Middle Black Sea Journal of Health Science / Mid Blac Sea J Health Sci **February 2022; 7(1):55-62**

RESEARCH ARTICLE **DOI:** 10.19127/mbsjohs.1026140

Analysis of Forensic Geriatric Patients Admitted to Emergency Department

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Received: 19 November 2021, Accepted: 02 January 2022, Published online: 25 February 2022

Abstract

Objective: Today, geriatric individuals are experiencing more health problems due to physiopathology changes caused by old age. In this study, demographic properties and diagnosis and treatment process in emergency service of geriatric cases who were admitted to emergency service and filed judicial report.

Methods: In four years (2013-2016), 65 years and older who applied to the emergency department of a university hospital and the data of 737 patients whose forensic reports were prepared were investigated. Data of this study were obtained from patient files and automation system records. Socio-demographical properties (age, gender), reason to admit to emergency service, trauma type, duration of treatment in emergency service, type of treatment outcome, and department of admittance were investigated.

Results: Average age of 737 cases were 73.70±7.54 (Female/Male,309/428). 84% of the cases had come to the service with trauma, and the most common reason for trauma was fall (45.4%). Highest number of the cases were observed in summer and autumn. Most common pathology in the cases was fracture (37.3%). 38% of the cases were admitted to related clinics, 5.6% of the cases died, and 56.4% of the cases had outpatient treatment.

Conclusion: In this study, the most common cause of forensic reports in elderly patients admitted to the emergency department was trauma caused by falls (street or home) and the resulting fracture.

Key words: Elderly, Emergency department, Forensic case, Geriatrics

Suggested Citation: Kokdener M, Duran L, Aksoy I, Ekiz M. Analysis of Forensic Geriatric Patients Admitted to Emergency Department. Mid Blac Sea Journal of Health Sci, 2022;8(1):55-62.

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Note: Presented as a poster at the XIII th National Emergency Medicine Congress (2017)

INTRODUCTION

World Health Organization (WHO) defined old age as "decrease in adapting to environmental factors" and accepted old age as 65 or above (1). As speed of death had decreased, preventive and medical health services had developed, diagnosing patients became easier with technology, and increased treatment options had extended average life expectancy. Thus, number of geriatric populations around the world had increased (2).

It is clear that geriatric individuals had decrease in adapting to new environment, perceiving events, and applying activities that require attention. As a result, it is also observed that those individuals acted slowly and carelessly (3). Therefore, geriatric patients are subjected to trauma more. Both multiple traumas and physiopathology, metabolic changes related with old age, and comorbid increased the frequency of complications as well as treatment (4). In Turkey, Unal et al. (5) stated that 20% of emergency service patients were geriatric group. In judicial geriatric cases in the hospital, increased mortality and morbidity was visible (6).

In this study, the main objective was to retrospectively determine demographical and clinical properties of 65 years or older cases where judicial report was filed when those individuals came to emergency service. The results of this study will contribute to forming country-based data, and rational, effective diagnosis and treatment protocols can be created for regional geriatric cases.

METHODS

After approval of ethical committee for using the data of patients, cases between 01 January 2013-31 December 2016 in Medical Faculty Hospital emergency service of individuals who are 65 years old or higher were investigated (ethical committee no: 2017/86). This study was planned descriptive and retrospective. Data of this study were obtained from patient files and automation system records. As there were insufficient information in a case file and records, this was excluded form evaluation. Socio-demographical properties (age, gender), type and time they came to emergency service, trauma type, injured body part, duration of treatment in emergency service, treatment outcomes, department of admittance, and mortality rates were investigated. Falls at home and on street were all defined under fall category.

Statistical analysis

Statistical analyses were conducted with SPSS 21.0 program. For numerical variables of descriptive analysis arithmetic average, and standard deviation were represented as number and percentage for category variables. Descriptive statistics were used and the relationship between intergroup and category variables were investigated with Chi-square test. Results were evaluated at 95% reliability rate, and $p<0.05$ was accepted as significant**.**

RESULTS

In 3-years period, 737 cases with judicial report and with individuals 65-years or older were determined in emergency service. 309 (41.9%) were female and 428 (58.1%) males. General average age was 73.70 ± 7.5, average age of female was 75.00 ± 7.5, and average age of male was 73.89 ± 6.6. There was no significant difference with gender for different years ($p=0.466$).

