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Incidence, pattern and outcome of stray bullet injuries: three years' experience in a teaching institute

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ABSTRACT

Objectives: The purpose of this study is to better define incidence, pattern, and outcome of stray bullet. **Material and methods:** The current study summarizes the data on stray bullet injuries presenting to the emergency department Hayatabad medical complex, Peshawar, from January 2016 to November 2020. A total of 24 subjects were included for three years. We enrolled all patient who had head or spine injuries caused by stray bullet. Data were extracted on Demographic profile, site of injury, operative procedure, complication and mortality, were recorded on prescribed proforma. Data was analyzed using SPSS version 20.0 and presented in tabulated form.

Results: A total of 24 subjects were included for 3 years.17 (70%) were male patients and 7 (30%) were females. Male to female ratio was 2:1. out of 24 cases 9 (37.5%) from district Peshawar, 3 (12.5%) cases from Mardan and Charsadda district, and 2 (8.3%) cases from Swat. 12 cases had bullet in Head and face. out of which 7 were supratentorial 3 cases had bullet in the posterior fossa. Out of 24 cases, 13 (54.1%) were operated for the removal of bullets.5 (20.8%) developed focal or generalized fits. 13 (54.1%) developed neuro deficit. 4 (16.6%) of cases remain in vegetative state, and overall mortality rate is 20%. **Conclusion:** Morbidity and mortality due to stray bullets is an increasing problem in our society. The aim of this study is to bring awareness among the concerned authorities to try and bring an end to this menace resulting in deaths and misery.

Keywords: Incidence, Outcome, Stray bullet injuries

INTRODUCTION

A stray bullet is a bullet, fired form gun and hits an accidental target. Such type of shooting occurs as a result of celebration or crossfire. It is widely practiced in the Middle East, northern India's south Asian region, Pakistan, especially the Khyber Pakhtunkhwa Province, Afghanistan, and parts of Latin America (Ali SA, et al., 2015). In our province the most common occasion for stray bullet shooting is wedding, New Year celebrations, political victories, disintegration of gathering by police and victory in cricket/Hockey match. On returning to the ground the bullet may fall on some one's head spine other part of the body. The extent of such injuries may be either superficial or very deep causing fatal outcome (Batley N, et al., 2016 and Fei SY, et al., 2012).

Stray bullet shooting leads to sense of insecurity and fear in community. These events are commonly reported in media but less studied. In literature the epidemiology of stray bullet shooting is not clearly mentioned. It is possible that not all stray bullet shootings were recognized, there is vast differential reporting related to severity of outcome, and missing data were common (Malik AM, et al., 2013). A study by the U.S. Centers for Disease Control and Prevention (CDC) found that 80% of celebratory gunfire-related injuries are to the head, feet, and shoulders (Wintemute GJ, et al., 2011 and Wani AA, et al., 2011).

A bullet's terminal velocity is determined by a number of factors. The bullet composition is one of them. Because of its high specific gravity and high weight per volume, lead is used in the majority of bullets. As a result, lead bullets would have less air drag per mass as they fall, resulting in a higher terminal velocity. The angle of firing is another aspect that affects the terminal velocity. The bullet will fly further and faster over terminal velocity if the angle is between 20° and 45° or even more acute (Rhee PM, et al., 2016 and Wintemute GJ, et al., 2012).

The mortality rate from falling bullets is about 32%, which is significantly higher than the 2%–6% mortality rate from non-failing bullets, despite the latter's effect having a much greater ability to kill. According to many reports, the head is the most frequent site of injury (Abdali HA, et al., 2018).

Till date, no such clear data available regarding the epidemiology, pattern and outcome of stray bullet in the region of Khyber Pakhtunkhwa. The purpose of this study is to better define stray bullet induce pathology and its consequences.

MATERIAL AND METHODS

The current study summarizes the data on stray bullet injuries presenting to the emergency department Hayatabad medical complex, Peshawar, from January 2016 to November 2020. The study was approved by the hospital ethical and research committee. HMC is KPK's largest tertiary care center, with nearly 49,000 annual patient visits. A retrospective chart analysis of patients of all ages who presented to the emergency department was conducted. We enrolled all patients who had head or spine injuries caused by stray bullet. Exclusion criteria included any bullet injuries that were not explicitly listed as stray bullets by the attending physician in the ED at the time of injury and those patients who were brought dead in ED. Data were extracted on: injured body part, admission to hospital, number of days spent in hospital, site of injury, operative procedure, complication and mortality and were recorded on prescribed proforma. Additionally, demographic variables such as age, gender, area of distribution were also noted. Data was analyzed using SPSS version 20.0 and presented in tabulated form.

RESULTS

Age and Sex

A total of 24 subjects were included for 3 years. 17 (70%) were male patients and 7 (30%) were females. Male to female ratio was 2:1. Among these patients, the most common age group was 30-40 years (Table 1).

Age in years	Sex		Total no. of cases
	Male	Female	
01-Oct	2	0	2
Oct-20	3	1	4
20-30	4	2	6
30-40	7	1	8
40-50	0	2	2
50 and above	1	1	2

Table 1: Age and Gender Distribution.

Area Distribution

Out of 24 cases 9(37.5%) from district Peshawar, 3 (12.5%) cases from Mardan and Charsadda district, 2 (8.3%) cases from Swat, Bannu and Deer district and one each from kuram agency, Malakand agency and Bara. The predominance of 37% from district Peshawar

signifies the increase in built up area and thickly populated city, makes the general population more vulnerable to injuries and death from stray bullet (Table 2).

Table	2:	Area	distribution	
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District	No. of cases	Frequency
District Peshawar	9	37.50%
District swat	2	8.30%
District Deer	2	8.30%

District Mardan	3	12.50%
District Charsadda	3	12.50%
District Bannu	2	8.30%
kuram Agency	1	4.10%
Malakand Agency	1	4.10%
Barra	1	4.10%

Outcome

10 cases were pronounced dead on arrival in neurosurgical center and were not included in the study: 12 cases had bullet in Head and face. Out of which 7 were supratentorial 3 cases had bullet in the posterior fossa with large hematoma and severe compression. Out of 24 cases, 13 (54.1%) were operated for the removal of bullets: 8 from cranium, 2 (8.3%) from neck area which is outside the canal and deep in muscle and 2 (8.3%) from dorsal and 1 (4.1%) bullet remove from lumbar spine removed (Table 3).

Table 3: Frequency of the patients by different characteristics.

Characteristics	No. of patients	Frequency
Location		
head and face	12	50%
neck	2	8.30%
spinal column (in the canal)	3	12.50%
spinal column (outside the canal)	4	16.60%
extremities	3	12.50%
surgery		
operated	13	54.10%
non operated	11	48.50%
Outcome		
Neurodeficit	13	54.10%
fits	5	20.80%
wound complication	8	33.30%
vegetative state	4	16.60%
mortality	5	20.80%

Out of 7 supratentorial cases had 3 had hemiplegia and 1 case were aphasic before operation; 2 cases developed left sided hemiparesis after operation and they were discharged home. Posterior fossa cases made good recovery, but on follow-up 1 developed hydrocephalus and needed shunt procedures. A total of 24 cases, both

in operative and nonoperative group developed complications. 13 (54.1%) developed neurodeficit 5 (20.8%) developed focal or generalized fits 4 (16.6%) of cases remain in vegetative state, and overall mortality rate is 20% (Figures 1-4).



Figure 1: X-ray skull lateral view showing bullet in the skull.



Figure 2: X-ray skull AP view showing bullet in the skull.



Figure 3: CT Scan brain showing bullet inside the brain tissue.



Figure 4: Per-operative picture of bullet inside cranium vault.

DISCUSSION

In Pakistan, injuries from stray bullets are not uncommon. The majority of these bullets are shot into the air during wedding ceremonies. These bullets have the potential to inflict significant brain injury, with potentially fatal consequences. The occurrence of stray bullet injuries to the brain that do not result in neurological deficit is extremely rare. There is a lot of literature available on bullet injuries in general and most of them are found in Newspapers (Siraj mu, et al., 2010).

In our study male were most commonly affected as compared to female and the most communal age group In this study the most communal site of stray bullet is head and face 12 (50%) area followed by spinal column (outside the canal) in 4 (16.6%). 13 (54%) patients were operated for removal of bullet. 4 (16%) went in to persistent vegetative state. the overall mortality rate was 20%. similarly results were reported by Azaz Ali shah in 1994 in leady reading hospital, Peshawar (Martucciello G, et al., 2012).

Apart from loss of life and injuries, there is great burden on resources of the state. There should be legislation against issuing prohibited bore licenses and aerial firing on any occasion; mass education of the public through different media available and prompt police action against law breakers. Issue of license for any weapon should be subjected to a person's sound mental and psychological health. Moreover, issuing such a license should be vigilantly scrutinized.

As one can realize, this study is just the iceberg to the greatly increasing problem. It is recommended that more surveys are conducted at the center and peripheral levels, as many cases remain unreported from the periphery. These studies would produce awareness among doctors and concerned officials of the state so that gradually the menace is eradicated from our society, and the wasting of innocent lives avoided.

Firing in air is a Social evil and there is no doubt that it should be stopped at any cost: Whether it is by legislation or mass education. It has taken lots of innocent lives; has put extra burden on economy and resources and has devoted the attention of doctors to an issue which is avoidable.

CONCLUSION

Morbidity and mortality due to stray bullets is an increasing problem in our society. The neurosurgical department of Hayatabad medical complex, Peshawar has studied skull and spine injuries. The aim of this study is to bring awareness among the concerned authorities to try and bring an end to this menace resulting in deaths and misery.

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