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Comparative analysis between hemiarthroplasty and Internal fixation in fracture intertrochanteric femur in elderly population.

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Abstract
Introduction:
Intertrochanteric fracture femur is one of the most encountered problem by the orthopaedic surgeons in elderly patients because of poor bone mass quality and accompanying systemic disorders.
In this study, patients operated with internal fixation and endoprosthesis are compared according to the survival, quality of life and mobilization.
Aims and Objectives:
The study aims to compare the result of the differentsurgical modalities of treatment for fracture intertrochanteric femur.
Hemiarthroplasty offers early mobilization, internal fixation preserves the hip joint and avoids long-term complications associated with the prosthesis. This retrospective study compares the results of these treatment modalities.
Methods:
The study included 42 patients who were available for follow-up after surgery for intertrochanteric femur fractures. Of 20 patients (mean age 68.5 years; range 60 to 75 years) treated with internal fixation, 18 were alive; of 22 patients (mean age 67 years; range 60 to 75 years) treated with hemiarthroplasty, 20 were alive at the last follow-ups. The two groups were compared with regard to perioperative characteristics, mobilization time, complications, mortality, and daily activities according to the Katz Activities of Daily Living Index. The mean follow-up was 22.5 months (range 6 to 39 months) in internal fixation, and 22 months (range 7 to 39 months) in hemiarthroplasty groups.
Results:
Subsequent to the operation, mortality occurred in 10% after a mean of 13 months (range 1 to 36 months) and in 9.09% after a mean of six months (range 1 to 24 months) in patients treated with internal fixation and hemiarthroplasty, respectively. There were significant differences with respect to mobilization in bed, standing, weight bearing without support, complications, and daily activity scores. The significant difference in favour of hemiarthroplasty was that full weight bearing with two crutches took a shorter time ($p<0.05$).
Conclusion:
Short-term results suggests that postoperative survival of the patients is longer and mortality rate is lesser in hemiarthroplasty. Hemi-replacement arthroplasty (cemented) seems to be the first choice in the treatment ofintertrochanteric femur fractures in elderly patients. Hemiarthroplasty is an advantageous alternative tointernal fixationin terms of early mobility, reduced duration in bed, early weight bearing and also it avoids the risk of non-union, malunion and subsequent surgeries, longer duration of stay and delayed weight bearing associated with internal fixation modalities in intertrochanteric fracture femur.
Key words:
Hip arthroplasty, Intertrochanteric fracture fixation, osteoporosis, complications, Pfn, DHS,Endoprosthesis.

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I. Introduction:

Intertrochanteric fracture femur is one of the most encountered problem by the orthopaedic surgeons in elderly patients because of poor bone mass quality and accompanying systemic disorders[1,2]. Points of treatment in this study is hemi-replacement arthroplasty and early mobilization. Recently used treatment modalities in this elderly patients are intramedullarynailing, trochanteric plate fixation, absorbable ceramic applications and proximal femoral osteotomies or endoprosthesis.

In this study, patients operated with internal fixation and endoprosthesis are compared according to the survival, quality of life and mobilization.

Aims and objectives:

In elderly patients, there is always a confusion between hemiarthroplasty and internal fixation in intertrochanteric fractures femur[3].An orthopaedic surgeon have many options for such fractures. Advantage of Hemiarthroplasty is early mobilization while of internal fixation preserves the hip joint and long-term complications which are associated with the prosthesis are less. The study aims to compare the result of the differentsurgical modalities of treatment for fracture intertrochanteric femur.

II. Methods And Material:

42 Patients, agedbetween 60 to 75years, were treated for intertrochanteric fracture femur, between March 2018 and February 2019 (22 women, 20 men; mean age 67; 22 endoprosthesis, 20 internal fixation). 38 of them (90 %) whose clinical data were available, were participated in this study and studied into two groups. 18 of 20 patients in the internal fixation group (group 1 DHS and PFN) and 20 of 22 patients in the hemiarthroplasty group (group 2) were alive[4,5,6]. Thetreatment methods and demographic data of these two groups were demonstrated in Table 1. The two groups were compared to thetime between injury and operation, hospitalization time,preoperative data, standing and walking times with two crutches, mobilization in bed, full weight bearing time and complications. The ratio of the patients death, theirdeath time and the daily living activities of alive patients were investigated. Daily living activities were calculated according to the KATZ Activities of Daily Living (Table 2). The classification of fracture intertrochanteric femur is mentioned in the table 1[7].

Table 1. Features of patients whom internal fixation and hemiarthroplasty was applied.

