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Research Article

Incidence, topography, types of firearm injuries before and after the revolution of the 25th of January 2011: a hospital-based study

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ABSTRACT

Background: Egyptian revolution of the 25th of January was associated with major changes in the community. Consequently, this might be associated with an impact on the injury pattern regarding the etiology, mechanism, and the victim's profile hence the objective is to study the incidence, pattern and topography of firearm injury before and after the revolution
Methods: Data was collected from the medical records retrospectively from January 2009 to January 2013 and prospectively from 2013 to 2014.
Results: The total number of patients was 447 patients demonstrating a highly significant and a sharp increase from 36 patients (about 12/year) before to 411 (about 134/year) after the revolution. There was no significant increase in sex, mean age or age distribution incidences.
Conclusions: Firearm injury has become a major problem, sharply increasing and evolving, after the revolution. This necessitates a rapid update of the protocols of first aid and emergency management as well as education and training of the future Health professionals in the country.

Keywords: Egyptian revolution, Firearm injury, Violence

INTRODUCTION

Gunshot injuries are one of the leading causes of high mortality and morbidity all over the world, their devastating effects cause profound morbidity leading to prolonged hospitalization, with subsequent high cost, reduced life quality and loss of productivity and above all death.[1,2]

Within the last two decades, the civilian gunshot injury incidence and their ensuing mortalities have been increased worldwide, also, there are a considerable differences between regions and countries.[3-7] Regarding the etiology, firearm injuries are usually a result of assaults or homicides in lower income countries but in high income countries it due to suicides.[8]

Firearm injury has many serious disabilities as traumatic brain injury, amputation, and spinal cord injuries, also, 16.5% of spinal cord injuries are due to firearm injuries nationally.[9]

There is lack of security in the last years after the revolution and increase the rate of violence in all the country and armed robbery doubled 12 times, from 233 cases in 2010 to nearly 3 thousand cases of robbery in 2012 globally the killings reached to more than two thousand cases a year were not more than a thousand cases a year before the revolution.[10]

The objective of the study was to determine the incidence, patterns, topography and types of firearm injuries in patients presenting to the emergency

department, Suez Canal university hospitals before and after the revolution of 25 January.

METHODS

This Cross-sectional analytical study was included all ages and both sexes firearm injured patients presenting to the Emergency Department (ED) at the Suez Canal university Hospital. It was conducted between 25th January 2008 and 25th January 2014.

The subjects were assigned randomly to 2 groups before and after 25th January 2011 revolution as described below.

Group 1 (retrospective group)

Those who presented from 25th January 2008 to 25th January 2011.

Group 2 (retrospective and prospective groups)

Retrospective group: Those who presented from 25th January 2011 to 25th January 2013.The data was retrospectively collected from patient registers kept in the medical records of Suez Canal University Hospital (SCUH).

*Prospective group***:** Those who presented from 25th January 2013 to 25th January 2014 to the emergency department, Suez Canal university Hospital**.**

The data included full history (from the patient or relative) including patient's file number and name, patient personal data, the patient complaint, patients' anatomical injury data, associated injury and disposition.

Statistical Analysis: SPSS program version 16 (SPSS Inc., Chicago, IL, USA) are used for statistical analysis. Mean and standard deviation (SD) was used to show quantitative data, numbers and percentages (%) were used to express qualitative data. Chi-square test was used to compare qualitative categorical variables. Student t-test was also used to compare quantitative continuous data. A probability value less than 0.05 was statistically significant.

RESULTS

The results revealed a total of 447 patients were presented with firearm injuries throughout this period. The highest percent of patients was in the year 2013 as 218 cases (48.8%) and the lowest percent was in the year 2009 as six cases. There was an increase in the prevalence of firearm injury cases per year from 0.01% in the year 2008 and 2009 to 0.25% in the year 2013 as given in Table 1.

Table 1: Frequency of patients per year.