When years and age average relationship was investigated (Table 1), there was significant

relationship between gender and age averages of individuals in 2015 (p=0,001).

Table 1. Relationship between years and age average of female and male

	Female		Male		p value
Year (n)	n	Average age	n	Average age	
2014 (284)	158	73.77±6.5	126	75.76±7.7	0.020
2015 (222)	129	72.34±6.0	93	75.36±7.5	0.001
2016 (231)	90	74.20±7.0	141	72.13±6.7	0.028

38.5% (n=283 people) of all cases applied in 2014, 30.25% (n=223) applied in 2015, and 31.3% (231) applied in 2016. When season applications were investigated the highest values were observed in autumn (31% n=230), and summer (29.5% n=218). In 2014, 30.38 (n=86) applied in summer, 29.32% (n=83) applied in autumn; in 2015, 30.49% (n=68) applied in autumn, 27.35% (n=61) applied in summer; in 2016, 30.30% (n=70) applied in summer, 26.83% (n=62) applied in autumn (Figure 1).

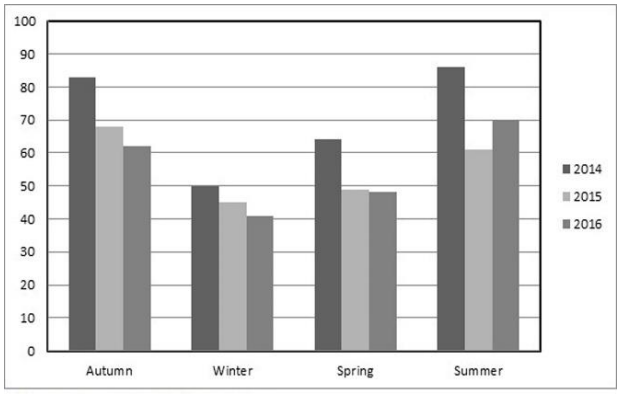

Figure 1. Seasonal distribution of patients

When application reasons of the patients were investigated, most common type was identified as trauma (84% of cases n=620). Most common reason for trauma was 45.4% (n=334) fall, and 20.4% (n=150) traffic accident. For female patients, 56.85% (n=175) had fall, 10% (n=31) had in-vehicle traffic accident, 5% (n=14) had extravehicular traffic accident, and 17.5% (n=54) had poisoning. For male patients, 37.2% (n=159) had fall, 14% (n=60) had in-vehicle traffic accidents, 10.6% (n=45) had extravehicular traffic accident, 15.5% (n=66) had sharp object injuries, and 11% (n=45) had poisoning. In both genders, there was significant difference for motor vehicle accident and fall compared to other trauma types (p=0.001).

When application reasons were investigated on yearly bases, in 2015 there was no significant difference between reasons; in 2016, there was statistically significant difference for motor vehicle accident, fall, and foreign object aspiration, in 2014 there was statistically significant difference for motor vehicle accident, and fall (p=0.0001). Fall had the highest values for all three years (in 2016 33.8% (n=78); in 2015 48.2% (n=107); in 2014 52.8% (n=149)). In 37.3% (n=275) of the cases fracture was observed. Additionally, in multiple trauma cases where two or more systems were affected, the ratio was determined as 70% (n=50), where for three or more systems the ratio was 30% (n=22). In multiple trauma cases where two or more systems were affected, most common was “extremity trauma and thorax trauma” with 40% (n=20), and least common was abdomen trauma and head-neck trauma with 1.4% (n=1). In multiple trauma cases where three or more systems were affected, most common was thorax with 77% (n=17), extremities with 68% (n=14), and head-neck with 45% (n=10). When treatment of the patients after emergency service were investigated 38% (n=279) of patients were admitted to related clinics, 5.6% (n=42) died, and 56.4%

(n=416) received outpatient treatment (Table 2). It was determined that 34% (n=105) of female cases, and 40.7% (n=174) of male cases were admitted to hospital. When gender and emergency service treatment outcomes were investigated, there was no significant difference (p=0.257).

