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RESEARCH

A RETROSPECTIVE ANALYSIS OF 65 YEARS OLD AND OVER FORENSIC CASES WHO WERE ADMITTED TO THE EMERGENCY DEPARTMENT

ABSTRACT

Introduction: The objective of this study was to analyze the characteristics of geriatric forensic cases who were admitted to the Emergency Department and to investigate them from the forensic perspective in order to develop prevention programs.

Materials and Method: Patient charts, forensic reports and computerized patient records of geriatric forensic cases, who were admitted to our emergency department from 01.01.2008 to 30.06.2012, were investigated retrospectively.

Results: A total 143 forensic geriatric cases with a median age of 71.00±0.50 were included in the study. The most common incidents were traffic accidents (48.3%) and falls (26.6%). The mean time period for reaching the hospital was 109.2±237.3 minute; more than half (n=75) of the cases suffered head and neck injuries; no consultations from other departments were required for the majority of cases (70.6%), and 58% were discharged from the Emergency Department. Fractures (26.6%) and soft tissue injuries (24.5%) were the most common medical diagnoses; tendon cuts were not encountered in falls and traffic accident cases, and soft tissue injuries and intracranial hemorrhages were not encountered in penetrating injury cases. Intracranial hemorrhages were more common among fall cases, and soft tissue injuries were more common in traffic accident cases.

Conclusion: Our investigation revealed that traffic accidents and falls were the most common forensic cases among the geriatric age group. Educational initiatives and legal measures addressing the safety of elders, when seriously and determinedly conducted, will help to reduce injuries in the geriatric age group.

Key Words: Emergency Medical Services; Legal cases; Geriatrics; Wounds and Injuries.

ARAŞTIRMA

ACİL SERVİSE BAŞVURAN 65 YAŞ VE ÜZERİ ADLİ OLGULARIN RETROSPEKTİF ANALİZİ

ÖZ

Giriş: Bu çalışmanın amacı acil servise başvuran geriatrik adli olguların özelliklerini analiz etmek ve önleme programlarının geliştirilmesi için bu olguları adli açıdan araştırmaktır.

Gereç ve Yöntem: Acil servise 01.01.2008-30.06.2012 tarihleri arasında başvuran, 65 yaş ve üzerindeki adli olguların hasta kartları, adli raporları ve digital hasta kayıtları retrospektif olarak incelendi.

Bulgular: Yaş ortancası 71.00±0.50 olan 143 geriatrik adli olgu tespit edildi. En sık trafik kazası (%48.3) ve düşme (%26.6) olguları görüldü. Olguların ortalama 109.2±237.3-dakikada hastaneye ulaştıkları, yarıdan fazlasında (n=75) baş boyun yaralanması olduğu, çoğunda herhangi bir birimden konsültasyon (% 70.6) istenmediği ve %58'sinin acil servisten taburcu edildiği kaydedildi. Fraktür (%26.6) ve yumuşak doku travması (%24.5) en sık tanı olarak görüldü. Düşme ve trafik kazasında tendon kesisine, delici-kesici alet yaralanmasında ise yumuşak doku travması ve intrakranyal kanamaya rastlanmadı. İntrakranyal kanamanın düşme olgularında, yumuşak doku travmasının da trafik kazalarında daha sık görüldüğü tespit edildi.

Sonuç: Çalışma geriatrik yaş grubunda adli olgulara en sık trafik kazaları ve düşmenin neden olduğunu açığa çıkardı. Yaşlıların korunması için yapılacak eğitimsel girişimler ve yasal düzenlemeler, ciddiyet ve kararlılıkla devam ettiğinde geriatrik yaş grubunda yaralanmaların azaltılmasına yardımcı olacaktır.

Anahtar Sözcükler: Acil Servis; Geriatri; Adli Olgular; Travma.

