

Fractures in Geriatric Cases Geriatric Olgularda Görülen Kırıklar

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Amaç: Geriatric olgularda kırıkların epidemiyolojisi az bilinmekte, bu konuda ise çok az çalışma bulunmaktadır. Bu çalışmanın amacı, geriatric olgularda kırıkların sıklığı, cinsiyet, yaş ve mevsimsel dağılımını değerlendirmektir.

Gereç ve Yöntemler: Ekstremitte ve omurga sorunları nedeniyle majör travma merkezine başvuran hastalar çalışmaya dahil edildi. 65 yaş üzeri hastaların yaş, cinsiyet, kırık tipi, tedavi şekli ve kırıklarının mevsimsel dağılımı retrospektif olarak değerlendirildi.

Bulgular: Ocak 2016 - Ocak 2018 arasında ekstremitte veya omurga ağrısı ile başvuran 65 yaş üzeri geriatric hastalarda 757 kırık tespit edildi. Bu hastaların yaş ortalaması 77.1 idi. Geriatric popülasyonda kırık insidansı 39,5 / 1,000 / yıl idi. Kırıkların cinsiyet oranı 39/61 (erkek / kadın) idi. Geriatric olgularda kırıklar en sık femur (%43.4, %60'ı kadın), ardından radius (%11.8, %74'ü kadın) ve humerus (% 10.6, % 70'i kadın) kemiklerinde tespit edilmiştir.

Sonuç: Geriatric hasta grubunda büyük kemik kırıkları sık görülmekte ve çoğu cerrahi olarak tedavi edilmektedir. Bu nedenle geriatric olgularda kırıklar multidisipliner yaklaşım gerektirmektedir.

Anahtar Kelimeler: Epidemiyoloji, geriatri, kırık, mevsim

Aim: Epidemiology of fractures in geriatric cases is little known and there are very few studies related with this issue. The aim of this study was to summarize the available evidence on the frequency, gender, age, and seasonal distribution of fractures in geriatric cases.

Material and Methods: Patients who were admitted to major trauma center because of extremity and spine problems were included in this study. Age, gender, type of fracture, treatment modality and seasonal distribution of fractures of all patients over 65 years of age were recorded and expressed in tables and graphs.

Results: Between January 2016 and January 2018, 757 fractures were determined in geriatric patients who had complaints of extremity or spine pain. The incidence of fractures of the geriatric population was 39,5/1,000/year. The gender ratio of the fractures was 39/61(male/female). Fractures in geriatric cases were most commonly seen in femur (43.4%, 60% of them women), followed by radius (11.8%, 74% of them women) and humerus (10.6%, 70% of them women).

Conclusions: Osteoporotic fractures are increasing in geriatric patients. Because of the higher incidence of morbidity and mortality, fractures in geriatric cases require multidisciplinary approach to their care.

Keywords: Epidemiology, geriatrics, fracture, season

INTRODUCTION

Because of osteoporosis and sedative life, a rapid increase in fracture incidence is observed in geriatric patient population (1). Fractures constitute an important part of health expenditures in our country and just around the world. The average annual medical cost associated with fractures among geriatric population in US, has been reported to be \$14 billion (2).

Epidemiology of fractures in geriatric cases is little known and there are very few studies related with this issue. Knowledge of the epidemiology of fractures in geriatric cases, in which many factors are thought to be important in its etiology, will increase taking preventive measures, identifying effective treatment strategies, conscious training, and awareness on this sensitive community (3).

It is the purpose of this report to summarize the available evidence on the frequency, gender, age, and seasonal distribution of fractures in geriatric cases to make recommendations for future needs and research opportunities.

