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CEMENTED BIPOLAR HEMIARTHROPLASTY VERSUS PROXIMAL FEMORAL NAIL FOR THE TREATMENT OF UNSTABLE INTERTROCHANTERIC FRACTURES IN ELDERLY: A COMPARATIVE STUDY

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ABSTRACT

Background: The treatment for unstable intertrochanteric fractures in the elderly has always been controversial issue. The aim in this study was to compare the curative effects of proximal femoral nail (PFN) and cemented bipolar hemiarthroplasty (CPH) on femoral interthrocantric fracture in the elderly. **Aim:** Assessment of primary and secondary outcomes among patients treated with PFN and hemiarthroplasty. **Materials and Methods:** Overall, 73 patients underwent CPH or PFN from January 2019 to May2021. IFF were classified according to AO/OTA classification. The difference in Harris scores, surgical time, intraoperative bleeding, Blood transfusion, postoperative time to partial and full weight bearing, Postoperative length of stay in hospital, mortality and Postoperative complications were analyzed. **Results and Discussion:** The bleeding volume, Blood transfusion in PFN Group are all significantlylower than those in CPH Group, while the partial and full weight-bearing activity time of CPH Group are all significantly higher than those in PFN Group. The Harris score in patients of CPH Group at 3, 6, and 12 months postoperative are all significantly higher than those in patients of PFN Group, Furthermore,. There were no significantly difference in mortality and incidence of postoperative complications between PFN and CPH Groups, although mechanical complications were more frequent in the nailing group (2.9% versus 10.2%). **Conclusion:** PFN and CPH have good therapeutic effects in the treatment of IFF. The advantages of CPH were Reflected in short-term weight bearing, faster recovery from stress, and better joint function in the long term. Therefore, we suggest that surgeons should consider the benefit of CPH in the treatment of IFF among the elderly**.**

KEYWORDS: Intertrochanteric fractures, Hemiarthroplasty, Proximal femoral nail.

INTRODUCTION

Intertrochanteric femoral fractures are an important cause of increased mortality and morbidity in elderly patients.[9,11] this fractures should be fixed early and patient should be mobilized early in order to avoid the complications such as bed sores, pulmonary complications'[11,20] Different fixation methods have been described in the literature for the management of these proximal femoral fractures. In comminuted intertrochanteric fractures, various operative options have been introduced.[1,8] However, the optimal treatment for unstable intertrochanteric fractures in elderly patients remains controversial. Traditionally, intertrochanteric fractures were operated with a sliding hip screw with a side plate. In the early 1990s, a new method of an intramedullary nail in the proximal femur with an interlocking screw in the femoral head was introduced.[5,9] In cases of unstable intertrochanteric fracture in the elderly, osteoporosis and comminution often result in delayed full weight- bearing and a high rate of complications that are treated with internal fixation including compression hip screw (CHS) and proximal femur nail (PFN).[2,8] Recently, many reports in the literature consider that prosthetic replacement is the preferred treatment for selected unstable comminuted intertrochanteric fractures in theelderly.

Study population

The present study recruited consecutive patients with unstable intertrochanteric fracture and admitted to the Department of Orthopedic, Tishreen University Hospital during the period from January 2019 to May2021**.** The

eligible criteria included age more than 60-years-old, unstable intertrochanteric fractures (31A22– 31A23 AO/OTA classification) and the patient able to walk before the fracture. The exclusion criteria included pathological fractures, multiple trauma, previous hip joint degenerative, initial surgical failure, patient was bedridden before the surgery.

Statistical analysis

SPSS 21.0 software was used for statistical analyses. All data were evaluated for homogeneity of variance and normality using Shapiro- Wilk test and Levene's test, respectively. T-tests were used for continuous variables with homogeneity of variance and normality, which was expressed as mean ± SD. Otherwise, Wilcoxon rank-sum tests were used, and data were expressed as medians with interquartile range. Counting data were analyzed using the Wilcoxon rank-sum test or Chi-square test, which were expressed as median. Probability (P) value < 0.05 was considered statistically significant.

RESULTS

Demographic profile: Our study consisted of 73 patients of unstable intertrochanteric fractures treated surgically either by proximal femoral nail and bipolar hemiarthroplasty. There was more female affected in the two groups and mean age of presentation was 82 years. According to AO/OTA classification, total 50 patients were presented as 31A2.2 type, while 23 patients were classified in type 31A2.3 and right side affected more than left.

Operative parameters: In CPH Group, the average operative time was 80.5±10.48 minutes, while it was 74.8±10.23 ml in PFN Croup, (P, 0.07). Mean blood loss in CPH Group (182.5±32.6 ml) was significantly higher (P, 0.001) than in PFN Group (69.74±15.23 ml**)**.