Years	Number of firearm injured patients	Percent of column	Prevalence of cases
25th January 2008: 25th January 2009	11	2.5%	0.01%
25th January 2009: 25th January 2010	6	1.3%	0.01%
25th January 2010: 25th January 2011	19	4%	0.02%
25th January 2011: 25th January 2012	100	22.6%	0.11%
25th January 2012: 25th January 2013	93	20.8%	0.11%
25th January 2013: 25th January 2014	218	48.8%	0.25%
Total	447	100%	

Table 2: Participants characteristics.

		Group		No. (%)	Test	
		Pre revolution	**Post revolution**			
Age (Mean±**SD**)		26.3 ± 8.7	29.2 ± 10.9		-1.53**	0.13 ns*
Gender	**Male No. (%)**	35(97.2%)	387(94.1%)	422(94.4%)	0.151***	0.698 ns*
	Female No. (%)	1(2.8%)	24(5.9%)	25(5.6%)		
Total		36(100%)	411(100%)	447(100%)		

*ns: not statistically significant, ** T-test, *** Chi square

Table 3: Frequency of patients according to residence in the pre and post revolution periods.

Residence	Frequency (% of column)		Total
	Pre revolution	Post revolution	
North Sinai	15 (41.6%)	181 (44.0%)	196(43.8%)
Ismailia	9(25.0%)	90 (22.0%)	99(22.1%)
Port Said	7(19.4%)	57(13.9%)	64(14.3%)
Suez	4(11.1%)	66(16.0%)	70(15.7%)
South Sinai	1(2.8%)	17(4.1%)	18(4.0%)
Total	**36(100%)**	**411(100%)**	**447(100%)**

Table 4: Cause of injury pre and post revolution.

Cause	Frequency (% of column)		Total Frequency(% of column)	P value
	Pre revolution	Post revolution		
Quarrel	4(11.11%)	33(8%)	37(8.3%)	=0.7127
Self-defence	0(0%)	4(1%)	4(0.8%)	=0.7427
Unknown	29(80.5%)	374(91%)	403(90.3%)	=0.0845
Accidental	3(8.3%)	0(0%)	3(0.6%)	<0.0001
Total	36(100%)	411(100%)	447(100%)	<0.001

Table 5: Type of weapon used pre and post revolution.

Type of weapon	Frequency (% of column)		Total Frequency (% of column)	p value
	Pre revolution	Post revolution		
High velocity	31(86.1%)	199(48.4%)	230(51.5%)	<0.001
Low velocity	5(13.9%)	212(51.6%)	217(48.5%)	<0.001
Total	36(100%)	411(100%)	447(100%)	<0.001

The mean of patient's age didn't differ significantly before and after the revolution. The mean age before the revolution was 26.3±8.7 and after the revolution was 29.2±10.9, also no significant sex changes in injury in the pre and post-revolution periods. The percent of male and female was 97.2% and 2.8% in pre-revolution period and 94.1% and 5.9% post-revolution as shown in Table 2.

SCUHs drain injuries from five governorates (North Sinai, Ismailia, Port Said, Suez and South Sinai). The highest percent of patients in the pre-revolution period was from North Saini (41.6%) followed by Ismailia 25.0% and Port Said 19.4% On the other hand, in the post-revolution period the highest percent of patients was from North Saini 44.0% followed by Ismailia 22.0% and Suez 16.0% as presented in Table 3.

The unknown cause of injury was the highest pre and post-revolution although it was increased by about 11% in the post-revolution period. On the other hand, the lowest cause was self-defense pre and post-revolution and quarrel causes had decreased in the post-revolution period by about 3% as seen in Table 4.

There was marked increase in injury by low-velocity weapons in the post-revolution period by about 38% as shown in Table 5.