MATERIAL AND METHODS

This was a retrospective, single center study carried out in a major trauma center, from January 1, 2016, to January 1, 2018. The local ethics committee stated that there was no ethical problem for this epidemiological study with the data obtained from the hospital information system. The study was conducted in Tokat State Hospital, which is one of the cities of Turkey, provides health services to patients of all age groups and is responsible for the inpatient and outpatient care of their injuries. Tokat is in a climate transition zone between Black Sea and the steppe of Central Anatolia. The average annual temperature is 12.8 ° C (21,6 ° C in summer and 3,02 ° C in winter) (4). All the trauma patients were evaluated by orthopedic surgeons at emergency medicine department and orthopedics outpatient clinics. The fractures

were firstly examined by physical examination and two plan radiographs. In patients with suspected fracture, was also evaluated by computerized tomography. All patients who had been diagnosed with a fracture and 65 years of age were included, and other age groups were excluded in the study. 757 fractures were determined in geriatric patients who had complaints of extremity or spine pain, and included in this study. Informed consent obtained from all the available patients. Age, gender, type of fracture, treatment modality and seasonal distribution of fractures of all patients over 65 years of age were recorded and expressed in tables and figures.

Statistical Package of Social Sciences version 15 (SPSS Inc., Chicago, IL, USA) software package was used for statistics. A descriptive analysis was used to evaluate the variables. Clinical data were presented as number, mean, and percentage.

RESULTS

757 fractures were determined in geriatric patients who had complaints of extremity or spine pain. The incidence of fractures of the geriatric population was 39,5/1,000/year. The gender ratio of the fractures was 39/61(male/female). There is a female domination except for 80-84 years of age, and a rapid increase in the incidence of fracture in both males and females after 80 years of age and this increase has reached the highest levels in the 90's (Figure 1).

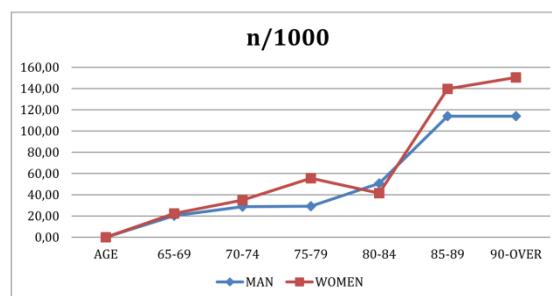


Figure 1. Age and gender distribution of fractures

Table I. Frequency, gender ratio, treatment options and mean age in fractures in geriatric cases

FRACTURE	n	%	Surgery(%)	Men (%): Women (%)	Surgical/ Conservative	Most Frequent season	Mean age
Femur	329	43.4	60,7	40:60	94:6	WINTER (34.6%)	80,2
Radius	89	11.8	3.1	26:74	19:81	WINTER (44.9%)	74.7
Humerus	80	10.6	11.7	30:70	58:52	SPRING (32.5%)	74.2
Fibula	64	8.4	6.6	52:48	53:47	WINTER,SPRING(40,6%)	72.7
Tibia	40	5.2	5.9	45:55	75:25	SPRING (40%)	73.3
Lumbar Spine	23	3.0	2.3	26:74	52:48	AUTUMN (43.4%)	76.6
Metatarsal	22	2.9	0.4	27:73	9:91	SPRING (36.4%)	71.7
Finger Phalanx	20	2.6	1.6	50:50	40:60	SPRING (40%)	81.2
Pelvis	18	2.4	2.3	6:12	67:33	WINTER (44.4%)	77.3
Metacarpal	16	2.1	0.4	25:75	13:87	SUMMER (50%)	76.6
Ulna	12	2.7	1.2	33:67	33:67	SUMMER,SPRING (33.3%)	79.6
Thoracic Spine	12	1.6	1.9	17:83	83:17	AUTUMN,WINTER (33.3%)	69.8
Toe Phalanx	8	1.0	0	50:50	0:100	SUMMER (50%)	74.7
Patella	6	0.8	0.8	67:33	67:33	SPRING (67%)	71.3
Clavicle	4	0.5	0.4	0:100	50:50	AUTUMN,SPRING (50%)	88
Tarsal Bones	4	0.5	0	50:50	0:100	SUMMER,SPRING (50%)	65.7
Carpal Bones	4	0.5	0.2	25:75	100:0	SUMMER (75%)	80
Coccyx	2	0.3	0	0:100	0:100	SPRING (100%)	74.5
Scapula	2	0.3	0	0:100	0:100	WINTER(100%)	77.5
Cervical Spine	2	0.3	0.4	0:100	100:0	WINTER(100%)	75.5
TOTAL	757	100	100	39:61	67:33	WINTER (32.9%)	77.1

Fractures in geriatric cases were most commonly seen in femur (43.4%, 60% of them women), followed by radius (11.8%, 74% of them women) and humerus (10.6%, 70% of them women). Most of the fractures of femur and humerus fractures were treated surgically and most of the radius fractures were treated conservatively. Fractures in geriatric cases are most commonly seen in women (61%), usually treated surgically (67%) and most commonly seen in winter (32.9%). All of the toes, tarsal bones, coccyx, scapula fractures; and most of the radius, metatarsal and metacarpal fractures were treated conservatively (Table I). Most of the fractures occurred women, mainly resulting from low-energy trauma that resulted in major fractures, usually caused by falling from a standing height.

