar	72.95	7.66	Difference is significant	
Harris hip score-6 months #	DHS	79.47	9.83	-2.013	0.04407
	Reconstruction bipolar	85.53	6.78	Difference is significant	

# Ordinal data. Hence Mann-Whitney test applied.

Table no. 2

Harris hip score-6 months	Prosthesis/impalnt used		Total
	DHS	Reconstruction bipolar	
Excellent	10 (52.6%)	14 (73.7%)	24 (63.2%)
Very good	5 (26.3%)	4(21.1%)	9 (23.7%)
Good	2 (10.5%)	1 (5.3%)	3 (7.9%)
Fair	2 (10.5%)	0 (0.0%)	2 (5.3%)
Total	19	19	38

Table no. 3



X Rays of patients from the study

Pre op and post op X ray of group 1 patients



Pre and post op X rays of Group 2 patients



## Discussion

Complexity of intertrochanteric fractures in elderly osteoporotic patients poses challenging problems, with an added risk of increased morbidity and mortality. Although union rates as high as 100% have been reported in association with well-reduced, stable fractures that were treated with ideal implant placements, failure rates of as high as 56% have been noted in association with unstable fractures, comminutions, suboptimal fracture fixations, or poor bone qualities in elderly patients<sup>6,7</sup>. Although the internal fixation of such fractures may reduce the morbidity of pain, it does not permit an early mobilization with a fear of failure of fixation and thus, indirectly, the morbidity of fracture remains same. Early ambulation following surgeries are important, for preventing complications that can be caused by long term bed rests in elderly patients with poor general conditions. The poor mechanical properties of the weak and osteoporotic bones in elderly patients lead to a collapse, with migration of the femoral head into the varus and retroversion, resulting in limping, which is caused by shortening and a decreased abductor muscle lever arm<sup>8</sup>.

Liang et al<sup>9</sup> concluded that hemiarthroplasty was an effective and a safe method for treating unstable intertrochanteric fractures in elderly. It leads to a decrease in complications and mortality and improve patient's living quality, and reduce the burden of the patient's family. Grimsrud et al.<sup>10</sup> studied 39 consecutive patients and concluded that these fractures could be treated with a standard femoral stem and circlage cabling of the trochanters. It allows early weight bearing on the injured hip and with relatively low rate of complications.

Hemiarthroplasty is a frequently employed alternative, as it gives stability and allows immediate full weight bearing. Many of the complications of internal fixations can be avoided by performing hemiarthroplasties<sup>11</sup>.

This allows a safe and early weight bearing on the injured hip and it has a relatively low rate of complications. The mean Harris Hip Score (HHS)

in this study at last follow up i.e. at 6 months was  $79.47 \pm 9.83$  in group 1 and in group 2 was  $85.53 \pm 6.78$ . In group 1 patients, 15 patients (75%) had good outcome and 4 patients (20%) with poor outcome. In Group 2 patients, 18 patients had good outcome (90%) and 2 patients (10%) with poor outcome.

In Haentjens's<sup>12</sup> series about 78% of the patients got excellent to good results. In Rady's<sup>13</sup> study about 63% of the patients got excellent to good results. Rodop *et al*<sup>14</sup> in a study of primary bipolar hemiprosthesis obtained good to excellent results in 31 out of 37 patients with unstable IT fractures after 12 months according to the Harris hip-scoring system. Thus the results of this modality of treatment are definitely promising especially in view of the variable results of osteosynthesis in this group.

