

Fire Arm Injury to the Head: A One Year 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 January 2010 to December 2010. 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 46 head injury patients due to firearm 37 (80.43%) were males and 9 (19.56%) were females. Most of the patients (73.91%) were in the age range of 16 – 45 years. At the time of initial presentation majority of the patients (65.21%) presented with mild to moderate head injury. Major radiological findings were intraparenchymal bleed / contusions (69.56%) followed by brain edema (58.69%). Most of the patients (76.08%) needed surgical intervention and were treated accordingly. The mortality rate was 15.22%. Seventeen patients had satisfactory condition at discharge, while 22 were referred to local hospitals for neuro-rehabilitation.

Conclusion: Majority of our patients was young males and the most common presenting age range was 16-45 years. Most of our patients (91.30%) sustained firearm due to homicide. At the time of initial presentation majority of the patients (65.21%) presented with mild to moderate head injury. Thirty five patients (76.08%) needed surgical intervention and were treated accordingly. Mortality rate was 15.22%.

Key Words: Head Injury, Firearm, Outcome, Brain edema.

INTRODUCTION

Head injury is considered as a major health problem and is a more frequent cause of death and disability that makes considerable demands on health services. Over the years, firearm injury (FAI) has experienced international episodes of epidemic and endemic nature, particularly in the South Asia, USA, South Africa, Italy and Finland. Very limited data from Pakistan also 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

Firearm injury is a global problem and poses a

considerable dilemma in a developing country like ours, where poverty and violence are dominant.² 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 vulnerable to receive injuries ranges from 17 – 25 years with male exceeding the female.³ The frequency of FAI varies from place to place depending on high gun possession in different parts of the world.⁴

Most firearm injuries are the result of enmity, communal clashes, domestic disputes and / or lastly the suicide. The high morbidity and mortality of FAI to

the head imposes a challenging burden on hospitals, families and society.⁵

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

MATERIAL AND METHODS

This observational study was carried out on 46 patients of FAI, conducted in Neurosurgery Department of PGMI, Lady Reading Hospital Peshawar from January 2010 to December 2010. Patients of all ages with either sex were included in this study, while those patients of Firearm having associated thoracic, abdominal or pelvic injuries at the time of presentation were excluded. All the data was collected and analyzed by descriptive statistics using software SPSS version 17.

All the patients were undergone through detailed history, clinical examination and relevant investigations including computerized tomographic (CT) scan of brain with bone window. All patients were managed as per standard protocol of ATLS, like any other patient of trauma, by taking care of the airway and breathing, restoration and maintenance of hemodynamics was taken and optimal environment for the brain (by taking care of intracranial pressure) was provided.

Those patients who need surgical intervention were subjected to pre-operative preparation, like complete blood count (CBC) and viral serology (HbsAg and Anti-HCV Ab) were done. Blood and surgical disposables were arranged accordingly. An informed consent was taken, explaining the prognosis. The ethical approval was taken from the hospital ethical committee, "Postgraduate Medical Institute, Institutional Research and Ethics board". The management and outcome of the patients were reviewed.

RESULTS

Sex Incidence

Out of total 46 head injury patients due to firearm 37 (80.43%) were males and 9 (19.56%) were females.

Age Range

Most of the patients (73.91%) were in the age range of 16 – 45 years, while 7 (15.21%) patients were in

the age range of 1 – 15 years and there were only 5 (10.86%) patients above 45 years (Figure 1).

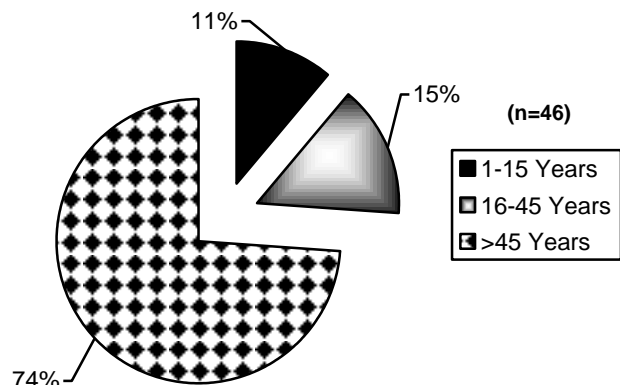


Figure 1: Age – wise Distribution.

