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Effects of early mobilization and weight bearing on postoperative walking ability and pain in geriatric patients operated due to hip fracture: a retrospective analysis

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Background/aim: Hip fractures in older adults are associated with high morbidity, mortality, and subsequent hospital costs and decreased quality of life. The objective of this study was to evaluate geriatric patients who underwent partial prosthesis surgery following hip fracture and effects of early mobilization and weight bearing on postoperative walking ability and pain.

Materials and methods: A total of 52 geriatric patients with intertrochanteric and femoral neck fractures were included in the study. Patients' service files, system records, pre- and postoperative X-rays were retrospectively reviewed.

Results: There were 52 patients in the study group with 36 (69.2%) being female. The mean age of the patients was found as 82.9 ± 6.5 years. The mean length of stay in hospital was found as 6.2 ± 2.6 days. The mean length of stay in hospital was found as 5.3 ± 1.7 days in male and 6.6 ± 2.8 days in female patients, and the difference was statistically significant (P = 0.035). The mean length of stay in hospital was found as 5.4 ± 1.8 days in early mobilization group and 6.9 ± 2.9 days in late mobilization group, and the difference was statistically significant (P = 0.026). There was a significant difference between Harris and pain scores in terms of the time of first weight bearing at the postoperative 1st month follow-up. Harris score was found as 84.0 ± 5.8 (median: 84.0, min–max: 73–94), and the main pain score as 36.8 ± 6.8 in the group with the first weight bearing within the first 24 h, while Harris score was found as 71.10 ± 2.8, and the main pain score as 24.4 ± 6.4 in the group with the first weight bearing after the postoperative 24th hour.

Conclusion: The results of our study indicated that early mobilization and full weight bearing in geriatric patients after hip fracture surgery shortened length of stay in hospital, reduced postoperative pain, and increased walking ability.

Key words: Geriatric, hip fracture, pain, mobilization, weight bearing

1. Introduction

Recently, increased life expectancy has caused a significant increase in the incidence of fractures. Especially hip fractures are common and serious injuries are seen in older adults, causing loss of mobility and significant socio-economic results [1,2]. Hip fractures in older adults are associated with high morbidity, mortality, disability and subsequent hospital costs and decreased quality of life. Thirty-five percent of people aged over 65 fall, and 10% of these falls result in hip fracture [3]. By the age of 90, 32% of women and 17% of men experience hip fractures [4]. It is estimated that globally about 2.3 million hip fractures will occur annually by 2050 [5].

Loss of function and decreased activity have been seen in geriatric patients who presented with immobilization and bed rest [6]. Functional recovery and discharge from hospital are delayed in patients who are immobilized for longer than 2 days following hip fracture surgery [7]. On the other hand, immediate mobilization shortens the length of stay in hospital, and facilitates early rehabilitation of the hip [8]. Earlier, it has been thought that immediate weight bearing is inappropriate, and therefore only partial weight bearing has been allowed. However, it has been found later that adverse events do not occur with full weight bearing. In a study, it was demonstrated that early mobilization after hip fractures lowers not only early postoperative period adverse outcomes, but also the rates of early complications [9].

Most patients need assistance in getting out of the bed, standing and walking after hip fracture surgery. The level of required assistance is important in terms of length of stay in hospital, time to discharge, mortality, and medical complications. This may result from that patients who need more assistance ambulate less. Intertrochanteric fractures occur along a line between the greater and lesser trochanters. These fractures are most commonly seen

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in older adults, and usually caused by a fall. Whenever possible, surgical treatment is indicated for rapid mobilization, shorter length of stay in hospital, decreased mortality and restoration of the function. The main goal of rehabilitation after intertrochanteric fractures is to provide walking of patients especially who were ambulatory before injury.

Femoral neck fractures most commonly occur in 8th decade of the life and caused by weakening of bone due to either osteoporosis or osteomalacia. Many orthopaedic surgeons prefer improving displaced neck fractures by replacement of the head and neck with a prosthesis. A gradual weight bearing program is indicated in most cases when a prosthesis is inserted.