The distal site of the radius, proximal site of the femur, proximal site of the humerus, and the ramus pubis of the pelvis were the most

seen sites (Table II). In the spring, the rates of females were 2.08 times higher than those in males, whereas, in the other seasons, rates of proximal femur fractures were similar to those in men (Figure 2).

DISCUSSION

In this study, it was seen that fractures in geriatric cases were in different trends at male and females. When all age groups are considered, the fractures were more common in males (male/female = 1.5); however, this dominance was changed to females after the age of 65 years (female/male = 1.56) (5). The number of fractures seen in the female was almost 2 times that of the number of males especially in the spring; however, this rate was similar in other seasons.

Fractures in geriatric cases have higher mortality and morbidity, and observed more

Table II. Distribution of the fractures according to the anatomical region

Fracture Type	The most common region (%)	The second most common region (%)	The third most common region (%)	The rarest (%)
Radius	Distal (93.2)	Proximal (4.5)	Diaphysis (2.2)	Diaphysis (2.2)
Femur	Proximal (81.7)	Diaphysis (9.1)	Distal (6)	Distal (6)
Humerus	Proximal (62.5)	Distal (25)	Diaphysis (12.5)	Diaphysis (12.5)
Pelvis	Ramus Pubis (44.4)	Acetabulum (33.3)	Sacrum (11.1)	Iliac crest (11.1)

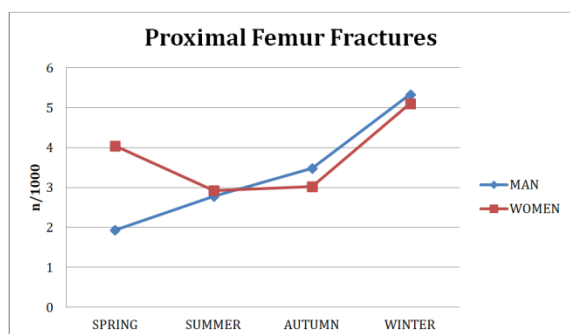


Figure 2. Age and seasonal distribution of proximal femur fractures

common than the normal population (5). In another study conducted in our country, it was observed that the fractures peaked after 60 years of age and increased up to 5 times to the normal age groups after the age of 70 years (5). In another study, it is argued that the number of fractures in geriatric cases, therefore the treatment costs will increase towards 2025's (1). We thought that, more attention should be given to fractures in geriatric cases; as to take preventive measures such as lifestyle modification, balanced diet, and to give training about management of fractures in geriatric cases.

In all age groups, male fractures are more common than female fractures; however, fractures in geriatric cases have female dominance (5). In Koca et al.'s study male fractures were much more than female fractures in all age groups (5). In a study conducted in the United States, it was stated that the female fractures were two-thirds of the total fracture (6). Iskrant et al. stated that fractures and deaths from falls due to fractures are most common in females and associated with bone fragility and osteoporosis in his epidemiologic study (7). In the literature too many reasons were determined for female dominance in fractures in geriatric cases. The prevalence of osteoporosis and deaths from falls in the females was lower in the patients who live in the areas that have high fluoride content in the drinking water when compared to non-fluoride content in the drinking water (7). In an epidemiologic study, 82% of the

osteoporotic pelvic fractures were seen in females and 80 % of them had Vitamin D deficiency (8). Low body mass index, menopausal estrogen withdrawal, malabsorption syndromes, including chronic liver disease and inflammatory bowel disease, long term immobilization, low calcium intake, physical inactivity, low sunlight exposure were the other described reasons (9,10). Similar to these studies, we observed that fractures in geriatric cases are almost 1.5 times higher in women than men. We think that preventive measures and supportive treatments should be given to females to decrease fractures in geriatric cases.

