

Evaluation of Firearm Injuries in Emergency Department

Ahmet Colakoglu¹, Yeliz Simsek², Muge Gulen², Akkan Avci², Salim Satar²

^{1,2}MD, Emergency Department, ¹Public Hospital, Hatay /Turkey

²Numune Education and Research Hospital Adana /Turkey

Corresponding Author: Yeliz Simsek

ABSTRACT

Objectives: We aimed to analyze the patients who visit to the Emergency Department (ED) with firearm-related injuries.

Materials and Methods: Patients aged 18 years and older with firearm-related injuries who presented to the ED between January 1, 2012 and December 31, 2013 were included in this study. The patients' age, gender, cause of injury, weapon used injury area of the body, presence of fracture, duration of hospitalization and clinical outcome were evaluated.

Results: 299 adult patients were included in the study. 84.3% of patients were male and, mean age was 32.6+/-12.7. Most of injuries (90.6%) were intentional. The used weapon was mainly pistol (50.8%). Extremity injuries were most commonly seen (%68.6) and 32% of them had fractures. The extremity fracture was mostly seen in pistol injuries (31.6%). The mortality rate was 6.4% in all patients. The rate of admission in patient with pistol injuries was 53.9%. It was determined that 70.1% of abdominal injuries and 55.7% of thoracic injuries were hospitalized.

Conclusion: According to our study, intentional was the most cause of injury. Pistol/handgun was the most frequent used weapon. The most frequent injuries were in extremities. Hospitalization rate was higher in abdominal and thoracic injuries.

Key words: Firearm injury, pistol/handgun, emergency department

INTRODUCTION

Firearms; are used by civilians and soldiers for hunting, defense or attack. Firearms are the most common cause of violence-related injury deaths in United States. ⁽¹⁾ 60.7% of the gun deaths in 2015 in the United States were suicides. ⁽²⁾ In our country, the mortality rate due to firearm injuries was reported as 12.6-15.1%. ^(3,4) Facilitation of access to firearms leads to increased injuries and deaths.

In this study, we aimed to analyze the patients who applied to our ED due to firearm injuries. Thus, we aimed to contribute the management of injuries due to firearms, which are frequently

encountered in ED, which can cause serious mortality and morbidity.

MATERIALS AND METHODS

We studied 18 aged and above patients who admitted to the ED with firearms-related injuries between January 1, 2012 - December 31, 2013. Our study was retrospective. 299 patients whose data were able to obtain from hospital records and patient card were included into the study. The exclusion criteria were the patients who are under the age of 18 and the patients whose data were unable to found.

Patients' age, gender, cause of injury (attack, accident, suicide), the weapon used (single shot, pump rifle, shotgun,

pistol/handgun), injury area (head, chest, abdomen, extremity), presence of fracture, clinical outcome (discharge, hospitalization, death), duration of hospitalization were recorded in the standard data form.

The data were recorded in the "SPSS for Windows version 22" program and statistical analysis was performed. Descriptive statistics, chi-square, t-test were used in statistical analysis. Statistically, $p < 0.05$ was accepted as significant. The distribution of the variables was checked by the Kolmogorov-Smirnov test. Ethic approval of our study was received.

RESULTS

299 patients who admitted to ED for firearm injury were included in the study. 252 (84.3%) of the Patients were male and 47 (15.7%) were female. The maximum age of the patients was 79 years and the mean age was 32.6 ± 12.7 years.

205 patients had extremity injuries (68.6%), 79 had chest injuries (26.4%), 77 had abdominal injuries (25.8%), and 51 had head injuries (17.1%).

66 (32.1%) of 205 patients with limb injuries had extremity fractures. 75.8% of these fractures were in the lower extremity, 19.7% in the upper extremity and 4.5% in the lower and upper extremities. Extremity fractures were seen 31.6% in pistol injuries, 17% in hunting-rifle injuries, and 11% in pumped-rifle injuries. There was no extremity fracture with single-shotgun injuries.

In our study, 19 (6.4%) patients were died, 161 (53.8%) patients were discharged and 119 (39.8%) patients were hospitalized. 76 of the hospitalized patients (63.9%) were followed up in intensive care unit. The mean duration of hospitalization was 7.6 ± 9.4 days. The mortality rate in hospitalized patients was 12.6% (15 patients). 20% of the deaths were in the emergency service, 80% of the deaths were in other clinics.

41.3% (112 patients) of the injuries due to attack, 100% (5 patients) of the suicidal injuries and 8.7% (2 patients) of the accidental injuries were hospitalized. Four of the suicide cases had chest injuries; one of them had head injury. Four of the five patients were injured with pistol, one patient was injured with pumped-rifle. Four of the five cases died within the first 24 hours.

