CANINE CASUALTY: A CASE OF PAEDIATRIC INJURY CASE REPORT

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Abstract

The Rationale : Dog bite injuries pose a significant public health concern, with over 50% of incidents involving children. The head and neck region is the most commonly affected area, particulary in pediatric victims, due to their shorter stature and increased vulnerability

Patient Concerns: The patient report with complaint of pain and bleeding with through and through injury over the mandible.

Diagnosis: On clinical examination it is diagnosed as case of dog bite injury

Treatment: After conducting a thorough analysis of potential outcomes, the surgeons in the study choose to perform primary wound closure.

Outcomes: The wound site was well approximated, and patient was on regular follow up

Take away Lessons: The author recommends that the immediate wound closure yields the most optimal aesthetic outcomes.

Key words : Dog bite, paediatric wound care, animal attack, primary management.

Introduction

Animal bites continue to be a serious public health concern, with an annual rise in the number of injuries. Dog bites can inflict devastating craniofacial injuries on infants and toddlers, posing a significant threat to their lives. Unvaccinated stray dogs or mixed breed dogs in the cities of developing countries remains at risk of bites by unvaccinated stray dogs.[1] The most frequent mammalian bites treated in emergency rooms are those from dogs. These could appear as tears, avulsions, abrasions, or punctures. Bites on children tend to occur on the head and neck due to their short stature, cause more extensive damage and disfigurement due to their smaller body size. There is a greater chance of a crush damage with devitalized tissue because of the force and relative bluntness of the teeth.

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Management of dog bite after being bitten by untamed, uninvited, or unidentified dogs is still debatable. Primary suturing (immediately closing the wound with stitches) and non-suturing (leaving the wound open to heal on its own) had similar infection rates for dog bite wounds. However, primary suturing resulted in better cosmetic outcomes i.e., less scarring and improved appearance. Early treatment regardless of whether suturing or non-suturing was used led to lower infection rates, improved cosmetic appearance Wounds located on the head and face had better outcomes likely due to the fact that these areas have a richer blood supply, which aids in healing[2].

Case Report

A 4-year-old child was rushed to our emergency department by his parents after being attacked by a stray dog near their home. The child was conscious and alert, but bleeding profusely and complaining of pain. The dog was quickly identified by the Tumkur City Municipal Corporation and quarantined for a 10-day observation period to assess for any signs of rabies or erratic behavior. After beign tested and monitored, no signs of rabies was found and the dog was released.

Following the dog attack, the child received initial vaccination at Tumkur District Hospital. A comprehensive treatment regimen was administered, including antibiotics to prevent infection, analgesics to manage pain, and sedatives to ensure the child's comfort. The wound was meticulously cleaned with soap and water, followed by a 15-minute saline irrigation to remove any remaining debris. The site was then disinfected with povidone-iodine and covered with a sterile dressing, without suturing. Passive immunization was achieved through the administration of human rabies immunoglobulin (HRIG) at a dose of 20 IU/kg body weight, injected directly into and around the facial wounds. To accommodate the large wound area, the HRIG dose was diluted to three times its original volume with sterile normal saline[3]. Concurrently, active immunization was initiated with a cell-culture derived anti-rabies vaccine, following standard post-exposure prophylaxis protocols and was subsequently transferred to a higher-level care center for further treatment.

On clinical examination of the child multiple avulsions and lacerations through and through laceration was noted over the mandible. Underlying mandibluar bone was mauled with mandibular bone exposure. Following successful intubation by the pediatric intensive care unit (PICU) team, the child's wounds underwent meticulous irrigation. Broad-spectrum antibiotic therapy, consisting of amoxicillin and clavulanic acid, was initiated to minimize the risk of infection. The parents were thoroughly counseled regarding the treatment options, including the potential risks and benefits, in the context of the child's critical condition. After weighing the options, primary wound closure was performed to promote optimal healing and minimize potential complications he wounds were subjected to a rigorous irrigation protocol, entailing high-pressure lavage with 0.9% saline solution for a duration of approximately 30 minutes, utilizing 50-mL syringes equipped with 18-gauge needles. Subsequent to the implementation of ocular protective measures, a substantial quantity of 10% povidone-iodine solution was applied to all wounds, permitting a 5-minute exposure period prior to being copiously flushed with normal saline solution in anticipation of wound repair. Lacerated wounds were carefully approximated, soft tissues were meticulously apposed following the wound closure with triple plane dissection over the mandible. After discharge, postoperatively no discharge of pus or no signs of infections were noted. The sutured wound was edematous post operatively but this subsided gradually. Anti rabies vaccination should be given

0.1ml ID 0,3,7,14,28 days or 0.5ml IM[4]. Child recovery was uncomplicated and uneventful.

