Animal Bites And Reconstruction

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Abstract

Animal bites resulting in significant tissue loss poses unique reconstructive challenge. This article reviews management of series of eleven cases of bite wounds with tissue loss and presents treatment guidelines for the same on the basis of the results.

INTRODUCTION

Animal bites have been on the rise with the explosion of human and animal population, accounting for 1 percent of emergency department visits.[1, 2] the animal bites with tissue loss present the surgeon with the challenging aesthetic and often functional problems. Though dog bites are the commonest animal bites, often unusual bites by wild and domestic animals occur often resulting in significant tissue loss necessitating reconstruction.

We present a series of eleven cases that were mauled by various wild and domestic animals requiring reconstruction. Various reconstructive options from primary closure to flap cover were considered.

PATIENTS AND METHODS

We have retrospectively reviewed management and outcome of eleven patients of various bites with tissue loss managed by Plastic Surgery department during August 2003 to February 2005.

The details of patient's demographics, biting animal, circumstances of bite injury, duration of injury, location and extent of wound, wound characteristics, local and systemic treatment received was noted. All the patients were evaluated in detail to ascertain full magnitude of the injury. All the injuries were carefully documented. The integrity of all the specialized structures was thoroughly evaluated. All the patients were regularly followed up, complications if any were noted and subsequently assessment for aesthetic and functional outcome was made. Wounds were cultured for bacteriological study in acute cases prior to cleansing.

Among the eleven cases studied, 6 patients were males and 5 were females. The age ranged from from 5 years to 60 years. The duration of injury varied from 2 hours to weeks. All the wounds presented with some tissue loss. The animals implicated were – dog(2), jackal (1), horse (2), camel (2), cat (1), bear (1), snake (2) (Table- 1).

Figure 1

Table 1 : Distribution Of Animals

S.No.	Animal	Number
1.	Dog	2
2.	Jackal	1
3.	Horse	2
4.	Camel	2
5.	Cat	1
6.	Bear	1
7.	Snake	2
	TOTAL	11

The site of involvement varied from face to feet and includes injuries on nose (2), lip (2),cheek(1), ear (1), finger (1), thumb (1),forearm (1), palm (1), feet (2) (Table - 2). The reconstructive options considered varied according to the injuries sustained (Table -2).

Figure 2

Table 2: Anatomical regions involved, their distribution, causative agent and reconstructive options

Anatomical region	Distribution	Causative agent	Reconstructive option
Face	Nose	Camel	Debridement +Forehead flap
	Nose	Bear	Debridement +Forehead flap
	Lip Lip	Jackal Dog	Debridement +Primary repair Debridement +Primary repair
	Cheek	Dog	Debridement +Primary repair
	Ear lobule	Horse	Debridement +Single stage reconstruction by retroauricular flap
Hand	Finger	Camel	Debridement +Revascularisation#
	Thumb	Camel	Debridement +Reconstruction with Groin flap(Two stage)
	Forearm	Horse	Debridement +Abdominal flap
	Palm	Cat	Debridement +SSG+
Leg	Feet	Snake	Debridement +SSG+
	Feet	Snake	Debridement +SSG+

Required vein graft

+ Split thickness skin grafting

Figure 3

All the patients were given tetanus prophylaxis (if immunization status not known) and full antirabic vaccination. The cases presenting in acute settings received aggressive wound toileting, debridement and reconstruction at the earliest. The cases which presented late were also treated on same line with the earliest possible reconstruction. Prophylactic antibiotic cover was given to all the patients.

RESULTS

Results of surgery in terms of aesthetic and functional components were satisfactory with few complications (Table -3). Patients presenting earlier for treatment achieved better cosmesis than the patients presenting late. Revision surgery was required for thinning of the forehead flap in two cases.

Figure 4

Table 3: Complications seen

S.No.	Complications	Number
1.	Wound infection	1
2.	Tetanus	-
3.	Rabies	-
4.	Hypertrophic scars	2
5.	Revision Surgery	2

DISCUSSION

Bite injuries with tissue loss may result in severe disfigurement with significant functional and aesthetic concern. The lifetime risk of experiencing a bite wound, human or animal, is approximately 50.[3] Though it is difficult to estimate the actual incidence, the bite wounds account for approximately 1% of all visits to emergency departments.[1, 2] Examples of animals inflicting bites can be quite exhaustive encomprising dogs, horse, donkey, bear and wolf, tigers, lions, leopards, monkeys, raccoons, hyenas, wolves, crocodiles, and other reptiles.

Management of bites requires both local wound and systemic considerations. The principles of management of bite wounds include proper assessment, meticulous documentation, thorough wound 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 (eg, 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 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. [4, 5, 6]

The bacteria involved in infection of bite wounds include Pasteurella multocida, Staphylococcus aureus, Staphylococcus intermedius, alpha-hemolytic streptococci, Capnocytophaga canimorsus, and other members of the oral flora.[3] Anaerobic bacteria are present in approximately one-third of bite wounds and are associated with the formation of abscesses and with relatively serious infections. P. multocida is found in infections of cat bites more than 50% of the time.[7] Because of the large number of bacteria in the oral cavity, animal bite wounds are generally contaminated, and their treatment is difficult because of the risk of infection, especially in extensive injuries.

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.

The most common antibiotics advocated are amoxicillin/clavulanate or a combination of amoxicillin and cephalexin. Patients that are sensitive to penicillin may be given cefuroxime (cat), doxycycline (cat), erythromycin, or trimethoprim-sulfamethoxazole, although these are less effective. Clindamycin plus ciprofloxacin in adults or clindamycin plus trimethoprim-sulfamethoxazole in pediatric age group may provide better coverage.[8] Azithromycin is also an effective alternative because of high tissue concentration. Generally, five days of prophylactic antibiotic coverage is adequate.

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. Now Surgical opinion is swinging in the favor of early repair.[9, 10] 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.

The basic principles of management of bite wounds include proper mechanical cleansing and debridement. High pressure irrigation is an important means of wound cleansing. Adequate debridement with removal of devitalized tissue, particulate matter, and clots helps in preventing infection. Clean surgical wound edges result in better scars and aesthesis.

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.[9, 10] 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.

CONCLUSION

Animal bites with tissue loss often lead to distressing physical and psychological consequences. Our results show that rational, well balanced, aggressive approach in managing tissue losses early gives satisfactory results. Bite wounds with significant tissue loss should be considered for reconstruction at the earliest to achieve maximal functional and aesthetic results. However; the treatment of each needs to be individualized and has to be treated accordingly. Health care provider needs to be familiar with these “wild” problems. Familiarity and proper management of such complex injuries is the key to optimal aesthetic and functional outcome.

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