

A 4 YEAR RETROSPECTIVE STUDY OF FACIAL DOG BITE INJURIES IN PATIENTS REPORTED TO PEDIATRIC EMERGENCY, BPKIHS, NEPAL.

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ABSTRACT

Introduction

Dog bites facial injuries are a significant health care problem and their sequelae ranges from minor to fatal injuries.

Objectives

To determine the incidence of facial dog bite injuries and to assess the outcome as well as presentation of facial injuries among the children reported to the pediatric emergency, BPKIHS, Nepal.

Methodology

A study was conducted where the clinical records of children with facial dog bite injuries reported from 2015 to 2018, were assessed and analyzed. A proforma was designed to extract relevant clinical data from the case records. Information such as age, gender of the victims, anatomical site of the injury, interval between injury and presentation to the hospital, nature of injuries, profile (stray or pet) and immunization status the of dog, outcome and complications were extracted.

Result

The incidence of facial dog bite injuries has significantly increased pointing male school going children injured predominantly (70%). Seventeen (81%) victims had presented within 24 hrs of injury whereas two(9.5%) patients had reported after 24 hours and 72 hours of the injury. Nineteen patients were treated on the same day under local anesthesia, one under general anesthesia where thorough wound lavage with meticulous reapproximation followed by suturing was done. Full recovery was evident in eighteen (86%) cases with primary wound closure whereas two (14%) patients had undergone healing with secondary intention.

Conclusion

There is an increase in incidence of dog bite facial injuries among children in our tertiary health care centre. Satisfactory healing outcomes were achieved with a thorough wound lavage and primary closure of non-infected wounds under appropriate rabies prophylaxis and proper antibiotic regimen.

KEYWORDS

dog bite; facial injuries; pediatrics emergency



INTRODUCTION

Dog bites present a major public health threat worldwide. The close relationship between humans and dogs is sometimes deteriorated by bites. Bite wounds have a special position in traumatology because of their high complication rate compared to similar soft tissue wounds caused by other reasons.¹

Reports have shown that 92% of the patients with bite wounds treated for plastic surgery were between one and seven years of age.² Being the most exposed part of the body, the head, neck and cheek region are particularly more vulnerable to bite injuries in children, while only 10% of adults suffer from similar injuries. This significant difference is attributed to the short stature of children and their willingness to bring their faces close to the animal.³ Facial bone fractures may occur with each of the three soft-tissue injury types and occur most often with lacerations.⁴ The types of wounds encountered may range from mild scratches to life-threatening facial injuries where the defects may be superficial, but the extent of injuries can result in amputations with severe vascular and nerve or bony destruction.⁵ A typical dog bite usually present a puncture type wounds with tearing of adjacent tissue (Hole and Tear effect) leading to a narrow point of entry and deeper inoculation of microorganisms which ultimately creates an ideal environment for the proliferation of anaerobic bacteria.⁶ Management of such injuries poses a great challenge to the pediatric dentists.

The possibility of rabies is another important aspect in dog bite wounds and is considered as the 10th biggest cause of death worldwide. While rabies is a 100% preventable disease, the lack of prophylaxis makes it 100% fatal.³

Over the years, reporting the cases of facial dog bite injuries in pediatric emergency are significantly increasing which necessitates the desire to evaluate the status of the problem. Therefore, the aim of this study was to determine the incidence of facial dog bite injuries in children and to assess the outcome as well as the presentation of facial dog bite injuries reported to the pediatric emergency, BPKIHS, Nepal.

METHODOLOGY

This was an observational retrospective study where the clinical records of all the children with facial dog bite injuries reported to the pediatric emergency unit, BPKIHS, from January 2015 to December 2018, were assessed and analyzed. Ethical approval was obtained from the Institutional Review Committee IRC/1445/018.

A proforma was designed to extract relevant information (such as age, gender of the victims, anatomical site of the injury, interval between injury and presentation to the hospital, nature of the facial injuries, profile of dog (stray/pet), immunization status (from dog owners) of the dog, clinical profile and outcome from the patient case notes.

All the collected data were entered into Statistical Package

for Social Sciences (SPSS, version 12). The results were expressed as frequency distribution and computed in percentages.

RESULTS

A total number of 21 children with age ranging from six months to 14 years had reported and treated for facial dog bite injuries. The incidence of dog bite has significantly increased from the year 2015 to 2018.

Table 1: Total number of reported facial dog bite cases in children from 2015 - 2018.

Year	Total	Percentage (%)
2015	1	5%
2016	6	28.5%
2017	6	28.5%
2018	8	38%
Total	21	100

The demographic characteristics of patients revealed that toddlers 9 (42.8%) and school going 5(23.8%) children were main victims for facial injuries as shown in Table 2.

