Case Report

Save by the Mandible: An Unusual Case Report of Gunshot Injury in Symphysis Region

Sharma A, Mohan S, Chauhan A

ABSTRACT: Maxillofacial traumas caused by gunshot wounds may cause quite varied defects. Facial gunshot injuries are unusual and complicated clinical entities.Gunshot wound injuries to the face result in a varied scope of traumatic injuries. Mandible fractures may occur through this mechanism of injury. The velocity of the weapon and the distance from which the injury occurred often determines the extent of injury produced from the penetrating force. Here we present an unusual case of gunshot injury with an atypical bullet entry wound, profound injury to the symphysis region.

Keywords: Mandible; Gunshot; Trauma; Reconstruction; Wound; Fracture.

Introduction:

Penetrating injuries are defined as those that violatemucosal or skin barriers to enter the body and can be causedby knives, bullets, shrapnel or other objects. The type of injury is often determined by the velocity of the weapon and the distance from which the injury occurred.[1] Gunshot injuries cause profound morbidity and significant mortality. Those involving the head and neck can be devastating especially when they affect vital organs. They can result in instant death. Facial Gunshot injuries can present as unusual and complicated clinical entities.[2]Gunshot wound injuries to the face result in a varied scope of traumatic injuries including soft tissue, vascular, skeletal, orbital, cervical spine, thoracic and intracranial.

Overall, mandible fractures are very common, however when caused by firearms, the patterns of fracture and overall composite defects resulting are unique[1] The extent of damage is dependent on a number of factors, such as: magnitude of energy transferred, distance travelled by the missile, type of bullet and the structures encountered before and on penetration. Secondary injuries are also possible following impact with bone which sets other missiles (bone fragments) into motion on their own paths, causing injury independent of the primary insulting missile.[2]Early management of these patients should focus on resuscitation, with paramount attention given to opening the airway. Bleeding from the injury and the subsequent swelling can significantly compromise the airway. Control with either an endotracheal tube or tracheostomy should be considered early.

Hemodynamic resuscitation should be performed followed by thorough patient evaluation to rule out concomitant injuries. Subsequent management for the patients becomes controversial in terms of surgical reconstruction for facial functions and aestheticsthe advantages of early aggressive reconstruction are ease of tissue mobilization, reduced tissue fibrosis and reduced period of facial deformity. Reconstructions are often performed as secondary intentions.

The secondary deformity of the facial gunshot injury may include skeletal as well as soft tissues covering the cranium, orbits, nose and maxillo-mandible areas. As such, the treatment requires multi-disciplinary evaluation and planning.[3]Management of facial gunshot wounds poses a challenge not only for the oral and maxillofacial surgeons but also for the reconstructive surgeons. The timing and sequence of different stages in the management of facial gunshot wounds with reconstruction and rehabilitation is of prime importance for successful aesthetic and functional outcomes, if inadequate may lead to graft rejection and frequent infection and as such multiple revisional operations.[4]

Case report:

A 26 year old male patient, reported to department of Oral and Maxillofacial Surgery, K.D. Dental College and Hospital

Mathura, with the chief complain of gunshot injury, pain and bleeding on the lower front region of face. Patient gave the history of inter personal violence one day back and met with the injury.On extra oral examination lacerated wound and bleeding was seen in sub mental area with features of infected granulation tissue. On palpating the wound extraorally, the foreign object (bulletlike??) was felt along with mobile bone fragments which were associated with severe pain.

On intra oral examination occlusion was not dearranged, sub lingual hematoma was noticed. On palpation patient complained of pain in lower anterior region with mobility in bone fragments. On radiographic evaluation of Antero-Posterior and Lateral view reveal a foreign object (bullet like) was seen in sub mental region along with fragmented fracture of symphysis region of mandible (Figure 1).

Fig 1: A.P. and Lateral view reveal a foreign object (bullet like) in submental region along with fragmented fracture of symphysis region of mandible.

After complete hematological examination, Primary treatment was done, Resuscitation and a surgical wound toilet with normal saline and betadine without extension of the wound. Essential antibiotics and vaccines were administered and the wound was dressed (not sutured) and packed with iodoform dressing.

