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RESEARCH

FORENSIC AUTOPSIES OF GERIATRIC DEATHS CONDUCTED IN ELAZIG

ABSTRACT

Introduction: The elderly population is rapidly growing throughout the world due to the increased life span of individuals, parallel to advances in the fields of medicine and technology, improvements in socio-economic conditions, and a decreased reproduction rate. The aim of the present study was to get epidemiological data on forensic deaths and autopsy findings in elderly people.

Materials and Method: Of 1439 cases that underwent an autopsy in the Department of Forensic Medicine in Elazig Fırat University Faculty of Medicine in a five-year period between January 2008 and December 2012, 345 cases (23.9%) aged 65 and over were evaluated for age, gender, and place and cause of death.

Results: The mean age of the cases was 73.7±7.6 years; 24 (73.6%) were males and 91 (26.4%) were females. Of these deaths, 207 (60.0%) occurred in the city center. Accidents were the most common cause of death, occurring in 181 cases (52.5%), followed by natural causes occurring in 112 (32.5%) cases. Traffic accidents (54.3%) and falls (21.5%) were found to be the most common causes of unnatural death, and myocardial infarction (72.1%) and cerebrovascular diseases (11.5%) was the most common causes of death from natural causes. 63% (80 cases) of traffic accidents were pedestrian accident.

Conclusion: In order to reduce mortality in the elderly population, more emphasis must be placed on personal health checks, which should be performed with higher frequency. More stringent safety measures should be taken in order to reduce the risk of accidents, and public awareness should be raised regarding the safety of elderly people.

Key Words: Forensic Medicine; Autopsy; Aged; Death.



ARAŞTIRMA

ELAZIĞ'DA ADLİ OTOPSİSİ YAPILAN GERİATRİK ÖLÜMLERİN DEĞERLENDİRİLMESİ

Öz

Giriş: Tıp ve teknoloji alanındaki gelişmelere paralel olarak yaşam sürelerinin uzaması, sosyo-ekonomik koşulların iyileşmesi ve azalan doğurganlık ile birlikte son yıllarda yaşlı nüfus oranı tüm dünya da giderek artmaktadır. Çalışmamızda; yaşlı adli ölümlerine ait epidemiyolojik verilerin ve otopsi bulgularının tartışılması amaçlandı.

Gereç ve Yöntem: Elazığ'da Ocak 2008-Aralık 2012 yılları arasındaki 5 yıllık süreçte Fırat Üniversitesi Adli Tıp Anabilim Dalı'nda otopsi yapılan 1439 olgudan 65 yaş ve üzerindeki 345 (%23.9) olgu değerlendirildi. Bu olgular yaş, cinsiyet, ölüm yeri, orijin ve ölüm nedeni açısından incelendi.

Bulgular: Olguların yaş ortalaması 73.7±7.6 olup, 24'ü (%73.6) erkek, 91'i (%26.4) kadındır. Ölümlerin 207'sinin (%60.0) il merkezinde gerçekleştiği belirlendi. En sık ölüm 181 olgu (%52.5) ile kaza orijinli olup, bunu 112 olgu (%32.5) ile doğal sebeplerin takip ettiği görüldü. Doğal olmayan ölümlerin en sık trafik kazaları (%54.5) ve düşme %21.5, doğal ölümlerin ise en sık miyokart enfarktüsü (%71.4) ve serebro-vasküler hastalık (%11.5) nedeniyle meydana geldiği belirlendi. Trafik kazalarının %63'ü (80 olgu) yaya kazaları olduğu belirlendi.

Sonuç: Yaşlı ölümlerinin azaltılması için kişiye ait sağlık kontrollerine önem verilmeli ve sıklığı artırılmalı, yaşlılara yönelik kaza risklerini önleyici güvenlik tedbirleri artırılmalı ve yaşlıların güvenliği konusunda toplumsal farkındalık sağlanmalıdır.

Anahtar Sözcükler: Adli Tıp; Otopsi; Yaşlı; Ölüm.