In the literature, studies objectively measuring physical activity in geriatric patients following hip fractures are limited. The objective of this study was to evaluate the impact of early mobilization and weight bearing on postoperative walking ability and pain in geriatric patients experienced hip fracture surgery.

2. Materials and methods

2.1. Patients

Patients were informed about the objective of the study, and their written and verbal consents were received for this retrospective study. The study was approved by the local Ethics Committee of Yozgat Bozok University with decision numbered 2017-KAEK-189-2019_19 on 29/05/2019, and was conducted in line with the principles of the Declaration of Helsinki.

A total of 72 patients aged over 65 years who underwent partial prosthesis surgery due to hip fracture in our tertiary Training and Research Hospital between 2017 and 2019 were determined from patient data and ICD codes via the MIA-MED (MIA Teknoloji, Ankara, Turkey) hospital information management system software. Among these patients, a total of 52 patients with intertrochanteric and femoral neck fractures were included in the study. Patients with missing data and those aged under 65 years, patients with pathological fractures, polytraumatized patients, patients already hospitalized in a different department in our hospital, and those with periprosthetic fracture, and subtrochanteric fractures, and those who received nonoperative therapy were excluded from the study.

2.2. Review of the medical records

Patients' service files, outpatient clinic registry data, epicrisis notes, pre- and postoperative X-rays were retrospectively reviewed. Using the hospital data, patients were grouped and reviewed in terms of age, sex, fracture type, mortality, ASA scoring, blood groups, comorbidities, walking ability, length of stay and Harris hip score. Fracture types were classified as intertrochanteric and femoral neck fractures.

2.3. ASA

Patients who underwent surgery were preoperatively classified according to the American Society of Anaesthesiologists (ASA) Physical Status classification. Physical status was classified as ASA I: A healthy person who had no disease or systemic problem except for surgical pathology which does not cause a systemic disorder. ASA II: A person with a mild systemic disorder due to a reason requiring surgery or another disease (mild anaemia, chronic bronchitis, hypertension, emphysema, obesity, diabetes etc.), which required surgical intervention. ASA III: a person with a disease, which limits activity, but does not incapacitate(hypovolemia, latent heart failure, previous myocardial infarction, advanced diabetes mellitus, limited pulmonary function). ASA IV: a person with a disease which causes full loss of strength and continuous threat to life (shock, decompensated cardiac or respiratory system disease, and renal or liver failure).

2.4. Weight bearing

All patients were asked to bear full weight on the first postoperative day. However, since full weight bearing is a patient induced feature, patients were mobilized either by full or by partial weight bearing. Patients were grouped as the ones with full weight bearing and those with partial weight bearing.

2.5. Walking ability

Walking ability of the patients were examined as 7 subgroups described by Baer et al. [10]: 1: The patient is bed bound or uses canes or crutches, and personal assistance to walk around; 2: The patient can walk only with crutches or walkers; 3: The patient can walk with canes; 3: The patient can walk with cane shorter than 1 h, and with difficulty without a cane; 4: The patient can walk longer than 1 h with a cane, and shorter without cane but with limping; 5: The patient can walk without assistance but with a slight limping; 6: Normal.

2.6. Mobilization

According to early or late weight bearing, mobilization of the patients was categorized as (a) within 24 h, (b) between 24 and 48 h, (c) after 48 h. In addition, early mobilization was defined as first mobilization of the patient within 24 h after surgery and late mobilization after 24 h [10].

2.7. Harris hip score (HHS)

The Harris hip score (HHS) was developed in order to evaluate results of hip surgery and various hip disabilities [11]. HHS is a clinician-administered scale and applied by an experienced healthcare professional such as a physician or a physiotherapist. Maximum score which can be obtained from the scale is 100 points. HHS has 4 subscales as pain, function, absence of deformity, and range of motion. Harris hip scoring was applied in all patients who continued to outpatient clinic controls after discharge,

at the 1st month controls. HHS pain subscale within the scoring was analysed as a separate parameter out of the Harris scoring.

