Case Report

GUNSHOT INJURY OF THE MAXILLOFACIAL REGION: A CASE REPORT

Dr. Vinay Kharsan[1], Dr. Ramnik Singh Madan[2], Dr Swatantra Shrivastav[3], Dr Prakriti Yadav[4]

[1] Professor, Department of Oral Maxillofacial Surgery, New Horizon Dental College & Research Institute, Bilaspur, Chhattisgarh, India
[2] Professor and Head, Department of Oral Maxillofacial Surgery, New Horizon Dental College & Research Institute, Bilaspur, Chhattisgarh, India
[3] Senior Lecturer, Department of Oral Medicine and Radiology, New Horizon Dental College & Research Institute, Bilaspur, Chhattisgarh, India
[4] Consultant Dental Surgeon, Apollo Hospital, Bilaspur, Chhattisgarh, India
Correspondence: swatantra.1281@gmail.com

Abstract: Gunshot injuries involving the head and neck confer a high potential for profound morbidity and mortality rates by damaging vital neurovascular structures, including the central nervous system, carotid arteries, and jugular veins. The main manners of firearm-related death comprise homicide, suicide, and accidental events, the rates of which largely vary depending on region and country. Although a bullet is commonly thought to travel through the body in a straight line, a few patients with head and neck gunshot injuries who survived without lethal organ damage thanks to a nonlinear bullet trajectory have been reported. However, there is no report of a patient who survived a gunshot wound transversely penetrating the entire neck across its deep structures. India's rates of violence vary greatly and in a majority of firearm related injuries illegal, unlicensed weapons are used. As in 2006, India was home to roughly 40 million civilian firearms, out of an estimated 650 million civilian owned guns then believed to exist worldwide. But only 6.3 million (just over 15%) are licensed. The unpredictable nature of the bullet also emphasizes the importance of projecting the missile trajectory. A missile trajectory-tracing software program could be an important tool in the diagnosis and management of patients with bullet injuries.

Keywords: Gunshot injuries, Ballistics, High velocity, Low velocity

Introduction

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Gunshot injuries involving the head and neck confer a high potential for profound morbidity and mortality rates by damaging vital neurovascular structures, including the central nervous system, carotid arteries, and jugular veins.[1] The main manners of firearm-related death comprise homicide, suicide, and accidental events, the rates of which largely vary depending on region and country.[2] Although a bullet is commonly thought to travel through the body in a straight line, a few patients with head and neck gunshot injuries who survived without lethal organ damage thanks to a nonlinear bullet trajectory have been reported.[3] However, there is no report of a patient who survived a gunshot wound transversely penetrating the entire neck across its deep structures. India's rates of violence vary greatly and in a majority of firearm related injuries illegal, unlicensed weapons are used. As in 2006, India was home to roughly 40 million civilian firearms, out of an estimated 650 million civilian owned guns then believed to exist worldwide. But only 6.3 million (just over 15%) are licensed. These estimates convey a sense of relative scale between legal, illegal, and overall Indian civilian gun ownership. Unlicensed weapons are not only the most common, but also appear to be the most lethal, both overall and individually. These illegal and unlicensed firearm weapons account for 86–92% of reported firearm- related murders, depending on the year. Here As the use of firearms has become

more prevalent in society, both the numbers of homicidal and suicidal victims have increased. We report a case of a civilian homicidal firearm injury sustained in the maxillofacial region, with the bullet having traveled through the head and neck region without causing any mortality and minimal morbidity to the victim.

Case Report

A 45-year-old man was referred to the tertiary hospital 6 hours after a single gunshot injury and complaints of a dull aching pain on the right side of his face. He mentioned that he was shot from close range with a local made gun. The patient was conscious, co-operative and well orientated. Clinically, a 1 cm wide entry wound was seen on the right side of the face approximately at the lower border of the mandible. There was no evidence of an exit wound. The patient's pulse, blood pressure and respiratory rate were all within normal limits. There was a diffuse swelling present over body of mandible with no signs of active bleeding or pus discharge from the entry wound. Intraorally, there was no swelling, signs of laceration or ecchymosis. Lateral 3D CT images revealed a bullet lodged in the anterior to the bodies of cervical vertebrae C2, C3 level and anteroposteriorly 3D CT images revealed a bullet in the right side of the neck region with Comminuted fracture to the mandible (body). Subsequent management under general anesthesia at surgery unit proceeded with exploration of the 3 cm bullet full metal jacket with expose lead tip with cartridge case entry wound. A comminuted fracture of the inferior border y of mandible was confirmed. Debridement was done and the entry wound was closed. Open reduction of fracture site and fixation was not done. Patient was put on a course of parenteral antibiotics, analgesics were also administered. (Figure 1a and b)