In a previous study conducted in the United States, it was stated that vertebral fractures were most common (27%), followed by wrist (19%) and hip fracture (14%) in the geriatric population (7). In our study, fractures were most frequently seen in femur (43,4%), then in radius (11,8%) and in humerus (10,6%). The recent study was conducted in a major trauma center and the data based on the emergency department and orthopedics and traumatology outpatient clinic. In our country, vertebral fractures in geriatric cases are usually to associate with osteoporosis and referred to physical therapy and internal medicine outpatient clinics, and given supportive treatment. Therefore, these fractures could not be included in the study. Again in our study, the fractures were sorted according to their names, not by regions. The difference of data may depend on these factors and the social differences. In the studies upper extremity fractures were also common in geriatric patients. This suggests that fractures may occur in geriatric patients, not only in the load-bearing bones but also in the non-weight-bearing bones. Most of upper extremity fractures have been treated conservatively; however, it considerably decreases the patient comfort.

More than 10 types of fractures are considered to be osteoporotic (11). Despite advanced

technics experience, proximal femur fractures accounts for the majority of mortality events and hospitalization in the geriatric patients (12). It has been reported that hip fractures are 14% of all fractures but 72% of health expenditures are used in the treatment of hip fractures in US (1). Because of comorbidities, advanced age, and actual fracture stress impact to the body, the mortality rate is believed to increased in the first year after a hip fracture (13,14). In this study, 43,4% of the fractures in geriatric cases was occurred in the femur, majority of them in the proximal region, probably as a result of osteoporosis (15). This situation brings huge economic burden to our country as it is in the world. Osteoporotic fractures are increasing in patients over the age of 50 years, especially in women in Turkey. Immobilization and being far from sunrise in winter and spring resulting in osteoporotic fractures in women. This clearly has significant implications for the detection, prevention, and treatment of osteoporosis and the prevention and treatment of osteoporotic fractures. Efforts are potentially geared toward educating the population and, consequently, reducing osteoporosis rates.

In the Koca et al.'s study fractures were most common during summer in all age groups because of the active daily works, sports activity and traffic accidents (5). Different than the other age groups, fractures in geriatric cases were most common in winter. Most of the weight bearing bone fractures (femur, pelvis, fibula, spine) were most common in winter, as a result of small number of sunny days in winter and immobilization. In this study we also observed that hip fractures in geriatric cases show different distributions according to seasons. Higher percentage of female fractures was rapidly decreased in summer and autumn than rapidly increased in winter. This shows that female fractures show sudden reaction to seasonal changes. The male fractures were minimum at spring, than increased in summer, autumn and were maximum in winter. This shows that males

were active in daily activities than women in spring and minimal sunshine is believed to be enough for bone deficiency. The fracture rates were maximum in winter in both male and females, and the rate of fractures in women was 2.08 times higher than those in men in spring. There may be any other reasons affecting seasonal differences between the sexes, and they should be investigated in the future studies.

Because of the lower activity expectation in elders, treatment preference differs in elder and younger patients. This difference is higher in upper extremity fractures. In Koca et al.'s study 24% of radius, 76% of humerus, 53% of ulna fractures were treated with surgery in all age groups (5). In the present study 19% of radius, 58% of humerus, 33% of ulna fractures were treated surgically. Most of the femur, pelvis, and traumatic spine were treated surgically. The entire coccyx, scapula, clavicle, and most of the radius, metatarsal, toe phalanx fractures were treated conservatively.

Limitations of the study are its cross-sectional design, lack of data on the status of patients in terms of osteoporosis, and strengths of the study are sufficient number of patients, evaluation of seasonal distribution of fractures. Further studies are needed to reveal the causes of differences in the distribution of fractures unique to gender and seasonal changes, to take protective measures and to determine the efficacy treatment strategies.

CONCLUSION

Because of the higher incidence of morbidity and mortality, fractures in geriatric cases require multidisciplinary approach to their care. In particular, attention must be given to the prevention of common fracture complications, rehabilitation, assessment of the cause of fracture, and prevention of subsequent fractures.

Declaration of Interest

The authors report no conflicts of interest.

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