An Extraordinary Case of Ricochet Gunshot Injury in the Head & Neck Region With an Atypical Bullet Trajectory

A Case Report

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Abstract: Civilian firearm injuries may be homicidal or suicidal and in rare cases it may be accidental. Gunshot injuries to the head and neck are associated with high mortality and morbidity owing to the presence of vital structures in very close proximity. It is very rare that a bullet’s trajectory traverses the head and neck region and avoids all the vital structures without causing mortality and with minimal morbidity to the victim. We present a rare case of a bullet injury in the temporo-zygomatic region traversing the head and neck region and lodging below and behind the angle of the mandible avoiding all vital structures with the victim walking into the hospital.

Introduction: Usually gunshot injuries are either homicidal or suicidal, but in rare circumstances can be accidental. We report a case of a civilian accidental firearm injury sustained with a ricochet bullet traversing extensively in the head and neck without causing any mortality or morbidity to the patient.

Case History: A 14-year-old male patient walked into the emergency department of Hamidia Hospital, Bhopal, India with a history of an alleged accidental injury with a firearm approximately 12 hours previously. While he was playing near a military firing range, he was hit by a ricochet bullet on his right temporo-zygomatic region with no exit wound. There was apparently no other injury. The patient gave a history of transient loss of consciousness at the time of the incident but regained consciousness in a few minutes and walked home. He received first aid at another hospital.

On examination, his general and systemic examination was within normal limits. There was no focal neurological deficit. There was an elliptical entry wound about 3 cm by 1 cm on the temporo-zygomatic region on the right side and was muscle deep. There was no soot deposit around the wound. The underlying bone was not exposed. On palpation, the right sternocleidomastoid muscle was taut and tender with painful movements of the neck. The bullet was not palpable.
anywhere in the head and neck. No exit wound was found in the head & neck region or elsewhere in the body. The rest of the ENT examination was within normal limits.

Soft tissue radiographs of the neck. AP and lateral views, were done and a bullet-shaped radio opaque shadow was seen in the neck posteriorly and inferiorly to the angle of mandible on the right side. Click on Picture to Enlarge

The patient was taken into the operating room and a neck exploration was done under general anesthesia. A 5 cm linear horizontal incision was made from the mastoid tip extending anteriorly along the lower border of the mandible. Soft tissue dissection was performed and the bullet was localized and approached with the help of a C-arm and was found medial to the sternocleidomastoid muscle just lateral to the internal jugular vein and internal carotid artery.

The bullet was dissected and removed in total. No major vessels were damaged. The wound was closed in two layers and hemostasis was achieved. The postoperative period was uneventful.

Enlarged Pictures Are At The End of The Manuscript

Discussion: The overall mortality from penetrating neck trauma is as high as 11%. Injuries to vital structures may be fatal in two thirds of all cases. Compounding the difficulties in evaluation and management is the complicated anatomy of the area, in which a dense concentration of vital vascular, aerodigestive, and nervous system structures are located within a very small space. In addition, there is a lack of consensus among trauma surgeons regarding injuries that mandate surgical exploration and those in which a conservative selective approach can be taken.

Gunshot wounds cause tissue injury by three mechanisms: Direct tissue injury, temporary cavitation, and transmission of shock waves. High-velocity bullet wounds (>2000-2500 ft/s) tend to follow a direct and predictable pathway, while low-velocity bullets travel a more erratic trajectory.

In the emergency room, in addition to cervical spine x-ray films, all patients with penetrating cervical-facial trauma should have an AP and lateral of the skull and AP and lateral soft tissue neck x-rays. These films can identify remaining bullets, bullet fragments, bone fragments and may help define the path of the projectile.1

Anatomically, the neck can be divided into three major zones. Zone I, the base of the neck, is demarcated by the thoracic inlet inferiorly and the cricoid cartilage superiorly; Zone II, encompasses the midportion of the
Patients with penetrating Zone II injuries who are symptomatic should undergo neck exploration. Asymptomatic patients with penetrating Zone II injuries may be treated with either mandatory exploration or direct evaluation and serial examinations, provided that the hospital has the facilities for regular examinations and emergent operations. Meyer, et al. treated 120 consecutive patients with penetrating Zone II injuries using the following protocol: All unstable patients underwent immediate neck exploration. All other patients (whether symptomatic or not) underwent clinical assessment, arteriography, laryngotraceoscopy, flexible esophagoscropy, and barium swallow. Then all patients underwent neck exploration. The authors reported that five patients had six injuries that had been "missed" by the diagnostic evaluation; they concluded that even a thorough clinical assessment was inadequate for detecting injuries to vital structures and recommended mandatory neck exploration for all Zone II injuries.

In this particular case, the ricocheted bullet had lost a significant amount of velocity as it entered the temporozygomatic region thereby causing minimal tissue damage. The patient was bending forward when hit by the bullet and probably tangentially it traversed the soft tissue and parotid gland missing the facial nerve and passing posteriorly to the angle of the mandible and then penetrating and burying in the sternocleidomastoid muscle and coming to a stop just lateral to the internal jugular vein and internal carotid artery.

The bullet may serve as a nidus for infection and was removed without causing damage to the surrounding structures. In this case, removal was uncomplicated and performed at the request of the patient and his family.

References:


