Aerial Firing and Stray Bullet Injuries: A Rising Tide

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Background: Aerial firing is shooting, using fire arm, into the air usually during a celebration.

Objectives: This observational study aimed to quantify magnitude and impact of stray bullet injuries by aerial firing at surgical emergencies of the Liaquat University Hospital (a university hospital), Hyderabad, Sindh, Pakistan from January 2009 to December 2010 (2 years).

Patients and Methods: During the study period, 144 firearm injuries due to stray bullet reported to the A and E departments of the university hospital. All patients referred to surgical unit providing emergency cover on that day irrespective of the severity of the injury for medico-legal reasons. For this study, the cases were divided into those having trivial injury and do not require any active surgical intervention and those having serious injury mandating surgical intervention. One hundred and two cases of stray bullet injury sustained trivial injury and followed as outpatients after an overnight period of indoor hospitalization; however, 42 patients with stray bullet injuries requiring surgical intervention were hospitalized.

Results: The most common events leading to aerial firing and stray bullet injuries were marriage ceremonies, followed by a political rallies and New Year celebrations. Stray bullet injury also reported after aerial firing on cricket/hockey team victories, Pakistan Independence Day (14th August), cultural day in Sindh and Basant (Kite) festival in Punjab. The most frequent sites with serious stray bullet injury were chest (15), head and neck (10), abdomen (9) and limbs (8), respectively. Surgical interventions performed included chest intubation, exploration of wound tract to retrieve bullet if lodged superficially and was palpable, laparotomy to managed intra-abdominal injury, reduction of fracture site followed by reconstruction, flap reconstruction and graft for nonhealing wound. The mean duration of hospital stay was 19 days. No mortality was observed in this series of patients.

Conclusions: We conclude that the prevalence of aerial firing resulting in stray bullet injuries is alarmingly on rise in our country. Above all, those doing aerial firing do not considered it as crime, instead taken it as they are privileged to do anything when celebrating. Awareness of the consequences must be propagated by every means to condemn this social crime.

Keywords: Wounds and Injuries; Management; Pakistan

1. Background

Aerial firing is shooting, using fire arm, into the air usually during a celebration. It is culturally practiced and accepted in middle east, south Asian region of northern India, Pakistan especially Khyber Pakhtunkhwa Province, Afghanistan and some parts of Latin America. The most common occasions for aerial firing include New Year celebrations and Christmas (1, 2). The other occasions varies from country to country like marriage ceremony, Islamic new year and Eid festivals in Islamic and Arab world, political strikes, rallies, gatherings, murderers, electoral victories and unrest in developing world, sport victories, especially football and soccer in European world (2-4). Fire arm experts studied and calculated the terminal velocity of falling bullet between 200 - 330 ft/s, which can penetrate the human skin. They also calculated that the verti-

cal shooting is less lethal than angulated shooting (5-7). The practice in Pakistan is more common in urban overcrowded living areas and may result in injuries and random deaths of innocent citizens, property damages with shattered windows, damaged roofs, damage overhead water tanks, gas and water pipelines are often found leaking after such celebratory aerial firing (7). In the Punjab Province, every year a lot of precious lives are lost during the Basant (kite) festival in city of Lahore (8). Even though some consider this as tradition, it is extremely dangerous and violation of the law. In densely population areas, this behavior is not illegal, but it's reckless. There is no way of predicting where these bullets will land (2). As in last two decades the prevalence of stray bullet victims attending our university hospital is on rise; hence, we design this

study to evaluate its prevalence, morbidity inflicted, area affected and management.

2. Objectives

This study was performed on 144 cases of stray bullet injuries referred from A and E departments to surgical emergency of Liaquat University Hospital Hyderabad/Jamshoro on call during last two years to document the impact and consequences of apparently harmless aerial firing.

3. Patients and Methods

A proforma was designed to record demographics, events resulting in injury, area of the body affected and management of the patients received stray bullet injuries. All cases with stray bullet injury were hospitalized. Patient having trivial injury; for observation and documentation; were hospitalized for not more than 24 hours; however, those having a serious injury were kept hospitalized to perform indicated surgical procedure(s) and relevant investigations. Investigations performed depend upon the site of injury and include baseline ultrasound, plain radiography as well as a Computerized Tomography (CT) scan. All cases with stray bullet injury were reported as medicolegal and therefore strict record keeping observed.

