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Case Report

Head and neck injuries after leopard attack: Presentation and management

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ABSTRACT

Leopard attacks on humans are reported most often from the Indian subcontinent. The bite wounds are complex injuries infected with polymicrobial inoculum and may present as punctures, abrasions, lacerations or avulsions. The presentation and acceptable treatment of these injuries vary according to the wound. We hereby describe the clinical presentation and treatment of a male victim with leopard bite injuries on the head and neck region. As bite injuries are commonly found on and around the face, maxillofacial surgeons should be familiar with the therapy. Through thorough clinical and radiological examination, it is essential to prevent missing any hidden injuries, which can easily turn lethal. To benefit the rural population, more health facilities need to be established in remote areas.

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Introduction

Animal bite is a major community health problem, and most of them are caused by pet animals (dogs, cats) and humans.¹ People rarely survive if bitten by wildcats, like a tiger and leopard. Bite wounds may be categorised as punctures, lacerations, superficial abrasions or avulsions. The pressure and bluntness of the teeth increase a probability of causing crush injuries with devitalized tissue. Bite wounds are generally infected with a polymicrobial inoculum, and thus the clinical manifestation and treatment may be different.² Since there are almost no reports of leopard bites, we hereby present a case of leopard attack with extensive soft-tissue damage accompanied by maxillofacial injuries.

Case report

A 50-year-old gentleman was taken to the emergency department in a trauma centre by onlookers after he was attacked by a leopard, while cutting trees in a forest. The worker nearby saw a leopard attacking the patient and retrieving him from the field where the patient was dragged by the animal. His relatives sent him

to a district hospital where he has been given the first aid, and then he was referred to our institute to undergo a treatment of severe neck and soft tissue injuries. Because of the remote location of village, the patient reached the centre about 5 h after the attack. He was conscious and had a full sense of the time, surrounding and persons. His oxygen saturation was 90% and other vitals were within normal limits. On initial examination, the patient had multiple deep lacerated wounds over the scalp, neck, face and back (Fig. 1). The neck lacerations were bandaged, but actively bleeding.

The patient was managed according to advanced trauma life support protocol. Since the immunization status of the patient was uncertain, tetanus toxoid 0.5 mL and tetanus immunoglobulin 250 IU single dose (tetanus antitoxin) was administered. Because of the bleeding penetrating neck injury, airway damage and multiple soft tissue injuries, the patient was immediately transferred to the operating room for exploration of the neck wound and repair of the larynx, pharynx and other facial lacerations. Preoperatively, he was administered intravenous antibiotics (Ceftriaxone, Sulbactam and Metronidazole) against Gram positive/negative bacteria as well as anaerobic microorganisms. Under general anaesthesia and oral intubation, the wounds were thoroughly washed and debrided. After the exploration of laryngeal and pharyngeal cartilages, the laceration was identified (Fig. 2).

There were vegetative material and sand particles throughout the head and neck region. Wounds were thoroughly washed with Chlorhexidine solution and saline. Deep and puncture wounds

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Fig. 1. Preoperative photograph showing facial lacerations in and around ears (A, B), scalp (C) and multiple injuries on the back (D) after the leopard attack.

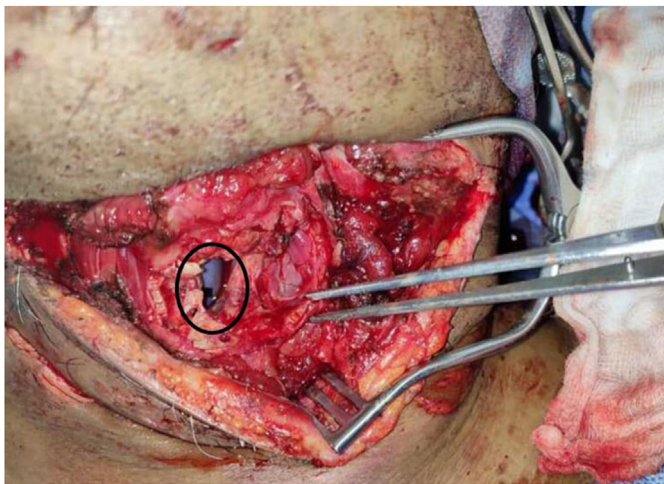


Fig. 2. Exploration of neck wound with exposed and lacerated thyroid cartilage and pharynx, and underlying endotracheal tube evident (encircled).

