

## Trauma analysis of patients over age of 65 who apply to emergency service

Nazlı GORMELI KURT<sup>1\*</sup>, Songül ARAÇ<sup>2</sup>, Evren EKINGEN<sup>1</sup>, Murat ORAK<sup>2</sup>,  
Mehmet USTUNDAG<sup>2</sup>

<sup>1</sup>State Hospital, Batman, Department of Emergency, Batman, Turkey

<sup>2</sup>Department of Emergency, Faculty of Medicine, University of Dicle, Diyarbakır, Turkey

### Abstract

**Background:** Changes in the physiology of patients over the age of 65 and additional internal pathologies cause them to be subject to trauma more often and change their ability to respond trauma. The purpose of this study is to make demographic analysis of geriatrics patients who apply to emergency service of Batman Regional State Hospital.

**Method:** Our study involves patients over the age of 65 who applied to Batman Regional State Hospital in 1st February 2016-31st January 2017. 615 cases which were considered convenient with study criteria, had been examined retrospectively. The reason of application of cases, social demographic characteristics, specifications, additional diseases, the month of trauma, trauma area, trauma hour, mortality rates, GKS (Glasgow Coma Scale) and RTS (Revised Trauma Score) were obtained from automation system and case files.

**Results:** 615 patients were included into study 252 of which were male and 363 were female. The average age of patients was 74.36. 70% of patients (n=433) were illiterate. The most common trauma was falling. Women patients were applied to service due to reason of falling than men. We used an anatomic scoring system called "Abbreviated Injury Scale (AIS)" and we divided patients into two groups as local and multiple according to the number of trauma areas. 58% (n=354) of patients were local cases while 42% (n=259) of them were multiple trauma cases and in both of the groups the most of affected body parts were extremities. In total, 6.17% (n=38) of patients were exitus. 11 of them died in emergency services. Most of patients died (78.94%) due to multiple trauma and they were mostly subject to traffic accidents. The most accompanying comorbid disease to deaths is hypertension.

**Conclusion:** Both in our country and globally, the elderly population is increasing rapidly. The deaths due to trauma has a significant share in geriatric age group. Thus, it is significantly important to eliminate geriatric traumas and to intervene to the cases with multidisciplinary approach beginning from emergency services.

**Keywords:** Trauma, geriatrics, emergency service

\* Corresponding author: Nazlı GORMELI KURT, E-mail: [nazligormeli@yahoo.com](mailto:nazligormeli@yahoo.com), Tel.: +90 530 110 0885

## Introduction

As in line with increasing living standards, the elderly population in our country is increasing. In parallel with this, the number of elderly application to emergency services is also increasing. The age of 65, which is considered as the beginning of being old, is also considered as the beginning of many physiological changes. Along with this, the fact that elderly individuals participate more to social life, may also cause them being subject to several trauma cases (1). In late ages, trauma is an important risk factor for mortality and morbidity increase. In comparison of post trauma survival of geriatric age groups with patients at non-geriatric age groups, meaningful solutions are achieved in relation with age and negative results (2). 28% of death cases due to trauma were composed of geriatric patients (3) and trauma is the 5<sup>th</sup> in death causes in population after the age of 65 (4). The most important factors that affect mortality in trauma are the adherent problems and decreasing physiologic reserve (5).

In this study, we aim to determine social demographic and epidemiological-clinical characteristics of geriatric population which have higher mortality possibility due to trauma.

## Materials and Methods

In this study, the patients over age of 65 who applied to emergency service of Batman Regional State Hospital with 1500 patient acceptance in 1<sup>st</sup> February 2016-31<sup>st</sup> January 2017 period, were examined retrospectively. Ethical approval of local committee was taken. Patient information was obtained from case files and hospital automation system. The cases with insufficient information was extracted from the study. Gender, age, trauma mechanism and month of trauma, body part where trauma occurred, the number of areas, local and multiple trauma frequency, accompanying diseases, hospitalized clinic, trauma occurrence hour, living style, mortality rate of the patients were examined. By using examined data, RTS (revised trauma score) based on physiological parameters and GKS (Glasgow Coma Scale) scores were calculated. Distinction of local and multiple trauma patients were done in line with anatomic scoring system "Abbreviated Injury Scale (AIS)" (6).

### *Statistical analysis*

Univariate statistical analysis was done by using chi test for categorical variables and student-t test for permanent variables. Numerical variables were given as mean  $\pm$  SD.  $P < 0,05$  were accepted statistically significant.