Table 2: The Demographic Characteristics of Patients

Age	No of cases	Percentage (%)
Up to 28 days (Neonate)	—	—
Till 1 Yr (Infancy)	1	4.7%
1-3 Yrs (Toddler)	9	42.8%
3- 6yrs (Pre- school)	3	14.2%
6-10yrs (School Going)	5	23.8%
10-14yrs	3	14.2%

Males were significantly affected 13(70%) as compared to females 8(30%).

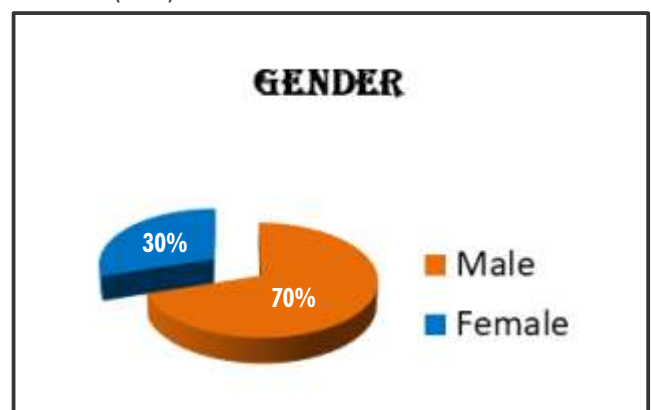


Figure 1: Gender Distribution

Majority of the victims 17(81%) had presented within 24 hours of injury, whereas two (9.5%) patients had reported after 24 hours and 72 hours of the injury.

Table 3: Average time of presentation

Average time of presentation	No of cases	Percentage (%)
< 24 hrs	17	81%
1-2 days	2	9.5%
3-5 days	2	9.5%
5-7 days	-	-
>7 days	-	-

There were six (29%) owned dogs and fifteen (71%) stray dogs involved in the attack.

Table 4: Profile of the Dog

Profile of the dog	Total	Percentage (%)
Stray	15	72%
Pet	6	28%

On assessment of vaccination status of the dogs for rabies, 3 pet dogs (14%) were vaccinated, 17 (81%) were unvaccinated and the status of one (5%) dog was unknown. However, none of the owner of pet dogs had any proof of vaccination of their dogs.

Table 5: Vaccination status of dog

Vaccination status of dog	Number	Percentage (%)
Vaccinated	3	14%
Not vaccinated	17	81%
Unknown	1	5%

The site of facial injuries was varied in all cases, with lips, cheeks and chin the most commonest areas to be affected. The children were categorized into various types based on the classification of facial injuries given by Lackmann et al.

Table 6: Severity of injury based on Lackmann et al

Type	Number of patients	Percentage (%)	Clinical findings
I	3	14.2%	Superficial injury without muscle involvement
IIA	7	33.3%	Deep injury with muscle involvement
IIB	6	28.5%	Full-thickness injury of the cheek or lip with oral mucosal involvement (through-and-through wound)
IIIA	3	14.2%	Deep injury with tissue defect (complete avulsion)
IIIB	0	0	Deep avulsive injury exposing nasal or auricular cartilage
IVA	2	19%	Deep injury with severed facial nerve and/or parotid duct
IVB	0	0	Deep injury with concomitant bone fracture

All the reported patients had been treated immediately on the same day. Out of 21 patients, 19 were operated under local anesthesia, one patient under general anesthesia and one patient did not require any surgical intervention. Wounds were cleaned, debrided and irrigated with saline in all cases followed by suturing. Majority of the cases, 18 (86%) recovered fully with primary closure whereas 2 (14%) patients reported with wound infection on whom healing was achieved with secondary closure.

Table 7: Treatment Provided

Treatment	Total	Percentage (%)
Primary closure	18	85%
Secondary closure	2	10%
Debridement and Antibiotic coverage	1	5%

All the victims had received antibiotic coverage for five to seven days with tetanus prophylaxis and anti-rabies immunoglobulin into and around the wound along with five dosages (0, 3, 7, 14 and 28th day) of rabies vaccine. Dosage of immunoglobulins administered was based on the weight of the patient (20 i.u per kg body weight).

DISCUSSION

Dog bite facial injuries inflicts considerable physical, emotional and psychological damage on children and now has become a serious concern for parents as well as the clinicians.