	Group 1- Internal Fixation(n=18)		Group 2- Hemiarthroplasty(n=20)	
	Number	Percentage	Number	Percentage
Treatment method				
PFN	12	66.6	-	
DHS	6	33.3	-	
Bipolar (Modular)			16	80
Austin Moore's			4	20
Types of Fracture				
Tip 1a	2	11.1	2	10
Tip 1b	4	22.2	6	30
Tip 1c	9	50	10	50
Tip 1d	1	5.5	2	10
Tip 2	2	11.1	-	
Neurologic,Cardiologic, Respiratory and Metabolic problems.				
None				
One	5	27.7	6	30
Two	10	55.5	10	50
Three	2	11.1	3	15
	1	5.6	1	5
Total	18	100.0	20	100.0

TABLE 2. KATZ INDEX OF INDEPENDENCE IN ACTIVITIES OF DAILY LIVING

Activities Points (1 or 0)	Independence (1 point) NO supervision, direction or personnel assistance.	Dependence (0 point) WITH supervision, direction or personnel assistance.
BATHING	Baths self completely or needs help in bathing only a single part of the body such as the back, genital area or disabled extremity.	Needs help with bathing more than one part of the body, getting in or out of the tub or shower. Requires total bathing.
DRESSING	Get clothes from closets and drawers and puts on clothes and outer garments complete with fasteners. May have help tying shoes.	Needs help with dressing self or needs to be completely dressed.
TOILETTING	Goes to toilet, gets on and off, arrange clothes, cleans genital area without help.	Needs help transferring to the toilet, cleaning self or uses bedpan or commode.
TRANSFERRING	Moves in and out of bed or chair unassisted. Mechanical transfer aids are acceptable.	Needs help in moving from bed to chair or requires a complete transfer.
CONTINENCE	Exercises complete self control over urination and defecation.	Is partially or totally incontinent of bowel or bladder.

FEEDING	Gets food from plate into mouth without help. Preperation of food may be done by another person.	Needs partial or total help with feeding or requires parenteral feeding.
Total points	Scoring 6=High (patient independent)	0=Low (patient dependent)

The patients died in the first postoperative month were evaluated according to the KATZ daily life activity score.The information of the patients; who were not able to come to the hospitalwho were dead and for control; were asked by telephone (from their relatives). Possible complications like loss of reduction, non-union, need for subsequent surgery, implant migration in group one and prosthesis dislocation and loosening in group two were evaluated with radiographic examination. The mean follow-uptime of the patients was 20.7 month (Range 5-36 month) in group one and 20.3 month (Range 6-36 month) in grouptwo. We used Wilcoxon rank sum test for statistical assessments ($p<0.05$ was accepted as statistically significant.)

Table 3. Death ratio, mobilization time and complications.

	Group 1 Internal fixation (n=18)	Group 2 Hemiarthroplasty (n=20)
Mean follow up time (month)	22.7	22.3
Number of patients died	2	2
Mean death time (month)	12	7
Mobilization in bed (day)	2.2	2.5
Standing up (day)	7	4.9
Two crutches (day)	25.5	5.2
One crutch (day)	45	20
Full weight bearing	90	30
Complications		
Pseudoarthrosis	1	-
Sacral decubitus ulcer	2	-
Infection	1	-
Implant migration	0	-
Aseptic loosening	-	1
Dislocation/Subluxation of the prosthesis	-	1

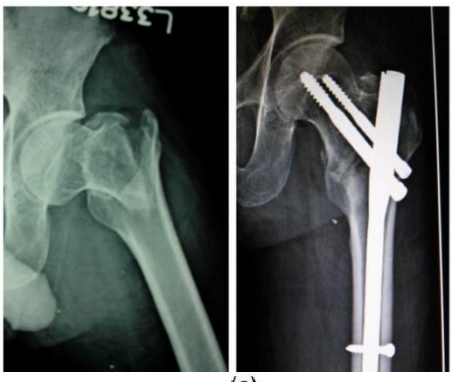


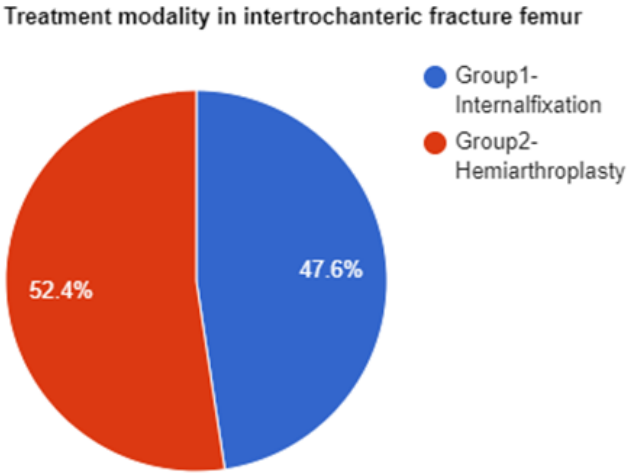
Figure 1 – pre and post operative x-rays of a 69 year old male patient with intertrochanteric fracture femur managed with proximal femoral nailing

