Management of Maxillofacial Injuries Sustained after a Bear Attack

Tanmoy Nath, Mohammed Imran[1], Kaling Megu[2], Adil Shafath[1], Kesang Wangdi Thongdok[3]

Department of Oral and Maxillofacial Surgery, Regional Dental College, Guwahati, Assam, [1]Department of Oral and Maxillofacial Surgery, Sri Rajiv Gandhi College of Dental Sciences and Hospital, Bengaluru, Karnataka, Departments of [2]General Surgery and [3]Otorhinolaryngology, Heema Hospital, Itanagar, Arunachal Pradesh, India

Abstract

There is a little available literature on injuries sustained due to bear attacks and their management. Bears are agile wild animals and injuries sustained after a bear attack have varying patterns. In general, such cases present to the emergency department with severe maxillofacial injuries with varying patterns, thereby limiting the use of common protocol for the management of such injuries. The aim of this article is to add to the current available literature on bear attacks, a present case of management of maxillofacial injury involving the orbit sustained after a bear attack.

Keywords: Bear attack, facial nerve injury, maxillofacial injuries

Introduction

In India, bear attacks are quite commonly reported all along the Himalayan range. Bears are herbivorous and usually do not attack unless provoked. They hibernate in the winter season; hence, before going into hibernation, they forage food. It is this time in months of September to November when the incidence of bear maulings increases and attacks are seen most frequently. Usually, they attack individuals, and rarely any incident of group of people suffering bear attacks has been recorded.

As the forest cover is decreasing over a period of time, the number of bear attacks have proportionately increased, however the overall incidence of bear attack is low.

Case Report

A 55-year-old male farmer from Daporijo, Arunachal Pradesh, was referred to our hospital in September 28, 2015, with history of bear mauling. He went to the forest to hunt and tame wild bovines *(Bos frontalis)*. He unexpectedly came across a bear (*Ursus thibetanus*). The bear attacked his upper body as he tried to defend himself, as a result of which, he sustained multiple soft-tissue injuries on his arms, scalp, and face. The patient was bleeding profusely and was initially admitted in the primary health-care center and stabilized, and was later referred to our hospital.

The patient was admitted and shifted to emergency room, where the preliminary examination revealed wounds on the right side of his face and scalp as well as both forearms. He had a scalp wound in the occipital region of 10 cm × 12 cm size [Figure 1]. Facial wound approximately 15 cm long extends from the right lateral forehead to 3 cm superior from the right mandibular angle and medially across the upper and lower eyelid till the bridge of the nose [Figure 2]. His right orbital cavity was also involved in the injury, and the right orbit appeared to be avulsed. He sustained right-side partial facial nerve and maxillary nerve injury along with loss of vision. He also sustained multiple fractures of the facial bones. A preliminary examination revealed fracture of the right zygoma and right maxilla which was later confirmed by radiographic diagnostic imaging [Figures 3 and 4]. As the bear ran away, we were uncertain of any rabies infection. Hence, antirabies vaccine was administered along with tetanus vaccine prophylactically. The wounds were debrided under local anesthesia, and any bleeding points were identified, and hemostasis was achieved; the wound was sutured with 3-0 silk sutures, and dressing was done.

Address for correspondence: Dr. Mohammed Imran, Department of Oral and Maxillofacial Surgery, Sri Rajiv Gandhi Dental College and Hospital, Bengaluru, Karnataka, India.
E-mail: dr.mohdimran22@gmail.com

Access this article online

Quick Response Code:

Website: www.amsjournal.com

DOI: 10.4103/ams.ams_169_18

How to cite this article: Nath T, Imran M, Megu K, Shafath A, Thongdok KW. Management of maxillofacial injuries sustained after a bear attack. Ann Maxillofac Surg 2018;8:369-72.