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INTRODUCTION

Globally, the process of increasing growth in the elderly population is one of the important changes in population demographics (1). The age distribution of the population changes during this process, and the decrease in mortality and fertility is accompanied by increased life expectancy after birth (2). The elderly population in the United States grew by 80% from 1920 to 2000, and it is anticipated that people over 65 years of age will comprise 20% of the American population in 2030 (3). According to data from the World Health Organization, the proportion of elderly was 16.9% in developed countries and 6.3% in developing countries (4). According to data from the Turkish Statistical Institute (TSI), the elderly aged above 65 represented 7.7% of the population in 2011 (5).

The rate of forensic geriatric deaths is increasing, parallel to the increase in the rate of elderly in the general population. Geriatric deaths due to natural causes often occur as sudden unexpected deaths. Trauma is the underlying cause of unnatural deaths, which can be attributed to accidents, homicide, or suicide (6). Although deaths in the elderly often result from natural causes, a considerable number of deaths are associated with accidents, murder, or suicide (7). The forensic autopsy investigation is considered necessary if a solitary person living alone is found dead with no history to suggest a cause of death (8).

In the present study, autopsies conducted in geriatric deaths were evaluated in order to make suggestions for reducing these deaths.

MATERIALS AND METHOD

A total of 345 cases aged over 65 that underwent forensic autopsy at the Department of Forensic Medicine in Elazığ Firat University Faculty of Medicine between January 1, 2008

and December 31, 2012 were included in the study. The forensic autopsy reports and post-mortem examination reports were retrospectively evaluated. The cases were assessed in terms of age, gender, and manner and cause of death. Descriptive statistics were tabulated as mean \pm standard deviation, number, and percentage. The data were analyzed using SPSS 17.0 (Statistical Package for Social Science) for Windows. Pearson's chi-square test was used for data analysis, and a p value of less than 0.05 was considered statistically significant. The study was approved by the Firat University Ethics Committee.

RESULTS

Of 1439 cases that underwent forensic autopsy at the Department of Forensic Medicine in Elazığ Firat University Faculty of Medicine in a five-year period, 345 cases (23.9%) were found to be over 65 years of age. Of the cases, 254 (73.6%) were males and 91 (26.4%) were females. The patients were aged between 65 and 99 years, and the mean age was 73.6 ± 7.6 years. The age distribution was as follows: 205 cases (59.4%) from 65-75, 116 (33.6%) from 76-85, and 24 (7.0%) at or above 86. The age and gender distribution of cases are presented in Table 1.

The distribution for manner of death was 181 (52.5%) accidents, 112 (32.5%) natural causes, 34 (9.8%) suicides, and 18 (5.2%) homicides. The distribution of cases according to manner of death is shown in Figure 1.

The distribution of manner of death according to age group showed that accidents were more common in the 65-75 and 76-85 age groups, and natural causes were more common in patients aged at or above 86. The distribution of age groups according to manner of death is shown in Figure 2.

In patients who died of natural causes, myocardial infarction was the most common cause of death, occurring in 80 (71.4%) cases, followed by cerebrovascular diseases in 13

Table 1— The Age and Gender Distribution of Cases.

Age Groups	Gender				Total	
	Male		Female		n	%
	n	%	n	%		
65-75	161	63.4	44	48.4	205	59.4
76-85	79	31.1	37	40.6	116	33.6
≥ 86	14	5.5	10	11.0	24	7.0
Total	254	100.0	91	100.0	345	100.0