Table 1: Age Range.

Sex	Number	Percentage
Male	37	80.43
Female	9	19.56
Total	46	100

Clinical Presentation

Regarding nature of injury most of our patients, i.e., 42 (91.30%) sustained FAI due to homicide and only 4 (8.7%) due to suicide.

The most common clinical feature of the patients presented with firearm was loss of consciousness (30 patients), followed by other minor symptoms, like bleeding from the wound or nose and / or ear, CSF leak, vertigo, dizziness and tinnitus (21 patients), while fits were present in 11 patients and lastly 3 patients were having focal neurological deficit at the time of presentation.

At the time of initial presentation the Glasgow Coma Scale (GCS) of majority of the patients (65.21%) were between 9 – 15, i.e. they presented with mild to moderate head injury, while 34.78 % of the patients presented with severe head injury (Figure 2).

Major radiological findings were intraparenchymal bleed / contusions (69.56%), brain edema 58.69%, followed by bone pieces in the brain 47.82% (Table 2). Majority of the patients, i.e., 35 (76.08%) needed surgical intervention and were treated accordingly, while 11 patients (23.91%) were treated conservatively. Out

Table 2: Radiological Findings.

Findings	No. of Patients	Percentage
Intraparenchymal Bleed / contusion	32	69.56
Brain edema	27	58.69
Bone pieces in brain	22	47.82
Depressed skull fracture	08	17.39
Perforating (skull # on both sides of cranial vault)	05	10.86
Subgaleal bullet	02	4.34

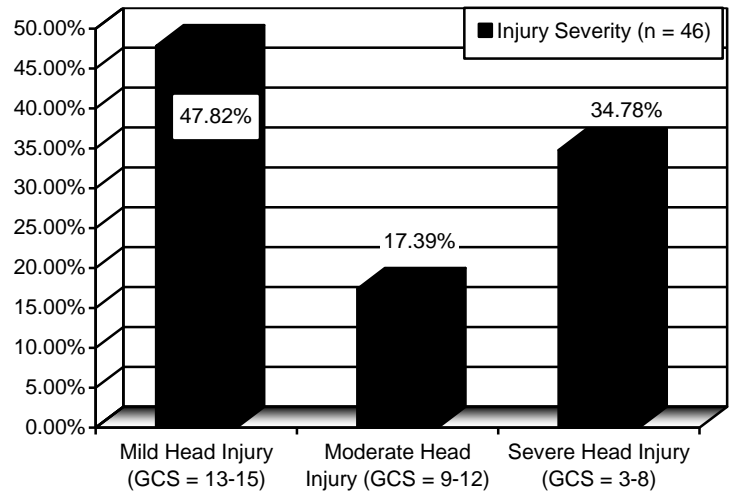


Figure 2: Injury Severity.

of total 46 patients of head injury due to FAI 7 expired, i.e. the mortality rate was 15.22%. Seventeen patients (36.95%) had satisfactory condition at discharge, while 22 (47.82%) were referred to local hospitals.

DISCUSSION

The morbidity and mortality related with FAI is relatively quite high in Pakistan, when we compared this with developed world. This difference is probably because of the fact that in the developed countries, there is stable socio-economic status than South-Asian countries where poverty and deprivation of basic necessities lead to commission of various crimes.⁶

Firearm injury is one of the commonest problem in our community because of the legally and illegally acquired weapons by the people, increasing violence, robbery, other forms of interpersonal violence and increasing rate of suicide.⁷ There is clear cut evidence that countries with relaxed attitudes to gun control have higher numbers of deaths related to FAI.⁸⁻¹⁰

The most common methods of homicide worldwide are firearms, stabbing, and blunt head injury. In USA the most frequent number of deaths in cases of homicide is by use of firarms.¹¹ When we compare this statistics with the present study, so it is obvious in our study that about 91% of the nature of FAI is homicide. This is in line with other studies in Pakistan where firearm is the first weapon of choice in homicide.¹

