

Pattern of civilian gunshot injuries in Irrua, Nigeria

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Summary

This retrospective review of 76 patients with gunshot wounds was undertaken to evaluate the pattern and outcome of civilian gunshot injuries in our region. The extremities were the most commonly affected site (51.5% of all gunshot wounds). Gunshot injuries were most common among young males in the third decade of life, and armed robbery was the cause of gunshot trauma in 69.7% of cases. Time from injury to arrival at hospital was less than 6 hours in 64.4% of cases. Wound exploration and debridement were the mode of treatment in the majority of cases. Hypovolaemia resulting from acute haemorrhage accounted for 52.9% of complications. The mortality rate was 5.3%. It is pertinent to observe that inefficient firearm control is a major factor contributing to civilian gunshot injuries in our region. In addition, high rates of unemployment and poverty in our society may be contributing to the increasing incidence of youth restiveness, armed robbery and associated gunshot injuries. Strong government legislation is required to provide adequate security for the teeming civilian population. The national government should embark on a poverty eradication strategy and engage the youth in gainful employment to reduce the incidence of youth restiveness, armed robbery and firearm-related violence.

Civilian gunshot injuries are becoming increasingly commonplace in many cities,¹⁻⁹ with increasing morbidity and mortality. The socioeconomic cost of civilian gunshot trauma is enormous, especially in developing nations. It is therefore important that trauma surgeons should be familiar with the management of gunshot injuries.

Gunshot injuries are typically classified as low velocity (< 615 m/second) or high velocity (> 615 m/second). A clear understanding of wound ballistics is important for effective management of gunshot injuries and has been well documented.¹⁰⁻¹⁶ However, clinical assessment of the wound and the state of the patient are the most important considerations in the treatment plan.

Proper management of bullet wounds requires a working knowledge of physical factors involved in the creation of such

injuries and the way in which they interact. Particularly important is the efficiency of energy transfer, which is dependent on the projectile's physical characteristics including deformation and fragmentation, kinetic energy, stability, entrance profile, path travelled through the body, and the biological characteristics of the tissues. Clinically this means that all gunshot wounds should be explored and debrided.

Treatment of associated fractures is generally dictated by the bony injuries, necessitating an approach similar to that in open fractures. Soft tissue plays a more crucial role in gunshot fractures, and grossly contaminated wounds mandate irrigation, appropriate debridement and use of open fracture protocols. Decompression and excision of necrotic tissue is the rule, with colour, consistency, contractility, and capacity to bleed providing valuable information on muscle viability.¹⁰ The principles of thorough excision and delayed primary wound closure are advocated.

In most developing nations there is no organised trauma service. Civilian gunshot injuries remain a significant cause of morbidity and mortality.

This article reviews the pattern of civilian gunshot injuries seen in a suburban teaching hospital and suggests control measures.

Patients and methods

A retrospective study was undertaken of the patterns and outcomes of gunshot injuries in 76 patients managed at the Irrua Specialist Teaching Hospital, Irrua, Edo State, Nigeria, between October 1999 and September 2004.

Hospital records of the patients were retrieved manually from the records department of the hospital. Demographic data, distribution of gunshot injury sites, causes of gunshot injury, type of gun used, time interval between injury and presentation to hospital, and treatment outcome were analysed using simple percentages and tables.

Results

A total of 101 gunshot wounds were recorded in 76 patients. The extremities were the most common injury site ($N = 52$, 51.5%) followed by the face ($N = 18$, 17.8%) and chest ($N = 17$, 16.8%) (Table I). The age and sex distributions are shown in Table II. Of the 76 patients, 70 were men and 6 were women. Incidence peaked in the 21 - 30-year age group

(*N* = 37, 48.7%). The median age was 30 years, with a range of 10 - 70 years.

The most common cause of the gunshot injuries was armed robbery (*N* = 53, 69.7%), followed by hunting accidents (*N* = 9, 11.8%) and accidental discharge from firearms handled by law enforcement agents (*N* = 8, 10.5%), as shown in Table III. Forty-nine cases (64.5%) presented to the hospital within 6 hours of sustaining injury, while 13 (17.1%) presented after 6 hours and 14 (18.4%) after 24 hours (Table IV). Each gunshot wound was explored, debrided and treated appropriately. The major complications of gunshot injury were hypovolaemia in 18 patients (52.9%), wound sepsis in 9 (26.5%), and blindness in 3 (8.8%), as shown in Table V. The outcome of gunshot wounds was good in 41 patients (53.9%), who were successfully treated and discharged. Twenty-one patients (27.63%) discharged themselves against medical advice, either to go to other health facilities or to opt for traditional medical treatment. Six patients (7.9%) were referred to a better health facility elsewhere because of severe head injuries. Prolonged morbidity was a major problem in 4 patients (5.3%), of whom 3 had severe head injuries and 1 severe spinal cord injuries. Four patients died (5.3%). Two of the deaths resulted from head injury and one each from chest injury and septic shock.

