

## COMPARATIVE STUDY OF HEMIREPLACEMENT ARTHROPLASTY WITH BIPOLAR PROSTHETIC AND PROXIMAL FEMORAL NAIL (PFN) IN UNSTABLE INTERTROCHANTERIC FRACTURE OF FEMURE: INTERVENTIONAL PROSPECTIVE RANDOMIZED STUDY

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### Abstract

**Background:** Intertrochanteric femur fracture incidence has increased due to increased life expectancy and osteoporosis. Management of these fractures in elderly is challenging due to difficult anatomical reduction, poor bone quality and osteoporosis. Internal fixation in these cases usually involves prolonged bed rest to prevent implant failure which leads higher complication such as deep vein thrombosis, pneumonia pulmonary embolism, bed sores, increased morbidity.

**Methods:** The present study was prospectively carried out in 60 consecutive patients of Fracture Intertrochanter Femur and treated with Hemiarthroplasty with Cemented Bipolar Prosthesis and Proximal Femoral Nail.

**Results:** The average harris hip score in PFN group is 88.21±4.36 and in Bipolar group is 85.21±8.12. Final functional outcome were better in PFN group (P value 0.02) than by Bipolar group and significant.

**Conclusion:** The outcomes of the stable fractures treated with either Bipolar or PFN were similar. Unstable comminuted fractures treated with Bipolar showed significantly better outcomes with all patients having good results.

**Keywords:** Hip arthroplasty, PFN, Complication

### Introduction

Intertrochanteric fractures are a major cause of morbidity and mortality in elderly population. The incidence of all hip fractures is approximately 80 per 100,000 persons. Intertrochanteric fracture makes up 45% of all hip fractures<sup>1</sup>

Their incidence has increased due to the increased life expectancy and osteoporosis. Earlier, these fractures were managed conservatively by traction or external splinting which resulted in higher morbidity and complication. Hence, trends for operative intervention increased with time.<sup>2</sup> Stable intertrochanteric fractures can be easily treated by osteosynthesis with predictable good result whereas the management of unstable intertrochanteric fracture are challenging because of poor bone quality, osteoporosis, and other underlying diseases. Hence it is necessary to choose an appropriate treatment modality so that they could be mobilized early and return to their respective activities early.<sup>3</sup> The surgical treatment for trochanteric fracture remains a challenge to a surgeon in terms of modality of treatment which gives the elderly patients early mobilization and rehabilitation, as the same are more prone to complications than the younger age group. This present study compares clinical outcomes of intertrochanteric fractures treated with PFN to bipolar hemiarthroplasty (BPH) in elderly patients.<sup>4</sup>

### Material and Methods

Type of study- Randomised Prospective Interventional Comparative Study

#### Inclusion Criteria

- Patients admitted in department of orthopedics with Unstable intertrochanteric fractures of femur (Evan's type third, fourth and fifth )
- Age 60-80 years
- Patients who have given informed and written consent

#### Exclusion Criteria:

- Patient unfit for surgery as per A.S.A. (American Society of Anaesthesiologists) guidelines.
- Patient having previous hip surgery
- Patient having pathological fracture
- Patient having Associated fracture
- Patient having compound injury.

#### Observation

The age of the patients in present study was in range of 60 - 80 years. There was a preponderance of female in present study in both groups.

**Table 1: Duration of Surgery**

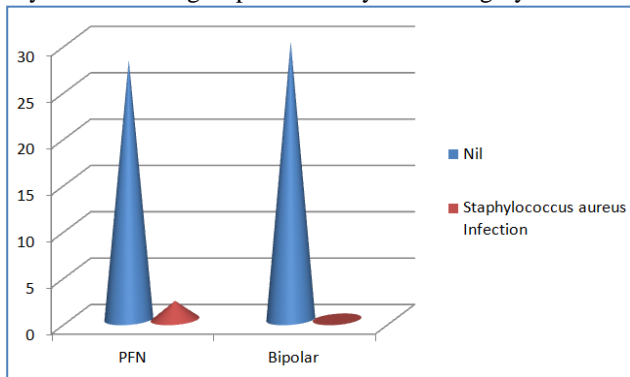
Duration of surgery in mint.	PFN	BIPOLAR	p-value
Mean	54.12	92.63	0.001
SD	6.35	9.14	

The mean duration of surgery in the Bipolar group (92.63±9.14 Minutes) was much More That In PFN (54.12 ±6.35Minutes) Group.

**Table 2: Post Operative Hospital Stay**

Hospital stay in days	PFN	BIPOLAR	p-value
Mean	5.42	5.89	0.689
SD	1.88	1.45	

All patients of Bipolar group was discharged between 4 to 9 days and in PFN group 4 to 12 days after surgery.