When discharge rates of patients were compared with death and hospitalization rates; discharge rate was statistically lower in pistol injuries, abdominal and thoracic injuries ($p = 0.000$, $p = 0.000$, $p = 0.001$). Discharge rate was statistically higher in extremity injuries ($p = 0.000$). The rate of hospitalization in patients with fractures in extremities due to firearm wounds was statistically significantly higher ($p = 0.000$). There was no statistically significant difference between discharge rates and death and admission rates in head injuries ($p = 0.396$) as shown in Table 1.

Table 1: Comparison of discharge and hospitalisation/death rates by cause of injury, weapon used, injury zone, presence of fracture

		Discharge		Hospitalization/Death		p value
		n	Percent(%)	n	Percent (%)	
Cause of injury	Intentional	159	58,7	112	41,3	0,000
	Accident	21	91,3	2	8,7	
	Suicid	0	0,0	5	100,0	
Weapon used	Single shotgun	11	91,7	1	8,3	0,000
	Pumped rifle	60	73,2	22	26,8	
	Hunting rifle	39	73,6	14	26,4	
	Pistol	70	46,1	82	53,9	
Injury zone	Head	28	54,9	23	45,1	0,396
	Thoraks	35	44,3	44	55,7	0,001
	Abdomen	23	29,9	54	70,1	0,000
	Extremity	142	69,3	63	30,7	0,000
Presence of fracture	unavailable	164	70,4	69	29,6	0,000
	available	16	24,2	50	75,8	

DISCUSSION

Firearm injuries are one of the important social and medical problems. Patient's clinic may vary according to the type of firearm used, shooting range and injury area. Knowing the injury mechanism and multidisciplinary approach are important in the management of patients.

In our study, the male sex ratio of the patients who were injured due to firearm injuries was higher and the mean age was 32.6. Similarly in other studies, it was reported that firearm injuries were mostly seen in young and middle age male patients. (5-8)

In our study, attack was the most common cause of injury in the patients who applied to the emergency service due to firearm injuries. Civil firearm injuries are more likely to occur with low-speed weapons, such as pistol and hunting rifles. However, such weapons can increase the severity of injury by producing more kinetic energy than high-speed guns in close range shots. In addition, after the bullet has entered the body, it damages not only in the passageway but also in the surrounding tissues with the blast effect. (9) In the study of Koksall O. and colleagues, the attack is most often the form of injury; pistol was found to be the most commonly used weapon. (3) In the study of Muscat JE. et al., the most commonly used weapon in gunshot injuries with attack was found pistol. (10) In the study of Davis M. et al., injuries were caused by low-energy weapons. (6) The easy of obtaining a license, the desire to have weapons in our region, and the inadequacy of legal regulations increase the frequency of gunshot wounds. Because of pistols are easier to hide and convenient to carry, injuries caused by pistols are most common.

In our study, limb injuries were found the most commonly affected injury area. This is parallel to literature data. (3,6,7,11)

In study by Persad IJ et al., extremity fractures were seen in 34% of extremity injuries. (12) Similarly, our fracture rate was 32.1%. According to the study of Aslan A. et al., there was no significant

difference between the effects of different weapons on injury severity. (11) In our study, the fracture rate of the injuries with pistol was found higher than the others. Although the types of weapons are low-speed weapons in our study, they can act as high-kinetic energy weapons when near-distance shot is done, and so they may increase amount of injury on the tissue. For this reason, the occurrence of fractures on the extremity may be more related shooting distance than low-speed firearms type. Because the pistols can be carried easily and can be used easily at fighting, they cause close shot injuries.

In our study, mortality rate was 6.4% in patients who applied to firearm injuries and mortality rate was 12.6% in hospitalized patients. The mortality rate was 13% in the study of Davies M. et al. (6) in other studies, mortality rates were reported 12.6% and 15.1%. (3,4) In the study of Eris S. et al., it was shown that injuries due to suicide affect mortality statistically. (4) Similarly, in our study, mortality was higher in suicidal patients. Suicidal patients' purpose is death. Because they occur shooting to deadly areas such as head, thorax and their shooting occurs closely, their mortality rates are seen high.

The limitation factors for our study were that our study was retrospective and we did not use any trauma scoring system for evaluating injuries.

CONCLUSION

The majority of patients who were injured by firearms were male and young-middle age group. The most common cause of injuries was attack. The pistol is the most commonly used firearm. The most common area of injury was extremity. Extremity fracture was most common in lower limbs and in injuries by pistols. The rate of discharge was higher in extremity injuries whereas the risk of hospitalization and death was found statistically significant in chest and abdominal injuries.

We think that injuries and deaths due to firearms can be reduced by preventing

violence programs in the media, legal regulations educating, children and families.

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