FIRE ARM INJURY TO THE HEAD: A TWO YEARS EXPERIENCE AT DEPARTMENT OF NEUROSURGERY LADY READING HOSPITAL, PESHAWAR

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ABSTRACT

Objective: To determine the outcome of head injury due to fire arm in Lady Reading Hospital, Peshawar.

Material and Methods: This observational study was conducted in Neurosurgery Department of PGMI, Lady Reading Hospital Peshawar from 1st June 2014 to 31st may 2016. Patients of all ages with either sex were included in this study, while those patients of firearm having associated thoracic, abdominal or pelvic injuries were excluded. All the data was collected by using a Performa. Data was analyzed by descriptive statistics using SPSS software version 17.

Results: Out of total 165 head injury patients due to firearm, 125 (76%) were males and 40 (24%) were females. Most of the patients 132(80%) patients were in age range 21-40 years. At the time of initial presentation majority of the patients (79%) presented with mild to moderate head injury. Major radiological findings were intra parenchymal bleed/ contusions (73.5%) followed by brain edema (62.4%). Most of the patients 147(89.09%) needed surgical intervention were operated while 18(10.89%)were managed conservatively. The mortality rate was 28.48%.while 88(53.33%) were referred to local hospitals for long term neuro-rehabilitation.

Conclusion: Majority of our patients having FAI to the head were young males,who sustained this injury due to homicide attempt,most of them presented in the state of unconsciousness classified into mild to moderate head injury. The major radiological findings in immediate CT scan were brain contusion, intra parenchymal bleed and bone fragments inside brain requiring surgical intervention.Initial presenting GCS score seemed to be most reliable factor affecting the ultimate outcome.

Key Words: Head Injury, Firearm, Outcome, Gunshot wound.

INTRODUCTION

Over the years, due to the growing hostility in the world in general and in Pakistan in particular, the incidence of firearm injurries to the head is alarmingly raising. Which may be attributed to the poverty, property dispututes, social intolerance and escalating trends of terrorism and extremisim[2]. it is considered as a major health problem and is a more frequent cause of death and disability that is challenging the already compromised economy and under resourced health services of the country[5]. Unfortunately, Very limited data from Pakistan available to highlight the contributions of firearm injuries to morbidity and mortality. Frequencies of homicidal firearm injuries/deaths range from 61.8% in Sindh to 78.5% in Peshawar.[1] Weapons are known for their high levels of lethality, and firearms account for every 4 out of 10 homicides globally. Firearm injuries may be caused by attempted suicide, homicide and/ or unintentional injuries due to various factors[6]. The head and neck region has been demonstrated to be the preferred area for intentional self-inflicted gunshot wounds[7,8].

Globally injuries accounts for 16% of the world load of disease. In 1990, 5 million people died due to trauma and injuries and the number is expected to rise to 8.4 million by year 2020. The age group most venerable to receive injuries ranges from 17–25 years with male exceeding the female,the potential earners and work force for a country.[3]

Our understanding of outcomes associated with FAI to the head in this part of the world is severely limited. The aim of the our study therefore was to investigate the different aspects of FAI on the our population and the impact of these on outcomes.

MATERIAL AND METHODS

This observational study was carried out on 165 patients of FAI, conducted in Neurosurgery Department of PGMI, Lady Reading Hospital Peshawar from june 2014 to may 2016. After permission from hospital ethical committee, the study was carried out on all patients admitted in Neurosurgery Department Lady Reading Hospital Peshawar, with the diagnosis of gunshot

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wounds to the head and meeting our inclusion criteria. The patients was undergo thorough history, detailed clinical examination and relevant investigations including computerized tomographic (CT) scan of brain with bone window. They were managed as per standard protocol of Advanced Trauma Life Support (ATLS) and Penetrating Traumatic Brain Injury (TBI) management protocol. All patients underwent surgical debridement and repair of Dura wherever possible (as per standard guidelines), and were received pre-operative and post-operative broad spectrum injectable antibiotics to prevent infection. All the observations and examination were carried out properly during inpatient period and follow-up visit and data was recorded in a pre-designed Proforma . Exclusion criteria had been followed strictly to control confounders and bias in the study results.

The data was analysed using the statistical program SPSS version 17. Outcome was stratified among the age, gender & initial Glasgow coma scale (GCS) score to see the effect modifiers. Post stratification chi-square test was applied keeping P-value 0.05 as significant. Results were presented in the form of various tables, charts & graphs.

RESULTS

Out of total 165 head injury patients due to firearm 125(76%) patients were male and 40(24%) patients were female .Age distribution was analyzed as 19(12%) patients were in age range 1-20 years, 132(80%) patients were in age range 21-40 years, 14(8%) patients were in age range >40yrs. Mean age was 28 years with SD ± 2.71. Regarding nature of injury most of our patients, i.e., 147 (89.0%) sustained FAI due to homicide, 10(6.06%) due to suicide,and 8(4.85%) due to aerial firing.

