Isolated globe rupture without concomitant eyelid laceration or orbital trauma following facial dog bite injury in a child

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ABSTRACT

Purpose: Facial dog bites often cause periorbital trauma; however, the globe is rarely damaged. Most globe injury following dog bites results from unusual circumstances and typically presents with concomitant periorbital and ocular adnexal injuries.

Observations: The case presented is a rare presentation of isolated globe rupture without orbital trauma following facial dog bite in a child without history or evidence of decreased blink reflex, mental deficiency, or substance use.

Conclusions and importance: Ophthalmic investigation is warranted in all pediatric periorbital dog bite injuries, even in the setting of minimal or absent periorbital trauma. As additional blunt trauma to the globe in the immediate recovery period resulted in a second open globe injury, the critical importance of protective eyewear, activity restriction, and judicious corneal suture removal postoperatively following repair of open globe injury is discussed.

1. Introduction

Pet-related trauma results in approximately 1% of emergency department visits, and dog bite attacks frequently affect the head and neck, particularly in young children. Facial dog bites often result in trauma to the periorbital region, most commonly the eyelids. Fortunately, the eye itself is seldom damaged due to the blink reflex. Few cases have been reported in the literature of open globe injury following dog bite attacks, and it has been described that atypical circumstances must be present for globe rupture to occur. In the present cases described in the literature, a delayed blink reflex is often present and concomitant periorbital injury is typically encountered. Additionally, one case recently described by Erickson et al. involved a seven-year-old boy who suffered a scleral laceration (Zone 3 injury) in addition to a lower eyelid margin laceration, superficial cheek laceration, with deeper lacerations to the midface. The upward rotation of the globe due to Bell’s reflex likely resulted in a direct Zone 3 globe rupture. The authors present an incredibly rare presentation of isolated open globe rupture (Zone 1 injury) without concomitant eyelid laceration or orbital trauma following a facial dog bite in a child without history or evidence of decreased blink reflex, mental deficiency, or substance use.

2. Case report

The patient is an eight-year-old male with no past medical history (including intellectual disability) and no substance use who was bitten on the left side of his face by his dog. At the time of injury, he noted significant pain and instant loss of vision in his left eye. On examination in the Pediatric Emergency Department, he was noted to have 20/20 vision OD, 20/200 vision OS and a left corneal laceration with uveal prolapse, consistent with left open globe injury, see Fig. 1. Interestingly, he had no evidence of eyelid laceration or other periorbital trauma. His ocular trauma score following injury was 57. An orbital computed tomography scan was performed which demonstrated no intraocular foreign body or concomitant orbital fracture or other periorbital injury, and he was taken to the operating room urgently and underwent left globe exploration and open globe repair. Infectious disease was consulted for guidance regarding appropriate antibiotic administration, and the patient received intravenous doses of ampicillin/sulbactam, metronidazole, and levofloxacin, with recommendations for a seven-day course of oral levofloxacin postoperatively. Postoperatively, he was recovering well and was following with pediatric ophthalmology for early visual rehabilitation. At postoperative week three, he was healing...
appropriately and his vision was 20/60 in the injured eye. He was noted to have a present Bell’s phenomenon and his corneal reflex was tested with a wisp of cotton and confirmed to be intact. He underwent limited suture removal to expedite his recovery by clearing the pupillary axis and in an effort to prevent the ultimate development of amblyopia. Although activity restrictions had been explicitly discussed with the parents, in addition to the need for constant eye protection with polycarbonate lenses, the following day the child suffered blunt trauma to his left globe with a wiffle ball. He noted significant pain and instant loss of vision in his left eye. On examination, he was noted to have 20/200 vision OS and a left globe rupture with wound gape and broken sutures in the corneal stroma. He was once again urgently taken to the operating room and underwent left globe exploration and open globe repair. He is recovering well and is following with pediatric ophthalmology for visual rehabilitation in coordination with cornea surgery, with plans for a longer observation period prior to corneal suture removal.

3. Discussion

Isolated Zone 1 open globe injury without concomitant eyelid laceration or orbital injury following facial dog bite attack is exceedingly rare, particularly in a child with an adequate blink reflex and Bell’s phenomenon. Few cases have been discussed in the literature of open globe injury following facial dog bite attacks. Most open globe injury secondary to dog bites surrounds atypical circumstances such as a delayed blink reflex and significant concomitant periorbital injury. Still, given the devastating consequences resulting from open globe trauma in a child with regards to amblyopia, careful and meticulous ophthalmic investigation is warranted in all pediatric periorbital dog bite injuries, even in the setting of minimal or absent periorbital trauma.

Regarding postoperative management following pediatric open globe injury, control of postoperative inflammation and early visual rehabilitation is key, particularly in visually immature children. Visual rehabilitation must be initiated as early as feasible, and includes utilization of spectacle correction or contact lenses, patching of the unaffected eye if the laceration involves the visual/pupillary axis. Furthermore, treatment and control of postoperative inflammation is paramount. As children heal more rapidly than adults, early corneal suture removal, particularly sutures involving the pupillary axis, has been recommended. As such, the corneal wound should be frequently monitored postoperatively and assessed for loosening of the corneal sutures and early signs of vascularization along the wound bed. Though clearing the visual axis, accompanied by refractive correction, is key to good long-term visual recovery, a lengthy discussion with the parents or guardian of the patient regarding proper activity restriction and monocular precautions with polycarbonate protective spectacle wear remains absolutely necessary to the ultimate success of visual rehabilitation.

4. Conclusions

The authors hope to highlight a rare presentation of isolated globe rupture without concomitant eyelid laceration or orbital trauma following a facial dog bite in a child without history or evidence of decreased blink reflex, mental deficiency, or substance use. Additionally, the authors hope to emphasize the critical importance of protective eyewear and activity restriction postoperatively following repair of open globe injury. Finally, the ophthalmologist must be able to adequately assess the compliance of the patient and parent of patient prior to initiating early corneal suture removal in the pediatric population, as the risk of subsequent open globe injury remains high in the early postoperative period.

Patient consent

The patient’s legal guardian consented to publication of the case in writing.

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Authorship

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