

Original article

**Forensic Evaluation of Fatal Head Injuries: A Retrospective Study of Autopsied Cases at Qena Governorate in Upper Egypt.****Afaf Mohamed Ahmed Farghaly¹, Nagwa Mahmoud Ali Ghandour², Mohamed Haroun Ali Youssef³**¹ Department of Forensic Medicine & Toxicology Faculty of Medicine, Assiut University² Department of Forensic Medicine & Clinical Toxicology Faculty of Medicine, Assiut University³ The Egyptian Forensic Medicine Authority, in the Ministry of Justice Qena department**ABSTRACT**

The study was designed to analyse the demographic data of victims with fatal head injuries and forensic evaluation of these injuries with recording some patterns, shapes and causes of fatal head injuries. This study included victims of fatal head injuries, which were autopsied at Qena governorate over a period of five years from the 1st of January 2011 to 31st December 2015. Data were collected from autopsy reports in Qena forensic department of ministry of justice archives. This study included 149 victims. The majority 130 cases were males while only 19 victims were females. Manner of death was homicidal in most cases (66.4%). The highest number of cases occurred in Dishna division (39 cases). The overall incidence of head injuries in Qena governorate was 4.7 per 100000 inhabitants. The highest number of cases occurred in summer (45 cases). May and July (22 cases each) were the most frequent. The most common causative instrument among the examined cases was the assault rifle (95 cases). Most victims (71.8%) died immediately after head injuries. Brain hemorrhages were found in all the studied victims. Contusions and lacerations were frequently presented. Death occurred immediately in most cases of brain laceration and contusion. In conclusion there were a high number of head injuries in Qena governorate during the duration covered by the study. Most of them were males. Injuries were more common during summer with highest incidence in Dishna division. The assault rifle was the weapon of choice. Most cases died immediately due to skull fractures, brain hemorrhages, contusions and lacerations.

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I. INTRODUCTION

Traumatic head injuries form a massive portion of the injury cases requiring forensic examination (Finnie, 2016). Head injuries are considered one of the most common causes of homicidal deaths worldwide. The WHO predicts that traumatic brain injuries will be the third leading cause of death by the year 2020 (Edge, 2010).

Any traumatic injury to the scalp skull or brain is considered traumatic head injury. They can vary from minor trauma up to fatal injuries (Heegaard et al., 2014). Scalp injuries range widely from simple abrasions up to serious lacerations which are associated with serious bleeding due to the rich blood supply of the scalp. Skull injuries have many forms as fissure, compound, depressed, cut and skull base fracture. Mortalities and serious morbidities are rarely caused by the fracture itself but usually from the damage to the underlying soft tissues (Saukko and Knight, 2016).

Brain injuries, which are the most serious, may be static or dynamic. Static injuries are less common and caused by compression with great force and heavy object and occur more common in children. Dynamic injuries are more common in adults and result from trauma from rapidly moving objects such as cars, bullets, etc. (Langlois and Sattin, 2005).

Photographic documentation of these injuries provides a valuable tool not only for medico-legal documentation but also to help us studying various typical and atypical injuries (Peterson and Clark, 2006). Moreover it will aid in second reviewing of cases by forensic consultants and specialists. Visually documented injuries provide a good opportunity for exchanging information between junior forensic doctors and improve their learning curve. Unfortunately there are no adequate studies about fatal head injuries in Qena.

This study was designed to

- (1) Analyze the demographic data of victims with fatal head injuries.
- (2) Evaluate the pattern of fatal head injuries and examine its forensic evaluation.
- (3) Record some patterns, shapes and causes of fatal head injuries.

II. SUBJECTS AND METHODS

Data collection:

- Data was collected from autopsy reports of the Qena and Luxor forensic department of the ministry of justice archives during the period from 1st January 2011 to 31st of December 2015.

Inclusion criteria:

- All fatal head injuries that had been autopsied at Qena governorate in Upper Egypt including: blunt, penetrating, homicidal motor car accidents, firearm and explosions during the period from the first of January 2011 to thirty first of December 2015 will be included.

Exclusion criteria:

- Other sites of injuries (other than head).
- Cases in which there is combination of head injuries with other organs
- Cases of accidental motor car injuries (since there isn't any reliable source of data this type of injuries and they are not referred to the Egyptian forensic authority which is the source of our data).

The data was analyzed to determine:

1. Demographic data of the victim, including: age, gender and residence.
2. Time of injury and time of death.
3. Causes of the injury (the causative instrument).
4. Manner of death (suicidal, homicidal, accidental or undetermined).
5. Site, pattern and shape of the injury in relation to the causative instrument.
6. Autopsy findings (Types of injuries, fractures, brain and meningeal hemorrhages).
7. Causes of death.

Statistical Analysis

All data were collected, tabulated and statistically analyzed using SPSS. Quantitative data were expressed as the mean \pm SD, and qualitative data were expressed as absolute frequencies (number) & relative frequencies (percentage).

Ethical considerations were taken regarding the consent of the legal authorities and the confidentiality of the obtained data.

III. RESULTS

The total number of examined victims was 149 cases, a high number of these cases was among those of age above 50 years old (48 cases (32.3%)), while the least number was among those of age below 10 years (14 cases (9.4%)) (Figure 1). The majority of examined victims were males 130 cases (87.2%), while only 19 (12.8%) victims were females (Table 1). It was noticed that the manner of death was homicidal in the majority of cases (99 cases) represented 66.5% of all examined victims while it was accidental in 34 cases (22.8%), unknown in 14 victims (9.4%) and suicidal in 2 victims (1.3%) (Figure 2). It was found that the mean age of

examined victims was higher in victims died homicidally (42.1 years \pm 18.1), while in unknown manner of death, it was (31.4 years \pm 14.6), among accidental cases it was (30.9 years \pm 17), while in suicidal death it was (30 years) (Table 2).

It was noticed that the highest number of autopsied head injury cases occurred in Dishna division (39 injuries) followed by Nag Hammadi (37 injuries), Qena (17 injuries) and While the was no cases in Naqada. Overall incidence of autopsied head injury cases in Qena governorate was 4.7 per 100000 inhabitants. Dishna division had the highest incidence (10/100000 inhabitants) followed by Qena (7.2/100000 inhabitants), and Farshut (6.8/100000). The least incidence of head injuries in Qena governorate was noticed in Abu Tesht division (2/100000 inhabitants) and Naqada division (0/100000) (Table 3).

Regarding the season of injuries, figure 3 showed that the most frequent autopsied head injury cases occurred in the summer (45 cases) followed by spring (42 cases), while the least number of head injuries was noticed in the winter (25 cases). Regarding month of injuries, it was noticed that the most frequent head injuries occurred at May and July (22 cases for each) followed by August and October (15 cases for each), while the least number of head injuries was noticed at January and December (7 cases for each) as illustrated in (figure 4).

In table 4, it was noticed that the most common causative instrument among the examined head injuries was the assault rifle (a rifle that is: (1) auto-loading, (2) has a large-capacity (20 rounds or more) detachable magazine, (3) is capable of full-automatic fire, and (4) fires an intermediate rifle cartridge. This term has been corrupted by the media and some politicians to include most self-loading

Weapons (**DiMaio, 2015**), its most common example in Egypt is AK-47 rifle. (95 cases) followed by shomma and hand gun (14 cases for each), while the least was fall from height (2 cases). In figure 5 it was noticed that examined victims were injured by sword/axe had high mean age (55.7 ± 19.8 years) followed by iron pipe (55 ± 11.9 years) and shomma (51 ± 18.3 years). Least mean age was noticed with those had head injuries secondary to hand gun (26.4 ± 13.9). Regarding manner of death with different causative instrument, table 5 showed that all victims with Shomma, iron pipe, sword/axe and motor car accident head injuries were homicidally inflicted. Also, homicidal death was noticed with majority of assault rifle (65.3%), injury with rock (66.7%). While, accidental manner of death, most of them had occurred among head injury victims inflicted by hand gun (10 cases). Also, it was noticed that all suicidal deaths were due to hand gun. The majority of inflicted injuries were by assault rifle, there were 62 cases (65.3%) homicidally inflicted, 22 cases (23.2%) were accidental and none were suicidal.