## Results

30116 patients applied to emergency service of Batman Regional State Hospital in period of 1<sup>st</sup> February 2016-31<sup>st</sup> January 2017. 4% (n=12042) of the patients were above the age of 65 and 7% (n=843) were trauma patients. 228 patients of which automation and file information were not achieved, were extracted from the study. 59% (n=363) of trauma patients were women and 41% (n=252) were men. The average age of female patients was  $74.6 \pm 7.89$  and  $74.01 \pm 6.64$  for male patients.

While examining the educational status of patients, it was understood that most of the patients 70% (n=433) were illiterate.

When we examine the living style of patients, we determined that 60.9% (n=375) lived with their families, 12.8% (n=79) lived alone, 2.2% (n=14) of them lived in retirement homes. We were unable to reach information of 23.9% (n=147).

Considering the location, since we have many Syrian citizens in our province, the number of cases of Syrian citizens were significantly high 8.2% (n=51).

In all patients considered in study, the first trauma reason was falling 75.6% (n=465) and traffic accident with rate of 12.68% (n=12.68).

Application reasons of patients according to gender, was shown in Table 1. The number of female applicants to emergency service 65.6% (n=305) were more than male applicants 34.4% (n=160) (p<0.001). Traffic accident, pounding and sharp object injury (SOI) were determined meaningful in men (p<0.001).

Table 1. Application reasons of patients according to gender

	Female	Male	Sum	P value
Traffic Accident	25 (32.1%)	53 (67.9%)	78 (12.7%)	0.000
Falling	305 (65.6%)	160 (34.4%)	465 (75.6%)	0.000
Pounding	3 (21.4%)	11 (78.6%)	14 (2.3%)	0.005
SOI	0 (0%)	4 (100%)	4 (0.7%)	0.028
Burning	20 (76.9%)	6 (23.1%)	26 (4.2%)	0.067
Gunshot	0 (0%)	1 (0.04%)	1 (0.2%)	0.41
Animal Kick	10 (37%)	17 (63%)	27 (4.4%)	0.026

When we examine the application hours of trauma occurrence (Table 2), we saw that traffic accidents mostly occurred between 18.00-23.59 while falling cases were mostly observed in 00.00-05.59 (p<0.001).

Table 2. Application hours of trauma occurrence

	00:00 - 05:59	06:00 - 11:59	12:00 - 17:59	18:00 - 23:59	Sum	P value
Traffic Accident	1 (1.3%)	2 (2.6%)	18 (23%)	57* (73%)	78 (12.7%)	0.000
Falling	175* (37.6%)	104 (22.4%)	132 (28.4%)	58 (12.5%)	465 (75.6%)	0.000
Pounding	0 (0%)	8* (57.1%)	5 (35.7%)	1 (7.1%)	14 (2.3%)	0.030
SOI	0 (0%)	0 (0%)	4* (100%)	0 (0%)	4 (0.7%)	0.007
Burning	8 (30.8%)	7 (26.9%)	9 (34.6%)	2 (7.7%)	26 (4.2%)	>0.05
Gunshot	0 (0%)	0 (0%)	0 (0%)	1 (100%)	1 (0.2%)	>0.05
Animal Kick	0 (0%)	13* (48.1%)	12 (44.4%)	2 (7.4%)	27 (4.4%)	0.001

\*Statistically significant.

In the 48.4% (n=298) background of patients, at least one comorbid disease was observed. The top three accompanying diseases, hypertension (HT) 28.7% (n=177), coronary artery disease (KAH) 20.16% (n=124), diabetes mellitus (DM) 17.8% (n=110).

When we examine the distribution of trauma diseases due to months, the most common months were June, July, August and September (Figure 1). It was observed that, the number of patients increased in summer and seemed to decrease in winter months.

In making local and multiple trauma distinction, scoring systems such as Abbreviated Injury Scale (AIS), Trauma Injury Severity Score (TRISS), Comprehensive Research Injury Scale (CRIS), Injury Severity Score (ISS) and Severity Characterization of Trauma (ASCOT). In our study, we used AIS scoring system in line with the information we achieved from retrospective data. We divided patients into two groups as local and multiple according to number of affected trauma area. 58% (n=354) of total 615 patients were determined local and 42% (n=259) of patients with two or more traumas in body were determined as multiple trauma patients. The most common affected local trauma areas were extremities 64.9% (n=230), the least affected area was abdomen 3.95% (n=14) (Figure 2). The most common observed multiple trauma combination was extremity +head and neck with the rate of 40.2% (n=105). 11.2% (n=41) of local traumas were hospitalized and they were mostly hospitalized in 58.5% (n=24) orthopedics departments. 50.5% (n=132) of multiple traumas were hospitalized and most of them 33% (n=44) were hospitalized at intensive care units.

