Maxillofacial Injuries due to Bear Mauling

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Abstract Bear bite injuries have become a common occurrence as the forest covers and natural habitats are diminishing. Patients injured in bear attack present with different patterns of injuries. A common protocol may not be suitable for the management of injuries inflicted by these large wild animals. These animals usually attack in remote areas where composite trauma centres do not exist and urgent referrals of these patients will have significant effect on the final outcome. Limited literature is available describing bear bite management in maxillofacial practice. The goal of the present case reports is to document the injuries suffered in bear mauling and to add to the literature on the conservative management with minimal complications.

Keywords Bear mauling · Maxillofacial · Management · Trauma · Injuries

Introduction

The chance of a human encountering a bear is on the rise as the remote bear territory is diminishing. Bear bite injuries to the head and neck region can result in facial disfigurement with distressing physical and psychological consequences [1]. Bear bite wounds are often underestimated and untreated. These bites can range in severity from minor

scratches to major trauma that involves fractured bone, joint damage, skin and deep tissue injuries [2, 3]. Facial defects caused from such bite injuries not only create functional problems but also serious psychological problems, which can cause the individual to avoid social contact [4]. Hence, the first aim of maxillofacial rehabilitation should be solving the functional and esthetic problems of the patient. This clinical report describes the conservative management of two cases of bear bite.

Case Report 1

A 40-year-old male patient was presented with severe maxillofacial injuries caused by bear attack. Patient had multiple skin lacerations resulting in exposure of underlying structures (parotid gland with duct, buccinators muscle, buccal pad of fat etc.) (Fig. 1) and was bleeding profusely from nose, and oral cavity. There were degloving injuries in upper and lower vestibule, and avulsion of upper anterior teeth in addition patient had dislocated jaw, multiple fractures of maxillary bone and was delirious at presentation. CT-scan revealed that there was bilateral fracture of alveolar process of maxilla with comminution on left side, comminuted fracture of hard palate, complete fractures of all the wall of maxillary sinus bilaterally with displacement of fractured fragments into the sinuses on right side. There was bilateral fracture of nasal bone—along with fractured zygomatic arch and temporal bone on right side.

Case Report 2

A 53-year-old patient reported with soft tissue avulsion from right periorbital region, including extensive damage

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Fig. 1 Showing exposed anatomical structures (parotid duct, muscles) and comminuted fracture of maxilla

of nose and upper lip due to bear mauling (Fig. 6). Patient was bleeding profusely from nose and oral cavity. CT-scan revealed no bony injuries.

Management

Both the cases were treated following a basic protocol as explained below:

After maintaining the airway, breathing and circulation, bleeding was arrested by placing the anterior nasal pack with paraffin. Tetanus prophylaxis and rabies vaccine were given to the patients. After thorough surgical debridement of wound, decision was taken to close the wound primarily under local anesthesia. Intraoral layer wise closure of the wound was done with 4-0 vicryl suture. After the adequate approximation of deep structures extra oral wound closure was done using 4.0 silk sutures and a suction drain (no. 12) was placed (Figs. 2, 3, 7). A course of broad spectrum antibiotic and anti-inflammatory was given for one week; in addition for the first case, it was decided to manage the fractured segments conservatively with intermaxillary fixation by using arch bars.

Discussion

Wild animal injuries are distinguished by combination of cutting, penetrating and crushing (due to powerful slap) are commonly seen in the victim of bear attack. The Asiatic Black Bear (*Ursus thibetanus* or *Selenarctos thibetanus*), also known as the Tibetan black bear, or the Himalayan black bear, is a omnivorous mammal. This animal is declared