Definitive surgical repair of mandible defect was deferred until the patient's clinical status was stabilized. Time was utilized for operative planning.The surgical removal of foreign object and repair of mandible defect was planned to be carried out further under general anesthesia.The patient was taken to the operating room where an external approach to the mandible atthe level of the sub mental region was utilized (Fig 2).

Fig 2: Extension of extra oral incision in wound margins

Fig 3: Fragmented fracture of bone at lower border of mandible in symphysis region

The patient had extensive scarring, which made identification of normal tissue planes and anatomic landmarks difficult. After induction anesthesia, Nasotracheal intubation was done followed by placement of throat pack, part preparation with betadine and draping done. Local anesthesia with adrenaline infiltrated extraorally at sub mental region to achieve hemostasis. Incision extended through wound margins extraorally with surgical blade no 15 (Figure 2).

Muco-periosteal flap raised, midline fracture fragment exposed (Figure 3). Blunt dissection carried out through sub mental region, foreign object located and removed, (Figure 4), debridement of wound done

(dilute hydrogen peroxide + povidone iodide followed by normal saline). Fracture fragments stabilized using 2mm 4 hole with gap plate and secured with 2mmx8mm screws (Figure 5). Layer by layer suturing done with 3-0 vicryl (intraoral) and 3-0 black silk sutures (extraoral) (Figure 6).

Fig 4: Foreign object (bullet)

Fig 5: Reconstruction of broken bone fragment with 2mm 4 holes with gap stainless steel plate

Extraoral dressing was done at surgical site. Patient extubated and shifted to post operative ward for further care. Follow up of the patient was done after 1week.No postoperative complications occurred (Figure 7,8).

Fig 6: Closure of wound with interrupted 3-0 black silk sutures

Discussion:

Gunshot injuries are uncommon problems, except in wartime or in certain areas. They are unpredictable puncture injuries that cause major tissue damage. Three major factors work together to determine the severity of a gunshot wound namely; location of the injury, size of the projectile and speed of the projectile.[6] Patients may suffer injury to the underlying craniofacial skeleton, airway compromise, intracranial injury, and great vessel injuries, which may require urgent surgical treatment.

Fig 7: Post operative follow up after 10 days

Figs 8: Postoperative occlusion

Craniofacial trauma associated with gunshot injury typically involves both functional and aesthetic deformities, leading to mental and social problems. Immediate reconstruction or serial debridement and delayed closure for secondary reconstruction have been advocated.[3] In all trauma patients securing the airway is very important. The airway of all patients with facial gunshot wounds is at the risk of collapse later on due to extensive necrosis associated with these wounds. Studies reveal that gunshot wounds of lower face and especially with floor of the mouth

entry sites are at increased risk of collapse and require emergency airway intervention.

A frequency of 57% for emergency airway establishment was found in this study which is greater as compared to other studies with frequency of 25% and 35%. The reason for increased frequency of emergency airway management was that the most frequent entry site was mandible. The need for emergency airway management differed according to entry site. Most of the patients with mandibular entry site required tracheostomy and it was also needed for later reconstructive surgeries.

The airway of patients with facial gunshot wounds and especially those involving lower third of face must be managed immediately before either extensive edema or bleeding may cause life threatening emergency. On the basis of patterns of injury, the importance of elective airway establishment is suggested in all facial gunshot patients especially with mandibular entry sites or if there is anticipated edema of airway. There must be multidisciplinary approach with active involvement of anesthetists, neurosurgeons, ophthalmic surgeons, vascular surgeons and otolaryngologists in addition to the oral and maxillofacial surgeons in the acute phase. [4]Interpersonal violence, alcohol, drugs and poverty have been reported as the main reasons for gunshot wounds. In a study on gunshot wounds in children and adolescents between 0 and 19 years of age, the mortality rate was 19.7% and the main cause was assault (78.7%).

The sites most affected by gunshots in the present study was the mandible specially symphysis region. Other studies found a prevalence of gunshot wounds in the maxilla, followed by the mandible. Regarding mandible fractures, the angle, body and symphysis were the most affected sites.[5]When a mandibular fracture is a component of gunshot wounds, reestablishing mandibular continuity and occlusion first is advisable. This aids restoration of the remaining facial skeleton by creating a useful anatomic platform. External fixation may be prudent in the event of extensive bone comminution with minimal soft tissue damage.[7] Rigid internal fixation offer many advantages to the patient and is superior to more conventional techniques in spite of minor infection rates. It was also seen that open reduction and internal fixation was advantageous as it allow immediate or early mandibular mobility, with good functional and aesthetic results and a low rate of complications.[8] Arch bars and Steel wires are the most commonly used methods to achieve maxillo-mandibular fixation.