Regarding time of death after injury, 107 cases (71.8%) died immediately after head injuries. Eighty cases of them died due to assault rifle and 12 cases of them died by hand gun. Also, 20 cases (13.4%) died within hours, 17 cases (11.4%) died within days while, time of death was unknown in five victims. These were illustrated in table 6. As the majority of cases inflicted in the current study by assault rifle (95 cases) most of them died immediately (84.2 % of those 95 cases) followed by those who died within hours (12.6 %) as showed in figure 6. In table 7 and figure 7, the site of bone fractures in all studied victims were demonstrated. It was noticed that out of examined victims the most common was

fracture of parietal bone found in 119 cases (80%) followed by base fracture in 90 cases (60%) while the least fracture was jaw fracture in 26 cases (17%). It was noticed that the majority of fracture of them were due to assault rifle. Site of injury in the head according to the causative instrument was illustrated in figure 8. The most frequent site of injury was in the front that occurred in 73 victims (49%) followed by the left side (24.2%), right side (17.4%). Also, most of them were due to assault rifle. In table 8, brain hemorrhages among examined head injury cases with different causative instruments, were presented in all the studied victims. It was noticed that more than one type of hemorrhage can occur in the same victim. The most frequent form of brain hemorrhage was subarachnoid hemorrhage as noticed in 141cases (94.6%). It was noticed that epidural and cerebral hemorrhage were absent in case of FFH. Regarding time of death with different types of brain hemorrhages, figure 9 showed that most cases died immediately, out of them 105 cases (98.1%) had subarachnoid hemorrhage and 101 cases (94.4%) had cerebral hemorrhage. While of those died within hours, subarachnoid and cerebral hemorrhage occurred in 18 cases (90%) and 13 cases (65%), respectively. In those who died within days, subarachnoid and cerebral hemorrhage also occurred in 13 (76.5%) and 4 (23.5%) victims respectively. Table 9 showed brain injuries with different causative instruments. Contusion and laceration were frequently presented in those autopsied victims as seen in 138 victims (92.6%) and 115 victims (77.2%) respectively. While edema affected only two victims. It was noticed that more than one type of injury occurred in the same victim. As well as, shomma and sword\axe victims showed all types of brain injuries.

Photos from 1 to 4 showed some head injuries due to firearms:

- Photo 1 showed atypical homicidal inlet wound in the mouth from

distant (as inlet wound in mouth is fairly common in suicidal contact firing).

- Photo 2 showed tattooing surrounding two inlet wounds from a hand gun on the left side of the face of a twelve years old victim.
- Photo 3 illustrated bone beveling in firearm injury.
- Photo 4 showed an inlet wound caused by a part of bullet that ricochet after hitting an object and came through the right eye of the victim in a case of distant firing.

Photos from 5 to 7 showed some head injuries due to blunt and sharp objects:

- Photo 5 showed a case of blunt weapon injury to the left side of the head causing fractures at the injured site but most of the meningeal bleeding was found on the right side (countercoup bleeding).
- Photo 6 illustrated axe injuries to the left side of the head causing multiple cut wounds and a cut fracture to the skull.
- Photo 7 showed a blunt object injury to the head causing hematomas in the scalp, fissure fracture to the skull and extra dural hemorrhage.

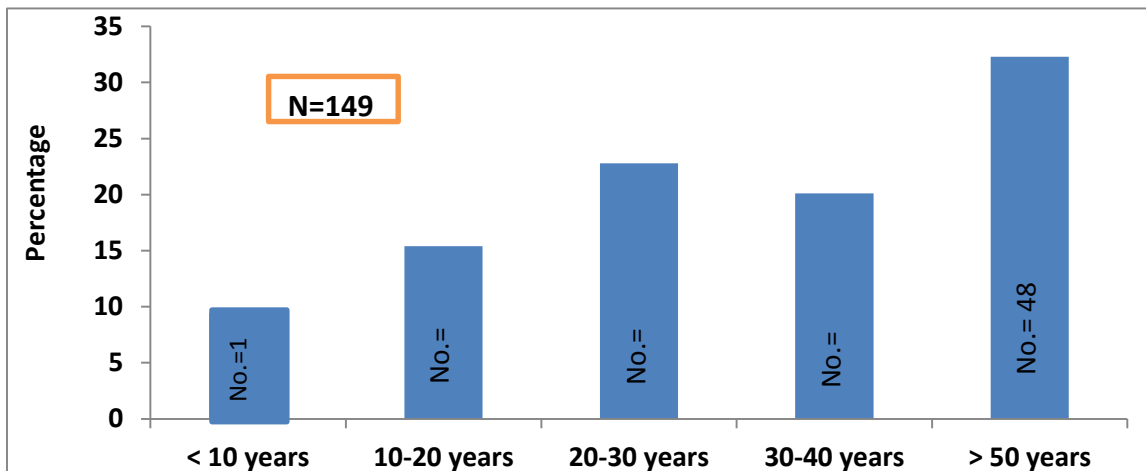


Figure 1: Age distribution of the victims examined by the Egyptian forensic authority in Qena governorate during the period from 1st January 2011 to 31st of December 2015, N: number of victims

Table 1: Sex distribution of the cases examined by the Egyptian forensic authority in Qena governorate during the period from 1st January 2011 to 31st of December 2015.

Sex	N= 149
Males	130 (87.2%)
Females	19 (12.8%)

N: number of victims

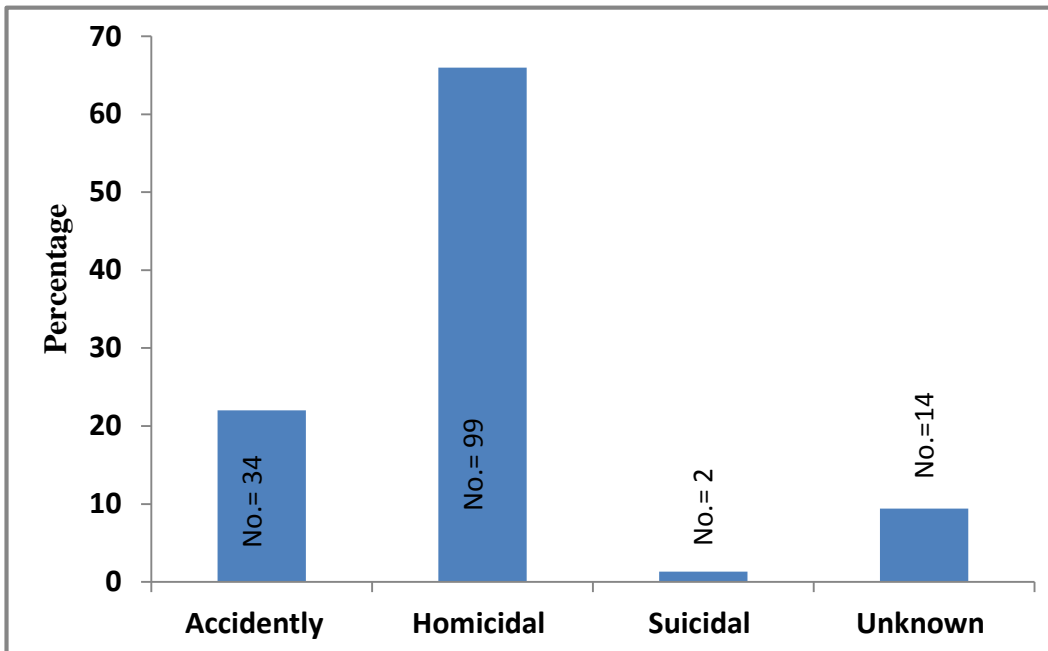


Figure 2: Manner of death in all victims examined by the Egyptian forensic authority in Qena governorate during the period from 1st January 2011 to 31st of December 2015, No: number of victims

Table 2: Manner of death according to the age of victims examined by the Egyptian forensic authority in Qena governorate during the period from 1st January 2011 to 31st of December 2015..