2.8. Statistical analysis

Data of the study were analysed using SPSS version 20.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics are expressed as number, percentage, mean, standard deviation, median, minimum and maximum values. Normal distribution of the variables was tested with Kolmogorov–Smirnov test. According to the normality outcomes, t test and variance analysis (ANOVA) were used as parametric tests and Mann–Whitney U test as a non-parametric test. Categorical variables were analysed using chi-square test. Fisher's exact test was used to compare walking ability according to ASA scoring and time of mobilization. According to the normality outcomes, Kendall's correlation analysis was used for correlation analysis of the data. In evaluation of the correlation coefficient, r: 0–0.24 was considered as weak, r: 0.25–0.49 as moderate, r: 0.50–0.74 as strong and r: 0.75–1.0 as very strong. Backward stepwise (conditional) logistic regression analysis was performed using independent variables including ASA, time of weight bearing, age, length of stay and comorbidity; and walking ability as the dependent variable. The most appropriate model was found when the independent variables were taken as ASA and time of weight bearing. $P < 0.05$ values were considered statistically significant.

3. Results

There were 52 patients in the study group and 69.2% (n = 36) were females and 30.8% (n = 16) were males. The mean age of the patients was found as 82.9 ± 6.5 (median: 84, min–max: 65–95) years. The mean age was found as 84.4 ± 6.7 years in male and 82.1 ± 6.6 years in female patients.

Ten (19.2%) patients had no comorbidities, while 42 patients (80.8%) had comorbidities. There were more than 1 comorbidity in 33 patients (63.5%). The most common comorbidity was hypertension by 67.3% (n = 35), followed by diabetes mellitus by 30.8% (n = 16), and heart failure by 13.5 (n = 7) of the patients.

When blood groups of the patients were evaluated; blood group was A in 19 (36.5%), B in 10 (19.2%), AB in 4 (7.7%), and 0 in 19 (36.5%) patients.

When fracture types were examined; 73.1% (n = 38) of hip fractures were intertrochanteric and 26.9% (n = 14) were femoral neck fractures (Figure 1). While 77.8% of the fractures were intertrochanteric and 22.2% were neck fractures in female patients, 62.5% of the fractures were intertrochanteric and 37.5% were neck fractures in male patients. Fracture was right sided in 53.8% (n = 28), and left sided in 46.2% (n = 24) of the patients (Figure 2). Of all patients, 55.8% (n = 29) were mobilized late, and 9 of these patients were mobilized after 48 h.

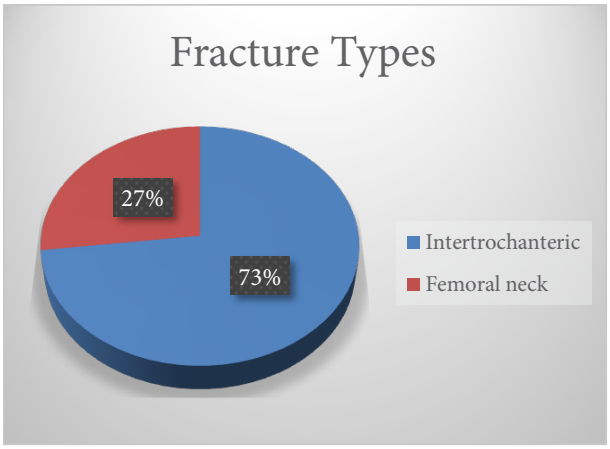

Figure 1. Fracture types.

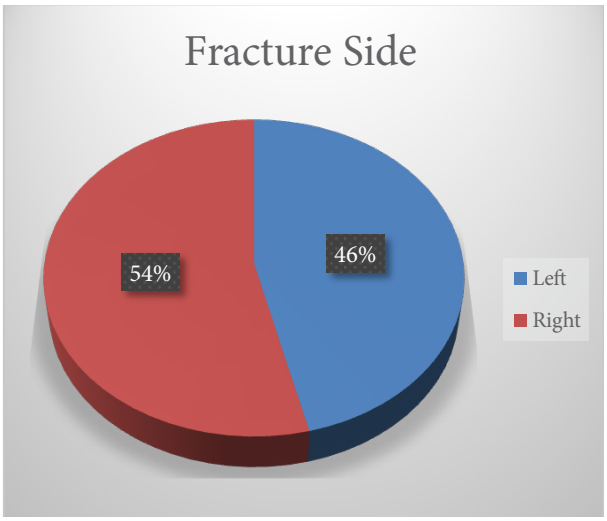

Figure 2. Fracture side.

