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Evaluation of Injury to Firearms Attending the Emergency Service

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Objective: Firearm injuries are forensic cases with high mortality among emergency patients. In this study; It was aimed to comparison the cases of firearm injuries applied to the literature.

Material & methods: 432 patients who applied to Emergency Department were included in the study. The cases were evaluated in terms of age, gender, date of event, origin, area of injury, number of firearm entry and exit, and clinical status.

Results: 91.0% (n = 393) of the cases were male and the mean age was determined 34.33 ± 13.55. The most frequent murder origin was detected with 54.6 %. Of the cases 38.2% (n=165) had soft tissue injuries and only one firearm entery hole was detected in 188 case. It was determined that 7.2% (n = 32) of the cases died during treatment. When the files of the cases were examined, it was seen that they did not contain any information about the shoot distance.

Conclusion: The high incidence of young adults among the injured requires the development of preventive measures targeting this group. The high rate of murder in this study may be related to the high mortality of firearm injuries. Failure to adequately describe the initial examination findings of such cases leads to difficulties in determining the weight of the injury and in determining the origin.

Keywords: firearm, forensic medicine, injuries, emergency.

Introduction

Firearm injuries are an important public health problem affecting all levels of society [1]. In Turkey, tens of thousands of people are injured and three thousand people die annually due to firearm injuries [2]. Factors such as deficiencies in legal regulations, easy availability of weapons, honour crime and terrorism increase the rate of deaths due to firearm injuries [3]. The aim of this study is to evaluate cases with firearm injuries, which applied to the emergency department, and examine their reports and compare the data with similar studies in the literature.

Material and Methods

In this study, the files and forensic reports of 432 cases, who were admitted to Firat University Hospital Emergency Department between 2013 and 2017 due to a firearm (n= 368) or explosive (n= 64) injuries, were retrospectively analysed. The cases were examined in terms of gender, age, date of incident, origin, and injury location, number of bullet holes, shooting distance and clinical status. The data were recorded in SPSS, and the tables and graphs were made by this program.

Results

Out of 18,016 forensic cases, who were admitted to the emergency department between 2013 and 2017, 432 (2.39%) cases had injuries due to firearms and explosive substances. Of the cases, 91% (n=393) were male and 9% (n=39) were female. The youngest of the cases was 6 years old and the

Table 1. Distribution of age groups according to the origin.

Age Groups	Homocide n (%)	Accident n (%)	Suicide n (%)	War n (%)	Terror n (%)	Explosive n (%)	Unspecified n (%)	Total n (%)
0-19	32 (66,6)	6 (12,5)	3 (6,25)	1 (2,08)	2 (4,16)	1 (2,08)	3 (6,25)	48 (100)
20-29	66 (52,8)	20 (16,8)	4 (3,2)	3 (2,4)	18 (14,4)	9 (7,2)	5 (4)	125 (100)
30-39	60 (46,2)	6 (4,6)	7 (5,4)	9 (6,9)	7 (5,4)	31 (23,8)	10 (7,7)	130 (100)
40-49	36 (56,3)	4 (6,3)	2 (3.1)	2 (3.1)	1 (1,6)	17 (26,6)	2 (3,1)	64 (100)
50-59	26 (61,9)	7 (16.7)	1 (2,4)	1 (2,4)	0 (0)	5 (11,9)	2 (4,8)	42 (100)
≥60	16 (69,5)	1 (4,3)	2 (8,6)	0 (0)	0 (0)	1 (4,3)	3 (13)	23 (100)
Total	236 (54,6)	44 (10,2)	19 (4,4)	16 (3,7)	28 (6,5)	64 (14,8)	25 (5,8)	432 (100)

oldest was 86 years, and the mean age was 34.33 ± 13.5 years.

The cases were mostly in the 30-39 age group (30.1%) (Fig. 1).

It was determined that 54.6% of the cases were of homicide origin. The homicide and accident cases were mostly in the 20-29 age range (28% and 45.5%) (Table 1).

When the cases were evaluated based on the months, it was seen that they mostly occurred in the month of August (21.5%) (Fig. 2).