Manner of death	Number	Age (Mean (\pm SD))
Accidental	34	30.9 years \pm 17
Homicidal	99	42.1 years \pm 18.1
Suicidal	2	30 years
Unknown	14	31.4 years \pm 14.6

Data expressed in form of mean (\pm SD)

Table 3: Incidence of autopsied head injury cases in different parts of Qena by the Egyptian forensic authority during the period from 1st January 2011 to 31st of December 2015.

Parts of Qena	Number of head injuries	Number of inhabitants	Incidence of head injuries per 100000 inhabitant
Dishna	39	390637	10
Nag Hammadi	37	581507	6.4
Qena	17	236624	7.2
Farshut	13	190064	6.8
Qus	13	466855	2.8
Village around Qena	12	451141	2.7
Abu Tesht	9	466395	2
Gebtu	7	143215	4.8
El Waqf	2	81806	2.4
Naqada	0	171910	0
Total	149	3180154	4.7

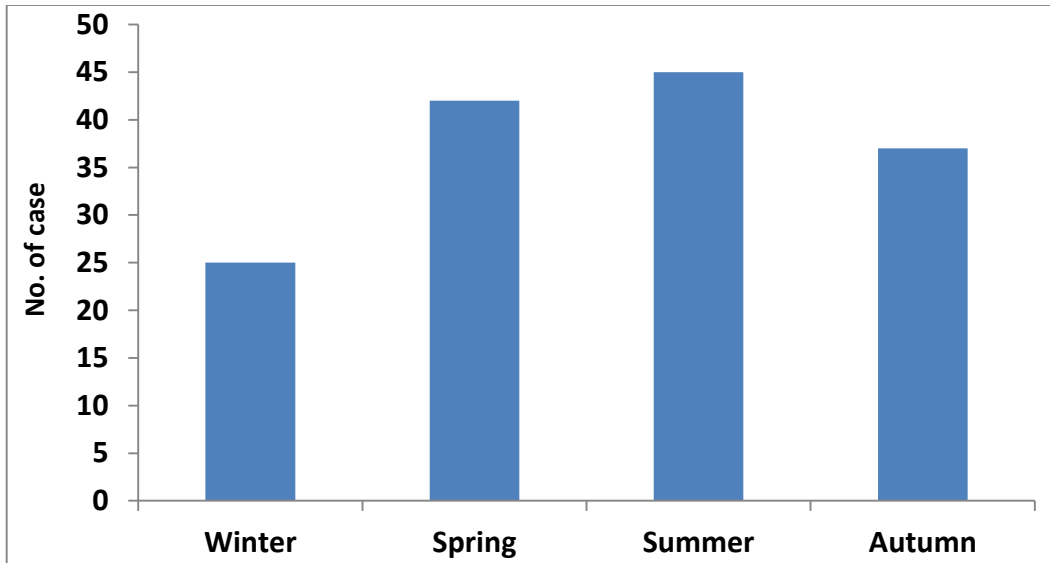


Figure 3: Number of autopsied head injury cases by the Egyptian forensic authority in Qena governorate in different seasons during the period from 1st January 2011 to 31st of December 2015.

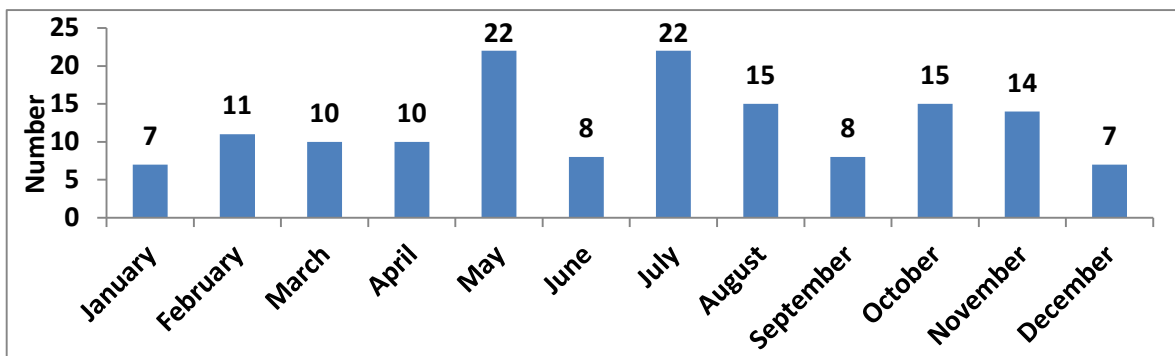


Figure 4: Number of autopsied head injury cases by the Egyptian forensic authority in Qena governorate in different months during the period from 1st January 2011 to 31st of December 2015.

Table 4: Causative instrument in different autopsied head injury cases by the Egyptian forensic authority in Qena governorate during the period from 1st January 2011 to 31st of December 2015.

Instrument	Number	Percentage
Assault rifle	95	63.8%
Shomma	14	9.4%
Hand gun	14	9.4%
Iron pipe	8	5.4%
Sword/axe	7	4.7%
Rock	3	2%
HMCA	3	2%
FFH	2	1.3%
Unknown	3	2%
Total	149	

HMCA: homicidal motor car accident; FFH: fall from height.

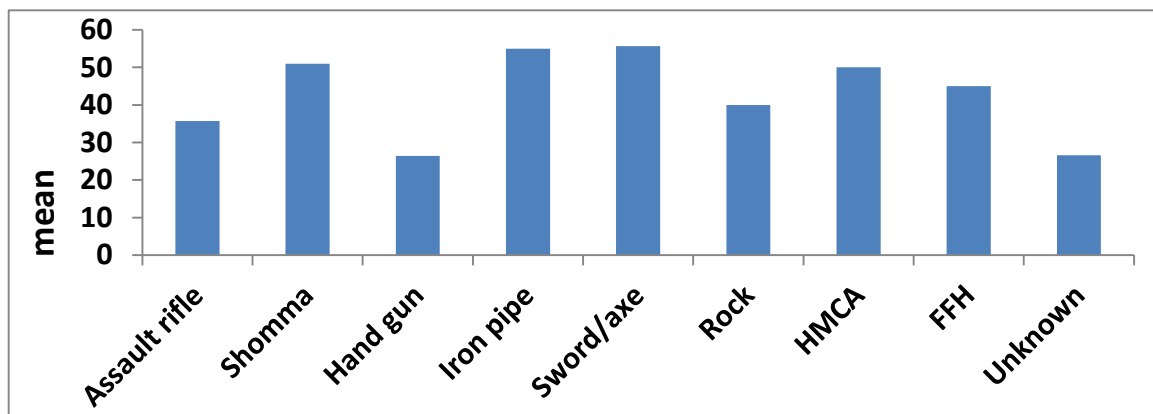


Figure 5: Mean age of victims autopsied by the Egyptian forensic authority in Qena governorate during the period from 1st January 2011 to 31st of December 2015 with different causative instruments

Table 5: Manner of death of victims autopsied by the Egyptian forensic authority in Qena governorate during the period from 1st January 2011 to 31st of December 2015 according to causative instrument