Of all patients, 80.8% (n = 42) showed full weight bearing and 19.2% (n = 10) partial weight bearing. ASA score was III/IV in 55.8% (n = 29) of the patients.

The mean length of stay in hospital was found as 6.2 ± 2.6 days. There was statistically significant difference between lengths of stay in hospital according to sex (male: 5.3 ± 1.7 days, female: 6.6 ± 2.8 days; P = 0.035) and mobilization (early: 5.4 ± 1.8 days, late: 6.9 ± 2.9 days; P = 0.026). No statistically significant difference was found between lengths of stay in hospital according to fracture type, fracture side, time of first mobilization, weight bearing status, and ASA scoring ($P > 0.05$) (Table 1).

It was found that, patients with early weight bearing were discharged earliest compared to those with late weight bearing, patients with the earliest discharge were the patients who were mobilized within the first 24 h, and

Table 1. Descriptive and clinical features of the patients.

	Total		Mortality		Length of stay
	n = 52		n = 3		6.2 ± 2.6
	n	%	n	%	Days (± SD)
Sex					
Male	16	30.8	2	66.7	5.3 ± 1.7
Female	36	69.2	1	33.3	6.6 ± 2.8
					P = 0.035
Fracture type					
Intertrochanteric	38	73.1	3	100.0	6.5 ± 2.6
Femoral neck	14	26.9	0	0.0	5.4 ± 2.6
					P > 0.05
Fracture side					
Right	28	53.8	2	66.7	6.4 ± 2.8
Left	24	46.2	1	33.3	6.0 ± 2.3
					P > 0.05
Mobilization					
Early	23	44.2	1	33.3	5.4 ± 1.8
Late	29	55.8	2	66.7	6.9 ± 2.9
					P = 0.026
Time to first mobilization					
<24 h	23	44.2	1	33.3	5.4 ± 1.8
24–48 h	20	38.5	0	0.0	6.7 ± 3.0
>48 h	9	17.3	2	66.7	7.3 ± 2.8
					P > 0.05
Weight bearing					
Full	42	80.8	1	33.3	6.1 ± 2.6
Partial	10	19.2	2	66.7	6.6 ± 2.8
					P > 0.05
ASA					
I/II	23	44.2	0	0.0	6.1 ± 2.4
III/IV	29	55.8	3	100.0	6.3 ± 2.8
					P > 0.05

ASA: American Society of Anaesthesiologist Physical Status classification; SD: Standard Deviation.

patients with full weight bearing were discharged earlier compared to the patients with partial weight bearing. Mortality rate was 5.8% (n = 3) in all study population. Two of these 3 patients were mobilized after 48 h with partial weight bearing. ASA score of these 3 patients was III/IV.

When ASA scores were compared according to walking ability and age variables, there was a statistically significant difference between ASA scores in terms of walking ability (P = 0.002). Among the patients with ASA III/IV, 1 patient (3.4%) was not able to walk, 17 patients (58.6%) could walk only with crutches or walking frame, 5 (17.2%) patients could walk with canes or with 1 cane for less than 1 h, and without a cane only with much difficulties. Whereas among the patients with ASA I/II, 14 (60.9%) patients could walk with canes or with 1 cane for less than 1 h, and without a cane only with much difficulties, and 6 (26.1%) patients could walk only with crutches or walking

frame. In the logistic regression analysis, ASA III and IV scores increased the status of "the patient is not able to walk/ the patient is bedridden or uses canes or crutches, and personal help to go to the bathroom/ the patient can walk only with crutches or walking frame" by 6.364-fold (95% CI: 1.247–32.464) and late weight bearing by 21.7-fold (95% CI: 4.172–112.880) (Table 2). Twelve (52.2%) of the patients with ASA I/II were in the age range of 75-84, while 48.3% of the patients with ASA III/IV aged 85 years and over (Table 3).