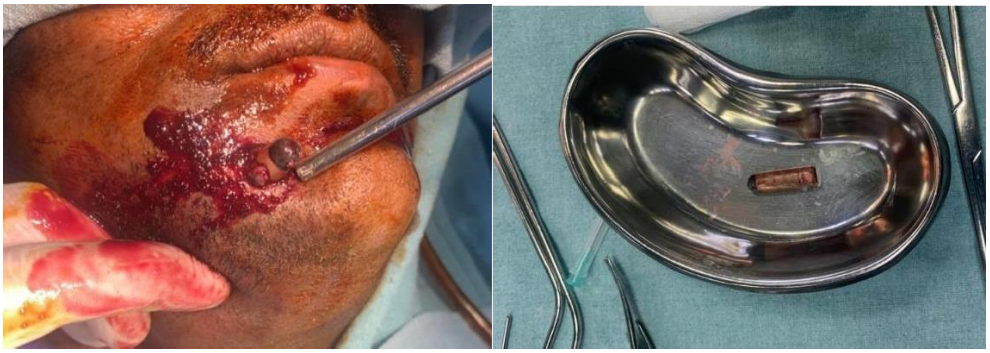

Figure 1a and b : Initial condition of the patient and the bullet recovered

Discussion

Traumatic injuries are usually located only in the area of impact, whereas a bullet, as it enters the body, forms splinters that magnify the damage in the direction of the bullet. The damage that a bullet creates is therefore unpredictable. To assess this damage, the basics of ballistics need to be well understood. The extent of tissue damage in gunshot wounds depends on the distance from which the gun is fired, missile track, and bullet structure, size, and velocity. In our case, a small caliber missile of comparatively low velocity caused the injury by direct tissue crushing and laceration, producing the cavity that is not as large as can be seen in high speed bullets, such as in rifle injuries. There was no injury to any vital structure. The missile, track, passed through the anterior to the bodies of cervical vertebrae C2, C3 level and anteroposteriorly a bullet in the right side of the neck region with comminuted fracture to the body of mandible. All the main blood vessels and nerves were distant enough from the missile trajectory. Newlands et al. reported the

mandibular body (38.8%) as the most common fracture site in the mandible followed by angle and then the anterior region. [4] Similar findings have been reflected in other studies as well. [5] The reason for common fracture in the body area could be due to large surface area of the mandibular body. We have observed that infection was found in more comminuted fracture and it has been reflected in other gunshot studies as well. A bullet retained within the tissues has delivered all its energy, creating a blind wound with only an entrance aperture. Alternatively, a perforating (through-and through) wound may be produced, with the bullet leaving the body through an exit wound. [6] Although a low velocity bullet may exit the wound depending on the width and density of the tissues traversed. [7] Ballistics is a branch of science that deals with natural laws governing projectiles and their predictable performance. [8] As a projectile enters the body the different layers of tissue behave differently according to their specific property. Bullet injuries are divided into high velocity (>2000 $ft \cdot s^{-1}$) and low velocity (<2000 $ft \cdot s^{-1}$). A high-velocity bullet is likely to lead to quick and fatal injury to the victim, whereas a low-velocity bullet may result in a nonfatal injury. [9] The degree of bullet fragmentation is also affected by bullet construction. The presence of a full or partial metal jacket has a major effect on deformity. Bullets with full metal jackets often remain in one piece and usually do not deform significantly. These projectiles typically do not leave a trail of lead fragments along their path. On the other hand, semi-jacketed, hollow-point, non-jacketed, and soft-point bullets tend to deform on impact or break apart, leaving a tell-tale trail of metal fragments through the soft tissue. [10] Our case represents a case of low-velocity bullet injury with a hand or shotgun because there is no evidence of fatal injury to the victim. The range of gunshot in the present case must be 3-7 yards. Based on the range, gunshot wounds have been classified into three types; Type I injury (long range of over 7 yards) penetrating subcutaneous tissue and fascia; Type II (range of 3 to 7 yards) penetrating the body cavities; Type III injury (Blast injury, less than 3 yards). Extensive soft tissue damage is usually seen in Type II and Type III injuries because, in these injuries, the patients frequently have extensively lacerated and contused wounds with bony injuries.

Conclusion:

Our report illustrates that knowledge of the path of the missile track is critical for assessment of the damage and management of the patient with a gunshot wound. The unpredictable nature of the bullet also emphasizes the importance of projecting the missile trajectory. A missile trajectory-tracing software program could be an important tool in the diagnosis and management of patients with bullet injuries.

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