When hospital admittance and application reasons were investigated, most common admittance were caused by 39.8% (n=181) fall, 23.5% (n=107) motor vehicle accident, 17.1% (n=78) poisoning, and 9.2% (n=42) blunt trauma. There was statistically significant relationship between admittance rate and application reasons (p=0.001).

Patients who admitted to hospital were mostly admitted to orthopedy clinic (n=116, 26%), emergency service (n=105, 23.1%), thoracic surgery (n=72, 16%), and brain surgery (n=60, 13.2%) services respectively, and least to otorhinolaryngology (n=2, 0.4%) service. Outcomes of cases were given in Table 2. When the relationship between case outcomes and gender was investigated, there was no significant difference (p=0,257). Most common cause of death among cases was motor vehicle accident (n=20, 48%), and fall (n=17, 41%). When the relationship between death rate of cases and application reasons was investigated, there was significant difference (p=0,001). 25.6% (n=189) of the patients applied to emergency service were operated, 64.4% (n=475) were evaluated with computer tomography (CT), 11.7% (n=86) were evaluated with magnetic resonance (MR), and 95.1% (n=702) were evaluated with direct graphs (Figure 2).

DISCUSSION

Increase in geriatric population is regarded as an important economic and social problem around the world. Fall is the first cause of injury in geriatric patients. In this study that aimed identifying judicial geriatric cases and determining related precautions in our region, it was observed that geriatric trauma ratio was high (n=620, 84%), and most common injury type was fall (n=334, 45.4%). Physiopathology changes in geriatric cases and increased medication use changes outcome, progress, and cost of trauma (7,8). In this study, 37.2% (n=159) of male, and 56.8% (n=175) of female cases indicated fall. Current diseases and decreased muscle and bone mass in geriatric patients increases the frequency of motor skill falls (9). Additionally, transition to elementary family from large family after industrial revolution showed a decrease in number of family members that lived together. Thus, trauma ratio of older people at their home increases. In addition, osteoporosis in female is frequently visible with decreased visual acuity and mobility, while balance loss during walking increases the frequency of falls (6). Tuncay et al. (10) found that fall frequency of geriatric patients was 38.1% within one-year frame. Hawk et al. stated that fall ratio of geriatric patients was 44% within one-year frame (11). Tanrikulu (12) stated that fall in both genders had 82.3% ratio. Durak et al., (13) in their study on patients who applied to the forensic medicine institution, detected trauma at a rate of 94.5%, and the female-male ratio was found to be 2/1. Beating was detected in 65.7% of the admitted geriatric patients and falls were detected in only 1.4% of them. The findings of this study were in line with the literature. We believe that precautions that will prevent geriatric patients to fall, and exercise programs that will develop and protect reflexes will decrease the traumas related with fall.

In our study, among 20.4% (n=150) of all cases, traffic accidents were the second most common trauma after falls. Among all cases, 12% (n=91) experienced in-vehicle traffic accident where 8.4% (n=61) experienced extravehicular traffic accident. Traffic accidents were less common in geriatric patients. However, these patients need more admittance and intensive-care services. It is believed that this relates to decreased driving rates with old age. Additionally, mortality rates related with accident were higher than other adults (14). Bilgin et al (6) and Aktas et al. (15) identified that most common trauma mechanism on geriatric patients were fall and traffic accidents. Bilgin et al (6). found that in-vehicle and extravehicular accident rates were close (in-vehicle 48.6%; extravehicular 46.3%). Yasar and Buken (16) found that 67.81% was in-vehicle accidents where 29.4% were extravehicular accidents. Different from our studies, Kandis et al. (17) found that traffic accident ratio was 69%, and fall ratio was 10%.

In our study, traffic accident was more common in male patients (n=105, 24.6%) compared to female patients (n=45, 14.6%). The reason for more common results in male patients indicated that male drivers are more intense in traffic and live more actively. Decreased visual and audial functions, slow motions during walking, unable to notice vehicles due to old age could be listed among reasons for extravehicular traffic accidents

In our study, 38% (n=279) were admitted to related clinics, and 5.6% (n=42) were dead. Ozturk et al. (2017) found that 68.5% of geriatric patients were admitted to hospital (18). Satar et al. (19) stated that admittance ratio was approximately 59.8% where death ratio was 2% among geriatric patients who come to emergency service. Kandis et al. (12), found admittance at 17% level and Tanrikulum (17) found 12.4%. Dagar et al., (20) identified 11.5% of patients with life-threatening condition and found that 3.2% of these patients died. It is believed that in literature, different death ratios due to trauma was related with trauma region and current conditions of the patients.