When the cases were evaluated in terms of injury location, extremity injuries were the most common with a rate of 52.3% (Table 2).

38.2% of the cases were soft tissue injuries (Table 3).

In 300 cases with a specified number of bullet holes, a single bullet hole (62.6%) was the most common, followed by five and more bullet holes (16.6%) (Fig. 3).

It was determined that 293 (67.8%) of the cases were hospitalized, 81 (18.8%) were discharged from the emergency department, 32 (7.4%) died and 26 (6%) were referred to another institution.

The shooting distance could not be determined due to lack of detailed wound description in all of the files examined.

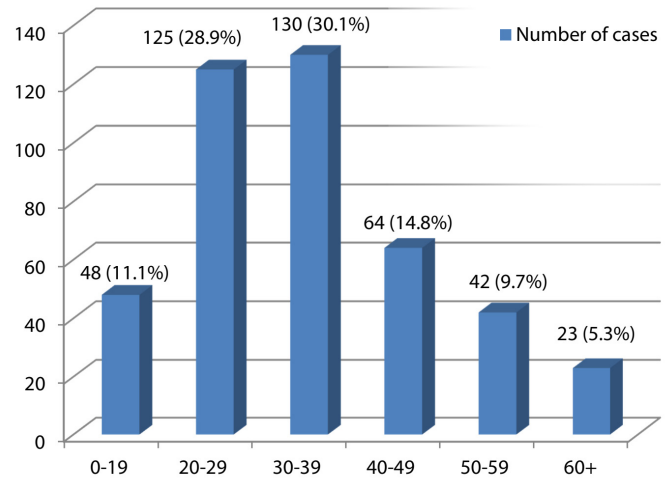

Figure 1. Distribution of age groups.

Discussion

In this study, 2.39% (n= 432) of 18,016 forensic cases were admitted to the emergency department due to firearm and explosive injuries. Similarly, this rate was 1.55% in Bursa, 2.39% in Isparta and 3.6% in Edirne [4-6]. In a study conducted in Los Angeles, it was stated that 3.89% of 12,136 cases were firearm injuries [7]; in USA, 1,565 cases (approximately 400,000 people in 5 years) were admitted weekly to hospital due to firearm injuries and 645 of them died [8]; in South Africa, an average of 127,000 people were admitted annually to hospital due to firearm injuries and 20,000 of them died [9]. This rate was significantly lower in our study. The reason for this is financial and legal difficulties in obtaining firearms in our country.

In this study, 91% (n= 393) of the cases were male and 9%

Table 2. Distribution of injuries area.

Area of injury	Number	%
Head-Neck	56	13
Chest	19	4,4
Abdomen	33	7,6
Extremity only	226	52,3
Chest + Abdomen	13	3
Head-Neck + Chest	4	0,9
Head-Neck + Extremity	21	4,9
Abdomen + Extremity	7	1,6
Chest + Extremity	17	3,9
Head-Neck + Abdomen	3	0,7
Chest + Abdomen + Extremity	7	1,6
Genitourinary System	1	0,2
Genitourinary System + Extremity	2	0,5
Multiple Injury	23	5,3
Total	432	100

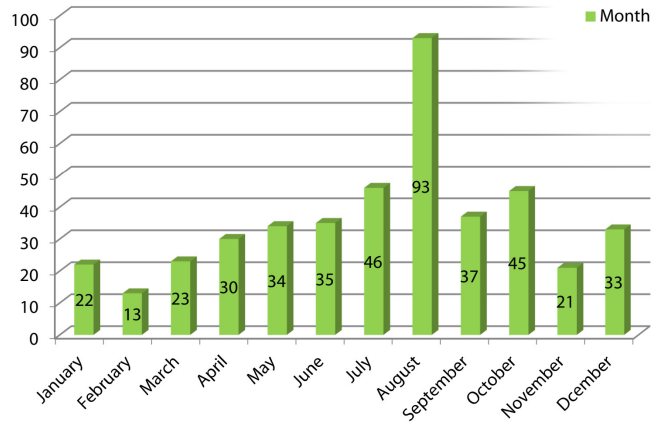

Figure 2. Distribution of injuries by month.