**Figure 1: Wound Infection**

Out of the 30 patients, 2 patients infected with staphylococcus aureus in PFN group. No patient infected in Bipolar group

**Table 3: Limb Length Discrepancy**

	Bipolar		PFN	
	No.	%	No.	%
Shortening	22	73.33	0	0
Lengthening	8	16.67	0	0
Total	30	100.00	0	0

There is no LLD in PFN group in Bipolar group 22 patients have shortening and 8 patients have lengthening.

**Table 4: Final Harris Hip Score**

	PFN		Bipolar	
	Mean	SD	Mean	SD
Final Hip Score	88.21	4.36	85.21	8.12
P value	0.02 (S)			

The average harris hip score in PFN group is 88.21±4.36 and in Bipolar group is 85.21±8.12. Final functional outcome were better in PFN group (P value 0.02) than by Bipolar group and significant.

**Table 5: final mobility score of parker and palmer**

	PFN		Bipolar	
	Mean	SD	Mean	SD
Final Mobility score of parker and palmer	8.12	0.86	7.39	0.78
P value	0.001 (S)			

The average mobility score in PFN group is 8.12±0.86 and in Bipolar group is 7.38±0.78. Final mobility score is better in PFN group (P value 0.001) than by Bipolar group.

**Discussion**

The mean duration of surgery in the Bipolar group (92.63±9.14 Minutes) was much More That In PFN (54.12 ±6.35Minutes) Group. The operative time was much more in Bipolar than the PFN group and result are significant. This is comparatively same as previous studies:

**Table 6:**

Authors	Operative time	Prosthesis
Chan, Gurdev <sup>6</sup>	69 mins	Modular endoprosthesis
Stern, Goldstein <sup>7</sup>	80.5 mins	Leinbach prosthesis
Present study	92.63 mins	Cemented Bipolar prosthesis

Early mobilization is well known with Bipolar hemiarthroplasty. Patients were trained to begin walking with walker earlier (average 5.87 days) in Bipolar group to reduce postoperative complications of prolonged recumbency like pneumonia, bed sore, DVT etc.

In Bipolar group patients were discharged after being trained to walk with Walker with full weight bearing. In PFN group patient were told exercises to strengthen muscle and increase range of motion and walk started after 10 to 15 days.

This is comparatively same as previous studies as Kayali *et al.*,<sup>8</sup> in their study showed that time to full weight bearing was significantly earlier in the hemiarthroplasty group as compare to the PFN group.

The patients who were ambulatory at discharge gradually improved over follow up period and were able to transition from walker to cane and few patients without support. Age, gender, prefracture health status and social dependency before fracture are important factors determining functional recovery after surgery. Other patient never followed any physiotherapy advices and showed up after one year with an attack of stroke and continue to remain bedridden. This indicates the importance of following of strict physiotherapy regime for good outcome of surgery in patients. Majority of patients gained good range of motion with physiotherapy.

Limb length discrepancy was absent in PFN group and in Bipolar group 70% of cases in present study had limb shortening >10 mm and 30% had limb lengthening >10 mm. Some may say that one set of problems associated with internal fixation (loss of fixation, hardware cut out) are being traded with another set of problems in arthroplasty (limb length discrepancy), but if center of prosthesis is taken at level of greater trochanter tip then appropriate limb length can be maintained. In cases when greater trochanter is fractured, a surgeon can still make the length determination by repositioning the fractured greater trochanter anatomically and observing the tension of fascia over the gluteus medius. Anteversion and retroversion of the prosthesis can be determined with the use of posterior aspect of lateral femoral condyle as a guide.

Modified Harris Hip Score and mobility score of Parker and Palmer was used at our hospital for assessing the final functional outcome of patients in present study. This score takes into account pain, limp, support, distance walked, climbing of stairs, putting on shoes and socks, entering public transportation, limb length discrepancy, deformity and range of motion. The total score is 100, with outcome graded as excellent, good, poor and fair.

The average harris hip score in PFN group is  $88.21 \pm 4.36$  and in Bipolar group is  $85.21 \pm 8.12$ . Final functional outcome were better in PFN group (P value 0.02) than by Bipolar group and significant. Both have good results. Stern and Goldstein reported good result in 94% of patients while Chan et al reported good result in 83% cases. Final functional outcome and mobility score of Parker and Palmer is better in PFN group than the Bipolar group after this study, we think that using standard arthroplasty is a reasonable alternative to osteosynthesis in intertrochanteric fractures. We would like to emphasize the careful selection

of cases for this technique. The potential advantage of hemiarthroplasties for the treatment of intertrochanteric fractures warrants additional larger studies to be compared with a matched control group treated with osteosynthesis.

### Conclusions

The outcomes of the stable fractures treated with either Bipolar or PFN were similar. Unstable comminuted fractures treated with Bipolar showed significantly better outcomes with all patients having good results.

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