DISCUSSION

Firearm related injuries are considered a serious public health problem. The most serious disabilities in firearm injury survivors caused by amputation, and injuries of the brain and spinal cord.[9] The epidemiologic characteristics of these injuries are little despite the magnitude of it.[11,12] In Egypt, during the year 2000, there were about 117 fatal cases (83 accidental, 18 suicidal and 16 homicidal) according to mortality statistics provided by WHO [(6)]. In 2011, about 68% of homicide cases caused by the firearm, 19% by sharp objects and 13% by other causes.[13] After the revolution of 25th of January in 2011, the homicidal rates increased dramatically to 3.5 per 100,000 people which represented an increase of more than 200 percent.[13] The current study was a cross-sectional analytical study of firearm injured patients attended the emergency department in Suez Canal University

hospitals during six years (retrospective from 25th of January 2008 to 24th of January 2013 and prospective from the 25th of January 2013 to 25th of January 2014). The present work aimed to determine the incidence, patterns, topography and types of firearm injuries in patients presented to the Department of Emergency in SCUH to know if the revolution of 25 of January had an impact on the profile of firearm injured patients who were attended to the Department of Emergency in Suez canal university hospitals or not.

The present study revealed 447 cases of firearm injured patients: this constituted 0.1% of the total patients attending the emergency department during the six years period of the study. The number of the patient was increased significantly in the before and after the revolution (P-value = 0.048). This may be due to the clear decrease in the role of police in controlling the security in streets all over the country because many of the police centers were attacked during the peak days of revolution and also most of the weapons were stolen from these police centers by desperadoes. These weapons were used after that in murder and stealing and used in political conflicts. Furthermore, the Libyan Crisis opened another way for weapons to enter Egypt. This comes in concordance with O_2 world news report confirming the increased rate of violence after the revolution.[10] The O_2 world news report confirmed that killings reached to more than two thousand cases a year; nearly doubled compared to not more than a thousand cases a year before the revolution.[10] The report also mentioned that after the revolution, the armed robbery was doubled 12 times; from 233 cases in 2010 to nearly 3000 cases in 2012.[10] In another study which was conducted in Palestine between 2000 and 2001 revealed that 63% of injuries during the rebellion was due to gunshot.[14] Also in a study which was conducted in Kuwait, firearm injuries composed 37% of injuries which occurred throughout the first two weeks of Gulf War 2003, and 34 % of them were civilians.[15] Moreover, the Romanian revolution during the events of the second part of December 1989, several police stations were attacked, set on fire and destroyed by violent crowds and with shotguns and a number of policemen were killed (18 officers, 24 noncommissioned officers.[16] In addition, there were some facts about homicidal and firearm injuries in different reports after or during conflicts. In Egypt Until 2010, the homicide rate was just over one for every 100,000 people. This was even lower prior to 2005.[13] In Egypt firearm percentage from 2006 to 2011 represented by 39%, 43%, 49%, 43%, 23%, and 68% respectively.[17] However, after the revolution of 25th of January in 2011, the rate of homicides was dramatically increased to 3.5 per 100,000 people which represent an increase of more than 200 percent.[13] In 2011, this changed to 68% by firearm, 19% by sharp objects and 13% by 'other means.[13] The dramatic increase in the use of firearms can be explained by the stoppage of the police services and looting of the police weapons from police stations during the first 18-days of the revolution.[13] These results confirm that despite Egypt's homicide rate almost 'tripled' since 2009, Egypt still has a homicide rate less than most of the African, Asian and American countries which include United States of America.[13]

In our study, the lowest frequency of cases (6 case) was in 2009 and constituted (1.3%), while the highest (218 cases) was in 2013 (48.8%). The range for the pre-revolution period was from 6 cases to 18 cases, whereas in the post-revolution it was from 93 to 211 cases. This is can be explained by the stable political and security circumstances before the revolution but after the start of revolution events, there were many political conflicts and political different groups which used the violence to express their opinion in political struggles. This high increase in trend comes in contrast to Hagras 2012 et al, it said that the lowest number of cases (37 case) was in 2008 and constituted (13.8%), while the highest (53 cases) was in 2007 (19.8%).[18] In addition Hassan et al in 2005[(19)], were all firearm injured persons attending the forensic medicine in Alexandria was studied, the lowest number of cases (7 cases) was in 1999 and 2000 constituted 13% while the highest (10 cases) was in 2002 and 2003 (18.5%). This strongly suggests the role of the revolution in increasing the prevalence of firearm injuries.