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Introduction

Elderly population represents an ever-increasing population in worldwide (1-3). As in most other countries of the world, in our country people 65 years old and over are classified as elderly (3-7). Improvements in healthcare have brought about a rise in life expectancy, but also a rise in the number of elderly patients. Turkish Statistical Institute publishes that 65 years and over citizens constitute 7.7% of Turkish population in 2013, meaning, the geriatric group keeps increases significantly when compared with previous years (5). This increase in the elderly population is expected to have a significant impact on public health issues all over the world.

The physiopathologic changes occurring in the geriatric age group like increase in chronic diseases frequency and motor and mental deterioration render this age group more vulnerable to physical traumas and cause more serious outcomes (6-8). The increase in the rate of complications affects therapeutic options, which in turn have a negative effect on mortality and morbidity rates. The Emergency Department (ED) is the common referral center for injuries; however, the epidemiologic trends of geriatric ED visits are not well known (6). Studies exploring the injury characteristics of the elderly would be valuable in defining priorities for further studies and for medical interventions. The above discussion led us to design a study to evaluate the demographics and other characteristics of geriatric forensic cases admitted to the ED of a tertiary-level hospital (9).

Materials and Method

This study has been approved by the Ethics Committee of Abant Izzet Baysal University with its decision numbered 2012/259 and dated 21.02.2013. Patient charts, forensic reports and computerized patient records of forensic cases, aged 65 and over, who were admitted to the emergency department from 01.01.2008 to 30.06.2012, were investigated retrospectively. This study included all forensic cases who were 65 years old and over, and applied to Abant Izzet Baysal University Hospital Emergency Service. The cases who were under the age of 65 years, and were not considered as forensic case were excluded.

Age and gender of the cases, type of the event, time of injury and time spent in reaching the hospital, site of injury, diagnosis, and admission and discharge data were evaluated.

The SPSS 19.0 (Windows SPSS Inc, Chicago, IL) program was used for statistical analysis. We used descriptive statistics to analyze the data. For demographic analyses, mean and standard deviation were used for data with normal distributions, and median and standard error were used for data with non-normal distributions. Student's t tests were used to compare continuous data, and chi-square tests were used to compare categorical data. Correlation analyses were conducted after significant chi-square tests for inter-group comparisons, and Kruskal-Wallis and Mann-Whitney tests were used for comparisons of times needed to reach the hospital. $p<0.05$ was accepted as statistically significant.

Results

The 2212 forensic cases admitted to the ED from 01.01.2008 to 30.06.2012 included 143 (6.4%) patients from the geriatric age group, with a median age of 71.0±0.5 years (95% CI 71.7-73.8 yrs). The median age of female cases (44.1%, n=63) was 73.0±0.8 yrs (95% CI 72.4-75.9 yrs), and the median age of male cases (55.9%, n=80) was 70.0±0.6 yrs (95% CI 70.4-73.0 yrs). Forensic geriatric admissions were greater in the months of July (n=29), October (n=20) and September (n=17). Fifty-nine cases (41.3%) were admitted in the summer months, 37 cases (25.9%) in the autumn months, 28 cases (19.6%) in the spring months and 19 cases (13.3%) were admitted in the winter months.

The time of the forensic event was 12:01-18:00 for most geriatric patients (49.0%, n=70), followed by 06:01-12:00 in 30 cases (21.0%), 18:01-24:00 in 27 cases (18.9%), and 00:01-06:00 in eight cases (5.6%). In eight cases (5.6%), the time of the injury was not recorded.

Type of event and the number of cases involved were as follows: traffic accident:48.3% (n=69) (42.0%, n=60 motor vehicle accidents; 6.3%, n=9 pedestrians); falls:26.6% (n=38); stab-cut injuries:8.4% (n=12); others:16.8% [six intoxications (all accidental), four assault and batteries, three burns, three hit by a falling object, three kicked by an animal, two suicide attempts (by taking pills), one stuck inside a door, one domestic assault victim, and one occupational injury].