Instrument	Manner of death (Number/Percentage)				Total	Percentage
	Accidentally	Homicidal	Suicidal	Unknown		
Assault rifle	22 (23.2%)	62 (65.3%)	0	11 (11.6%)	95	63.8%
Shomma	0	14 (100%)	0	0	14	9.4%
Hand gun	10 (71.4%)	1 (7.1%)	2 (14.3%)	1 (7.1%)	14	9.4%
Iron pipe	0	8 (100%)	0	0	8	5.4%
Sword/axe	0	7 (100%)	0	0	7	4.7%
Rock	1 (33.3%)	2 (66.7%)	0	0	3	2%
HMCA	0	3 (100%)	0	0	3	2%
FFH	1 (50%)	1 (50%)	0	0	2	1.3%
Unknown	0	1 (33.3%)	0	2 (66.7%)	3	2%
Total	34 22.8%	99 66.4%	2 1.3%	14 9.4%	149	

Data expressed in form of frequency (percentage). HMCA: homicidal motor car accident; FFH: fall from height

Table 6: Time of death of victims autopsied by the Egyptian forensic authority in Qena governorate during the period from 1st January 2011 to 31st of December 2015 with different causative instruments

Instrument	Time of death (Number/Percentage)				Total	Percentage
	Immediately	Within hours	Within days	Unknown		
Assault rifle	80 (84.2%)	12 (12.6%)	2 (2.1%)	1 (1.1%)	95	63.8%
Shomma	2 (14.3%)	3 (21.4%)	9 (64.3%)	0	14	9.4%
Hand gun	12 (85.7%)	1 (7.1%)	1 (7.1%)	0	14	9.4%
Iron pipe	2 (25%)	1 (12.5%)	3 (37.5%)	2 (25%)	8	5.4%
Sword/axe	4 (57.1%)	1 (14.3%)	2 (28.7%)	0	7	4.7%

Rock	2 (66.7%)	1 (33.3%)	0	0	3	2%
HMCA	2 (66.7%)	1 (33.3%)	0	0	3	2%
FFH	2 (100%)	0	0	0	2	1.3%
Unknown	1 (33.3%)	0	0	2 (66.7%)	3	2%
Total	107 (71.8%)	20 (13.4%)	17 (11.4%)	5 (3.4%)	149	

Data expressed in form of frequency (percentage). **HMCA**: homicidal motor car accident; **FFH**: fall from height

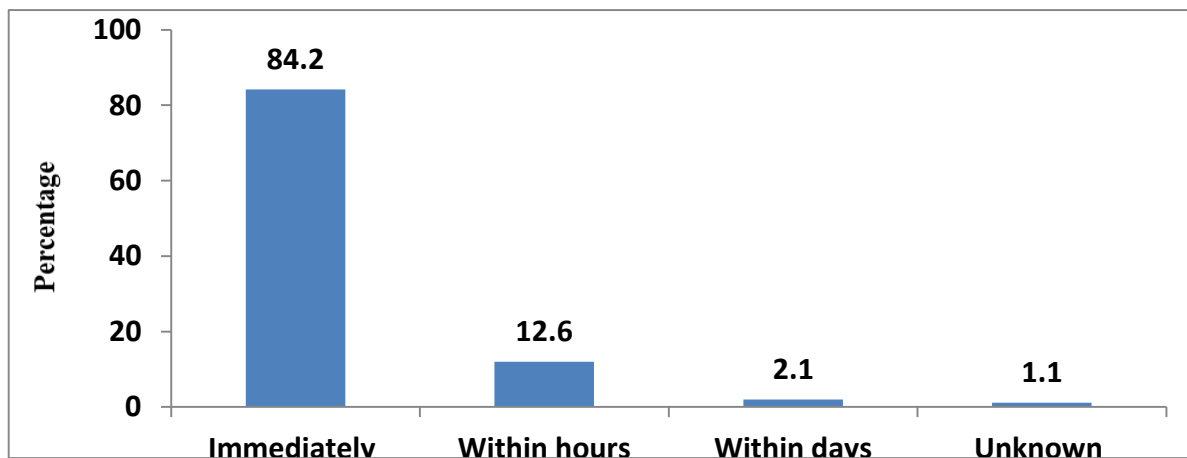


Figure 6: Time of death in autopsied victims autopsied by the Egyptian forensic authority in Qena governorate during the period from 1st January 2011 to 31st of December 2015 with assault rifle as cause of death

Table 7: Site of bone fracture according to causative instrument in victims autopsied by the Egyptian forensic authority in Qena governorate during the period from 1st January 2011 to 31st of December 2015

Instrument	Bone fracture						Total	Percentage
	Frontal	Parietal	Temporal	Occipital	Base	Jaw		
Assault rifle	47 (50%)	82 (86.3%)	49(51.6%)	35 (37%)	58(61.1%)	16 (17%)	95	63.8%
Shomma	4 (28.6%)	11 (78.6%)	9 (64.3%)	3 (21.4%)	5 (35.7%)	0	14	9.4%
Hand gun	3 (21.4%)	7 (50%)	5 (35.7%)	5 (35.7%)	12(85.7%)	5 (35.7%)	14	9.4%
Iron pipe	1 (12.5%)	6 (75%)	5 (62.5%)	1 (12.5%)	7 (85.7%)	0	8	5.4%
Sword/axe	1 (14.3%)	4 (57.2%)	4 (57.1%)	1 (14.3%)	2 (87.5%)	1 (14.3%)	7	4.7%
Rock	1 (33.3%)	2 (66.7%)	1 (33.3%)	0	1 (33.3%)	0	3	2%
HMCA	2 (66.7%)	2 (66.7%)	2 (66.7%)	1 (33.3%)	1 (33.3%)	2 (66.7%)	3	2%
FFH	1 (50%)	2 (100%)	2 (100%)	0	1 (50%)	1 (50%)	2	1.3%
Unknown	3 (100%)	3 (100%)	3 (100%)	3 (100%)	3 (100%)	1 (33.3%)	3	2%
Total	63(42.3%)	119 (80%)	80(53.7%)	49 (33%)	90 (60%)	26 (17%)	149	

Data expressed in form of No. and percentage HMCA: homicidal motor car accident; FFH: fall from height

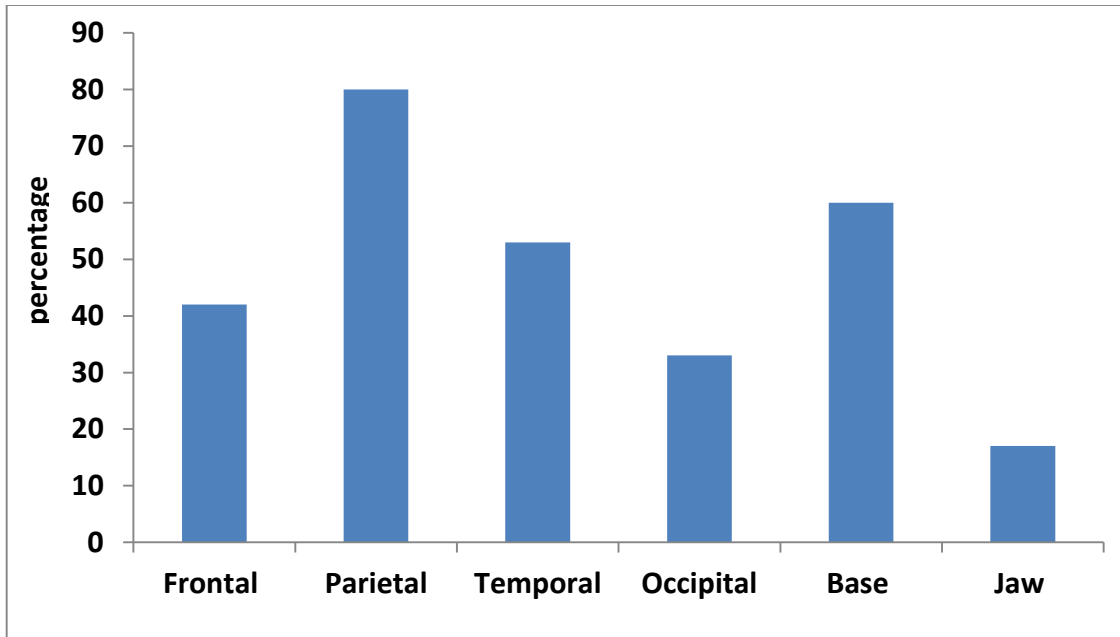


Figure 7: Site of bone fracture in all autopsied victims by the Egyptian forensic authority in Qena governorate during the period from 1st January 2011 to 31st of December 2015

