Head and Neck Dog Bites in Children – A Retrospective Study.

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Abstract

Objectives:
Demonstrate facial laceration patterns of dog bites to the head & neck area in children. Identify treatment outcomes of dog bite injury repair in the head and neck region.

Methodology:
We performed a retrospective chart review (1999-2006) of children, age 0-19 years, who were treated at our tertiary care children's hospital after dog bite injuries to the head and neck. Patient demographics, dog bread and ownership, location of bite injury, seasonal incidence, wound characteristics and management, and complications were recorded.

Results:
Primary repair of dog bite injuries (<24 hrs) to the head & neck region were performed on 84 children. Median age at time of injury was 4.7 years. 50% of patients were less than 5 years old at the time of injury. The most common location for injuries were: cheeks 34%, and lips 21%. Wound patterns included: complex 45%, linear 32%, avulsion 18%, and puncture 4%. Average length of wounds was 7.15 cm (range 1 – 39 cm). Most injuries occurred during warmer months peaking in July (28%). All wounds were cleaned and repaired within 24 hours of injury. Post-operative antibiotics were used in all patients. Post-operative wound infections occurred in 10.7%. Long term wound management involved pulsed-dye laser therapy for persistent hyperemia and hypertrophic scars in a few patients (14%). There were no mortalities.

Conclusions:
Young children are particularly vulnerable to dog bite injuries to the head and neck area. Overall, wound healing is excellent regardless of the extent of injury. Despite a contaminated wound, infections occur infrequently and resolve with local wound care and antibiotics. Pulsed-dye laser may be useful to improve cosmesis for hypertrophic, hyperemic scars.

Case Studies

Case 1: A 4 year old girl suffered multiple complex, full thickness lacerations to the scalp, forehead and cheek (a, b). The cheek laceration resulted in parotid gland injury without facial nerve damage. The wounds resulted from a neighbor's Rottweiler attack. Primary repair of the wounds was performed under general anesthesia after copious irrigation with saline solution. Post-operatively, IV and then oral antibiotics were used for a total of 10 days. The wounds healed without complication.

Case 2: A 12 year old boy was provoking his family dog, a Golden Retriever. He suffered an avulsion injury of his right cheek. The parotid duct was completely avulsed from the gland and could not be re-attached (a, arrow). Minimal right facial nerve (buccal) weakness was noted. Primary closure to reduce the size of the wound was performed (b). The remaining wound was treated with saline wet to dry dressings to encourage secondary healing over several weeks time (c). The wound granulated nicely and later epithelialized without grafting. Previously, he had been bitten by the same dog.

Case 3: A 4 year old boy was bitten by a Siberian Husky. A large, soft tissue defect involving the right lower face resulted. Primary closure with local tissue advancement was performed. Antibiotics were given post-operatively. A persistent hyperemic, hypertrophic scar was noted 1 year after injury (b). A single treatment with pulsed-dye laser resulted in improved cosmesis (c).

Results

Eighty-four children were treated for dog bites to the head and neck over a 7 year period. Mean age at presentation was 4.7 years (Figure 1). Forty-six patients were male and 38 were female. Median follow-up after injury was 37 days (range 4 days to 4.4 years). Several wound patterns were noted (Figure 2). Some patients suffered wounds to more than one location (Figure 3). Most injuries occurred during warmer ambient temperatures (Figure 4) and were due to family pets (Figure 5). Pit Bulls were responsible for a large proportion of the injuries (Figure 6). Forty-nine wounds were repaired in the ER under local anesthesia with IV sedation and 35 under general anesthesia. Despite local irrigation/debridement, antibiotics, and primary closure, infections occurred in 9 patients (Figure 7). Avulsed tissue that was surgically re-attached as a free graft was completely lost in all 4 cases, but served as a biologic dressing to help promote wound healing. Hypertrophic and hyperemic scars persisted in 14% of patients. The pulsed-dye laser (PDL) was used successfully to improve cosmesis and pliability of these scars.

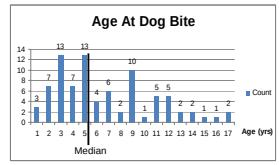

Figure 1

Wound Type	Number
Avulsion	17
Complex	42
Linear	30
Puncture	4
Total	93

Figure 2

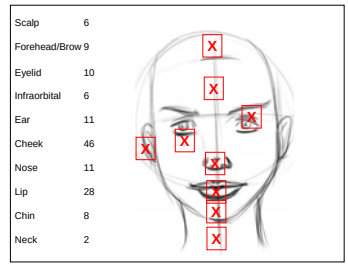

Figure 3

Distribution and Location of Dog Bite Injuries

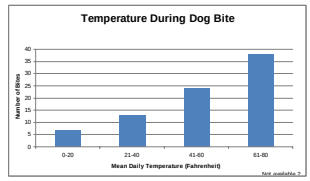

Figure 4

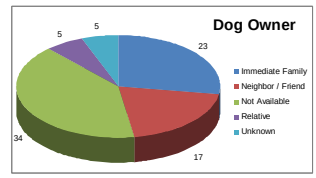

Figure 5

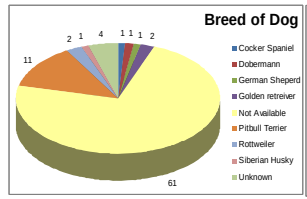

Figure 6

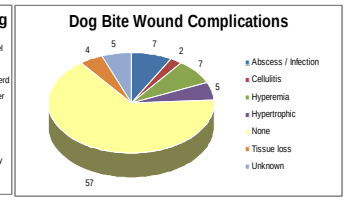

Figure 7

Discussion

The American Pet Products Manufactures Association reports that there are 74.8 million dogs in the United States in 2007. A national survey by the Center for Disease Control in Atlanta, GA reported that dogs bite nearly 2% of the US population annually(1). Dog bites result in approximately 44,000 facial injuries treated in US hospitals each year. This represents about .5% to 1.5% of all emergency room visits. In children under 10 years of age, the face is the most common target, representing 77% of injuries. The middle third of the face is most frequently involved. The majority of biting dogs belong to the family or friend of the victim (2). As reported in our study, Pit Bull Terriers are the most common breed causing the injury. The incidence of dog bite injury in our study is highest during warmer weather. This may be due to increased exposure of playing children to dogs in the summer months or due to irritability of the dog because of increased ambient temperature.

After careful wound irrigation and debridement, primary repair of head and neck wounds caused by dog bites achieves good results. A multiple layer closure using an absorbable, subcutaneous suture and a non-absorbable synthetic, monofilament cutaneous suture was performed in the majority of our patients. Broad spectrum antibiotics were used in all cases. Despite a contaminated wound, infection rates are low. In only one case was avulsed tissue not re-implanted (Case 2). Re-implantation of avulsed tissue was unsuccessful in all of our patients. Re-implantation of this non-vital tissue acts as a biological dressing and can help decrease wound size (3).

In this study, all patients who underwent PDL treatments for persistent hyperemic and hypertrophic scars showed clinical improvement. Case 3 illustrates cosmetic improvement following only 1 PDL treatment. The exact mechanism of action of the PDL is unknown. Laser induced selective photothermolysis of microvasculature leading to hypoxia and collagenesis from decreased microvascular perfusion is a plausible explanation (4). We recommend PDL treatments on select patients with persistent hyperemic, hypertrophic scars following repair of dog bites to the head and neck.

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