While 70% (n=431) of patients were discharged, 28.13% (n=173) of them were hospitalized. In total, 6.17% (n=38) of the cases died. In the hospitalized departments the first three sections were orthopedics 32.94% (n=57), intensive care unit 25.4% (n=44) and neurosurgery 18.49% (n=32).

GKS average of the patients involved in study (n=615) was  $14.11 \pm 1.20$ , RTS average was  $7.65 \pm 0.71$ . GKS average of the survived patients was  $14.41 \pm 0.89$  and RTS average was  $7.71 \pm 0.21$ . GKS and RTS average of the patients died were relatively  $9.50 \pm 2.62$  and  $6.01 \pm 2.81$ . Meaningful relation was determined between low GKS and RTS values and mortality ( $p < 0.05$ ).

6.17% (n=38) of the patients involved in study died. 11 of them died in emergency service, 17 in intensive care unit where they were hospitalized, 8 in neurosurgery department, 2 in general surgery department. 21.05% of the patients who passed away had local, 78% had multiple traumas and the most common observed multiple trauma combination was triple and more combination with the ratio of 73.3% (n=22). The most common application reasons of patients who died were traffic accidents and accompanying comorbid diseases and hypertension.

## **Discussion**

Increasing of elderly population and increase of possibilities for elderly population to have a healthy and active life, cause increase of old trauma patients' day by day. Trauma comes fifth in the death causes of elderly people (7). Due to increase of old population in general population, increase of life expectancy and also increase in quality of living standards, the number of old patients applying to our emergency services increase each day (8). Since elderly people may be affected with different clinical results due to additional problems and challenges even after many traumas with low energy levels, they compose a patient group which require special interest and attention (9,10).

In a study undertaken by Mert et al (11) 2006, traumas compose 5% of the geriatric emergency service applications. In the study executed by Dede et al (12) this rate was determined as 9.9%. In our study, this ratio was determined in between these two values.

In the geriatric age group, women are expected to apply with trauma cases more often than men since the number of women population is higher than men in this age group. In the Use of Health Services undertaken by Ministry of Health, women using health services were determined higher than men patients (13). In our study, similarly, number of women was determined higher than men.

In many publications, the most common trauma mechanism for old people is falling and traffic accidents follow this (12,14). In our study, main three application reasons were determined as falling, traffic accidents and being kicked by the animals. Frequency of falling in geriatric age group may be related with loss in visual and hearing capacities, physiological changes in motor skills. Like in other studies undertaken on trauma, also in our study, number of women patients were observed more common than men (12,14). This can be explained by weakness of women patients related with muscle strength, motor and movement capacities in comparison with men. On the other hand, the possibility of men patient to have motorized vehicle accident is higher than women patients (15). In our study the number of men cases applying with the cause of traffic accidents was determined significantly meaningful. We believe this is strongly related with women spending more time at house in comparison with men, being less in traffic as drivers, men having more active role in social life comparing with women. Since people living in environment mostly deal with animal breeding, traumas related with animal accidents are mostly observed in men population with a significant rate.

When the trauma hours and trauma occurrence types are observed, it was determined that application with the cause of traffic accident was mostly observed in 18.00-23.59 hours. These are the active hours in terms of social life and it was considered related with geriatric people with improving living conditions and participating more actively in social life. Falling applications were determined significantly meaningful in hours 00.00-05.59. Most of the residents of region wake up early in the mornings in order to exercise their religious duties. Due to weakened visual and movement capabilities related with age, we believe most of old people apply with the cause of falling especially early hours in the morning.

In our study, like in similar studies, the first three comorbid diseases that accompany the cases were determined as hypertension (HT), coronary artery disease (KAH) and diabetes mellitus (DM) (16,12).

When the trauma patients are examined due to months of events, the most common months were June, July, August and September (Figure 1). It was observed that, the number of patients increased in summer and seemed to decrease in winter months. We believe this is related with being more active in social life in summer months and preference of closed environments in winter months. Kandiş and friends achieved similar results in a study undertaken at a center with continental climate conditions (17).

In our study, according to Abbreviated Injury Scale (AIS), local trauma patients were determined more than multiple traumas. In the study undertaken by Akoğlu H and friends, in all age groups numbers of local and multiple trauma cases were determined close (14). According to scoring systems, we believe numbers of groups may change. In the old population, injured parts after trauma are generally head and the extremities (18,19). Similarly, in our study, it was determined that extremities were commonly observed in local traumas while extremity+head and neck traumas were observed in multiple trauma cases.