Miniplates must be regarded as a semi-rigid fixation[9] and therefore, frequently required the use of elastics and MMF of short duration, in order to obtain satisfactory results and that in comminuted fractures of the mandible, preference must be given to treatment with ORIF. Nevertheless, in many cases of fractures of the mandible treated with miniplates, elastic fixation for 2 to 6 weeks is necessary to avoid complications such as pseudoarthrosis or malocclusion.[10]

Conclusion: Facial gunshot wounds frequently involve mandible with more likely requirement of establishment of emergency airway and open reduction and internal fixation. Management of facial gunshot wounds is highly individualized depending upon patient presentation, general condition of the patient, available resources and experience of operating team in the management of such patients.

Author affiliation: 1. Dr Abhishek Sharma, MDS, Post graduate, 2. Dr. Shishir Mohan, MDS, HOD & Professor, 3. Dr. Arti, MDS, Senior lecturer, Department of Oral & Maxillofacial Surgery, K.D. Dental College &Hospital, Mathura, U.P, India

REFERENCES:

1. Hoddeson E, Berg E and Moore C. Management of Mandibular Fractures from

Penetrating Trauma. The Open Otorhinolaryngology Journal 2013; 7:1-4.
2. Ongom PA, Kijjambu SC, Jombwe J. Atypical gunshot injury to the right side of the face with the bullet lodged in the carotid sheath: a case report. J Med Case Rep. 2014 Jan 27;8:29. doi: 10.1186/1752-1947-8-29.
3. Long V, Lo LJ, Chen YR, Facial Reconstruction after a Complicated Gunshot Injury. Chang Gung Med J 2002; 25:557-62.
4. Sali Bukhari SG, Khan I, Pasha B, Ahmad W. Management of Facial Gunshot Wounds. J Coll Physicians Surg Pak. 2010 Jun;20(6):382-385.
5. Lauriti L, Bussadori SK, Fernandes KP, Martins MD, Ferrari RA, Luz JG et al. Gunshot injuries in the maxillofacial region: A retrospective analysis and management. Braz J Oral Sci. 2011;10(4): 236-240
6. Chukwudi OA, Sunday AD, Rowland A, Uche O. Reconstruction of multiple hard and soft tissue wounds of the face in a patient following gunshot injury at ABUTH, Zaria. Journal of Medicine and Medical Sciences (ISSN: 2141-9477)2013; 4(9):329-334.
7. Kaufman Y, Cole P and Holier LH Jr. Facial Gunshot Wounds: Trends in Management. Craniomaxillofac Trauma Reconstr. 2009 May;2(2):85-90.
8. Channar KA, Dal AQ, Safia, Warriach R. A Comparison of Open Reduction and Internal Fixation Versus Closed Reduction and Maxillomandibular Fixation for the Treatmentof Gunshot Injuries of Mandible. Journal of Liaquat University of Medical and Health Sciences 2011;10(3):168-173.
9. Melo AR , de Abreu TC, de Santana Santos T, do Amaral MF, et al Conservative Treatment of Comminuted Mandibular Fracture Involving Maxillomandibular Fixation With Miniplates. J CraniofacSurg 2012;23: 893-895.
10. Abreu ME,, Viegas VN, Ibrahim D, Valiati R, Heitz C, Pagnoncelli RM,et al. Treatment of comminuted mandibular fractures: A critical review. Med Oral Pathol Oral Cir Bucal. 2009;14(5):E247-251.

Corresponding author:
Dr. Arti Chauhan
Senior lecturer
Department of Oral & Maxillofacial Surgery
K.D. Dental College &Hospital, Mathura, U.P.,India
Contact no:09956750734
Email id: drartiomfs@gmail.com

How to cite this article: Sharma A, Mohan S, Chauhan A. Save by the Mandible: An Unusual Case Report of Gunshot Injury in Symphysis Region. Rama Univ J Dent Sci 2015 Mar;2(1):62-66.
Sources of support: Nil **Conflict of Interest**: None declared