Post-operative parameters and rehabilitation: In CPH Group, all the patients were allowed partial weight bearing (PWB) on 1.5±0.7 day after surgery with the help of a frame walker while it was 18.4±5.8 days in PFN group. Mean time of full weight bearing (FWB) was 21.6±2.4 days in CPH Group, while for PFN group these was 47.8±3.5 days significantly better in CPH Group. The average hospital stay was 3.18±2.19 days in CPH Group and 2.65±2.21 in PFN group, which was no significant difference among the two group. In CPH Group, mean Blood transfusion were1.5±0.6 ml, while it was 0.45±0.7 ml in PFN Croup.

Complications: In CPH Croup, Pulmonary embolism occurred in tow patients after surgery, one of them died in intensive care after 4 days. Another patient died during the follow-up period (after 6 months of surgery). Prosthesis dislocation occurred in one case, which was associated with pressure sore. Superficial infection of the wound was developed in one patient, which was managed conservatively with antibiotic and nursing care. In PNFGroup, Pulmonary embolism had occurred in one patient 48 hours after the surgery, he died in intensive care 7 days after. Three other patients died during the follow-up period. Fixation failure occurred in four patients, which were associated with Pressure sore. Superficial infection of the wound was developed in one patient, which was managed conservatively with dressing and antibiotic coverage. Deep venous thrombosis (DVT) occurred in one patient.

Functional evaluation: Functional outcomes were assessed using Mean Harris hip scores at different intervals and compared among different groups as described in Table3. Mean Harris hip score at 3 months was 73.26±10.5, 68.48±9.28 in CPH and PFN Group respectively. Mean HHS at 6 months increased to 84.42±7.63, 78.27±8.85 CPH and PFN Group respectively. Mean HHS at final follow up was 86.8±7.4 (range 62-95) in CPH group while in PFN Group this value was 82.48 ±8.61 (range 60-93). It was significantly higher (*P* value =0.03) in hemiarthroplasty group than PFN Group.

DISCUSSION

The present prospective comparative observational study validated the indication of arthroplasty in unstable trochanteric fracture in over-60 year-olds. Perioperative mortality and general complications rates were no higher than with nailing, despite elevated bleeding and the need for blood transfusion. Clinical results were better and earlier, and mechanical complications rates were lower in CPH Group. Experienced operators, better able to avoid the pitfalls induced by loss of anatomic landmarks, however, should perform Arthroplasty.

Table 1: Comparison of pre injury Parameters and Demographic profile.

	Cemented hemi-arthoplasty 34 patients	PFN 39 patients	P value
Age (60-80/ Above 80)	12/22	21/18	0.1
Sex (Male/ Female)	11/23	14/25	0.7
Side (right/left	21/13	23/16	0.5
Fracture type(31A22/A23)	22/15	28/8	0.3

Table 2: Comparison of Intraoperative and Postoperative parameters.

	Cemented hemi-arthoplasty	PFN	P value
Duration of surgery(minutes ± SD)	80.5 ± 10.48	74.8 ± 10.23	0.07
Intraoperative blood loss (ml ± SD)	182.5 ± 32.6	69.74± 15.23	P < 0.001
Blood transfusion (ml ± SD)	1.5± 0.6	0.45 ± 0.7	P < 0.001
Hospital stays (days ± SD)	3.18± 2.19	2.65± 2.21	0.2
Partial weight bearing (days ± SD)	1.5±0.7	18.4±5.8	P < 0.001
Full weight bearing (days ± SD)	21.6±2.4	47.8±3.5	P < 0.001

Table3: Comparison of functional outcome at the postoperative one year follow-up.

Characteristics	Sub item	Hemiarthroplasty	PFN	P value
Harris score	Total score	86.8 ±7.4	82.48 ± 8.61	0.03
Harris grade	Excellent (≥90 score)	13(40.6%)	9(25.7%)	
	good(80 ~ 89 score)	14(43.7%)	12(34.3%)	
	fine(70 ~ 79 score)	3(9.4%)	10(28.6%)	
	fare(< 70 score)	2(6.3%)	4(11.3%)	

CONCLUSION

Primary hemiarthroplasty for the treatment of unstable intertrochanteric fractures in elderly patients seems tobe a secure and effective procedure, showing an earlier ability to bear full body weight with lesser failure rates and better functional outcome. Early mobilization is advantageous in preventing complications like, pressure sores and generalized deconditioning of the patient associated with prolonged immobilization. The results of cemented bipolar hemiarthroplasty are promising as compared to internal fixation in elderly patients.

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