

Trap gun : an unusual firearm injury pattern and injury severity score

M. F. Afdhaal, M. U. F. Zumra, I. Ijaz, M. M. N. S. Madhubhashana, M. Pathirana
Teaching Hospital Anuradhapura, Sri Lanka

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Abstract

Trap gun injury causes a substantial socio-economic and health burden to Sri Lanka. The key objectives of the study are to identify the Trap gun injury pattern, injury severity score, common geographical locations, and to identify the health burden.

This is a retrospective descriptive cross-sectional study conducted at surgical units of Teaching Hospital Anuradhapura [THA]. Patients presented with trap gun injury as surgical casualty admissions were selected for the study.

Injury severity score [ISS] is used as an indicator for anatomical injury severity. A total of 53 persons who suffered from trap gun injury in the north-central province of Sri Lanka in the year 2020 were studied. Our analysis shows that more than 64.1% of those have serious or severe injuries [ISS > 3], while injury to the lower limb accounts for 88.7%.

Triangular distribution of geographical area within the north-central province of Sri Lanka is identified as the most vulnerable region. The cost of care of these patients results in a significant health burden to the free health system.

Introduction

A trap gun is an illegally manufactured unusual firearm that causes significant insecurity among the resident of rural areas in Sri Lanka. It has a long-barreled, smoothbore muzzle [figure 1] which fires low-velocity projectiles [1]. It has a basic trip system as a trigger mechanism and is triggered by the movement of an animal or human, which fires the gun [2].

Though it's uncommon in many parts of Sri Lanka, we are observing an unusual number of victims admitted to Surgical units of THA from the North Central province, particularly from rural areas.

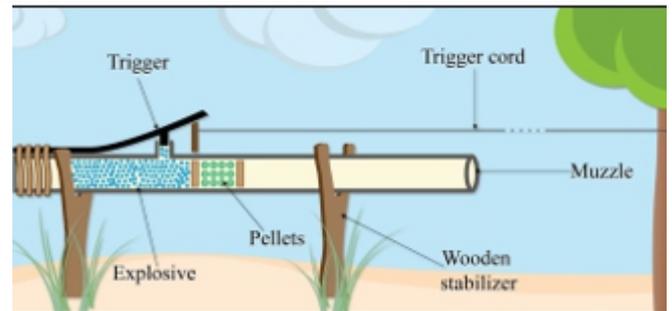


Figure 1. Illustration of a trap gun

The first case of trap gun injury in the medical literature of Sri Lanka dates back to 1888 [3]. There are instances, where approximately 200 admissions were reported annually to Teaching Hospital, Anuradhapura following trap gun injuries [4].

The purpose of this study is to identify the injury pattern, injury severity score, common geographical locations, and correlate its health burden.

Methodology

This is a retrospective descriptive cross-sectional study conducted in surgical units of THA. Patients presented with trap gun injury as surgical casualty admissions were selected for the study.

Our study population consisted of 53 patients. Bed Head Tickets [BHT's] of the patients from 2020 January to 2020 December were traced. The data were collected from the relevant BHT's by medical officers using a pre-tested checklist.

Patient demographics, time of occurrence and admission, body region involved, type of anatomical structure involved, injury description, number of surgeries done, days of hospital stay, amounts of blood, and blood component transfusions were included as study variables.

We used the Injury severity score as a simplified indicator for anatomical injury severity. We defined injury severity score as minor injuries [ISS-1], moderate injuries [ISS-2], serious injuries [ISS-3], severe injuries [ISS-4], and unsurvivable injuries [ISS-5] [Table 1].

Correspondence: Afdhaal Faurdeen

E-mail: afdhaalmf@gmail.com

 <https://orcid.org/0000-0002-0248-6935>

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Table 1. Injury Severity Score

Injury Severity Score [ISS] – Anatomical injury severity in trap gun injuries	
Minor injuries	ISS-1
Moderate injuries	ISS-2
Serious injuries	ISS-3
Severe injuries	ISS-4
Unsurvivable injuries	ISS-5

All the BHT's were traced from the medical record department. The data analysis was done using SPSS v.23.

Results

Figure 3. Age distribution of study population The ages of the victims ranged from 20 to 70 years. The mean age is 41.2. The majority of the victims are between the ages of 41 to 50 years [26.4%] [Figure 3]. 51 [96.2%] were males [Figure 2]. Firings had occurred round the clock, but a peak during dusk [6 pm to 6 pm] is observed [54.7%].