Male were dominant in our study with about 80% and this data is comparable with national and international studies.¹² The findings of 74% of victims between 16 – 45 years of age is in accordance with the generally reported worldwide trends^{13,14} and a similar

age pattern has been reported in other cities of Pakistan,^{15,16} like Marri, et al¹⁷ in their study on homicidal deaths in Peshawar conclude that males constituted 86.15% of the victims of homicide; Bashir et al¹⁸ in their 12 – year study from Lahore reported that 88% were males with 42% being in the age range of 21 – 30 years. Studies from other parts of Pakistan also report similar findings.¹⁹ Furthermore, the very high rate of homicide in our community and the involvement of young males is because of very low literacy rate, poverty and easy and economical availability of the arms.

In the current study about 35% of the patients presented with severe head injury (GCS = 3 – 8). But in an international study²⁰ the rate of severe head injury patients was more than 50%. This disparity is due to inclusion of patients with co morbid diseases in that study, while we exclude those patients.

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., 35 (76.08%) needed surgical intervention in the form of major surgery like craniotomy (11 cases), debridement and dressing (19 cases) and tracheostomy (5 cases). On the other hand 11 patients (23.91%) were treated conservatively, of those 9 were managed in the neurosurgical ICU and 2 in the ward. Again it is observed that majority of our patient required surgical intervention and ICU care, which poses economical burden on the society as well, besides other burdens and this, could easily be reduced if there is prevention of FAI.

All the patients in present study were either had CT scan with them or we did in timely fashion. This is now standard treatment that a patient with FAI to the head should undergo a head CT scan as early as possible. It must never be postponed even in spite of mild head injury because approximately 10% of patients with non-penetrating injury may still suffer a significant intracranial injury and will benefit from neurosurgical intervention.^{5,21} The CT scan provides valuable information about the extent and location of penetrating injury that can be used for prognosis.^{22,23}

The ultimate insight in managing the patients of head injury due to FAI is "Time is brain," as only a fraction of second could cause the devastating neurologic harm. The relevant damage evolves in the time span after the incident and any achieved outcome correlates to the time between injury and the time of intervention and postoperative management.²⁴ Having said that an efficient course of action is crucial and it requires a well – trained team, including proper trauma assessment through the ATLS protocols and then effective referral to the neurosurgical facilities for the definitive management.

Regarding outcome of our patients, 39 (84.78%) were discharged and of those 17 (36.95%) were having satisfactory condition, while 22 (47.82%) were referred to local hospitals, because these patients of head injury need prolonged rehabilitation including physiotherapy, therefore, these were referred to appropriate local hospitals for neuro-rehabilitation.

In the present study mortality rate was 15.22% (7 patients). 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%.²⁵

The objective approach to gunshot injuries is the prevention, as the famous saying for every disease, "Prevention is better than cure". Furthermore, preventive strategy should be adopted by everyone, like: legislation to reduce the availability of guns should help in reducing the cases of death and firearm related morbidities of head injury.⁸

There were few limitations of our study, firstly we did not collect and / or data from the first hospital or primary health care center the patient attended, and it is possible that this would bias the results, like injuries sustained by the patients, GCS of the patients and particularly the objective assessment of head injury severity. 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 Peshawar 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:

1. Majority of our patients were young males and the most common presenting age range was 16 – 45 years (73.91%).
2. If we look at the nature of FAI, so most of our patients, i.e., 42 (91.30%) sustained FAI due to homicide.
3. The most common clinical feature of the patients presented with firearm was loss of consciousness (30 patients).
4. At the time of initial presentation the Glasgow Coma Scale (GCS) of majority of the patients (65.21%) were between 9 – 15, i.e. they presented with mild to moderate head injury.
5. Major radiological finding was intraparenchymal bleed / contusions (69.56%) followed by brain edema (58.69%).
6. Majority of the patients, i.e., 35 (76.08%) needed surgical intervention and were treated accordingly.
7. The mortality rate was 15.22% in patients of head injury due to firearm injury.

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