Ninety-nine cases (69.2%) were transferred to the hospital by the 112 Emergency Service ambulances, and 44 cases (30.8%) were brought by private vehicles. The mean time interval from injury to admission to the hospital was 109.2±237.3 min (range: 10-1440 min). There was a statistically significant correlation between the event characteristic and the injury-to-admission period ($p=0.001$). Further analysis revealed that traffic accident cases (mean=83.5 min) were admitted to the hospital more rapidly than those in the "falls"

(mean=118.2 min) and "others" (mean=161.2 min) categories (p=0.002, p=0.001, respectively).

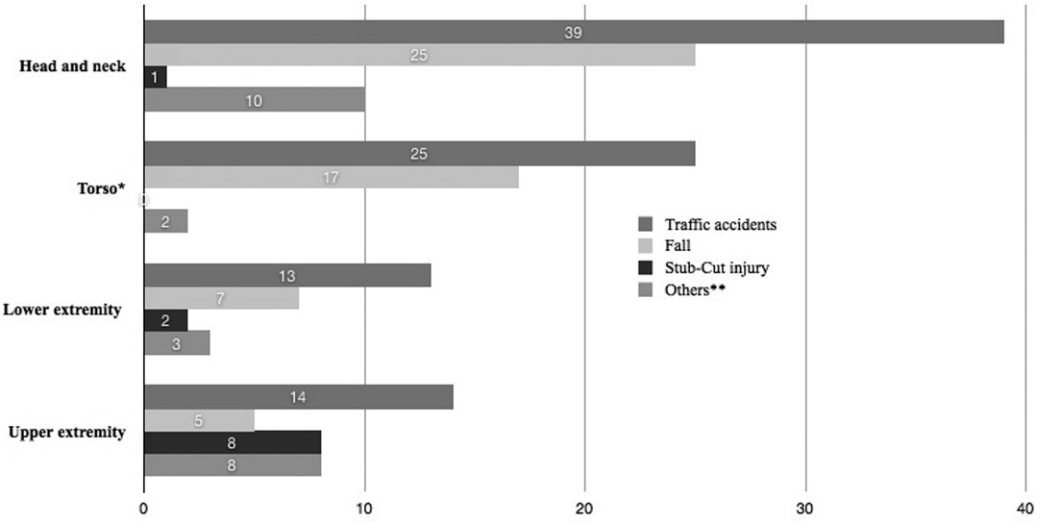
The sites of injury were as follows: head and neck in 75 cases (52.4%), torso in 44 cases (30.8%), upper extremities in 35 cases (24.5%), and lower extremities in 25 cases (17.5%). Twenty-four cases (16.7%) had injuries in both head and neck and torso regions, 13 cases (9.1%) had injuries in the head and neck and upper extremities, nine cases (6.3%) had injuries in the head and neck and lower extremities, 19 cases (13.2%) had injuries in the torso and extremities, and two cases (1.39%) had injuries in all body regions. Injuries in only one body region were most common in traffic accident cases (n=29); 74 cases had injuries in one body region, and the most commonly involved body regions were head and neck (n=32), followed by upper extremities (n=16), torso (n=10), and lower extremities (n=6).

When the correlation between the site of injury and the event characteristic was explored, it was found that there were no torso injuries in stab-cut incidents (Figure 1). There was a statistically significant difference between the fall cases with (26.1%, n=21) and without (11.9%, n=17) torso injuries (p=0.030). There were no significant differences between the fall cases with and without head and neck (p=0.087), upper extremity (p=0.077) and lower extremity (p=0.896) injuries.

There were consultation requests from various departments for 101 cases (70.6%). In these cases, 51 (50.5%) cases had one, 20 cases (19.8%) had two, and 30 cases (29.7%) had three or more consultation request orders. The most common consultation requests were those forwarded to the Orthopedic Clinic (37.8%, n=54). The second consultation request for those who already had an orthopedics consultation was forwarded to the Neurosurgery Department (55.6%, n=30), followed by the General Surgery Department (48.1%, n=26) (Figure 2). When correlation between the event characteristic and the number of consultation requests was explored, there was a significant difference between traffic accident cases (n=19, 63.3%) who had three or more consultation requests, and other event characteristics (n=11 36.7%; p=0.006).