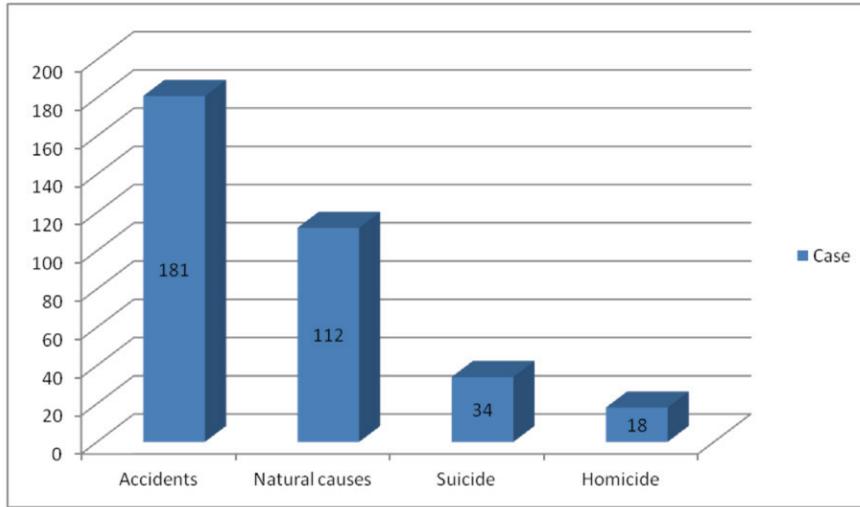


Figure 1— The distribution of cases according to manner of death.

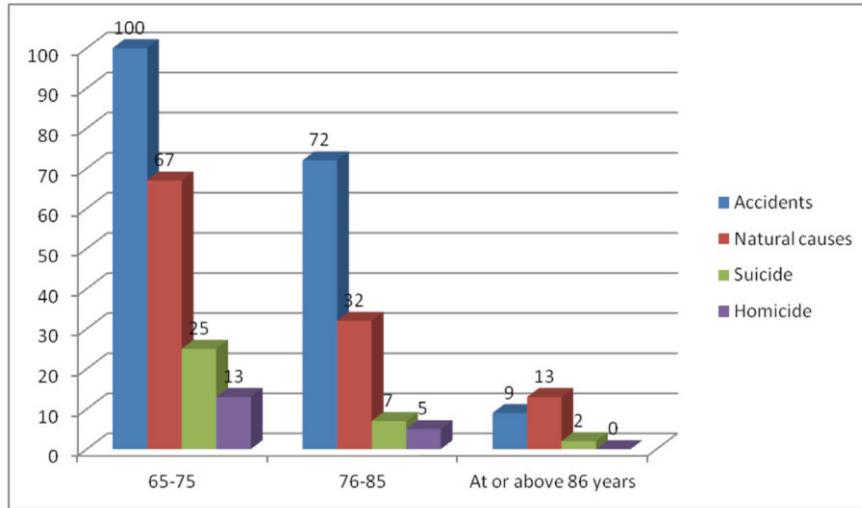


Figure 2— The distribution of age groups according to manner of death.

(11.5%) cases. The underlying causes of death due to natural causes are presented in Table 2.

Accidents were the most common cause of death due to unnatural causes, occurring in 181 cases, and the causes of accidents were traffic accidents (127 cases, 70.2%) and fall from a height (39 cases, 21.5%). Of the motor vehicle accidents, 63% (80) involved motor vehicle-pedestrian accidents and 37% (47) involved vehicle collisions. The distribution of underlying causes of death in accidents is presented in Table 3.

DISCUSSION

The number of forensic geriatric deaths is increasing, parallel to the increase in the number of elderly in the population, and there is an effort to determine the causes of these deaths (9). The rate of elderly people aged over 65 was 12.4% in all forensic autopsies conducted in Ankara (9), 8.1% in Adana (8), and 7.8% in Istanbul (10). In the present study, the rate of elderly people aged over 65 was 24.1% in a five-

**Table 2—** The Underlying Causes of Death Due to Natural Causes

Causes of Death	Gender				Total	
	Male		Female		n	%
	n	%	n	%		
Myocardial Infarction	58	73.4	22	66.7	80	71.4
Cerebrovascular Disease	9	11.4	4	12.1	13	11.5
Senility - Multiple Organ Insufficiency	4	5.1	2	6.0	6	5.4
Cardiac rupture - Tamponade	4	5.1	1	3.1	5	4.5
Pneumonia	1	1.2	4	12.1	5	4.5
Cancer	2	2.6	-	-	2	1.8
Epilepsy	1	1.2	-	-	1	0.9
Total	79	100.0	33	100.0	112	100.0

Table 3— The Distribution of Underlying Causes of Death in Accidents.