In the studies undertaken by Knudson and friends (20) and Özdoğan and friends (21), patients with low RTS (Revised Trauma Score), had high mortality rates and their (Glasgow Coma Scale) and RTS (Revised Trauma Score) values were determined significantly high.

Various studies show the mortality rate in old trauma population ranging between 10% and 34% (22,23). In our study, this ratio was determined as 6.17%. In our study, most of the patients who died were multiple trauma patients and in convenient with other similar studies the most common application cause was traffic accidents. We believe that taking some measures in traffic may contribute to decrease of mortality in geriatric trauma patients.

Most of our patients were illiterate (70%) and this ratio was considered high in comparison with ratio in literature (12,24). A study indicates that the fact why patients with low social and economic level tend to apply emergency service is the difficulties they face with while accessing to other health services (13).

In the study where our study has been undertaken, it is observed that there are few retirement houses and many of the applicant patients live with their families as a part of customs and social tissue in the region. But, this living style is not sufficient enough to reduce the applications in comparison with those who live alone and in order to eliminate the number of trauma cases, we believe it is necessary to inform geriatric population as well as their environment.

Considering the location and migration, since we have many Syrian citizens in our province, the number of cases of Syrian citizens was significantly high. Measures on language, accommodation and traffic, the number of applications to emergency services with the cause of trauma may be reduced.

## Conclusion

As a result, in parallel with improvement in living standards, like in developed countries, the ratio of old population increases and will continue to increase in our country. Increase in trauma applications may be observed in line with increasing participation of old population to social life. In geriatric cases where mortality rate is high due to physiological reserves and additional diseases, we believe decrease in these cases may be achieved through training, information on trauma and a multidisciplinary approach at the application point.

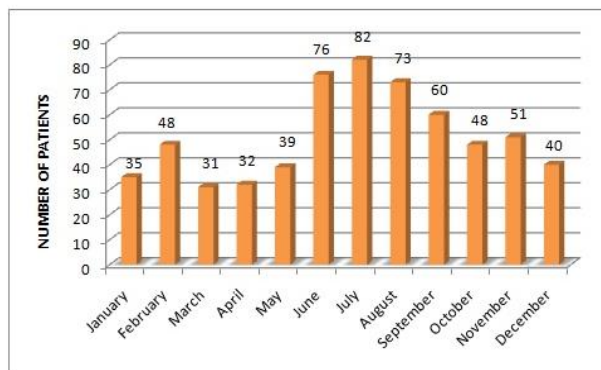


Figure 1. Applications of patients according to months.

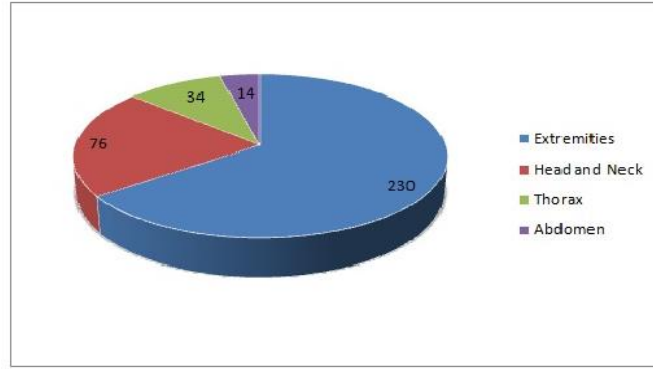


Figure 2. Distribution of local trauma areas based on body parts

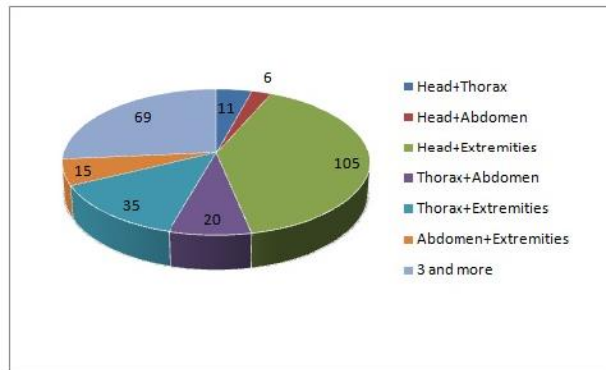


Figure 3. Distribution of multiple trauma areas based on body parts.