Thirty-eight cases (26.6%) had bone fractures, 35 cases (24.5%) had soft tissue injuries, 30 cases (21.0%) had skin-mucosa cuts, nine cases (6.3%) had intracranial hemorrhages, seven cases (4.9%) had tendon cuts, and seven cases (4.9%) had hemopneumothorax (Table 1, Figure-3).

Eighty-three cases (58.0%) were discharged from the ED after the observation period, 50 cases (35.0%) were hospitalized in one of the clinics, five cases (3.5%) were transferred to another health center, four cases (2.8%) refused treatment and one case (0.7%) passed away. Of the cases transferred to other



* Torso: front and back, pelvis and perineum

**Others: Six intoxications (all accidental), four assault and batteries, three burns, three hit by a falling object, three kicked by an animal, two suicide attempts (taking pills), one stuck inside a door, and one domestic assault victim, one occupational injury

Figure 1

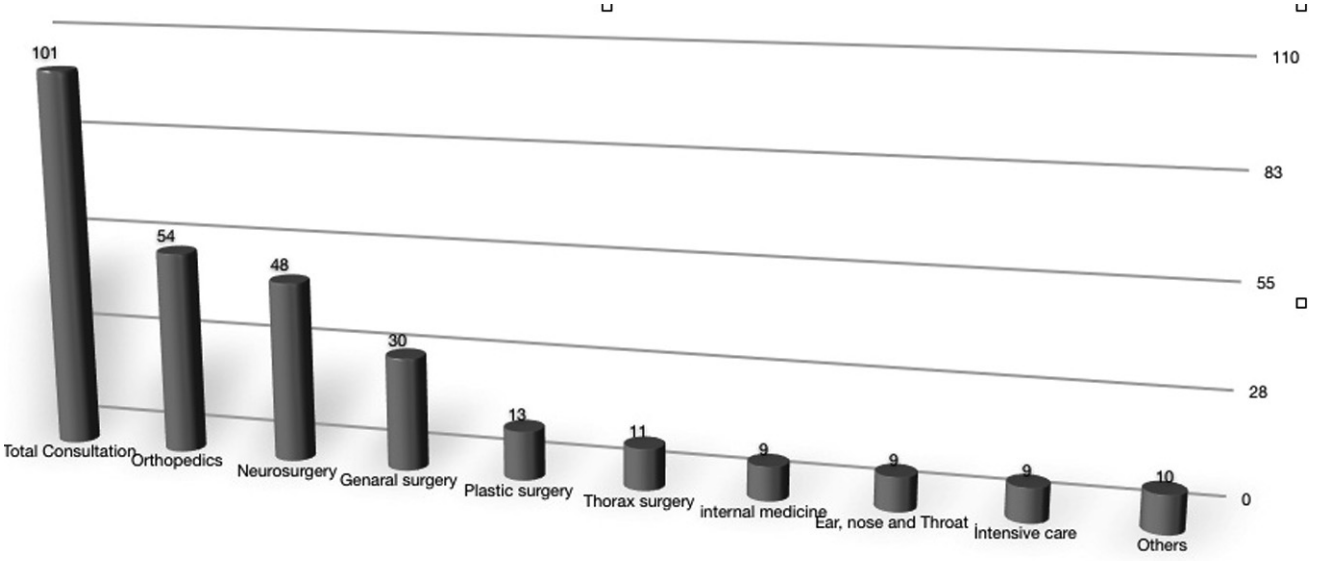


Figure 2

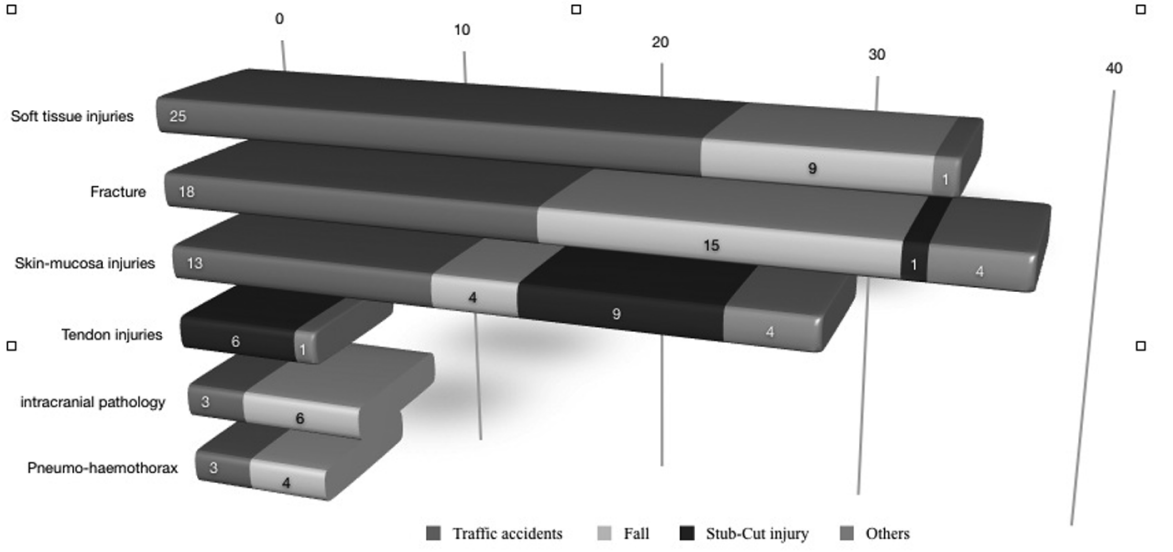


Figure 2

departments, 11.9% (n=17) were transferred to the Orthopedic Department, 7.7% (n=11) to the Neurosurgery Department, 4.9% (n=7) to the Intensive Care Unit, and 10.5% (n=15) were hospitalized in other departments. The greatest numbers of hospitalized patients were traffic accident cases; there was no significant difference between the event characteristic and hospitalization (p=0.901) (Table 2).

Discussion

People aged 65 and over are considered as geriatric (10,11). With advancing age, social activities decrease and so does the time spent outdoors. Thus the geriatric population is less exposed to trauma, be it forensic or not. On the other hand, the relative increase in the elderly in a given population and their more active involvement in everyday activities, plus the