were also cleaned with profuse syringe irrigation. Eventually, the surgical repair of thyroid cartilage and pharynx was done with tracheotomy tube and Ryle's tube through nose in situ. After reconstruction and adequate approximation of platysma, wounds



Fig. 3. Repaired thyroid cartilage, larynx and platysma muscle.

were closed in layers (Fig. 3). He was tracheotomised prophylactically during the surgery as per laryngeal repair protocol, and then was taken to ward postoperatively for observation (Fig. 4). The patient was administered intravenous antibiotics (Ceftriaxone and Sulbactam and Metronidazole) three times a day. Postoperatively, the patient swallowed a barium meal, which revealed no leak of contrast in the whole process and no sign of contrast leak in pharynx and oesophagus.

On the second postoperative day, the patient complained of difficulty on opening mouth and could not close mouth completely (Fig. 5A). On intraoral examination, the dental occlusion was deranged and the oral hygiene status is poor. The mouth opening (measured inter incisally) was 16 mm. The mobility of few maxillary and mandibular posterior teeth was in grade III, and the mandibular midline was shift to right by 1.5 cm with generalised gingival recession. He had no significant facial bony tenderness. Initially, it was suspected to be a case of temporomandibular joint dislocation, and then the patient was subjected to radiographs (Fig. 5B). The orthopantomogram showed the fracture and dislocation of the left condyle head (Fig. 6A).

The need of treatment was explained to the patient, which included 2 options: the conservative and surgical treatments. After obtaining informed consent, the patient underwent closed reduction of the condylar fracture under local anaesthesia. Postoperatively, arch bars and intermaxillary fixation were used for the closed reduction of the left condylar fracture for a period of 3 weeks.

The patient was kept under observation in the hospital for a week and discharged after suture removal. Tracheostomy tube was removed after 15 days and intermaxillary fixation was released after 3 weeks, and then the physiotherapy initiated. Psychiatry consultation and evaluation was performed in the meanwhile, and the counselling of emotional and mental well-being was started. Satisfactory occlusion was achieved, and the mouth opening was 38 mm a month postoperatively. The patient has a good quality of life and no specific complaints in the regular follow-up, even 1 year after injury (Fig. 7).

Discussion

This case report aims at describing the type of injury and treatment required after a leopard attack to increase the chances of survival of the victim. The face and neck are known to be the most vulnerable places to be attacked by a leopard according to findings on the dead bodies of animals attacked in the forest. Bite wound in the neck generally causes massive bleeding due to laceration of the trachea, external carotid artery, internal jugular vein and injuries of