Fifty percent (n = 3) of the 6 patients in the age group of 65-74 and 47.8% (n = 11) of 23 patients in the age group of 75-84 years, could walk only with crutches or walking frame, while 9 of 23 patients in the group of 85 years old and over could walk only with crutches or walking frame, and 9 patients could walk with canes or with 1cane for less than 1 h, and without a cane only with much difficulties (Table 4).

There was a significant difference between walking abilities according to the mobilization (P < 0.001). Of the patients with early weight bearing, 69.6% (n = 16) could walk with canes or with 1 cane for less than 1 h, and without a cane only with much difficulties, while 62.1% (n = 18) of the patients with late weight bearing could walk only with crutches or walking frame (Table 5). When mobilizations and walking abilities were evaluated with Kendall's correlation analysis; a positive, strong, statistically significant correlation was found between mobilization and walking ability (r = 0.651, P < 0.001)

In our study group, 3 of the 52 patients died postoperatively. Among the remaining 49 patients, 22 applied early weight bearing and 27 delayed weight bearing. There was a statistically significant difference between Harris and pain scores in terms of the time of first weight bearing at the postoperative 1st month follow-up (P < 0.001). There was a statistically significant difference

Table 2. Results of the logistic regression analysis.

	B	Exp (B)	CI 95%	P
Constant	–2.043	-	-	0.003
ASA				
I-II (0)			1.0	
III-IV (1)	1.851	6.364	1.247–32.464	0.026
Time of weight bearing				
Early (0)			1.0	
Late (0)	3.077	21.700	4.172–112.880	< 0.001

Exp (B): Odds ratio, CI: Confidence interval, Nagelkerke R square = 0.620, Hosmer and Lemeshow chi square = 0.371

Table 3. Walking ability and age by ASA scoring.

Variables	ASA I / II	ASA III / IV	P
Walking Ability	n (%)	n (%)	
The patient is not able to walk/ The patient is bedridden or uses canes or crutches, and personal help to go to the bathroom/ The patient can walk only with crutches or walking frame	7 (30.4)	24 (82.8)	< 0.001*
The patient can walk with canes/ The patient can walk with 1 cane for less than 1 h, without a cane only with much difficulties/ The patient can walk for a long period (>1 h) with a cane, short time without cane but with a limp	16 (69.6)	5 (17.2)	
Age (years)			0.570
65–74	2 (8.7)	4 (13.8)	
75–84	12 (52.2)	11 (37.9)	
≥ 85	9 (39.1)	14 (48.3)	

P: Chi-square test, *: Fisher's exact test

between the group with the first weight bearing within the first 24 h and the group with the first weight bearing after the postoperative 24th hour in terms of Harris and pain scores (both P < 0.001) (Table 6).

No significant difference was found between the Harris scores in terms of full or partial weight bearing and age at the postoperative 1st month follow-up (P > 0.05). The mean and median Harris scores were higher in the group with full weight bearing. In addition, the mean and median Harris scores were higher in the age group of 65-74 years than the other age groups.

4. Discussion

It was accepted in general that hip fractures in geriatric patients have a detrimental effect on all aspect of their lives. For all fracture types, quality of life after the fracture significantly decreased compared to the prefracture status. This study was conducted in order to evaluate geriatric patients who underwent partial prosthesis surgery due to hip fractures, in terms of in-hospital early weight bearing, walking ability, age, sex, fracture type, in-hospital mortality, ASA scoring, blood groups, and comorbidities.

Early mobilization and full weight bearing is usually associated with a faster recovery, lower complication rates, and shorter length of stay in hospital in geriatric patients with hip fractures. Early mobilization has been shown to be more effective compared to delayed mobilization [7,12]. Even in some studies, mobilization has commenced the same day of the surgery [13].

As in the previous studies, the results of our study

Table 4. Walking ability by age.

Age (years)	The patient is not able to walk	The patient is bedridden or uses canes or crutches and personal help to go to the bathroom	The patient can walk only with crutches or walking frame	The patient can walk with canes/ The patient can walk with 1 cane for less than 1 h, without a cane only with much difficulties	The patient can walk for a long period (>1 h) with a cane, short time without a cane but with a limp
65–74	1 (16.7)	0 (0.0)	3 (50.0)	2 (33.3)	0 (0.0)
75–84	0 (0.0)	2 (8.7)	11 (47.8)	8 (34.8)	2 (8.7)
≥ 85	0 (0.0)	5 (21.7)	9 (39.1)	9 (39.1)	0 (0.0)

n: Number, %: Row Percentage.