The most common clinical feature of the patients presented with firearm was loss of consciousness (150 patients), followed by other symptoms, like bleeding from the wound, while fits were present in 45 patients and lastly 11 patients were having focal neurological deficit at the time of presentation without loss of consciousness,mostly aerial firing cases and those homicide cases having tangential trajectory to the skull bone,the suicidal cases were deeply comatosed and presented with most serious injuries.

Initial GCS score among 165 patients was analyzed as 53(32%) patients had GCS score 13-15, 79(48%) patients had GCS score 9-12, 33(20%) patients had GCS score 3-8. Mean GCS score was 11 with SD ± 2.66. (as shown in Table- II) (Figure II).

Major radiological findings were intraparenchymal bleed/contusions 136(82.42%), brain edema 118(87.69%), followed by bone pieces in the brain 67(40.60%) (Table- I). Majority of the patients, i.e., 147 (89.09%) needed surgical intervention and were treated accordingly, while 18(10.89%) patients were treated conservatively.47(28.48%)patients expired in hospital, i.e. the early (in hospital)mortality rate was 28.48%. 30 patients (18%) had satisfactory condition at discharge to home, while 88 (53.33%) patients were referred to local hospitals for continued medical and nursing care before finally being discharged home from there. Mortality in those patients couldn't be calculated.

DISCUSSION

Weapons are known for their high levels of lethali-

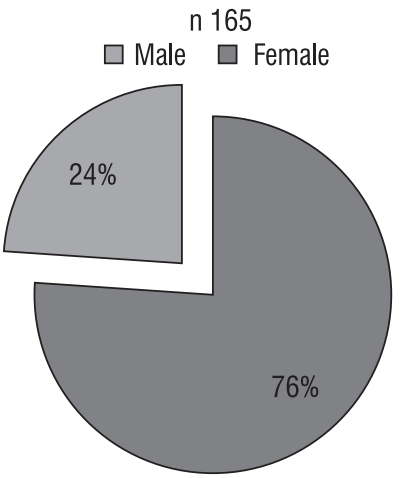


Figure 1: Gender-wise Distribution

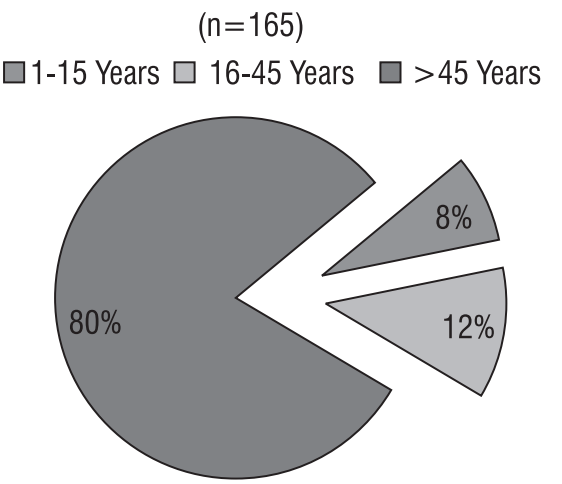


Figure 2: Age-wise Distribution

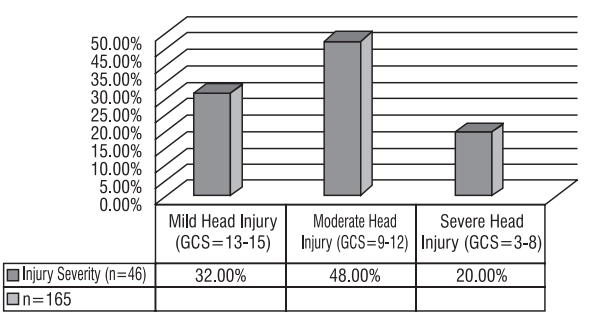


Figure 3: Injury Severity

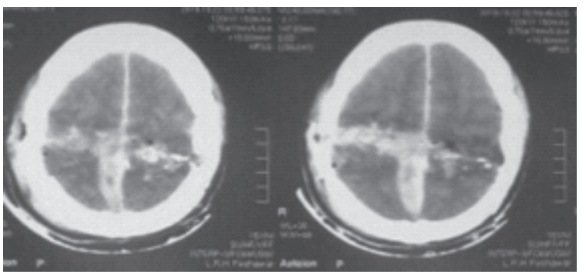
Table 1: Radiological Findings

Findings	No. of Patients	% age
Intraparenchymal Bleed/ contusion	136	82.42
Brain edema	118	71.51
Bone pieces in brain	67	40.60
Depressed skull fracture	52	31.51
Perforating (skull # on both sides of cranial vault)	07	4.24
Subgaleal bullet	05	3.03

Table 2: Initial GCS Score (n=165)

GCS score	Frequency	Percentage
13-15 mild	53	32%
9-12 moderate	79	48%
3-8 severe	33	20%

Mean GCS score was 11 with SD ± 2.66



CT scan of our patient, bullet entering from right and exiting left side skull

ty, and firearms account for every 4 out of 10 homicides globally. Firearm injuries may be caused by attempted suicide, homicide and/or unintentional injuries due to various factors6. The head and neck region has been demonstrated to be the preferred area for intentional self-inflicted gunshot wounds[7,8].