The complication rate of the intertrochanteric fractures treated with sliding hip screws was reported as 38.6 % by Wolfgang et al<sup>15</sup>. Larosand Moore<sup>16</sup> reported that most important causes for complications were fragmentation of most fractures, insufficient fixation of the osteoporotic bone and discordancy of the patients to the postoperative rehabilitation. It was reported that the mobilization time was shorter, and complication rate was lower in the hemiarthroplasty cases compared to internal fixation. They also reported a success rate of 90% in hemiarthroplasty cases

Haentjens et al.<sup>17</sup> operated 79 patients using AO/ASIF plate or Muller bipolar type endoprosthesis. They didn't determine any significant difference between two groups according to operation time, amount of bleeding, hospitalization time, death frequency, and preoperative internal diseases but they observed that rehabilitation was easier and faster and decubitus ulcer and pneumonia were seen less in the arthroplasty group. In the short term, unipolar or bipolar hemiarthroplasty seem to give better results than open reduction and internal fixation in terms of mortality and morbidity rates, complications, early rehabilitation and returning to daily living activities in the treatment of

unstable intertrochanteric hip fractures. Long-term problems such as loosening, protrusioacetabuli, stem failure, late infections and late dislocations have not been seen in these series.

Although the average patient age in these series was between 74 and 82 years, short term complications seem to be more important than long-term ones. Because life expectancy increases in all countries, long-term disadvantages of the hemiarthroplasty may outweigh its short-term advantages. Results of primary unipolar or bipolar prosthetic arthroplasty for unstable intertrochanteric fractures cannot be compared with the outcomes reported for internal fixation of similar injuries without a prospective randomised study. We anticipate further reports of our work in the future.

Delay in surgery is an important predictor for mortality in patients with proximal femur fracture and also of the postoperative morbidity<sup>18,19</sup>. We in our study, however, could not comment on these points because of small sample size and this is one of the limitations of our study. Further, inhomogeneous population in terms of existing co-morbidity and retrospective nature of our study are the other limitations.

Thus in conclusion, primary hemiarthroplasty does provide a stable, pain-free, and mobile joint with acceptable complication rate as seen in our study; however a larger prospective randomised study comparing the use of intramedullary devices against primary hemiarthroplasty for unstable osteoporotic fractures will be needed.

**Table no. 4**

Patient characteristics	Present study		Kayli et al <sup>6</sup>		KH Sancheti et al <sup>20</sup>	
	Fixation	Arthroplasty	Fixation	Arthroplasty	Fixation	Arthroplasty
Operative time (minutes)	127.8	97.8	85	90	-	71
Blood transfusion (units)	0.40	0.15	0.89	1.28	-	-
Time for full weight bearing (days)	76.21	26.37	70	28	-	4.2
Hospital stay (days)	14.20	14.70	12	13	-	10.96

**Table no. 5**

Complications	Present study		KESMEZACAR et al <sup>21</sup>	
	DHS Plating	Hemiarthroplasty	DHS Plating	Hemiarthroplasty
Bed sores	4	2	3	-
Infection	2	-	2	-
Implant failure	4	-	1	-
Aseptic loosening	-	-	-	1
Dislocation	-	-	-	1

## Conclusion

In our study, we conclude that hemiarthroplasty may be a better option in patients with unstable intertrochanteric fractures as compared to DHS fixation in elderly age group

## References

1. Davis TR, Sher JL, Horsman A, Simpson M, Porter BB, Cheketts RG. Intertrochanteric femoral fractures: Mechanical failure after internal fixation. *J Bone Joint Surg Br.* 1990;72:26–31. [[PubMed](#)]
2. Kaufer H, Matthews LS, Sonstegard D. Stable fixation of intertrochanteric fractures: A biomechanical evaluation. *J Bone Joint Surg Am.* 1974;56:899–90. [[PubMed](#)]
3. Kim WY, Han CH, Park JI, Kim JY. Failure of intertrochanteric fracture fixation with a dynamic hip screw in relation to pre-operative fracture stability and osteoporosis. *IntOrthop.* 2001;25:360–2. [[PMC free article](#)] [[PubMed](#)]
4. Broos PL, Rommens PM, Deleyn PR, Geens VR, Stappaerts KH. Pertrochanteric fractures in the elderly: Are there indications for primary prosthetic