Table 5. Walking ability by mobilization.

Mobilization	The patient is not able to walk/ The patient is bedridden or uses canes or crutches and personal help to go to the bathroom/ The patient can walk only with crutches or walking frame	The patient can walk with canes/ The patient can walk with 1 cane for less than 1 h, without a cane only with much difficulties/ The patient can walk for a long period (>1 h) with a cane, short time without a cane but with a limp	P
Early	5 (21.7)	18 (78.3)	< 0.001
Late	26 (89.7)	3 (10.3)	

n: Number, %: Row percentage, Fisher's exact test

Table 6. Harris and pain scores according to the time of first bearing.

Postop. 1st month control	Partial-full weight bearing				P
	First 24 h (n : 22)		After 24 hours (n : 27)		
	Mean ± SD	Median (Min–Max)	Mean ± SD	Median (Min–Max)	
Harris score	84.0 ± 5.8	84.0 (73.0–94.0)	71.1 ± 2.8	71.0 (68.0–76.0)	<0.001
Pain score	36.8 ± 6.8	40.0 (20.0–44.0)	24.4 ± 6.4	20.0 (20.0–40.0)	<0.001

indicated that early mobilization and full weight bearing were associated with a shorter length of stay in hospital [7,10,14]. In our study, there was a statistically significant difference between lengths of stay in hospital according to age and mobilization. Accordingly, length of stay in hospital was significantly lower in male patients and early mobilization group (< 24 h). In a retrospective study by Baer et al. with 219 patients treated with surgery after hip fracture, early mobilization was reported to be associated with lower complication rates and shorter length of stay in hospital [10]. Again in the same study, the mean length of stay in hospital was shorter in male than in female patients. In a multicentre study by Ottesen et al. including 4918 patients aged over 60 years who underwent surgery due to hip fracture, late mobilization was reported to prolong the length of stay in hospital [15]. The results of our study were consistent with those of the other studies in terms of length of stay in hospital.

Delayed mobilization following surgical treatment of hip fracture has been associated with several complications such as pneumonia [16], urinary tract infection [17], thromboembolism [18], and delirium [19].

ASA score was used as a measure of comorbidities as in the previous studies [20]. In our study, there was no difference between the lengths of stay in hospital according to ASA scoring. Similarly in studies performed by Baer et al. and Chen et al., no significant difference was found between the lengths of stay in hospital in terms of ASA scoring [10,21]. It has been proposed that full weight bearing after hip arthroplasty shortens length of stay in hospital and decreases deep venous thrombosis [22]. In addition, it has been reported that partial weight bearing may inhibit functional recovery and increase muscle atrophy and loss of bone mineral density. In our study, there was no significant difference between lengths of stay in hospital according to full and partial weight bearing. Difference between the studies might be resulted from fracture types included and patient specific factors.

In our study, there was no significant difference between age and walking ability. There was a statistically significant difference between ASA scores and walking ability. While one of the patients with ASA III/IV was not able to walk, 17 patients could walk only with crutches or walking frame. Among the patients with ASA I/II, only 6 patients could walk with crutches or walking frame, 14 patients could walk with canes. Low ASA scores were associated with more walking ability. In the study by Baer et al. similar results were obtained, and in the multivariate regression analysis, low ASA score was found as a predictor of walking ability [10].

Early mobilization following hip fracture surgery is thought to be an imperative part of the postoperative management. Bed rest has been associated with undesired cardiovascular, pulmonary, and urinary effects, decreased muscle tone and negative psychological impacts [23,24]. Improvement of the gait after hip fracture is a necessity for patients to return their normal environment. The patients who performed early mobilization showed increased walking ability compared to those with late mobilization. Accordingly, it was found that 69.6% of the patients with early weight bearing could walk with a cane, while 62.1% of the patients with late weight bearing could walk only with crutches or walking frame. In our study, a positive, strong, and statistically significant correlation was found between mobilization and walking ability. Similarly, in the study by Baer et al., early mobilization was found to be a predictor of walking ability [10]. From this aspect, our study was consistent with the literature.