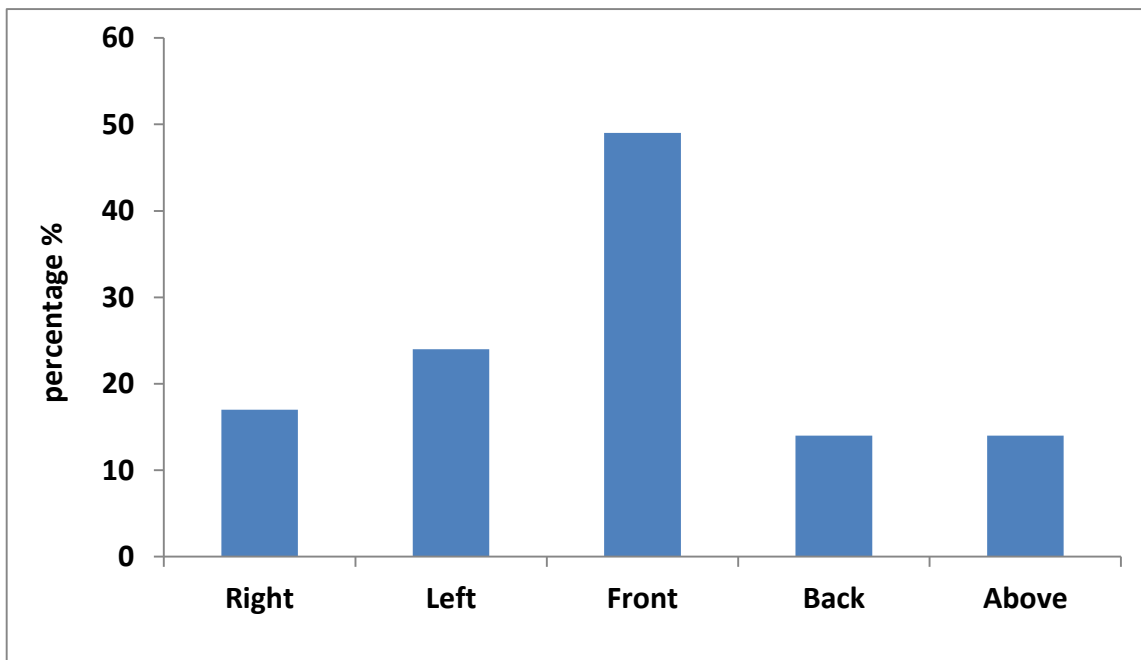


Figure 8: Site of injury in all autopsied victims by the Egyptian forensic authority in Qena governorate during the period from 1st January 2011 to 31st of December 2015

Table 8: Brain hemorrhages with different causative instrument in victims autopsied by the Egyptian forensic authority in Qena governorate during the period from 1st January 2011 to 31st of December 2015

Instrument	Brain hemorrhage				Total	Percentage
	Epidural	Subdural	Subarachnoid	Cerebral		
Assault rifle	91 (95.8%)	89 (93.7%)	92 (96.8%)	90 (94.7%)	95	63.8%
Shomma	6 (42.9%)	9 (64.3%)	10 (71.4%)	4 (28.6%)	14	9.4%
Hand gun	13 (92.9%)	13 (92.9%)	14 (100%)	13 (92.9%)	14	9.4%
Iron pipe	5 (62.5%)	6 (75%)	7 (87.5%)	4 (50%)	8	5.4%
Sword/axe	2 (28.6%)	3 (42.9%)	7 (100%)	5 (71.4%)	7	4.7%
Rock	2 (66.7%)	2 (66.7%)	3 (100%)	1 (33.3%)	3	2%
HMCA	2 (66.7%)	2 (66.7%)	3 (100%)	2 (66.7%)	3	2%
FFH	0	1 (50%)	2 (100%)	0	2	1.3%
Unknown	3 (100%)	3 (100%)	3 (100%)	3 (100%)	3	2%
Total	124 (83.2%)	128 (85.9%)	141 (94.6%)	122 (81.9%)	149	

HMCA: homicidal motor car accident; FFH: fall from height

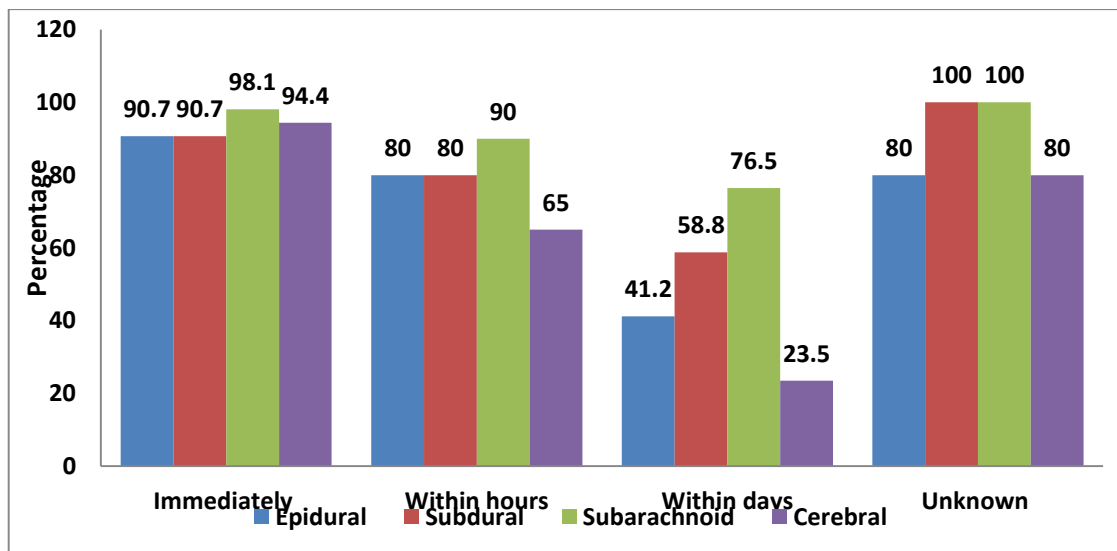


Figure 9: Time of death in autopsied cases regarding type of brain hemorrhage in victims autopsied by the Egyptian forensic authority in Qena governorate during the period from 1st January 2011 to 31st of December 2015

Table 9: Brain injuries in relation to causative instrument in victims autopsied by the Egyptian forensic authority in Qena governorate during the period from 1st January 2011 to 31st of December 2015

Instrument	Brain injuries			Total	Percentage
	Laceration	Contusion	Edema		
Assault rifle	84 (88.4%)	88 (92.6%)	0	95	63.8%
Shomma	4 (28.6%)	13 (92.9%)	1 (7.1%)	14	9.4%
Hand gun	13 (92.9%)	14 (100%)	0	14	9.4%
Iron pipe	4 (50%)	7 (87.5%)	0	8	5.4%
Sword/axe	2 (28.6%)	5 (71.4%)	1 (14.3%)	7	4.7%
Rock	1 (33.3%)	3 (100%)	0	3	2%
HMCA	2 (66.7%)	3 (100%)	0	3	2%
FFH	2 (100%)	2 (100%)	0	2	1.3%
Unknown	3 (100%)	3 (100%)	0	3	2%
Total	115 (77.2%)	138 (92.6%)	2 (1.3%)	149	

Data expressed in form of No. and percentage. HMCA: homicidal motor car accident; FFH: fall from height