When locations of injuries were evaluated, 37.3% (n=275) of the patients had fracture. Most common damage were seen in extremities (34.3%, n=212). The fact that geriatric patients have more osteoporosis or osteoarthrosis explains the frequent occurrence of fractures. Similarly, Bilgin et al. (6) found 33% extremity trauma in their study. Akoglu et al., (21) determined that in both local and multiple trauma patients, most organ injuries were extremities. Tanrikulu (12) found in a study conducted in Erzurum that, extremity trauma ratio was 77%. Durak et al., (13) determined that isolated head trauma (35.2%) and isolated extremity trauma (31.0%) were the most common. Traumatic bone fracture was detected in 31.0% of the patients.

Patients who admitted to hospital were mostly hospitalized in orthopedy clinic (n=57, 26%), emergency service (n=35, 23%), thoracic surgery (n=35, 16%), and brain surgery (n=29, 13.4%) services respectively, and least to otorhinolaryngology (n=8, 0.4%) service. Most common cause of death among cases was motor vehicle accident (n=20, 48%), and fall (n=17, 41%).

In our 3-yearlong study, it was determined that male geriatric patients who applied to emergency service of a university hospital were subjected to more trauma (58.1%, n=428). Findings of our study

were consisted with other studies. It is believed that such high ratio is related with actively working male population, and active involvement to social life. When seasonal distribution of hospital applications was investigated, each 3 years showed similar results, and the highest ratio was observed during winter, and highest ratio was observed during summer and autumn. In the Samsun region, the coastline had temperate climate while the interior region has continental climate. Therefore, due to cold weather conditions during winter, it was seen that geriatric population mostly spent time at home and were inactive. Kandis et al. investigated cases applied to hospital in Kirikkale and found that number of cases decreased during winter and number of cases increased during spring and summer (17). Tanrikulu and Tanrikulu (12) investigated geriatric cases in emergency services in Erzurum and found that highest number of applications to emergency services were during summer and autumn and lowest number or applications were during winter.

In our study, mortality rate of cases that applied to emergency service and judicial reports were filed was determined as 5.6% (n=42). Guneytepe et al. (22) identified mortality ratio as 9.6%.

Emergency services are highly intense departments where first aid is made, and patients are directed to different clinics if necessary. Due to physiognomy, mental and motor system decreases, geriatric patients are more defenseless against trauma and various diseases. Therefore, those patients apply to emergency services with higher admittance and treatment needs. Additionally, since treatment processes of geriatric patients is longer, those patients are subjected to radiological and laboratory processes, and require more complex service. It is extremely important to regulate emergency services in hospitals according to needs of geriatric patients. Therefore, increasing the number of research regarding emergency service application of geriatric patients across the country will be guiding to plan services with high quality.

To help geriatric patients to live healthy and active life, reasons and frequencies of trauma should be determined, preventive precautions should be taken, cost and functionality analysis should be conducted, and emergency service needs should be arranged accordingly. Different corporate regulation is needed for different requirements of geriatric patients to help increasing life quality and decreasing health costs.

CONCLUSION

As a result, in this study, the most common cause of forensic reports in elderly patients admitted to the emergency department was trauma caused by falls (street or home) and the resulting fracture. It was found to be the most common case application in summer and autumn season. Although there are many articles about geriatric patient groups in the literature, geriatrics and forensic cases are a subject that has not been studied much together. We think that our study will contribute to this deficiency.

Ethics Committee Approval: Was obtained from the Ondokuz Mayis University Ethical Committee (approval number: OMÜ KEAK 2017/68)

Peer-review: Externally peer-reviewed.

Author Contributions: Concept- M.K, L.D, I.A, M.E, Design- M.K, L.D, I.A, M.E, Materials- M.K, L.D, I.A, M.E, Data Collection and/or Processing- M.K, L.D, I.A, M.E, Literature Review- M.K, L.D,

I.A, M.E, Writing- M.K, L.D, I.A, M.E, Critical Review- M.K, L.D, I.A, M.E.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: There is no financial disclosure statement for the study.

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