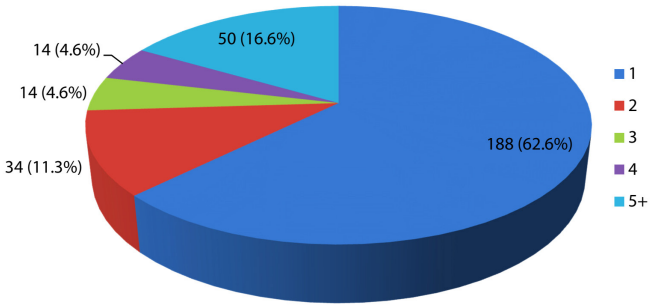

Figure 3. Distribution of the number of firearm entrance holes.

were female (n= 39). The male-to-female ratio was found to be higher than other studies conducted in Turkey and abroad [7, 8, 10]. This is due to the fact that men have easier access to firearms and take part in social life more actively, and that terrorist incidents are more frequent in this region.

The mean age in the study was determined to be 34.33 ± 13.5 years. In similar studies, the mean age was 32.96 in Samsun, 34.3 in Trabzon and 31.28 in Erzurum [2, 10, 11]. This rate was found to be 27.9 in Iran [12]. This ratio is similar to that of the studies in the literature.

In this study, the most common age range was 30-39 (30.1%) years, followed by age range of 20-29 years (28.9%) (60% in the 20-39 age range). In similar studies, this rate was found to be 57.8% in the 21-30 years age group in Thailand and 61.5% in the 20-39 years age group in Brazil [13-14]. The rate found in our study is similar to that of the studies in the literature.

In this study, the most common origin of cases was homicide (54.6%). The homicide and accident cases were most common in the 20-29 age group (28% and 45.5%, respectively), while suicide cases were most common in the 30-39 age group (36.8%). In this study, suicide rates were lower than those of similar studies [8, 14]. The homicide and accident rates were similar to those in the literature [2, 12]. The low suicide rates were due to difficulty of obtaining firearms in suicide attempts.

When firearm injuries were evaluated in terms of seasons, they were more common in summer (40.2%) while their rate significantly decreased in winter (15.7%). These results were consistent with similar studies [3, 11]. The fact that people spend more time in social life in the summer months due to long days may explain the frequency of forensic cases in these months.

In this study, since extremities (52.3%) are the most common injury location, the most commonly observed condition was soft tissue injury (38.2%). In USA, extremity injuries were seen in 77% of unintentional firearm injuries and 49% of intentional firearm injuries. In Nigeria, extremity injuries occurred in 41% of firearm injuries [8, 15]. These results were consistent with similar studies.

In the study, a single bullet hole (62.6%) was the most commonly observed number of bullet holes, which was consistent with similar studies [16, 17]. In this study, no information was found about the firearm entry wound in the medical documents of 68 cases. In these cases, emergency physicians had not made a sufficient wound description, which causes difficulties in writing a final report and determining the shooting distance. In order to prevent this, physicians should be educated and given in-service training on these topics.

In the study, 293 (67.8%) of the cases received in-patient treatment. The mortality rate was lower than that of similar studies conducted abroad [8, 14, 18]. This is a natural result of the fact that extremity injuries were more common in this study.

Table 3. Distribution of injured organ.

Injured organ	Number	%
Soft tissue	165	38,2
Extremity-bone	107	24,7
Lung-rib	47	10,8
Vascular structures	42	9,7
Stomach-intestinal	39	9,0
Brain	33	7,6
Maxillofacial region	33	7,6
Liver-bile	14	3,9
Genitourinary System	12	2,7
Spleen-pancreas	11	2,5
Heart	4	0,9
Unspecified	18	4,1

In 178 cases there was more than one injured organ.

Conclusion

Since the portion of young adults among such patients is high, we believe that new preventive measures aimed at this age group need to be developed. The high number of cases with homicide origin may be associated with the high mortality rate in firearm injuries. Physicians' failure to sufficiently represent the initial examination findings in such cases leads to difficulties in determining the severity and origin of injuries in the future.

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