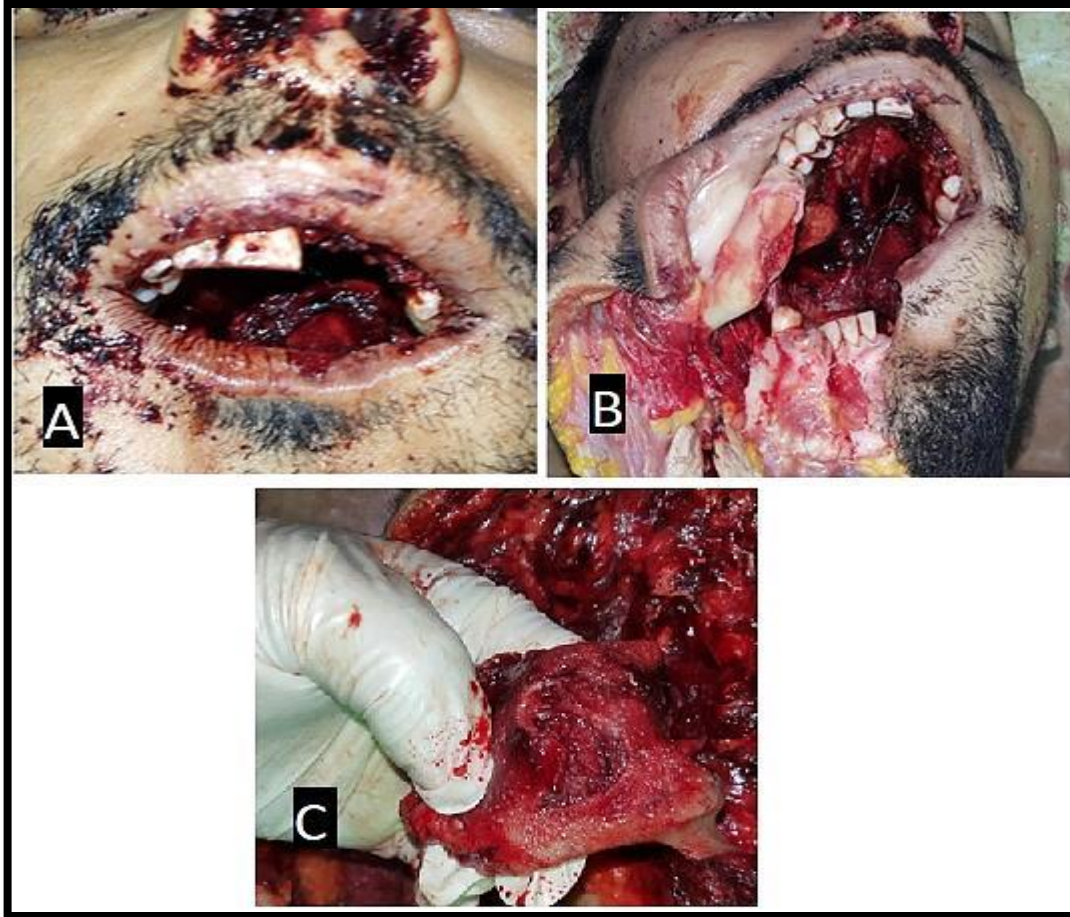


Photo 1: Atypical homicidal inlet wound



Photo 2: Tattooing surrounding two inlet wounds

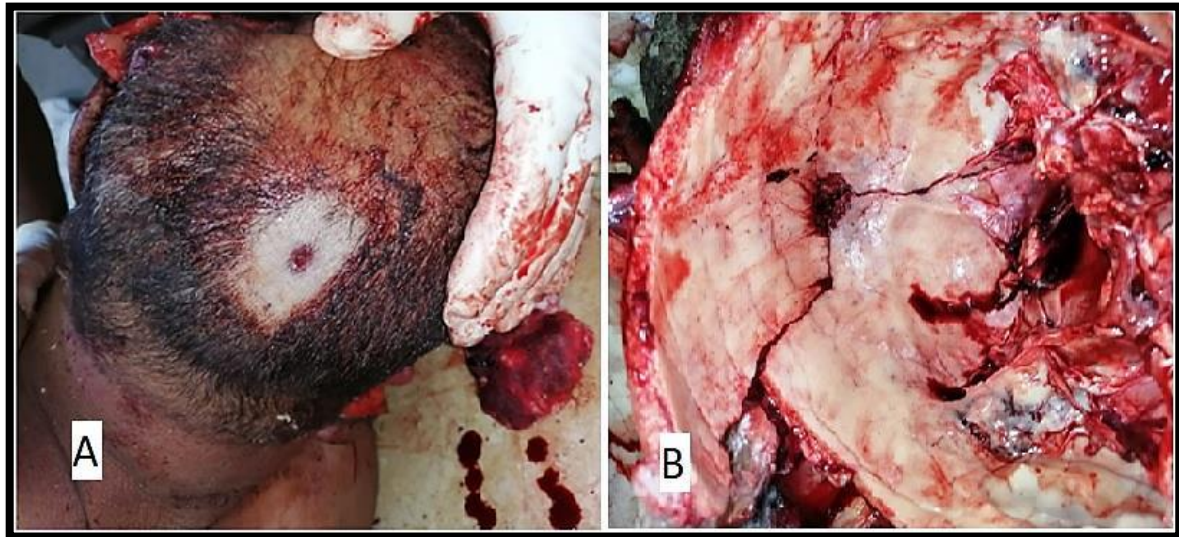


Photo 3: Bone beveling



Photo 4: Ricochet

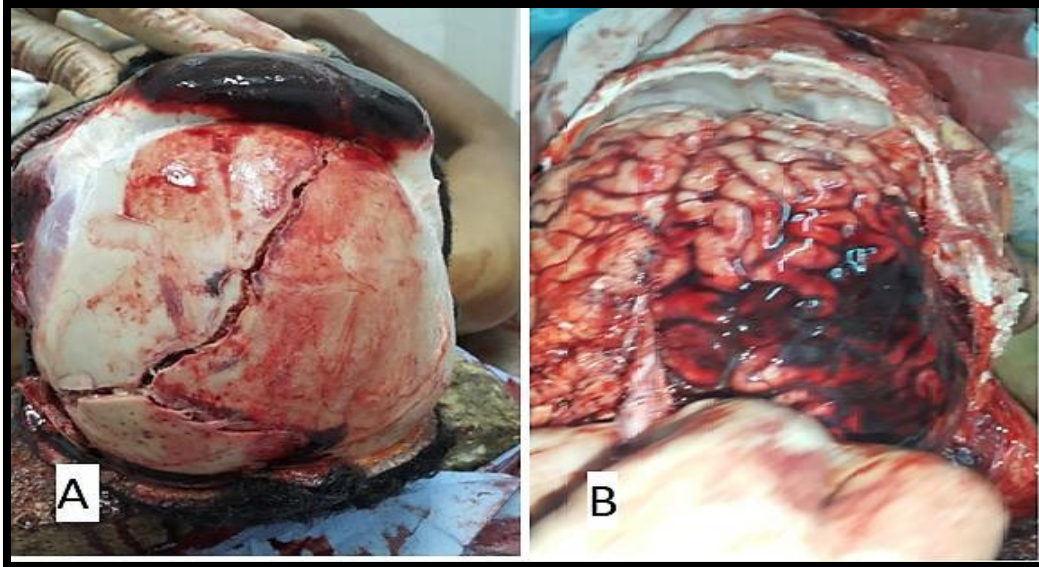


Photo 5: Countercoup bleeding

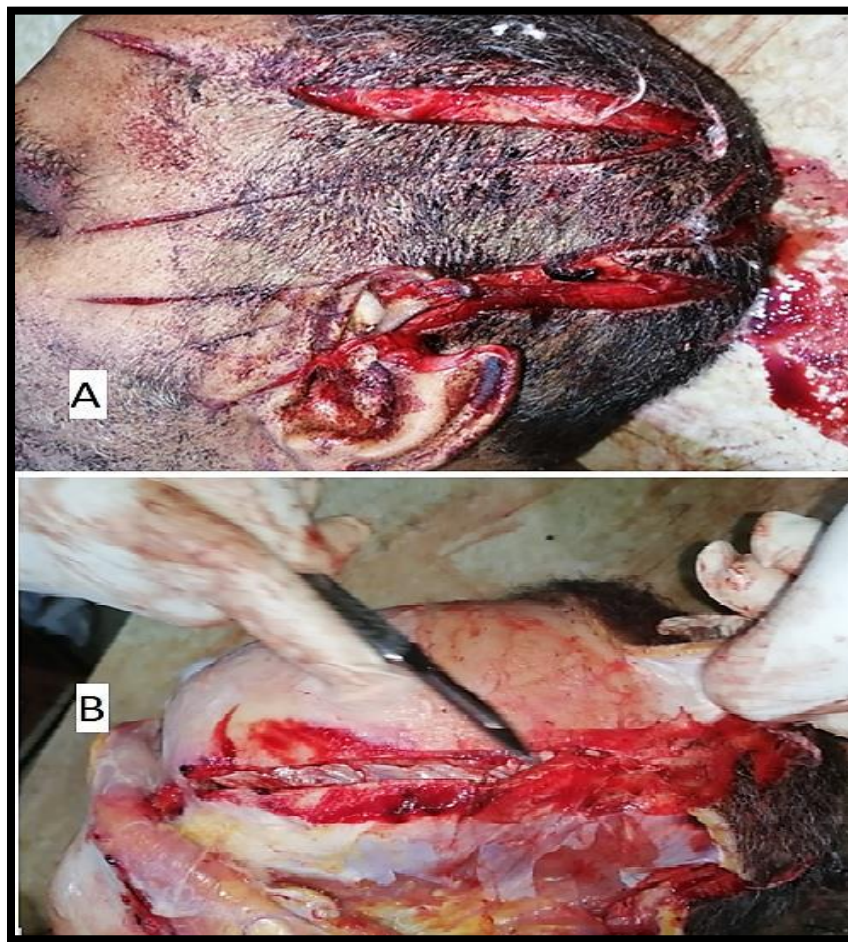
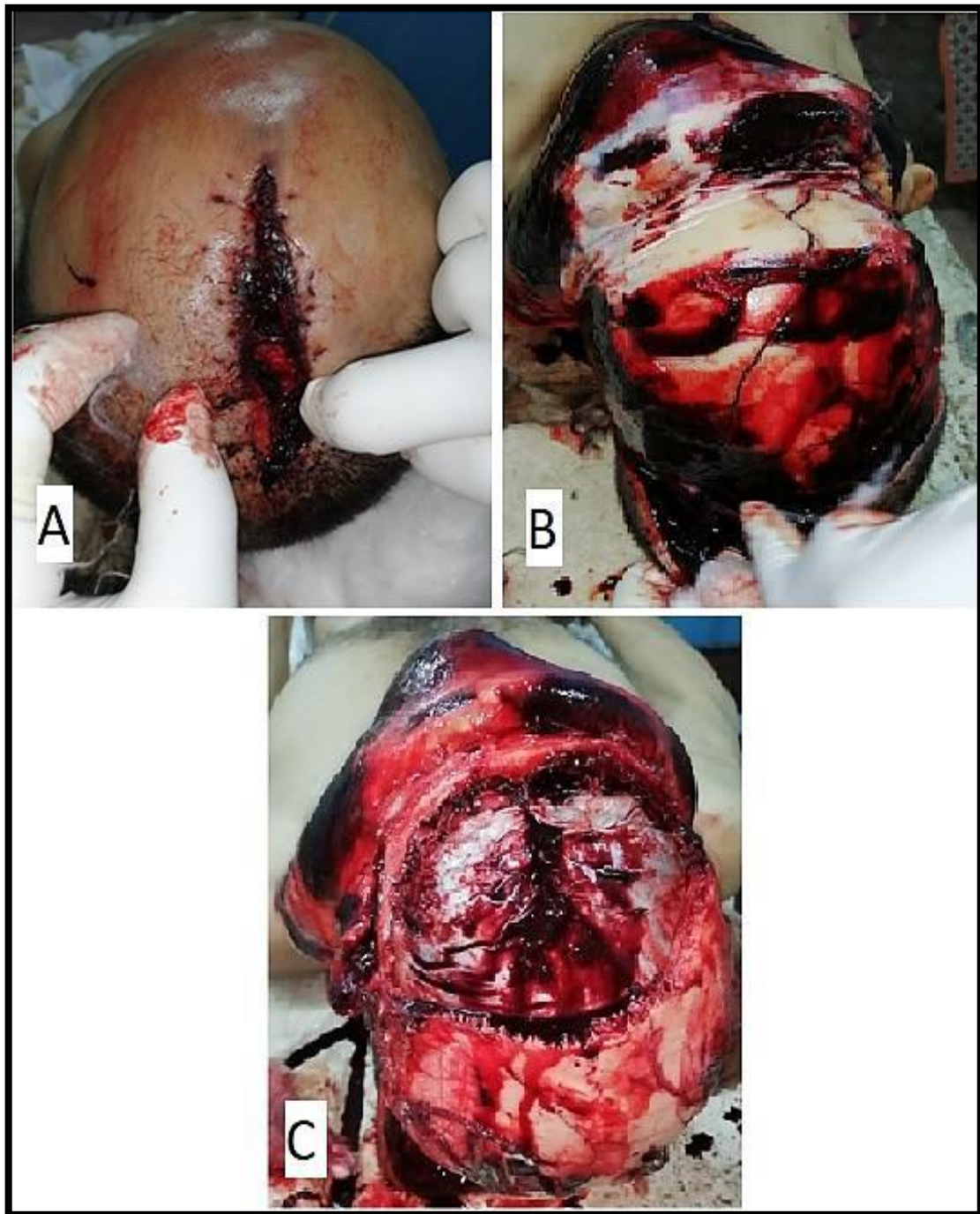


Photo 6: Cut wounds and a cut fracture to the skull



**Photo 7: Hematomas in the scalp (A)
fissure fracture to the skull (B)
extra dural hemorrhage (C)**

IV. DISCUSSION

Head injuries are considered a worldwide health problem (Tagliaferri et al., 2006). It consumes a lot of financial resources and man power (Langlois et al., 2006). It causes the highest number of deaths and infirmities in people below 40 years old (Basso et al., 2001). Although forensic studies produced a lot of data in different countries but comparing the data of these studies is hard because they have different definitions of the term head injury as well as different inclusion and exclusion parameters (Aenderl et al., 2014).

In the current study, among the 149 examined cases, the head injuries were common in older age > 50 years old (32.3%). In contrary of that, most head injury victims, in a study done in Bangladesh by Akber et al., (2016), was found to belong to a younger age group i.e. 21-40 years (43.34%) as was found in studies in India (Parmar et al., 2015) and Tunisia (Khelil et al., 2018)

Regarding sex, the present study revealed that majority of examined victims was males (130 cases) which represented 87.2% of examined cases, while only 19 victims (12.8%) were females. This may be attributed to the traditions in Upper Egypt related to assault, which consider assaulting a female a shameful insult to the attacker and by the fact that males by their nature participate more in violent activities than females. That agrees with what was reported in central India, as 67.26% of the examined cases were male victims (Parmar et al., 2015). Also Akber et al., (2016) and Hsu, et al., (2018), showed male preponderance (63.10%) in the Bangladesh study and (62.1%) in the Taiwanese study.

Regarding manner of death, the current study revealed that the majority of cases were homicidal 99 cases, 85 cases were male victims and 14 cases were female victims, taking into consideration that proven accidental motor car accidents were excluded from the study since they are not autopsied in Egypt. In this context, it may be stressed that the bad traditions (crimes of revenge) in upper Egypt may be the prominent cause for the high rate of homicidal cases.