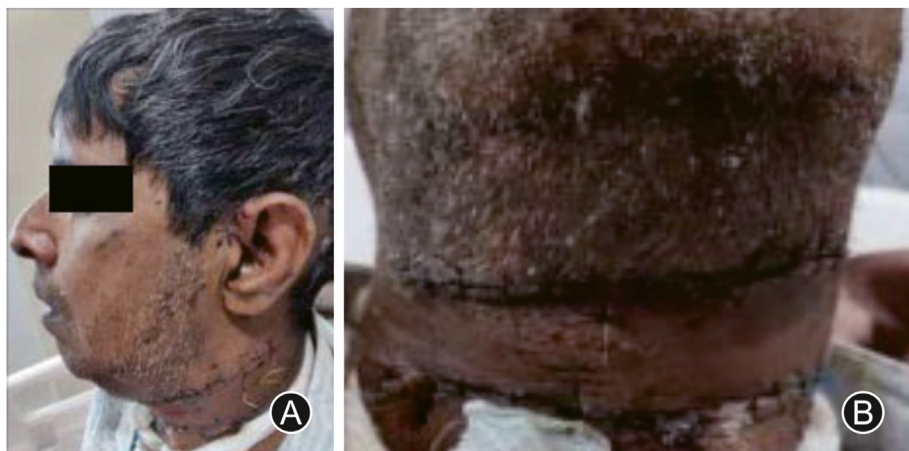


Fig. 4. Post operative photograph after primary surgery (A), thyroid cartilage and pharynx repair (B) and suturing of lacerations.



Fig. 5. Evident deviated mouth opening with inability to completely close the mouth, clinical (A) and CT findings (B).

the cervical spine, which proves to be fatal.³ Other complications of animal bites are disfigurement of face, infection and psychological issues, like depression, distress. The severity of animal bite wound depends on the sharpness of teeth, velocity of bite and site of attack. Deep infection may cause sepsis with infected bone, cartilage, tendons and sometime compartment syndrome.⁴

It should be highly suspected that all animal bite injuries are associated with tetanus. Thus, a patient's tetanus prophylaxis history should be recorded and tetanus prophylaxis should be performed for the patient. Tetanus antitoxin as well as Tetanus toxoid should be administered to those patients who have unclean wounds or to those who have been administered less than 3 prior doses of tetanus toxoid in the past or to those who have unknown history of prior doses of tetanus toxoid administration. Antitoxin is also administered because early doses of toxoid sometimes may not induce immunity, but only prime the immune system. Even if the immune system has no response when injuries occurred, tetanus antitoxin can provide the temporary immunity and immediate

protection.⁵ Rabies post exposure prophylaxis (RPEP) should be given to all patients who suffered animal bites. But before initiating RPEP, local health departments should give some advices because of geographical differences in vectors and endemics. RPEP should be performed along with human rabies immune globulin and vaccine, which is currently recommended by the Advisory Committee on Immunization Practices.⁶

Antibiotic prophylaxis is usually advised to be administered for all deep and penetrating bite injuries, which markedly reduce the rate of infection. All patients should be administered empirical antibiotics while their samples are sent for culture and sensitivity, of which the results are awaited. Traditionally, selective antibiotic is used for the coverage of most likely microorganisms. As most isolates from animal and human bite wound are responsive to Amoxicillin and Clavulanate, it is considered the choice of antibiotic for prophylaxis, which should be given for 5 days to 2 weeks depending on the degree of infection.⁷ Patients with history of mild allergy to Amoxicillin can be given Cefuroxime, and of severe



Fig. 6. Orthopantomogram showing dislocated left condylar fracture with deranged occlusion and anterior open bite (A) and reduced left condylar fracture and improved occlusion postoperatively (B).



Fig. 7. One year postoperative photograph.

allergy to Amoxicillin can be given Doxycycline. For paediatric patients, a combination of Clindamycin with Fluoroquinolone or Trimethoprim-sulfamethoxazole can be administered.⁸ Azithromycin can be given to pregnant women who are allergic to Penicillin. Patients should be started on definite antimicrobials as soon as their reports of culture and sensitivity are available.⁸

Along with antibiotic coverage, the irrigation and debridement plays an equally important role in initial wound management.⁹ The treatment of animals bite injuries includes exploration, irrigation, cleansing, debridement, drainage and suturing.^{10,11} Cleansing and irrigation should be done with soap water followed by Chlorhexidine solution or Betadine to reduce viral contamination.¹¹ To decrease the likelihood of infection, it is crucial to cautiously debride the crushed and devitalized tissue.^{9,11} About 1 mm of healthy tissue around the perimeter can be excised to facilitate the healing of wound. Tissues of the face and mouth manage to maintain viability even with small tissue pedicles remaining, with better chances at survival. Thus, minimal excision and debridement of facial wounds was done to minimize scarring.¹²