## References

1. Cesur F. Geriatrik travma hastalarının prospektif analizi. Uzmanlık tezi, Ege Üniversitesi Tıp Fakültesi Acil Tıp Anabilim Dalı, İzmir. 2012.
2. The EAST Practice Management Guidelines WorkGroup, Practice Management Guidelines for Geriatric Trauma, 2001.
3. Ma OJ, DeBehnke DJ. Geriatric trauma. In: Tintinalli J, Kelen GD, Stapczynski JS, editors. Emergency Medicine, A Comprehensive Study Guide, 5th ed. New York: Mc Graw Hill; 1999. p.1623-7)
4. Rubenstein LA, Robbins AS, Josephson KR, et al: The value of assessing falls in an elderly population –A randomized clinical trial, Ann Intern Med 1990;15:113-308).
5. Perdue PW, Watts DD, Kaufmann CR, Trask AL. Differences in mortality between elderly and younger adult trauma patients: geriatric status increases risk of delayed death. J Trauma 1998; 45:805-10).
6. Committee on Medical Aspects of Automotive Safety: rating the severity of tissue damage. 1. The Abbreviated scale. J Am Med Assoc. 1971; 215:277-280.
7. Miriam T. Aschkenasy, MD, MPH\*, Todd C. Rothenhaus, MD, FACEP Trauma and Falls in the Elderly Emerg Med Clin N Am 24 (2006) 413–432.
8. Koval KJ, Meek R, Schemitsch E, et al. An AOA critical issue. Geriatric trauma: young ideas. J Bone Joint Surg Am 2003;85-A:1380–8.
9. Eliastam M. Elderly patients in the emergency department. Ann Emerg Med 1998;18: 1222–9.)
10. Champion HR, Copes WS, Buyer D, et al. Major trauma in geriatric patients. Am J Public Health 1989;79(9):1278–82.
11. Mert E. Geriatrik Hastaların Acil Servis Kullanımı. Turkish Journal of Geriatrics. 2006;9(2):70-4.
12. Dede F. Hacettepe Üniversitesi Erişkin Acil Polikliniği'ne Ocak 2005 - Aralık 2005 Tarihleri Arasında Başvuran 65 Yaş ve Üzerindeki Hastaların Epidemiyolojik İncelenmesi. Hacettepe Üniversitesi; 2006.

13. Ersel M. Dokuz Eylül Üniversitesi Tıp Fakültesi Acil Servisinin Kullanım Özellikleri ve Hasta Aciliyetinin Hekim ve Hasta Açısından Değerlendirilmesi.
14. Akoğlu H, Denizbaşı A., Ünlüer E., Güneysel Ö., Onur Ö., Marmara Üniversitesi Hastanesi Acil Servisine Başvuran Travma Hastalarının Demografik Özellikleri, Marmara Medical Journal 2005;18(3); 113-122).
15. Trafik Kaza İstatistikleri. TÜİK; 2010.
16. Gürol Arslan G, Eşer İ. Yaşlılara Verilen Eğitimin İlaç Kullanım Uyumuna Etkisinin İncelenmesi. Türk Geriatri Dergisi. 2005;8(3):134-40.
17. Kandiş H, Karakuş A, Katırcı Y, Karapolat S, Kara İH. Geriatrik yaş grubu ve adli travmalar. Turkish Journal of Geriatrics 2011; 14 (3) 193-198.
18. Ghodsi SM, Roudsari BS, Abdollah M et al. Fall-related injuries in the elderly in tehran. Injury 2003; 34: 809-14.
19. Moore BT. Trauma in the elderly. Mol Med 2003; 100:515-7.
20. Knudson MM, Lieberman J, Morris JA, Jr., Cushing BM, Stubbs HA. Mortality factors in geriatric blunt trauma patients. Arch Surg. 1994;129(4):448-53.
21. Özdoğan M, Ağalar F, Daphan ÇE, Topaloğlu S, Çakmakçı M, İ. S. Geriatrik Travmada Mortalite Ve Morbiditeye Etki Eden Faktörler. Ulusal Travma Dergisi. 1999;5(3):189-93.
22. Day RJ, Vinen J, Hewitt-Falls E. Major trauma outcomes in the elderly. Med J Aust 1994 160:657-8.
23. Richmond TS, Kauder D, Stumpf N et al. Characteristics and outcomes of serious traumatic injury in older adults. J Am Geriatr Soc 2002; 50:215-22.
24. Abdulhayağlı E. Hacettepe Üniversitesi Erişkin Acil Servisi'ne Başvuran Geriatrik Travma Olgularının Analizi, Hacettepe Üniversitesi 2011)