Causes of Deaths	Gender				Total	
	Male		Female		n	%
	n	%	n	%		
Motor Vehicle Accident	98	69.5	29	72.5	127	70.2
Fall from Height	33	23.4	6	15.0	39	21.5
Drowning in Water	5	3.6	-	-	5	2.8
Hypothermia	-	-	4	10.0	4	2.2
CO poisoning	2	1.4	1	2.5	3	1.6
Animal Kick	2	1.4	-	-	2	1.1
Burns	1	0.7	-	-	1	0.6
Total	141	100.0	40	100.0	181	100.0

year period. The rate of elderly in the present study seems to be higher compared to the other studies. The authors consider that this can be explained by high rates of forensic autopsy in cases that involved motor vehicle collisions.

The rate of males was higher than females in many studies that have evaluated forensic cases (9). The rate of males was found to be 71.6% in Istanbul (10), 72.5% in Ankara (9), 57.0% in Japan (11), and 58.0% in the USA (7). Consistent with the literature, the rate of males in the present study was 73.6% (254).

In our study, the distribution of cases according to manner of death showed that the cause was accidents in 181 (52.5%) cases, natural causes in 112 (32.5%) cases, suicide in 34 (9.8%) cases, and homicide in 18 (5.2%) cases. A study from the USA on forensic geriatric deaths reported that natural causes were the most common cause of death, followed by

accidents (7). In a study conducted in Ankara (9), death was by natural causes in 54.4% of cases, accidents in 27.5%, suicide in 9.9%, and homicide in 8.2%, whereas in the study conducted in the USA (7), the manner of death was natural causes in 70.5% of cases, accidents in 16.1%, homicide in 6.4%, suicide in 6.0%, and undetermined cause in 1.0%. The forensic autopsies are not usually performed in deaths caused by motor vehicle accidents, and an inhumation license is issued based on post-mortem examination. In another study conducted in the same region in the same period, forensic autopsies were conducted on 92% of cases of motor vehicle accidents. The natural deaths rank first in studies conducted in other countries. The forensic officers in the US and Europe do not issue a death certificate based on insufficient data and without performing effective investigation, and they order an autopsy with the assumption of suspicious death even if they consider that it was a natural death.



The studies conducted to cardiovascular system disorders were the most common cause of natural death. Central nervous system disorders were ranked second among the natural causes (12). The underlying cause of death was cardiovascular disorders in 52.9% and cerebrovascular causes in 4.4% of the cases in Ankara, and cardiovascular causes in 83.9% and cerebrovascular causes in 4.8% of the cases in Adana. In a study conducted in the USA (13), cardiovascular causes accounted for 78% of the geriatric deaths that occurred outside of the hospital. In the present study, cardiovascular causes were responsible for 85 out of 112 deaths that occurred due to natural causes and cerebrovascular causes were responsible for 13 deaths (11.6%). Cardiovascular disorders should be considered in forensic autopsy of elderly deaths.

In the geriatric age group, the rate of death from natural causes increases with age. In a study by John et al. (14), natural causes accounted for 85% of forensic deaths in patients aged above 90 years, and cardiovascular causes were reported to be the most common. In the present study, distribution of cases according to age group showed that death from natural causes was significantly higher among subjects aged over 86. Individual mobility decreases with increasing age, and people die of natural causes rather than accidents.

In the present study, motor vehicle accidents were the most common cause of unnatural deaths. In a study conducted in the USA (15), pedestrian deaths were reported to occur most frequently in people over 75 years of age. It was suggested that people in this age group are at higher risk of sustaining motor vehicle/pedestrian injuries than other age groups due to reduced physical capabilities, sensory impairment, and distractibility. Consistent with the literature, motor vehicle accidents (70.2%) were the most common cause of unnatural deaths, and motor vehicle/pedestrian collisions were the most common cause accident-related deaths, occurring in 63% of the cases. This was followed by falls from a height (21.5%). Driver awareness should be increased with respect to the elderly. Safety measures can be further improved in order to reduce the risk of accidents involving geriatric people.

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