- replacement? J Orthop Trauma. 1991; 5:446–51. [PubMed]
5. Chan KC, Gill GS. Cemented hemiarthroplasties for elderly patients with intertrochanteric fractures. Clin Orthop Relat Res. 2000;371:206–15. [PubMed]
  6. Kyle RF, Cabanela ME, Russell TA, Swiontkowski MF, Winquist RA, Zuckerman JD, et al. Fractures of the proximal part of the femur. Instr Course Lect. 1995;44:227–53. [PubMed]
  7. Haidukewych GJ, Israel TA, Berry DJ. Reverse obliquity fractures of the intertrochanteric region of the femur. J Bone Joint Surg Am. 2001;83:643–50. [PubMed]
  8. Sinno K, Sakr M, Girard J, Khatib H. The effectiveness of primary bipolar arthroplasty in treatment of unstable intertrochanteric fractures in elderly patients. N Am J Med Sci. 2010 Dec;2(12):561–68. [PMC free article] [PubMed]
  9. Liang YT, Tang PF, Guo YZ, Tao S, Zhang Q, Liang XD, et al. Clinical research of hemiprosthesis arthroplasty for the treatment of unstable intertrochanteric hip fractures in elderly patients. Zhonghua Yi Xue Za Zhi. 2005;85:3260–62. [PubMed]
  10. Grimsrud C, Monzon RJ, Richman J, Ries MD. Cemented hip arthroplasty with a novel cerclage cable technique for unstable intertrochanteric hip fractures. J Arthroplast. 2005;20:337–43. [PubMed]
  11. Baumgaertner MR, Levy RN. Skeletal Trauma. Vol 2. Philadelphia: W B Saunders; 1992. Intertrochanteric hip fracture. In: Browner BD, Levine AM, Jupiter JB, editors; pp. 1833–81
  12. P. Haentjens, P. P. Casteleyn, H. De Boek, F. Handelberg and P. Opdecam, “Treatment of Unstable Intertrochanteric and Subtrochanteric Fractures in Elderly. Primary Bipolar Arthroplasty Compared with Internal Fixation,” Journal of Bone and Joint Surgery, Vol. 71, No. 8, 1989, pp. 1214- 1225
  13. E. Rady, A. A. Sharaf and A. A. Abuelela, “Primary Bipolar Hemiarthroplasty in Unstable Intertrochanteric Fractures in Elderly,” 24th SICOT Meeting (International Society for Orthopaedic Surgery and Traumatology), Cairo, 2003
  14. Rodop O, Kiral A, Kaplan H, Akmaz I. Primary bipolar hemiprosthesis for unstable intertrochanteric fractures. IntOrthop. 2002;26:233–7. [PMC free article] [PubMed]
  15. Wolfgang GL, Bryant MH, O’Neill JP. Treatment of intertrochanteric fracture of the femur using sliding screw plate fixation. ClinOrthopRelat Res 1982;(163):148-58.
  16. Laros GS, Moore JF. Complications of fixation in intertrochanteric fractures. ClinOrthopRelat Res 1974;(101): 110-9.
  17. Baumgaertner MR, Levy RN. Skeletal Trauma. Vol 2. Philadelphia: W B Saunders; 1992. Intertrochanteric hip fracture. In: Browner BD, Levine AM, Jupiter JB, editors; pp. 1833–81.
  18. Moran CG, Wenn RT, Sikand M, Taylor AM. Early mortality after hip fracture: is delay before surgery important? J Bone Joint Surg Am. 2005;87:483–9. [PubMed]
  19. Umarji SI, Lankester BJ, Prothero D, Bannister GC. Recovery after hip fracture. Injury. 2006;37:712–7. [PubMed]
  20. K.H.Sancheti et al ; Primary hemiarthroplasty for unstable osteoporotic intertrochanteric fractures in the elderly: A retrospective case series; Indian J Orthop. 2010 Oct-Dec; 44(4): 428–434
  21. KESMEZACAR et al :Treatment of intertrochanteric femur fractures in elderly patients:internal fixation or hemiarthroplasty, Acta Orthop Traumatol Turc 2005;39(4):287-294