The injuries caused by bullets are far more lethal and damaging in the long run for survivors, as compared to blunt trauma to the head. The reason being that bullets penetrate the tissues and cause damage and destruction internally.

Firearm injury is one of the grave problem in our country in general and our province in particular because of the growing trends of violence,intolerance,social injustice,property disputes, deteriorating law and order situation and terrorism.[7] Countries with relaxed attitudes to gun possession liscensing control have higher numbers of deaths related to FAI and probably every second house in Khyber Pakhtunkhwa households posses atleast single hand gun or automatic riffle this has put the law enforcement agencies on toes to meet the challenge of controlling violence trends.[12-14]

Firearm is the first weapon of choice in homicide cases in Pakistan and this is the reason of growing trend of reciving gunshot wounds to head in our neurosurgical department,in the current study 89% of our cases was the result of homicide attempts in civil conflicts.[1]

The gender distribution of the cases under study heavily tilted towards male gender being 76% of all cases,this demographic distribution data is comparable with national and international studies.[16] The findings of 80% of victoms between 16– 45 years of age group is following the generally reported worldwide trends[17, 18] and a similar trend has been reported in other cities of Pakistan,[19,20] like Marri et al[17] in their study on homicidal deaths in Peshawar conclude that males constituted 86.15% of the victims of homicide; Bashir et al[22] in their 12-year study from Lahore reported that 88% were males with 42% being in the age range of 21–30 years.

In our study we observed that there is a significant correlation between the presence of trans-ventricular or bi-hemispheric central type trajectory and high mortality. The patients presenting with unilobar and/or supra tentorial wounds had a better outcome as compared to those having bi-lobar or multi lobar gunshot wounds,this may be our next question to investigate in upcoming study, the fact has been quoted by Can M et al[9].

As there is maximum involvement of individuals in the economically productive years, FAI mortalities have an important economic impact. Therefore, preventive measures focusing at these high-risk groups are important to reduce the incidence of head injury.

Majority of the patients, i.e., 147 (89.09%) needed surgical intervention in the form of major surgery like craniotomy, debridement duroplasty,contusionectomy,elevation of depressed skull fracture and retrieval of accessible bone fragments.Tracheostomy was done in all cases requiring mechanical ventilation and/or associated maxilo facial injuries.The 18 patients treated conservatively, all were managed in the ward because they had minimal injuries and did not require mechanical ventilation, most of these cases were caused by aerial firing/stray bullets, and bullets hardly penetrated skull bone, a few even didn't cross inner table of the skull. As it is evident from the above discussion that majority of these patients required specialized neurosurgical ICU care and surgical intervention, thus costed heavy economical burden on the health budget and hospital resources in particular and society in general.

As a general protocol we subjected all our patients to urgent CT brain doesn't matter how trivial initial clinical picture was which helped us identify cases with non penetrating bullets causing to fracture skull bone and develop extradural hematomas, we observed that even mild head injury caused by non-penetrating injury approximately 10% of patients may still suffer a significant intracranial injury and will benefit from neurosurgical intervention, also quoted in international and national

studies.[5,25] The CT scan provides valuable information about the extent and location of penetrating injury that can be used for prognosis and surgical decision making.[26,27] CT scan of our patient, bullet entering from right and exiting left side skull.

Our ultimate understanding of firearm injury cases leads us to believe that basic difference in management from closed head injury is, more frequent requirement of surgical intervention in firearm related head injury. Moreover management starts from emergency room of the hospital as there is no concept of on site resuscitation and medical care in our country due to scanty health care resources,the golden hours have already been passed once we receive patients at neurosurgery department but still the strict application of ATLS protocol,efficient triaging and swift and accurate referral of patient to our department along with CT brain already done at emergency department has helped improved outcome of such cases. FAI to the head is always a challenging modality to manage because of the fact that pre-hospital mortality remains very high and the in hospital mortality is as high as 95%29. Owing to the high mortality objective approach to gunshot injuries should be the prevention, as the famous saying, "Prevention is better than cure". Furthermore, preventive strategy e-g legislation to reduce the availability of guns should help in reducing the cases of death and firearm related morbidities of head injury.[12]

There were few limitations of our study. first, we were unable to do proper follow up of patients due to limited resources hence our data represent picture of in-hospital cases and ends at discharge or referral of patient for neuro re habilitation, thus the mortality rate does not include late mortality (after discharge from hospital) Secondly it was a single center trial, a multi-centered trial is necessary to give any recommendations. Despite this, the data presented in this article will provide important sum of information on the nature and severity of injuries due to FAI in Khyber Pakhtunkhwa and it will assist with planning to deal with these head injuries in our part of the world.

CONCLUSION

From this study we concluded that:majority of our patients having FAI to the head were young males,who sustained this injury due to homicide attempt,most of them presented in the state of unconsciousness classified into mild to moderate head injury. the major radiological findings in immediate CT scan were brain contusion,intraparenchymal bleed and bone fragments inside brain requiring surgical intervention.

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