) (c)

Figure 2 – pre- and post operative x-ray of a 73 year old female patient with intertrochanteric fracture managed by Dynamic hip screw.

III. Results

2 patients, treated with internal fixation(PFN), (10%; 1 men, 1 women) died at meanly 12 months (1-24 months) and 2 patients, treated with endoprosthesis, (9.09%; 2 men) died at meanly 7 months (1-20 months) after the operation. In group one(PFN), 1 patient died on the third month, 1 died at an interval of 13-16 months after the operation[8]. In group 2 (bipolar), the number of the dead patients at the same time intervals were 1,1 respectively. Cardiology complicationwere seen in 1 patient who died in the hemiarthroplasty group. Total hospitalization time was mean 5 days and postoperative hospitalization of mean 3 days in the hemiarthroplasty group and was 10 and 7 days in internal fixation group respectively. Mobilization in bed as well as standing up time were similar for internal fixation and hemiarthroplasty groups. Full weight bearing without crutches in group two is earlier in comparison to group one (Figure 2, 3). Statistically differences were significant in this two groups (Table 3). Pseudoarthrosis and infection was observed in 1 patient each in group 1.Sacral decubitus ulcer was seen in 2 patients in group 1 which healed conservatively. One patient in hemiarthroplasty group underwent total hip replacement surgery due to aseptic loosing. Katz Activities of Daily Living Indexes were3 in group 1 and5in group 2 ($p<0.05$).



IV. Discussion

The intertrochanteric fracture femur have many treatment modalities but have to consider other systemic conditions. The main aim in the elderly patients with such fractures is to early mobilize the patient and so help the patient to regain the day to day activities and to preserve the hip joint and decrease the implant related complications.

There are many advantages of hemiarthroplasty compared to the internal fixation such as early mobilization, less complications,success rate is higher than internal fixation, and also the total follow up time is less with hemiarthroplasty[9,10].

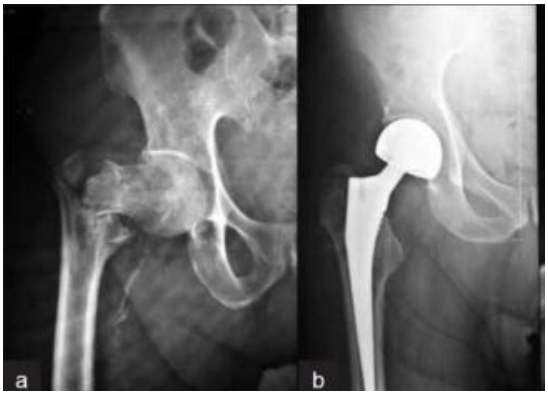


Figure 3 – pre and post operative x-ray of right intertrochanteric fracture of a 65 year old male patient managed by bipolar hemiarthroplasty (cemented).

Although early mobilization and the outcome is dependent on the patients general health and less on the surgical technique. The quality of life of these patients decreased due to the systemic complications which are common in this age group.

In our study, death frequency was high in group 1 than group 2, which may be related to the patient and delayed mobilization of the patient, prolonged bedridden, total time taken for the surgery.

Our principal aim is to prevent the complications (non-union/ malunion) and prevent the need of subsequent surgeries in fixation modalities so that patient regains their normal life as soon as possible. Many factors which should be taken care of before deciding the modality such as age of the patient, quality of the bone,mental status, general condition of the patient, type of the fracture, and the systemic complications.

V. Conclusion

Hemi-replacement arthroplasty (cemented) seems to be the first choice in the treatment ofintertrochanteric femur fractures in elderly patients. Hemiarthroplasty is an advantageous alternative to internal fixation in terms of early mobility, reduced duration in bed, early weight bearing and also it avoids the risk of nonunion, malunion and subsequent surgeries, longer duration of stay and delayed weight bearing and reduced morbidity and mortality in comparison to internal fixation modalities in intertrochanteric fracture femur[11].

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