Several scales are used to evaluate the functional status following surgery due to hip fractures. Merle d'Aubigné [25], Harris hip scores (HHS) [11], Parker mobility score (PMS) [26], short physical performance battery (SPBB) [27] and Chinese Barthel index (CBI) [21] are among the most commonly used scales for this purpose. In this study, we used the Harris hip score to assess functional outcomes of the geriatric patients following hip surgery. The mean HHS score was found as 84.0 ± 5.8 in the patients with early weight bearing. Similarly, Sankarlingam et al. found the mean Harris hip score as 85 in 23 patients who allowed immediate weight bearing, on the postoperative 12th day. The results of our study were consistent with the above mentioned study [14].

In our study, the mean Harris score was significantly higher in patients who mobilized within the first 24 h, compared to the patients with delayed mobilization (after 24 h). When studies in the literature evaluating postoperative functional outcomes following hip surgery were reviewed; in a study by Zhang et al. with 191 patients who underwent hip surgery due to femoral neck fracture, HHS score was found to be higher in patients with early mobilization compared to those with delayed mobilization at the 3rd month follow-up [28].

Chronic postoperative pain has been described for several surgical procedures including hip surgery [29]. Postoperative pain following hip surgery has been reported between 27% and 38% depending on the type of surgery and the pain definition used [30,31]. In our study, postoperative pain in geriatric patients who underwent surgery due to hip fracture was evaluated using pain subscale of HHS. Accordingly, the main pain score was significantly higher in patients with weight bearing within the first 24 h, compared to those with weight bearing after 24 h. The mean pain score was found as 36.8 ± 6.8 in patients with early mobilization. This score corresponds to 'slight, occasional, no compromise in activity' and 'mild pain, no effect on average activities, rarely moderate pain

with unusual activity' in the Harris hip score. The mean pain score was found as 24.4 ± 6.4 in patients with delayed mobilization. This score corresponds to 'moderate pain, tolerable but makes concessions to pain, some limitations of ordinary activity or work' in the Harris hip score. This result obviously indicated that early mobilization has a positive effect on postoperative pain. Consistently with our findings, Sankarlingam et al. found positive effects of early mobilization on postoperative pain [12]. Some authors have mentioned the positive effect of postoperative pain control on early mobilization [32,33] since there was no data about postoperative day 1 pain scores, or preoperative and postoperative analgesic drugs used by the patients. However, we could not present an analysis and a comparison on this issue. Nevertheless, there are studies reporting no significant difference between pain scores in terms of early mobilization. This might be resulted from different pain definitions and pain scales used among the studies.

In our study, no significant difference was found between the mean HHS scores in terms of full or partial bearing and age groups. Nevertheless, HSS scores were higher in the age group of 65-74 years compared to the other age groups. Considering increased adverse effects of ageing in postoperative outcomes, this was an expected result.

This study has several limitations. First, this study was designed as a retrospective observational study. Second, data of the study were obtained from the medical records and reports, and only in-hospital period was analysed. Postoperative day 1 pain scores or pre- and postoperative analgesic usage data were not included in the study, therefore; an analysis or comparison about the effects of early mobilization and postoperative drug usage on pain relief could not be performed. Third, we could not evaluate postoperative complications. The results of regression analysis shown in Table 2 indicate a wide confidence interval due to small number of patients, thus prevent a definitive conclusion. This is included in the limitations section of the article and the final limitation is the limited number of patients. The mean age of our patients being over 80 years was the strength of our study. The mean age is about 65 years in the similar studies in literature.

In conclusion; the results of our study indicated that early mobilization and full weight bearing in geriatric patients after hip fracture surgery shortened length of stay in hospital and increased walking ability. In addition, early mobilization and weight bearing were found to positively affect postoperative functional outcomes and reduce pain. Accordingly, early mobilization and full weight bearing could be provided with appropriate rehabilitation program in geriatric patients operated on due to hip fracture, providing a shorter time to discharge, decreased pain, increased functionality, and return to daily activities. As a result, quality of life will be increased and healthcare costs will be decreased in these patients.

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