4. Results

From a total of 144 patients admitted with fire arm in all four surgical units (Liaquat University Hospital Hyderabad/Jamshoro Sindh Pakistan) during the period of the study, 133 cases (92.36%) were male and 11 cases (7.6%) were female. The patients aged from one-year old to 70-year old. One hundred and two patients (70.83%) with stray bullet injury were managed with follow-up surveillance as outpatients because nature of their injury found trivial. However, 42 (29.16%) patients with serious injuries were managed as indoor patients. In this series, the most common event where aerial firing done and consequently stray bullet injury sustained were marriage ceremony (56), followed by a political protest/unrest/rallies (35), New Year celebrations (28), cricket/hockey team victories (12), Pakistan Independence Day (14th August) (8), and Eid festival (5). However, the event that resulted serious injury due to stray bullet after aerial firing were New Year celebration (12) marriage ceremony (11) Independence Day (6), political protest (6) cricket team win (5) and Eid festival (2). The distribution of trivial and serious injury on different occasions is shown in Figure 1. In cases of serious injury, the most frequent sites with injury were chest ($n = 15$, 35.71%), head and neck ($n = 10$, 23.80%), abdomen ($n = 9$, 21.42%) and limbs ($n = 8$, 19.04%), respectively. All hospitalized cases of stray bullet injury underwent some surgical procedure. These include chest intubation, exploration of wound tract to retrieve superficially lodged bullet and to achieve homeostasis, laparotomy to managed intra-

abdominal injury, reduction of fracture site followed by reconstruction, flap reconstruction and graft for non-healing wound. During this series, 8 patients had more than 2 sessions of surgical procedure. All patients were followed regularly on weekly basis once discharged from the hospital. The mean duration of hospital stay was 13 days; however, no mortality was observed in this series of patients.

Figure 1. Distribution of Trivial and Serious Injury on Different Occasions

5. Discussion

Stray bullet shooting are unique subset of firearm related injury events. Most are unintended consequences of intention violence. "Collateral damage" is the term applied to death resulting from such act of terrorism. Stray bullet injuries by falling bullets are defined as gun fire injuries inflicted usually outdoors by an unidentified shooter (2, 3). In certain Middle East countries stray bullet injuries are seen at the wedding ceremonies, on the arrival of spring season and graduations (2, 4). In Pakistan, the phenomena is continues to rise for last two decades due to wide spread availability of automatic fire arms and ammunition. In the province of Sindh, the incidences of aerial firing due to dirty politics is increasing compared to other provinces, especially in the cities of Karachi and Hyderabad as different political, and ethnic groups show their power probably to impress other group. In these cities, low-educated and jobless youth is particularly more active. Unfortunately our educational institutes are also not exempted from such incidences as the main political parties have their active student wings. In Pakistan the practice is most commonly observed during the marriage season in the Islamic month of Shawal, friends of the bridegroom open celebratory aerial firing at the time of arrival at the marriage halls. Print and electronic media have reported that these bullets can cause disastrous consequences to bridegroom or any invited guests in the marriage ceremony or any other unknown victim remote from the site of marriage ceremony. There are plenty of literature and news reports available on the Internet and print media about stray bullet injuries; however, there are very few case reports and original articles in medical literature (9-14). We found chest as the most common site of the stray bullet

injury (35.71%), followed by head and neck region (23.80%) with no mortality, which is in sharp contrast to the finding of Al-Tarshihi who reported most (77%) stray bullet injuries are sustained to the head. He also reported 32% mortality rate which is significantly higher than all other type of gunshot injuries. He suggests that there is a need to educate the public and law enforcement is required to prevent these serious but preventable injuries (12). The Center for Disease Control (CDC) in United States of America has also reported that 80% of these stray bullet injuries are to the head, followed by feet and shoulder (13). Celebratory gunshots are often seen in big cities of Pakistan and densely populated areas. Shooters are single or multiple usually on a street. Victims are more commonly a male; however, it is not rare for children and women to be a victim as observed in our study (15, 16). Celebratory gun fire near an airport can be dangerous to landing air craft (17, 18). There are case report studies reported a bullet entering a gravid uterus of a pregnant women and resulting in the death of her fetus and a bullet entering directly into pericardium resulting in sudden death (19, 20). Moreover, CDC report from Puerto Rico showed that on average 2 died and 25 got injured annually as a result of celebratory firing on the occasion of New Year. Some media also reported that 68% stray bullet injuries victims on the New Year night with victims with the age range between 4 months and 82 years, 63% males and 37% females and 21% victims were hospitalized. Out of 68%, 21% were children with head (38%) the most frequent area hit by the stray bullet, followed by foot (26%) and shoulder (16%). Forty-two percent of injuries took place during late evening and night and 48% from mid-night till early morning next day (4, 21). The aerial firings and stray bullets injured innocent citizens, sometime fatally and the documented mortality of these victims is about 32% compared to 2%-6% normally associated with other type of fire arm injuries (22). Sometimes, these stray bullets are fired from a distance to far for the short to be heard but had a sufficient energy and velocity of more than 200 feet per seconds to penetrate the victim's body (5, 6). Wintemute et al. reported that 59.2% of the events of areal firing are due to violence on streets. He reported that among all incidence of aerial firing, 59.2% times it is the result of interpersonal violence. He also reported that age group most commonly affected is between 15 - 34 years with 50.2% male and 44% female. In his study, the victim wound location was frequently the extremities (35%), followed by abdomen (30%) and head and neck (20.5%) (23). Media reports such aerial firing and stray bullets leading to fatal injuries and death are punishable with the detention, imprisonment with variable period and heavy fine in various States of America (24). In addition to the homicidal, suicidal and accidental cases of fire arm injuries, aerial firing resulting in stray bullet injuries is a new tide rising in our country. Most of the people think that aerial bullets vanish in the air/space like explosives and fire work, but this is not true in fact these bullets make a projectile or vertical motion and come back to surface to hit anything which comes in