Facial trauma due to bites in children represents a significant medical health issue.⁸ This study revealed that toddlers and school going children were more vulnerable candidates to dog bite injuries. This could probably be due to the fact that children at this age group are more likely to play the dogs and even provoke them, making them less likely to defend when attacked. This is in agreement with a study which showed that the risk factors for dog attacks include school-aged children.⁹ According to Zerfowski and Bremerich, facial trauma in children are seen mainly on below five years of age which is often under reported.¹⁰ Mendez Gallart et al in his 10 years retrospective study had reported that 654 patients under the age of 14 years, being treated for the dog bite injuries.¹¹

In the present report, male (70%) children were more injured as compared to the females (30%). This is in concurrence with our society and cultural scenarios where boys are more commonly involved in outdoor games/ activities as compared to the girls. A high frequency of dog bites in children, especially boys, had also been reported by Wright et al.¹²

For complicated bite wounds presenting beyond the "golden 24-hour period" primary closure remains controversial. The major proportion of patient afflicted with bite injury presented within the first 24 hrs to the pediatric emergency unit which is quite appreciable and coincides to the findings reported by Abubakar and Bakari in Northern Nigeria.¹³

Majority of the bite injuries were by stray dogs (72%), as there is neither animal control law nor any agencies to control these wandering stray dogs in our part of the country.

Lower vaccination status of the dogs in this study coincides with the observation reported by Abu bakar et al.¹³ The high percentage of the unvaccinated dogs (81%) in this study indicates that rabies still remains a significant threat to the population and calls for a policy response to ensure higher coverage of anti-rabies vaccination of dogs. Public education such as good dog ownership and confinement of dogs by relevant authority along with other preventive measures are critical to minimize risk of dog bite incidences.

According to Ozanne-Smith et al the highest rate of serious injury from dog bite occurred in children below five years with the various body region affected in different patterns for children and adults.¹⁴ The facial region mainly affecting cheeks, lips, nose and the scalp represent 51% of bites to children, while 50% of the bites in adults were limited to the



upper extremity with facial region being uncommon. In the present study it was observed that all injuries mainly involved eyes, cheeks, lips and chin. This additionally also supports the findings of Palmer and Rees who termed this region as the "central target area (CTA)".¹⁵

Dog bites associated with facial injury are designated into three categories: lacerations, punctures, and avulsions (tissue loss). Lacerations were the most frequently associated soft-tissue injury in this study. Based on Lackmann's et al classification of facial injuries, 14.2% of injuries falls under type I, type IIA (33.3%), type IIB (28.5%), type IIIA (14.2%) and, type IV with 19%.⁷

The surgical approach to bite injuries includes primary closure of the wound whenever possible. Tissue defects in which primary closure is unobtainable can be managed by local flaps, regional flaps, skin grafts or microvascular reconstruction.

After several years of debate, there seems to be some consensus on the guidelines for the management of facial bite wounds.¹⁶ The principle steps in this management are as follows:

- Proper surgical toilet of the wound by copious irrigation
- Meticulous debridement of devitalized tissue
- Primary closure of the wound except in high-risk cases
- Appropriate antibiotic therapy
- Tetanus and rabies prophylaxis where required.

The regimen used in this present study with primary closure of wound after careful debridement of necrotic tissue and meticulous reapproximation has been the favored procedure in almost all recent publications.¹⁷⁻¹⁹ Majority of the children (85%) had undergone healing with primary closure whereas postoperative complications with wound infections were seen on two cases (10%) which had undergone healing by secondary intention and one case (5%) had undergone healing with debridement and antibiotic therapy. Antibiotic therapy is almost mandatory in facial polymicrobial dog bite wounds either from a prophylactic or a therapeutic point of view. A combination of amoxicillin and clavulanic acid with metronidazole and other combinations of extended-spectrum penicillin with beta-lactamase inhibitors were prescribed to ensure wide coverage for the pathogenic flora. Tetanus (if the history of immunization was unclear), anti-rabies immunoglobulins prophylaxis and five doses of anti-rabies vaccines were given in all the cases as per the WHO protocols. This supports the findings of the study by Kountakis et al where all the patients were given prophylactic antibiotics without regard to the severity of their injuries.²⁰ None of the patients had presented with symptoms of rabies during our follow up periods.

CONCLUSION

The present study had shown that increase in incidence of facial dog bite injuries among children were becoming a common presentation in our tertiary health care centre with higher percentage involving toddlers (42.8%) and school going children (23.8%). Satisfactory healing outcomes were achieved with a thorough wound lavage and primary closure of non-infected wounds under appropriate rabies prophylaxis and proper antibiotic regimen.

RECOMMENDATIONS

- Anticipatory guidance by pediatric health care providers should attend to dog bite prevention.
- Wound infection is the most common complication following dog bite injuries. Pediatric dentists should provide immediate primary wound care and surgical repair to avoid post-operative infections in order to obtain the better cosmetic results.
- A high number of unvaccinated dogs alarmed the possibility of rabies not been eradicated till date which calls for the preventive strategies and a policy response to ensure coverage of anti rabies vaccination.

LIMITATION OF THIS STUDY

- This study being a hospital centered one where the data obtained may not be a representation of the entire population.
- Retrospective design.

SOURCE OF FUNDING

NONE

CONFLICTS OF INTEREST

There are no conflicts of interest

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