This agrees with the study among 5649 cases of head injuries in Bangladesh, where (13.22%) of the cases were homicidal and (8.88%) were accidental (Akber et al., 2016). Also Pate et al., (2017) found high incidence of homicide in the age group of 21-30 years in India (36.57 %).

In the current study, the highest number of autopsied head injury cases occurred in Dishna division (39 cases out of 149 injuries) with highest incidence of head injuries (10/100000 inhabitants, which is attributed to the high number of crimes of revenge in this region.

Also, the highest number of autopsied head injury cases (45 cases) was during summer, which can be attributed to the hot summer climate especially in May and July and its effect on human behavior and higher number of people in the streets on summer.

These results were inconsistent with (Tabish et al., 2006 & Kasmaei et al., 2015) studies in Kashmir and Iran respectively, as they found that spring is the season with most injuries.

The relation between the age and the causative instrument revealed that victims with sword/axe head injuries had

the highest age (55.7 ± 19.8 years) followed by iron pipe (55 ± 11.9 years) and shomma (51 ± 18.3 years). Least mean age was noticed with those had head injuries secondary to hand gun (26.4 ± 13.9 years) which is attributed to the fact that older people in upper Egypt favors using these weapons in their fights because these weapon are used by them as normal tools in their life.

The present study revealed that majority of head injuries were secondary to assault rifle 95 cases (63.8%) and most of them (62 cases) were homicidal. Also, eighty of those assault rifle cases (84.2%) died immediately and 12 cases (12.6%) of them were associated with death within hours. While, Shomma and hand gun were the second frequent causative instruments in the current study as 14 cases represented (9.4%) for each. These results showed that the assault rifle is the weapon of choice in Upper Egypt and is the most dangerous, and its victims had lowest chance to be treated since most victims die immediately.

This agreed with Chattopadhyay and Tripathi, (2010) in India who realised that firearms were the most commonly used weapons in homicide. While, Ghangale et al., (2003) in Nagpur (India) found that sharp weapons were the most common type of weapon used in homicides. Also, Akber et al., (2016) in Bangladesh, stated blunt weapon tops the list of causative weapons (89.22%) than firearms (8.07%) and sharp pointed weapons (2.68%). And Kasmaei et al., (2015) in Iran found that falls from height was the most common mechanism of trauma (62%).

In the current study, it was noticed that the majority of victims 107 cases (71.8%) died immediately after head

injuries, while 20 cases (13.4%) died within hours, only 17 cases (11.4%) died within days (table 13 and figure13). This coincide with the study of Mohanty et al., (2005) in India in which the majority of the victims died instantly or within 24 hours.

In the current study it was noticed that out of examined victims the most common type of fracture was fracture of parietal bone found in 119 cases (80%) followed by base fracture in 90 cases (60%) while the least common fracture was jaw fracture in 26 cases.

This coincide with Akber et al., (2016) in Bangladesh, as they found fractures of occipital bone in (34.53%) followed by parietal bone in (28.29%), frontal bone in (15.01%), temporal bone in (13.75%), anterior Cranial fossa in (3.21%), posterior Cranial fossa in (3.07%) and middle cranial fossa fractures in (2.08%). Also, in another head injury study done by Mohanty et al., (2005) in India, it was noticed that the skull was fractured in more than 80% of the victims. Also, Menon and Nagesh (2005) in manipal India found skull fractures in 62% of his cases, which involved vault and base equally.

The present study declared relation between the site of injury and the causative instrument. The most frequent site of injury was the front that occurred in 73 cases (49%) followed by the left (24.2%), the right (17.4%), the back (14.8%) and the above (14.8%). In this context, it can be understood that the front injury enables the attacking person to be sure of the victim personality and the left side injuries were much more common than the right side where a weapon other than firearms was used (shomma -sword-axe), which can be attributed to the higher percentage of the

population favoring their right hands, which will cause more injuries on the left side of a victim standing in front of the assailant.

In the current study, it was noticed that brain hemorrhage was common in the studied victims. Out of 149 victims, 124 cases (83.2%) had epidural hemorrhage, 128 cases (85.9%) had subdural hemorrhage, 141 cases (94.6%) had subarachnoid hemorrhage and 122 cases (81.9%) had cerebral hemorrhage.

This agrees with DiMaio and DiMaio (2001), as they stated that the subarachnoid hemorrhage was the most common type of hemorrhage caused by head injuries. Also, intracranial hemorrhages were seen in 47 victims out of 77 cases in a study in India by (Mohanty et al., 2005).

V. CONCLUSION

In conclusion, there were a high number of head injuries in qena governorate during the duration covered by the study. Most of them were males and common among those of age above 50 years old. Head injuries were more common during summer. Also, it was high in Dishna division. The assault rifle was the weapon of choice. Most cases died immediately due to skull fractures, brain hemorrhages, contusions and lacerations.

Recommendations

The police should increase searching for and confiscating the illegal weapons specially assault rifles. There should be more police presence especially in Dishna and especially during summer. Hand guns – even licensed ones – should only be in the hands of well-trained persons since it is the most common cause of accidental head injuries. Head injuries should always be taken very

seriously and patient should be taken to and admitted in hospital immediately because even if death was not immediate it still may happen even after days of the injury. Awareness campaigns should be done in different parts of Qena making people understand the gravity of head injuries. Brain surgery department and a brain surgery intensive care unit should be present in all hospitals not only in big ones.

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الملخص العربي

التقييم الطبي الشرعي للإصابات المميتة بالرأس: دراسة مرجعية للحالات المشرحة بمحافظة قنا بجنوب مصر

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مقدمة: صممت الدراسة الحالية لتحليل البيانات الديموغرافية لضحايا إصابات الرأس القاتلة و التقييم الطبي الشرعي لهذه الإصابات مع تسجيل بعض أنماط و أشكال وأسباب إصابات الرأس القاتلة. شملت هذه الدراسة ضحايا إصابات الرأس القاتلة، والتي تم تشريح جثتها في محافظة قنا على مدى خمس سنوات من 1 يناير 2011 إلى 31 ديسمبر 2015. تم جمع البيانات من تقارير التشريح في قسم الطب الشرعي بقنا بأرشيف وزارة العدل. شملت هذه الدراسة 149 ضحية. وكانت الغالبية 130 حالة من الذكور بينما كانت 19 ضحية فقط من الإناث. كان أسلوب الوفاة هو القتل العمد في غالبية الحالات (66.4%). و وقع أكبر عدد من القضايا في قسم دشنا (39 حالة). بلغ معدل الإصابة الكلي لإصابات الرأس في محافظة قنا 4.7 لكل 100000 نسمة. وحدث أكبر عدد من الحالات في الصيف (45 حالة). و كان شهري مايو و يوليو هما الأكثر تكرارًا (22 حالة لكل منهما). وكانت أكثر الأدوات المسببة شيوعاً بين الحالات التي تم فحصها هي البندقية الهجومية (95 حالة). و توفي معظم الضحايا (71.8%) مباشرة بعد إصابات الرأس. و تم العثور على نزيف في المخ في جميع ضحايا الدراسة. و كانت الكدمات والجروح الرضية موجودة بشكل متكرر بالحالات. حدثت الوفاة على الفور في معظم حالات تهتك و تكدم الدماغ. في الختام توصلت نتائج الدراسة الى انه كان هناك عدد كبير من إصابات الرأس في محافظة قنا خلال الفترة التي تغطيها الدراسة. كان معظمهم من الذكور و كانت الإصابات أكثر شيوعاً خلال فصل الصيف و كانت أعلى نسبة إصابات في محافظة دشنا. كانت البندقية الهجومية هي السلاح الأكثر استخداماً. وتوفيت معظم الحالات على الفور بسبب كسور في الجمجمة ونزيف و تهتك و كدمات في المخ.