TABLE I. DISTRIBUTION OF GUNSHOT INJURY SITES

Site	Males (<i>N</i>)	Females (<i>N</i>)	Total (<i>N</i> (%))
Upper limbs	25	2	27 (26.7)
Lower limbs	23	2	25 (24.7)
Head (face)	17	1	18 (17.8)
Chest	15	2	17 (16.8)
Abdomen	11	1	12 (11.9)
Spine	1	1	2 (2.0)
Total	92	9	101 (100.0)

TABLE II. AGE AND SEX DISTRIBUTION

Age (years)	Sex		Total (<i>N</i> (%))
	Males (<i>N</i>)	Females (<i>N</i>)	
0 - 10	1	-	1 (1.3)
11 - 20	5	1	6 (7.9)
21 - 30	33	4	37 (48.7)
31 - 40	12	1	13 (17.1)
41 - 50	14	-	14 (18.4)
51 - 60	4	-	4 (5.3)
> 60	1	-	1 (1.3)
Total (%)	70 (92.11)	6 (7.89)	76 (100.0)

TABLE III. CAUSES OF GUNSHOT INJURIES

Causes	Males (<i>N</i>)	Females (<i>N</i>)	Total (<i>N</i> (%))
Armed robbery	48	5	53 (69.7)
Hunting accidents	9	-	9 (11.8)
Law enforcement agents	7	1	8 (10.5)
Community clashes	3	-	3 (3.9)
Cult clashes	3	-	3 (3.9)
Total	70	6	76 (100.0)

TABLE IV. TIME INTERVAL BETWEEN INJURY AND PRESENTATION AT HOSPITAL

Time interval (h)	Males (<i>N</i>)	Females (<i>N</i>)	Total (<i>N</i> (%))
0 - 6	46	3	49 (64.5)
7 - 12	10	1	11 (14.5)
13 - 18	1	-	1 (1.3)
19 - 24	1	-	1 (1.3)
> 24	12	2	14 (18.4)

TABLE V. COMPLICATIONS OF GUNSHOT INJURIES

Complications	<i>N</i> (%)
Hypovolaemia	18 (52.9)
Wound sepsis	9 (6.5)
Blindness	3 (8.8)
Haemorrhagic shock	2 (5.9)
Limb gangrene	1 (2.9)
Paraplegia	1 (2.9)

Discussion

Civilian gunshot wounds have become a common emergency in most hospitals in our region.^{1,3,5,7,9} In this review, armed robbery was found to be the leading cause of gunshot wounds (69.7% of patients). Armed robbery attacks have been reported from homes, workplaces and highways. On occasion our facilities have been stressed by the arrival of multiple gunshot victims from armed robbery attacks on passengers in commercial transport buses and people in banks. Reports on the increasing incidence of civilian gunshot wounds resulting from armed robbery attacks have come from other centres too.^{1,5,7,9} This may be linked to the high rate of unemployment in Nigeria and the lack of successful poverty eradication programmes. Other causes of gunshot injury in our setting are hunting accidents, accidental discharge of bullets from firearms handled by law enforcement agents, and cult and community clashes.^{1,9} Gunshot wounds were found to be most common in the third decade of life and to affect more males than females, with a male/female ratio of 12:1. The male preponderance is in keeping with the fact that young males are generally more adventurous, and more aggressive in responding to perceived threat.¹⁷

In this study the extremities were the most commonly affected site, perhaps because attackers aimed to disarm and immobilise their victims.⁵ The upper limbs were most commonly affected as individuals were likely to raise their arms to defend themselves against gunshot injuries.^{7,18} The face was the next most commonly affected site, followed by the chest and abdomen. The face was probably shot at to prevent victims from identifying their assailants; cases of blindness resulted from bullets shot at the eyes at close range. It is therefore appropriate to advise people not to look at their assailant's face in order to reduce the incidence of gunshot wounds to the face and the associated fatal head injuries.

Although the chest and abdomen are the most easily targeted region of the body, we found that they were not the most frequently injured sites. However, injuries of the chest and abdomen were commonly associated with severe blood loss and hypovolaemia necessitating blood transfusion and emergency surgical interventions.

In a resource-poor setting like ours trauma surgeons depend on good clinical judgement; it is our practice to do mandatory prophylactic chest intubation and exploratory laparotomy in all cases of perforating gunshot injury of the chest and abdomen. We have not found the advocated selective conservative management useful in managing perforating gunshot wounds of the chest and abdomen.^{9,19,20}

The mortality rate in our series was 5.3%, with most deaths resulting from severe head injury. Higher mortality rates have been reported from other centres.¹ The relatively low mortality rate in our centre may have been due to natural selection of patients, namely those with moderate injury, as well as early presentation and management and access to referral services. Each gunshot wound was managed according to the appropriate procedure, including debridement, irrigation, treatment with antibiotics, daily wound care, and delayed primary wound closure where necessary.

The socioeconomic cost of gunshot wounds is high for patients, their families and the health care system. Control measures to minimise the incidence of gunshot wounds would be a desirable development. Youth need to be gainfully employed, which may help to reduce the high rate of armed robbery. Strong government legislation is required to ensure effective arms control in our region, and government should be ready to provide adequate security for the teeming civilian population.

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