In this study, we used the Injury Severity Score as the indicator for anatomical injury severity. According to the injury severity score, 22 [41.5%] of the victims suffered a score of 3, which is severe injury. 12 [22.6%] of the victims suffered very severe injuries [ISS-4]. 17 [32.1%] had suffered moderate injuries [ISS-2] and only a small percentage [3.8%] had suffered minor injuries [ISS-1] [Table 1]. The most common body region affected is lower limbs in 47 [88.7%]. Among those cases, 39 [73.6%] were injuries below the knees.

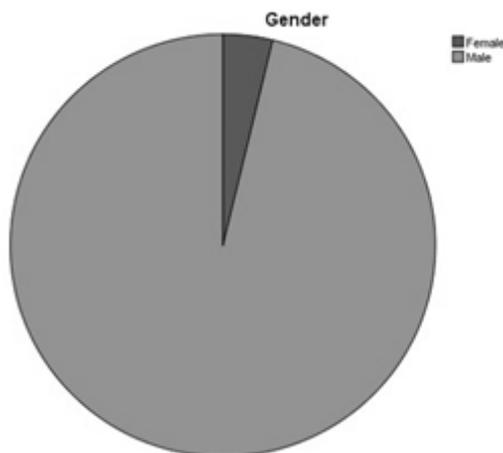


Figure 2. Gender distribution of study population

Other anatomical regions that were involved were the upper limb [5.7%] and the abdomen [3.8%], however, in most of those cases [60%] the lower limbs were also involved simultaneously. Twelve [22.7%] of the victims had suffered vascular injuries. 3 [5.7%] of them suffered from nerve injuries and [62.3%] from open fractures. Fortunately, no

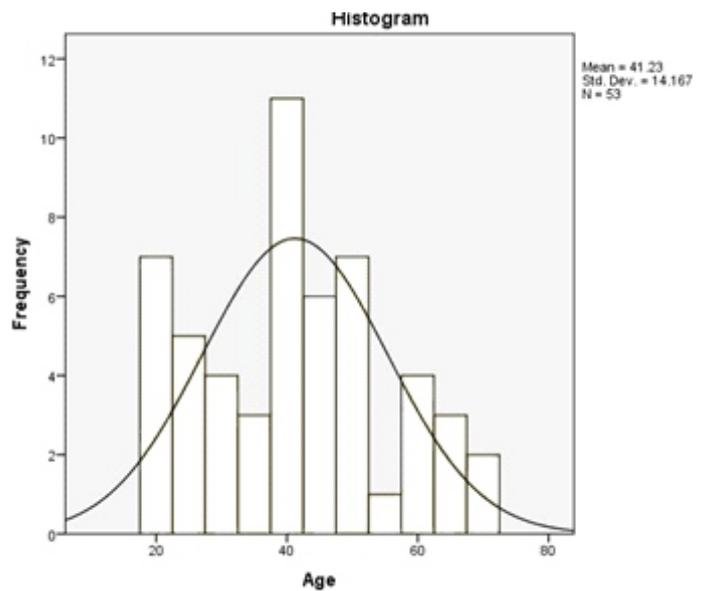


Figure 3. Age distribution of study population

Table 1. Injury severity score

Injury Severity Score				
	Frequency	Percent	Valid Percent	Cumulative Percent
minor	2	3.8	3.8	3.8
moderate	17	32.1	32.1	35.8
severe [not life-threatening]	22	41.5	41.5	77.4
severe [life-threatening, survival probable]	12	22.6	22.6	100.0
Total	53	100.0	100.0	

death or amputations were reported within the particular year. The number of surgeries done in each of the cases varies from 1 to 10 in our study. 42 [43.1%] of them had undergone only 1 surgery, commonly under spinal anaesthesia. The median number of surgeries is 2. Out of the cases, 4 [7.9%] of them had undergone more than 5 surgeries. Seventeen [32.1%] of the victims had undergone resuscitation with blood products. Days of hospital stays range from 1 to 97. Mean hospital stay 7 days.

Forty six [86.8%] of the victims were admitted to peripheral hospitals initially. Most numbers of victims were transferred from DH Huruluwewa and BH Medawachchiy. A triangular geographical area of distribution is noted in the analysis [Figure 2].

Discussion

The reduction in the incidence of trap gun injuries might reflect the prevailing COVID-19. Where in this particular year people mobilization was restricted with several months of lockdown by law enforcement.