In our study, the age of firearm injured patients didn't present any significance difference before and after the revolution (mean value of 26.3± 8.7 in the pre-revolution group and 29.2 ±10.9 in the post-revolution group). The peak incidence of injuries in both groups was among those in their 3rd decade of life (46%). This appeared logic because the third and fourth decades of life have the peak of participation in the general events and the persons in this period are more susceptible to trauma. This mean age of our study coincides nationally with the findings of Hagras et al, Hassan et al, and internationally with Hugenberg et al and with hospital-based New Mexico Firearm Injury Surveillance.[18-21] In our study, males outnumbered females in the pre and post-revolution periods as males resembling 97.2% in the pre-revolution period and resembling 94.1% in the post-revolution period with no significant difference between the two groups. This also appeared logic due to the great participation of males in political events and even in out of law events. This coincides nationally with the findings of Hagras et al, where males constituted 96.6% and internationally with the result of Ikramullah et al in 2011 where the percentage of males was 75% and Nasrullah et al where males constituted 92%.[18,22,23]

As regard the residence, North Sinai was the most common residence for patients before and after the revolution; although the percentage increased only from 41.6% to 44% but the number of patients increased from 15 to 181 patients' pre and post-revolution respectively. This is due to the presence of many types of weapons, the geographic and tribal nature of this area. Before and after the revolution Ismailia came second (25%) and (22%)

respectively and this explained by the presence of Suez Canal University Hospital in Ismailia city. In the third place, Port Said came in the pre-revolution period and Suez was in the post-revolution period. South Sanai came at the end 2.8% and 4.1% pre and post-revolution respectively because the mountainous nature of this area and a low number of population. This with the results of Hagras et al, in 2012, where all fatal and non-fatal firearm cases, between years 2005 and 2010 in Suez Canal Area, were from North Saini.[18] Surprisingly enough, the lowest occurrence in their study was in Ismailia. This may be due to that Hagras study covered all the Suez Canal Area hospitals, unlike our study which included Suez Canal University Hospital only.

In our study, in the pre-revolution period, the self-defense cause of firearm injuries was the lowest 0% but the unknown cause was the biggest 80.5% but in the post-revolution period the accidental cause was the lowest 0% and self-defense came the second 1% and the unknown cause was the highest 91%. This results express the wide spread of weapons in the post-revolution period and the use of it in the streets, out of law activities and also in political conflicts. Contrary to Hagras et al where 65.7% were homicides and accidental injuries represented only 13.4%.[18] The emergency of "unknown" etiology made the comparison with any other known reference, nationally and internationally, impossible.

High-velocity weapon was the most commonly used in the pre-revolution period represented by 86%. Injury by shots was markedly increased in the post-revolution period by about 38% and became the most frequent cause of injury (51.6%). This is due to the widespread of these type of weapon in the post-revolution period because it was cheap and can be locally made. The other cause may be that this type of weapons had low mortality rate than the high-velocity weapons so the people use it easily in self-defense imposition. Finally, there were studies conducted in different places of the world after great events as revolution and revealed the increase of homicides by firearms.

CONCLUSION

Firearm injury has become a major problem, sharply increasing and evolving, after the revolution. This necessitates the increase of police presence in firearm hot spots, aggressive enforcement of firearm laws and adopts new restrictions to eliminate illegal firearm sales and ownership to reduce the morbidity and mortality from the use of these weapons. We recommend a rapid update of the protocols of first aid and emergency management. Furthermore, a creation of a web-based registry is an indispensable tool for better quality research.

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