Figure 1: Intraoperative

Figure 3: Preoperative right lateral radiograph of facial fracture

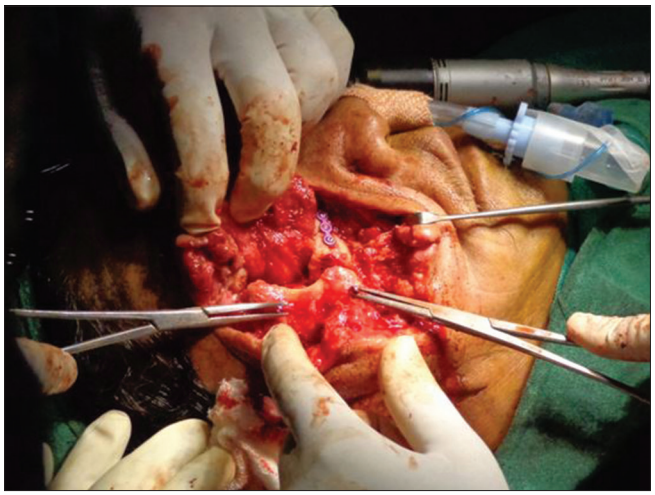

Figure 5: Intraoperative view of right orbit repair

The patient was initially semiconscious, disoriented with no episodes of vomiting or bleeding through ear or nasal cavity after the incident. On admission, the Glasgow coma scale(GCS)

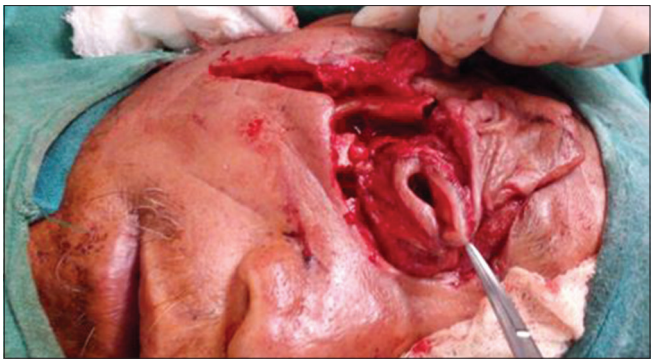

Figure 2: Intraoperative view of repair of scalp injury

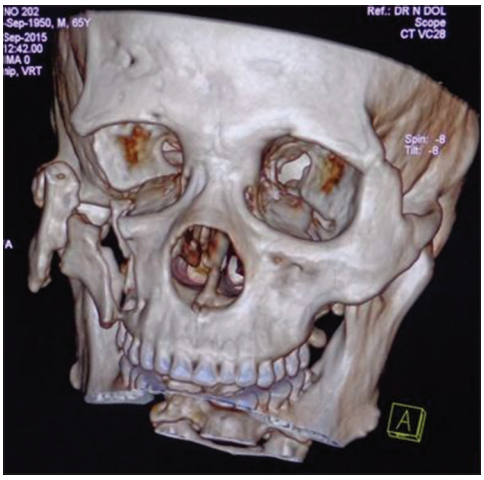

Figure 4: Preoperative radiograph showing right sided facial bone fractures

Figure 6: Immediate postoperative view of face

was recorded to be 13/15. Neurosurgical consultation was sought. The neurosurgical team ruled out any intracranial lesion. After 48 h, the GCS had improved to 15/15.

Radiographic investigations revealed fracture of right zygomatic complex, involving the frontozygomatic suture, zygomaticomaxillary suture and fracture of zygomatic arch. The infraorbital foramen and maxillary antrum were involved

Figure 7: Postoperative frontal closed mouth view

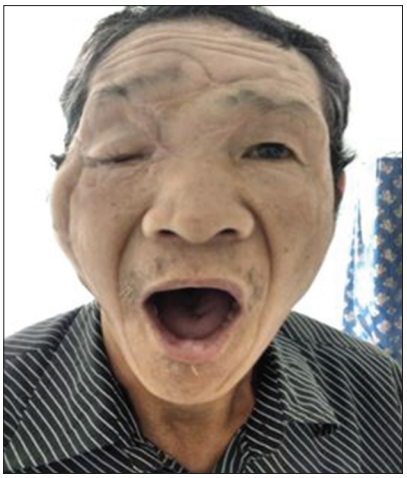

Figure 8: Postoperative frontal open mouth view

Figure 9: Postoperative left lateral view

Figure 10: Postoperative right lateral view

Figure 11: Postoperative Paranasal sinus (PNS) view

in the fracture line (zygomaticomaxillary), the fracture line terminated superior to the maxillary tuberosity.