Fig. 2 Parotid duct stabilized using 4-0 vicryl

Fig. 3 Extraoral wound closure

threatened animal and rarely comes in human contact. Recent decrease in forest area has, however, increased the chances of bear–human interaction, hence causing injuries to humans. These injuries involves substantial struggle on the part of victim on the ground, which forces mud, grass and other contaminating material into the wounds, so vigorous irrigation and removal of all foreign material are off paramount importance. The two major types of bear attacks are defensive and predatory [5, 6, 7]. Defensive, attacks are the result of abrupt, unexpected encounters that follow in response to a perceived threat to cubs, individual space or food supply, and often involve activities such as hiking and hunting. Predacious attacks are far less common and occur when humans are perceived as a source of food. In these

Fig. 4 Post-operative 1 year (intraoral view)

Fig. 5 Post-operative 1 year (extraoral view)

instances, the bear more often invades human territory, e.g., camping or picnicking sites. Predacious attacks result in the majority of fatal encounters. Bear bite injuries with tissue loss may result in severe disfigurement with significant functional and aesthetic concern. Management of bites requires both local wound and systemic considerations. The principles of management of bite wounds include proper assessment, meticulous documentation, thorough wound

Fig. 6 Pre-operative view (case 2)

Fig. 7 Post-operative view after suturing (case 2)

cleansing and debridement. Tendon/sheath involvement, distal neurovascular status, bone injury, joint space involvement, visceral injury and tissue loss must always be thoroughly assessed. The bottom of the wound should always be carefully screened to identify devitalized tissue, deep injury and foreign bodies (e.g., teeth). A major concern in all bite wounds is infection due to the presence of the large number of bacteria in the oral cavity. Hence all bite wounds should be considered contaminated. The relative risk is determined by the species of the inflicting animal, bite

Fig. 8 Post-operative front view after 1 year (case 2)

Fig. 9 Post-operative lateral view after 1 year (case 2)

location, time until wound management, type of wound, host factors, and local wound care. Infections can be caused by wide spectrum of pathogens (bacteria, viruses, rickettsia, spirochetes, fungi). Typically the infections are polymicrobial, with mixed aerobic and anaerobic species [8–10]. Antibiotic therapy is indicated for infected bite wounds and

fresh wounds considered at risk for infection, such as large wounds, large hematoma, full-thickness skin punctures and wounds with tissue loss. Tetanus and rabies prophylaxis should be considered for all bite wounds. Though surgical management in animal bites remains a controversy, there is no doubt that role of primary wound management specially emphasizing on highest level of wound toileting plays a very important role [11]. Now surgical opinion is swinging in the favor of early repair [12, 13]. The definitive treatment depends on the type of wound, depth of the wound, location of the wound and tissue loss, if any. Bites from large animals generally have a significant crush element and often tissue loss because of the force involved. Primary closure/reconstruction may be considered in relatively clean bite wounds or wounds that can be cleansed effectively so as the possibility of infection has been eliminated. Areas of aesthetic concern such as facial wounds, because of the excellent blood supply are at low risk for infection and should be closed primarily, but in other areas, a short period of aggressive conservative management followed by delayed primary closure/reconstruction results in better outcome. However, bite wounds to the lower extremities, wounds in immuno-compromised individuals generally requires varying period of conservative management initially.

In the present case reports since the subjects was attacked in the jungle while grazing cattle, the bear might have attacked them as a defensive measure. The majority of the wounds sustained by the victims (defensive or predacious attacks) in the present study involved the head and extremities. This is consistent with previously documented attacks [5]. Infection is a common problem following bear attacks [7, 14] therefore we prescribed a broad spectrum antibiotic for 1 week. Since the subjects were in a puzzled state of mind a sedative was also prescribed with consultation of a psychiatrist. Psychiatric complications are common following bear mauling. Post-traumatic stress disorder (PTSD) is defined as development of symptoms lasting longer than 1 month following emotional stress associated with trauma. These symptoms include depression, anxiety and cognitive difficulties. If these symptoms persist for less than 1 month following emotional stress, a diagnosis of acute stress disorder can be made [14]. None of these complications were noticed in the present cases and both the subjects are living happily after 1 year following the attack (Figs. 4, 5, 8, 9).

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