Table 1— Injury Sites By Gender in The Geriatric Forensic Cases.

Injury Sites	Woman		Man		Total		p
	n	%	n	%	n	%	
Soft tissue injury	44	42.3	60	57.7	104	100	0. 326
Fracture	18	47.4	20	52.6	38	100	0. 375
Skin-mucosa injury	11	36.7	19	63.3	30	100	0. 246
Intracranial pathology	5	55.6	4	44.4	9	100	0. 348
Tendon injury	3	42.9	4	57.1	7	100	0. 635
Pneumo-haemothorax	1	14.3	6	85.7	7	100	0. 107

Table 2— Hospitalization Status of Forensic Cases.

Type of Event	Hospitalized Cases		Discharged Cases From The ED**		Total	
	n	%	n	%	n	%
Traffic accidents	23	33.3	46	66.7	69	100.0
Fall	13	34.2	25	65.8	38	100.0
Stab-Cut injury	4	33.3	8	66.7	12	100.0
Others*	10	41.7	14	58.3	24	100.0
Total	50	35.0	93	65.0	143	100.0

X2 p=0.901

*Others: Six intoxications, 4 assault and batteries, 3 burns, 3 hit by a falling object, 3 kicked by an animal, 2 suicide attempts, 1 stuck inside a door, 1 domestic assault victim, 1 occupational injury

**ED: Emergency Department

normal physiological changes of old age which slow down the reflexes and decrease overall body strength and sensory functions like hearing and seeing, make elders vulnerable to trauma (3,12). Study on forensic cases has reported that the elderly population is less involved in forensic cases than other age groups (13). The rates of geriatric patients were 6.2% in a study of 842 cases, and 5.4% in a study of 12823 cases, which are all compatible with our finding of 6.4% of geriatric cases in a total of 2212 forensic cases (8,14).