their way. Stray bullet injury is usually by a single bullet with wound of entry and most of the time they lodge in the subcutaneous areas and consequently there was no exit wound. Many of the victims are unaware of the fire arm event and hence a healthy number of them seek medical advice few days later (25). The incidence of stray bullet injuries are more common during the night hours as most of the victims at the time of incidence were sleeping on the roof of their houses during the summer. In tribal areas of Khyber Pakhtunkhwa (KPK) Province, birth of a male child is usually traditionally celebrated by aerial firing. However, these tribal areas are mountainary area not thickly populated; hence, the chances of injury are less compared to densely populated areas in cities. Almost all age group irrespective of sex are victims of aerial firing, but male adults are the usual victims. Stray bullet injuries are usually single and nonfatal then other type of bullet injuries as they usually lodge in subcutaneous tissues with less mortality and morbidity. Our youngest victim was a one-year old baby girl with a stray bullet impacted firmly to right femoral area through her pampers. Few of the patients with superficial palpable bullets causing discomfort were removed under local or short general anesthesia. The usual history narrated by the patients is injury by stone with sudden feeling of a wetness on the cloths, which reveals fresh blood. Some patient who received bullet while sleeping and unaware of the event report they have a rat bite last night and causing pain. Victims with abdominal or chest stray bullet injuries usually attend A and E departments soon after the event due to bleeding. Some of the patients of stray bullet injuries were picked up by radiographs. There are cases where the stray bullets after entering the body wanders to nearby area or remote areas like stray bullet hitting the cheek lodge into submandibular area, stray bullet hitting chest wall was wandering in abdominal cavity, bullet entering in the jejunum was drag down by peristalsis movements to the terminal ileum, intracranial migration and intra venous migration (9, 13, 14). Some of the patients had no knowledge as to how and when they had sustained bullet injury. Children are usually presented with a swelling or small wound for which no cause could be found in such cases, stray bullet should be suspected and radiological evidence can be helpful (25). Having said this, one cannot measure the psychological trauma associated with stray bullet injury, imagine a person relaxing at roof of the house and inflict fire arm injury for none. The house is even not safe place to avoid stray bullet injury. In Pakistan, section 144 of the law is imposed to prevent aerial firing during celebration if harm is caused, and an first investigation report (FIR) may be registered against a person who does so. However, many cases go unreported (3). As aerial firing is preventable; hence, existing laws should be actively enforced and secondarily community leaders of public housing areas should develop a campaign focused on changing attitudes and behaviors towards celebrating firearm in these areas. A concerted effort should be taken at preventing progression of fire-

arm use. Future research might combine active surveillance, with follow-up, interviews of victims to identify all cases and obtain more complete data. We conclude that prevalence of aerial firing resulting in stray bullet injuries is alarmingly on rise in our country. Above all, those doing aerial firing do not considered it as crime, instead taken it as they are privilege to do anything when celebrating. Awareness of the consequences must be propagated by every means to condemn this social crime.

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Authors' Contributions

Dr Syed Asad Ali conceived the idea of the research paper; therefore, the major theme of this paper was according to the idea of Dr Asad Ali. He collected data. Dr. Syed Mohammed Tahir prepared and revised the manuscript it and collected the data. Dr. Asadullah Makhdoom revised the manuscript and collected the data. Dr. Abdul Razaque Shaikh: Data collection. Dr. Akmal Jamal: Data collection.

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