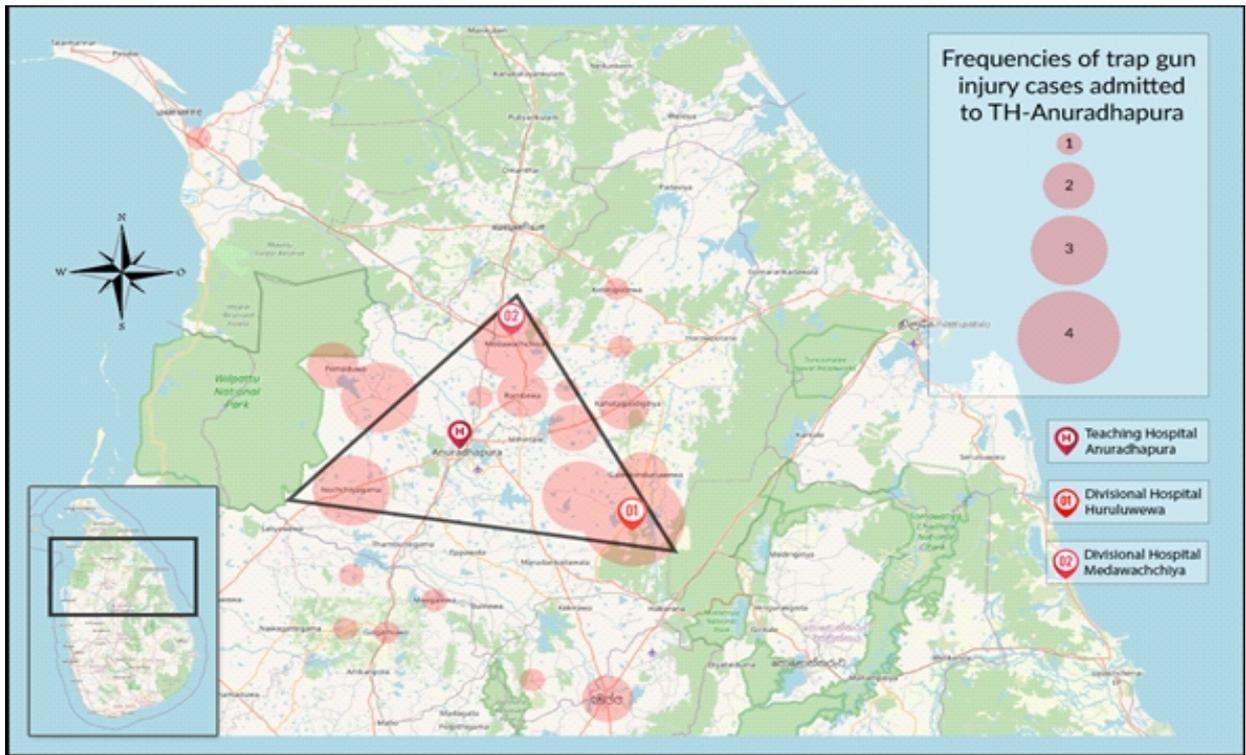


Figure 4. A triangular geographical area of distribution of trap gun injuries noted in North-Central Province, Sri Lanka.

Young males who are capable of active occupation are mostly [96.2%] at risk. Similar data has been reported in other local studies [5]. Thus, the trap gun injuries are likely to have a major economic impact on their families.

Most of the patients suffered moderate to severe injuries. Such injuries are likely to result in permanent disability. Therefore result in an enormous health burden, which includes costs involved in-hospital stay, operative treatment, drugs, and rehabilitation. This creates a huge socio-economic burden on the universal healthcare policy of Sri Lanka.

Though exact injury geographical location is not available in the BHT's, we considered the local hospitals from which they were transferred, as the vulnerable geographical area. We've noticed a triangular geographical area of distribution as the most vulnerable region. [Figure 4] It is a loosely defined region in the North Central Province, giving its vertices as Medawachchiya, Huruluwewa, and Nochchiyagama.

Preventive measures such as educating the local population, especially farmers on avoiding these hotspots need emphasis. The possession and usage of firearms are illegal according to the Firearm Ordinance of Sri Lanka [6]. Therefore, the victims are also addressed by law enforcement on legal aspects. Trap gun is one of the worst survival threats faced by the rural agricultural community of Sri Lanka. Not only in the north-central province, but it exists in several other regions in the country[7].

It is vital to put a collaborative effort on this health hazard to safeguard wildlife as well as human beings who live in the vicinity of forests.

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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