The appropriate method of bite wound closure remains controversial, especially when aesthetic concerns are high.^{9,12} The option of treatment depends on the type and location of injury, surgical skills and time elapsed from the injury. Early treatment and wound cleansing have been recommended. To minimize scarring and disfigurement, bites on the maxillofacial region are frequently sutured primarily, which is what we preferred.¹³ Excellent blood supply, thorough irrigation, layered closure and antibiotic prophylaxis provide a good result. Most surgeons advocate wound closure for all uninfected bite wounds on face within 24 h, because it is positive for a good aesthetic result with minimal wound infection rate (1%–6%).¹² Debridement with proteolytic agents can

also be tried for successful immediate primary closure.⁹ Contaminated wounds can be treated by thorough debridement and delayed closure as well. It is suggested that as long as the repair is performed before the proliferative phase of healing, aesthetic results are not different from those of obtained by primary repair.⁹ Final aesthetic result depends upon wound eversion during suturing and the time of suture removal. Factors responsible for a poor outcome include infection, contused wound, retained foreign body, improper orientation of lacerated wound, tension and bevelled edges of wound during repair. For wound closure, percutaneous non-absorbable sutures should be used. Minimal, tension-free, fine monofilament suturing is done with early suture removal (3–5 days).¹²

Indications for hospital admission of bite victims include systemic infection, severe cellulitis, deep penetrating wound, head injuries, injuries needing reconstructive surgery or presence of peripheral vascular disease.¹⁴ Because of a high risk of infection in the later stages, close and prolonged monitoring of patients is required, which was done for our patient. Regular follow-up of patients is advised to review the wound and patients should be counselled about dressings, ointment and cleaning to get the best outcome.¹⁴

Generally, soft tissue injuries (mostly fatal) have been reported more commonly than hard tissue injuries after a leopard attack. Our case was associated with mandibular fracture which required management. The condylar head fractures in cases like these are preferably treated by closed reduction and intermaxillary fixation with the advantages of decreased chances of postoperative infections and hospital stay, low economic burden and risk of local complications compared with patients managed by open reduction.¹⁵ A team effort with multidisciplinary intervention is indicated, when injuries are multiple and extensive.² A thorough clinical as well as radiological examination of the face and neck must be performed, even if there is a minimal soft-tissue injury to prevent missing any occult injuries which may easily turn lethal.

Sometimes, in the early post-trauma period, patients can exhibit features of acute stress disorder lasting 2 days to 4 weeks, which can include sleep disturbances, depression, anxiety and cognitive difficulties.¹⁶ When the features of acute stress disorder are not resolved in a month, they progress to post traumatic stress disorder with features of depression and sleep disturbances, which might last for more than 6 months post-attack in some cases. Nightmares can be seen in about 60% patients with hallucinatory hearing of the howls of the attacking animal.¹⁷ Psychiatry consultation and counselling of survivors after animal attacks is important to give mental and emotional relief, and if needed antidepressants are also prescribed.^{16,17}

Leopard attacks on human beings are increasing due to the encroachment into animal habitats. Attacks take place in vicinity to dense forests where there are not many hospitals, and thus severely injured patients have to be transferred hundreds of kilometres for a definitive care. There is a need to set up hospitals in the remote areas to facilitate health-care of the prone populations. The prompt treatment of animal bite injuries with adequate antibiotic, tetanus and rabies prophylaxis ensures maximum chances of survival with best cosmetic results.

In conclusion, all surgeons in trauma settings must be aware of various patterns of animal bite injuries and the treatment plan including post-exposure prophylaxis of anti-rabies, tetanus toxoid and antibiotic regimens. Multidisciplinary intervention is required for the treatment. There is a need to set up health-care facilities in remote areas to promote the prompt treatment of animal attack victims, thereby increasing the chances of survival.

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Ethical statement

Patient consent has been obtained for utilization of his photographs and personal details for academic purposes.

Declaration of competing interest

None.

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