Four days after the incident, the patient was operated. The fracture was treated with open reduction and internal fixation with 1.5-mm titanium plates and screws. The zygoma was fractured from maxilla, temporal, and frontal bones into two large fragments. To align the fragments into position, two titanium screws were drilled into the fragments such that their placement does not hamper plate fixation [Figure 5]. Fragments were manipulated into anatomic location, and after plate fixation, the two screws were removed. The orbital rim was reconstructed. Fixation was initially done on the maxillary fragment and later on the zygoma. Zygomatic arch was also stabilized with 1.5-mm titanium plate and screws. Any small bony fragments were sacrificed to minimize any chance of necrosis due to loss of periosteum. Ophthalmic surgeon performed soft-tissue reconstruction of the upper and lower eyelids. Traction sutures were placed from the upper eyelid downward to improve eyelid closure postoperatively. The wound was approximated in layers with resorbable sutures [Figure 6].

After 2 weeks, postsurgical complication of salivary fistula was noted in the parotid region. Antisialagogues were administered, and the patient was closely observed for 2 weeks. As the result was not satisfactory, the patient had to undergo superficial parotidectomy under general anesthesia. Follow-up was done for 1 year. Facial nerve injury was noticeable in the upper eyelid region and during smiling. After 8 months, the

patient showed fair amount of improvement from facial nerve paralysis [Figures 7-10].

Discussion

Man is encroaching upon forests for his needs and hence animal attacks are not uncommon today, but these cases usually remain unreported in literature. There is no study on the incidence of bear attacks in Arunachal Pradesh till date (PubMed Search, Medline Search). Bears are usually located in isolated areas. Human encroachment of forest for numerous reasons is making these incidents more common. However, fatalities associated with bear attacks is uncommon. Most of the reported fatalities arise due to infections or multiorgan failure or due to hemorrhage following injury to vital structures.[1]

Animal bites can prove to be quite challenging from the restoration and infection point of view. Bear mauling wounds have been commonly colonized by various diverse species of microorganisms including viruses. This may lead to transmission of zoonotic diseases also.[2] Ignoring this aspect of infection can delay wound healing as well as osteosynthesis of the craniofacial skeleton. A wide range of antibiotics have been used to deal with infection in such cases. Dhar *et al*. have used cefazolin, amikacin, and metronidazole;[3] Timothy Floyd prefers using parenteral penicillin followed by a broad-spectrum oral antibiotic.[4] Kunimoto *et al*. used piperacillin-tazobactam intravenously every 8 hourly.[5] We administered amoxicillin and clavulanic acid which is considered as gold standard.[6] However, it is always better to do culture sensitivity from the wound initially and start with broad-spectrum antibiotics until the results of culture sensitivity comeback.

In the present case, tetanus and rabies prophylaxis was given to the patient as the status of the animal could not be ascertained.

Samprat Chandra Prakash *et al*. suggested a treatment protocol for bear maulings, which focuses first on the identification of the animal, followed by postexposure prophylaxis for tetanus and rabies. Culture from the wound site often helps to deal with infection. This is followed by specific management of the wound which includes inspection, wound debridement, and closure if required. If associated facial nerve injury is present, immediate nerve decompression is advised. Follow-up and psychological assessments are crucial in these cases.[1]

According to Lackmann's classification for facial injury, the present case can be classified as Stage IV B due to the involvement of right zygoma and orbit.[7] The right zygomaticomaxillary complex was fractured into two fragments involving four sites: frontozygomatic suture, zygomatic arch, inferior border of orbit, and zygomatic buttress area. Three-point fixation was done with titanium implants at frontozygomatic suture, inferior border of orbit, and zygomatic arch [Figure 11].

In our present case, the postoperative fistula was noticed 1 week after the surgery. The fistula was observed for a further 2 weeks following which total parotidectomy was carried out on the right side. Parotid fistulas can be treated with other treatment modalities such as botulinum toxin A, hyoscine, cyanoacrylate glue, and alloderm to name a few.[8-10] However, keeping in mind the availability of the drug and socioeconomic condition of the patient, total parotidectomy was carried out.

Follow-up was done monthly for 1 year. Mouth opening was noticed initially in 1 month, which improved to normal range in 6 months. Function of the right lacrimal gland was normal in 2 months. Facial nerve injury improved in 8 months. Visceral injuries from bear maulings in the form of injury to the brain, eyes, salivary glands, lungs, and abdominal organs were reported from time to time by different authors. The involvement of parotid salivary gland which has the facial nerve running through it, is considered to be the cause of facial nerve injury.[1] In our case, the facial nerve injury may be the result of the facial laceration.

Bear maulings can cause considerable soft- and hard-tissue damage. Injury to the face should preferably be treated with a multidisciplinary team to provide the best treatment to the patient.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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