The mean age of geriatric forensic and wounded cases was reported as 81.50 years (n=276) in Labib et al.'s study, 69.80 years (n=52) in Gunduz et al.'s study (3,8). In our study, the median age of forensic geriatric cases was 71 years (females: 73 yrs, n=63; males: 71 yrs, n=80), and is quite close to the above findings. Our national culture where women are more sedentary and are mostly housewives may have been reflected in the above findings (15). Holbrook and Hoyt report that each year over one million women are hospitalized due to various traumas, and those women are more vulnerable to traumas than men (16). The rate of women was 57.8% in a study conducted in Tokyo with trauma cases, 50.6% in a study conducted in our country with forensic cases, and again constituted the majority in another study where blunt traumas were investigated in geriatric cases (6,9,17). The reason for women constituting the majority in studies investigating traumas is not clear, but gender-related physical differences, especially osteoporosis, might provide an explanation. However, there are other studies of forensic cases where men are in the majority (51.3%, 58.2%, 59.6%) and also trauma series with a prodominance of men (69.2%), reflecting our findings (8,14,18). Our study included only forensic cases. Men's more active social life may account for their predominance in our study.

There are studies in the medical literature which report that geriatric forensic cases and traumas of the elderly are seen most frequently beyond the winter months, and are especially prevalent in July and May (14,18,19). A decrease in trauma and forensic cases during the winter months is a natural consequence of social life reaching a minimum during the winter. Our findings are compatible with the relevant literature, with maximum ED admissions in summer and autumn months, and minimum in winter months.

All over the world a great number of injuries, which cause morbidity and mortality, are brought about by traffic accidents. In a study with non-traumatic forensic cases, it was reported that 38.7% of the cases reached a hospital in 30-120 min, and 50.9% of the cases were transported to the hospital by private vehicles; another study investigating traffic accident cases admitted to the ED observed that 41% of the cases reached the hospital in 0-2 hours (20,21). A study on geriatric trauma cases reported that 79.5% of their cases were transferred to the hospital by private vehicles (13). There are various studies that support the idea that for non-traumatic cases, their families and friends are preferred instead of an ambulance, due to the anxiety caused by the incident (20). Our forensic cases reached the ED in a mean time of 1.8 hrs, the earliest being 10 min, and 62.9% reached the hospital through the 112 Emergency Service system. In incidents like traffic accidents, which occur in public with many witnesses, it is usually easier to communicate with the Emergency Service, thus such cases can reach the hospital earlier and in an ambulance.

Various studies indicate that in the geriatric population (46%) as well as in all age groups, traffic accidents are the prominent event characteristic of all forensic events (6,14,21); however, some studies place falls in first place, with traffic accidents following as the 2nd most common forensic event (10,18). Most traffic accidents are motor vehicle accidents, with patients sitting inside the vehicle (41%), yet some study observed an increase in traffic accidents involving pedestrians (8). In our study, there were more motor vehicle accidents (42%) than accidents involving pedestrians. In addition, it is well known that in developing countries like ours, the traffic system has insufficient precautions designed for the security of pedestrians, like safer sidewalks and underground or overhead crossings.

Falls may cause significant injuries in the geriatric population (3). Studies report a high percentage of falls among forensic cases, especially in geriatric women, and involving low energy falls (10,18). In our study, falls (26.6%) were found to be second to traffic accidents as the event characteristic. The reduction in family size accompanying socioeconomic improvement, and the increase in the elderly population who actively participate in social life, have resulted in more people living by themselves. This is a significant point in evaluating geriatric cases, and an increase in fracture cases is to be expected, especially in falls, due to widespread osteoporosis in women. Since falls can be prevented and treated, both health personnel and the general population need to be educated on this issue.