Figure 1: Dog bite injury in a 4 year old child showing extensive deep laceration and intraoral involvement.

Figure 2: Intra operative wound debridement using normal saline and povidine iodine solution showing clean site

Figure 3:
Flap revison and wound approximation

Figure 4: Immediate post operative results after multilayered tension free closure of wound using Vicryl (deep) and Ethilon (superficial)

Figure 5: Wound Closure

Figure 6: Post Operative followup after 4 weeks

Discussion:

Canine bites constitute a pressing public health concern, disproportionately affecting pediatric populations and resulting in a range of complications, including infections, rabies, and soft tissue damage. The risk of dog bite injuries in children is heightened during playful interactions, direct eye contact, and meal times, underscoring the necessity for diligent supervision of child-dog interactions. Notably, the majority of dog bites in children occur in the head and neck regions, whereas adults tend to sustain injuries on their extremities, largely due to differences in height. Close monitoring and education on safe interactions with dogs are crucial to mitigate these risk. Dog bite injuries are classified majorly as laceration, avulsion and puncture. Typically a combination of all 3 are present. The force produced by dogs bite usually of 1380-3100kPa (200-450pounds per square inch), which is stronger to perforate metal sheets[5]. This force is sufficient to fracture thin facial bones in children, especially over the orbit, nose and skull as the facial bones are spongy and have high regenerative potential. When aligned correctly these properties frequently result in proper fracture healing.

Wound should be thoroughly rinsed with saline solution and debridement, which includes removing any foreign objects and devitalized tissue If there is any suspicion of infection Cultures of purulent fluid and blood should be acquired since cultures of the wound alone may be contaminated by skin flora.

48 hours should pass before wounds are reassessed. If the wound is on the hand or has broad, gaping edges, suture tape or nylon sutures can be used to approximate the wound edge when clinically appropriate. These sutures can be quickly removed if signs of infection develop later in the wound's evolution. Referrals for surgical consultation should be made for patients who require extensive debridement or who have wounds in high-risk areas, like the face or genitalia. It is advised to radiograph wounds close to joints.

Soft tissue infections arise in approximately 10% of canine bite wounds, with Pasteurella canis being the predominant isolate (50%). Polymicrobial infections may occur, involving additional bacteria such as Fusobacterium, Bacteroides, Prevotella, and Pseudomonas. Capnocytophaga canimorsus is a rare but virulent organism, characterized by a prolonged incubation period of 1-7 days, and is associated with septic shock and purpura fulminans in vulnerable patients, resulting in a mortality rate of 25%. Consequently, short-term preemptive antimicrobial therapy is recommended for moderate-to-severe bite injuries, particularly those situated on the face and upper extremities, to minimize the risk of infection and associated complications[6].

Aesthetics play a crucial role in facial wounds, as open wounds that heal secondarily can lead to unacceptable scars, resulting in lifelong cosmetic concerns. A comparative analysis reveals that wounds closed within the initial 24-hour period exhibit superior aesthetic and functional outcomes, with comparable secondary infection rates, when contrasted with non-suturing. Furthermore, prompt initiation of wound management yields decreased infection rates and improved aesthetic results, irrespective of suturing status.In most of the included trials, primary closure was the preferred course of treatment for facial injuries caused by dog bites. The remaining instances were treated with reconstructive surgeries, which typically involved a split skin graft, a full thickness skin graft, or a local or advanced flap[7].

Significant emotional, psychological, and bodily damage are inflicted upon sufferers with facial

bite injuries. After the upper and lower limbs, the face is the third most often bitten region by dogs. The nose and lips are the areas of the face that are most commonly impacted. Facial reconstruction prioritizes the restoration of critical central structures, including the lip vermilion and commissure, nasal margins, and columella, due to their intricate anatomy. Extensive tissue loss resulting from avulsions may necessitate the use of reconstructive flaps or grafts. If primary surgery is postponed, a delayed primary closure can be successfully performed up to 5 days later, contingent upon rigorous daily wound irrigation, providing a suitable alternative.

Conclusion:

Dog bite injuries constitute a persistent global public health issue, with concomitant psychological sequelae significantly impacting affected individuals. A recent case involving an 4 year old child who sustained severe trauma from a canine attack exemplifies the efficacy of early primary reconstruction. Meticulous surgical technique, employed in conjunction with comprehensive safety measures, yielded exceptional long-term results. Vigilant postoperative care, supplemented by prolonged multidisciplinary support, ensured optimal recovery and culminated in exemplary patient-reported outcomes.

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