The aging world population brings with it an increase in elder abuse and negligence (8,22). In a study including 454 geriatric cases, only one case was evaluated as elder abuse (17). Similarly, in our study, only one case was evaluated as physical elder abuse. A study conducted in Eskisehir revealed that 17 out of 19 injury cases, other than unintentional injury, were assaults by immediate family members or by relatives (8). Since the rate of elders living by themselves is rather low in our country, and since most are living with their children, it may be inferred that they are less exposed to elder abuse; however, it is also possible that abuse might have been overlooked due to inadequate or faulty information. It is known that elder abuse is usually practiced by close family members, or by caretakers or attendants in houses or in nursing homes (22). ED physicians need to be alerted in this regard and elder abuse should be included in differential diagnoses.

Some studies have reported that geriatric forensic cases or injuries have a mortality rate of 0.8-12%, and are usually (76.4-90.6%) discharged from the ED (6,9,17,20,21). The rate of hospitalization in geriatric forensic trauma cases can be expected to be higher due to the number of chronic diseases associated with old age. Hospitalization rate was found as 55.6%, 88.45%, 47%, 21.7% in some studies (8,9,17,20). The most common departments where geriatric forensic patients were hospitalized are Orthopedics, Neurosurgery and Intensive Care Units (8,9,18,21). The findings of our study are compatible with the relevant literature, with hospitalization in Orthopedics being the most common (11.9%), followed by Neurosurgery (7.7%).

It should be kept in mind that normal physiologic changes of the aged will facilitate injuries, especially bone fractures. Bone fractures are common among forensic cases, and the Turkish Penal Code evaluates them as injuries "not relieved by simple medical intervention." Bone fractures are a common consequence of traffic accidents, followed in frequency by other traumas like falls and assault and battery (8-9,13). In our study, 48% of the fracture cases were from traffic accidents. Traffic accidents were in first place among event characteristics, which may account for why the most bone fractures were seen in traffic accidents.

Various studies affirm that head and neck injuries are common in geriatric trauma cases (8,17). In multiple injuries, head and neck is the most commonly affected (44.2%) body region, followed by the extremities (26.9%); a study investigating traffic accident injuries also indicated the head and neck region as the most affected site (18.6%), followed by multiple injuries of head and neck and extremities (14.5%) (17,18,21). Atilla et al., in their study of low-energy traumas where 96% of the cases fell on smooth surfaces, found that the

most commonly affected body regions were the extremities (17). Twenty-four cases (16.7%) in our series had head and neck plus torso injuries, followed in frequency by head and neck plus extremity injuries, and our findings are compatible with the relevant literature.

In conclusion, in line with the expected growth of the geriatric population, forensic geriatric visits to the ED will continue to increase. Our study observed that forensic cases in the geriatric population were predominantly due to traumas resulting from accidents, mostly traffic accidents and falls. Morbidity of such cases has a greater economic and social impact than mortality. Thus, prevention measures at home and outdoors, considering the physical capacities of the elderly, need to be taken. Enforcement of traffic rules is a must, and preventing the aged from living unattended, providing caretakers or increasing the number and quality of nursing homes will be helpful. Even simple measures to that end will help to decrease age-related injuries.

REFERENCES

1. Mion LC, Palmer RM, Anetzberger GJ, Meldon SW. Establishing a case-finding and referral system for at-risk older individuals in the emergency department setting: the SIGNET model. J Am Geriatr Soc 2001;49(10):1379-86. (PMID:11890500).
2. Samaras N, Chevalley T, Samaras D, Gold G. Older patients in the emergency department: a review. Ann Emerg Med 2010;56(3):261-9. (PMID:20619500).
3. Labib N, Nouh T, Winocour S, et al. Severely injured geriatric population: morbidity, mortality, and risk factors. J Trauma 2011;71(6):1908-14. (PMID:21537212).
4. WHO | Definition of an older or elderly person. [Internet] Available from:http://www.who.int/healthinfo/survey/ageingdefnolder/en/ Accessed:01.02.2014.
5. Turkish Statistical Institute. The Results of Address Based Population Registration System, 2013 [Internet] Available from: http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=15974 Accessed: 29.04.2014.
6. Ng W, Fujishima S, Suzuki M, et al. Characteristics of elderly patients presenting to the emergency department with injury. Keio J Med 2002;11:6. (PMID:11951373).
7. Calland JF, Ingraham AM, Martin N, et al. Evaluation and management of geriatric trauma: an Eastern Association for the Surgery of Trauma practice management guideline. J Trauma Acute Care Surg 2012;73(5):345-50. (PMID:23114492).
8. Gunduz T, Karbeyaz K, Yuksel F, Balci Y. Evaluation of forensic reports for the geriatric cases in line with the new Turkish Penal Code. Turkish Journal of Geriatrics 2010;13(1):8-12.
9. Karbeyaz K, Gunduz T, Balci Y. Forensic medicine approach to bone fractures in the framework of the new Turkish penal code. Turkish Journal of Trauma & Emergency Surgery 2010;16(5):453. (PMID:21038125).
10. Gowing R, Jain MK. Injury patterns and outcomes associated with elderly trauma victims in Kingston, Ontario. Can J Surg 2007;50(6):437-44. (PMID:18053371).
11. Wang H, Coppola M, Robinson RD, et al. Geriatric trauma patients with cervical spine fractures due to ground level fall: Five years experience in a level one trauma center. J Clin Med Res 2013;5(2):75-83. (PMID:23519239).
12. Aydin SA, Bulut M, Fedakar R, et al. Trauma in the elderly patients in Bursa. Turkish Journal of Trauma & Emergency Surgery 2006;12(3):230-4. (PMID:16850362).
13. Goren S, Subasi M, Tırascı Y, Kaza Z. Deaths related to traffic accidents. J Foren Med 2005;2(1):9-13.
14. Demircan A, Keles A, Gürbüz N, et al. Forensic emergency medicine-six-year experience of 13823 cases in a university emergency department. Turk J Med Sci 2008;38(6):567-5.
15. Unsal A, Ayranci U, Cevik A, et al. Use of emergency departments by elderly patients in a city of Western Turkey. Eur J Emerg Med 2007;14(3):125-9. (PMID:17473604).
16. Holbrook TL, Hoyt DB. The impact of major trauma: quality-of-life outcomes are worse in women than in men, independent of mechanism and injury severity. J Trauma 2004;56(2):284-90. (PMID:14960969).
17. Atilla OD, Tur F, Aksay E, et al. Clinical factors in geriatric blunt trauma. Tr J Emerg Med 2012;12(3):123-8.
18. Tanrikulu CS, Tanrikulu Y. Analysis of trauma in geriatric population: A cross- sectional study. The New Journal of Medicine 2013;30(2):100-4.
19. Tugcu H, Ozdemir C, Dalgic M, et al. Evaluation of the forensic reports documented at the Department of Forensic Medicine of Gülhane Military Academy of Medicine between 1995 and 2002 in the view of new Turkish Criminal Law. Gulhane Med J 2005;47(2):102-5.
20. Bilge S, Aslan S, Katirci Y, et al. The retrospective analysis of nontraumatic forensic cases in emergency department. Tr J Emerg Med 2005;5(3):133-7.
21. Varol O, Eren SH, Oguzturk H, et al. Investigation of the patients who admitted after traffic accident to the emergency department. Cumhuriyet Medical Journal 2006;28(2):55-60.
22. Sooryanarayana R, Choo WY, Hairi NN. A review on the prevalence and measurement of elder abuse in the community. Trauma Violence Abuse 2013;14(4):316-25. (PMID:23878148).