Cyanoacrylate repair of laser in situ keratomileusis corneal flap perforation by a snake bite

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A 30-year-old man who had laser in situ keratomileusis (LASIK) for myopia 1 year earlier developed a corneal perforation in the left eye from a boa constrictor. The patient presented to the emergency room, and a small corneal perforation just outside the visual axis was diagnosed within the LASIK flap. Cyanoacrylate adhesive was used to close the corneal perforation. The patient went on to full visual recovery with an uncorrected visual acuity of 20/20. This is the first reported case of a penetrating corneal injury from a serpent in an eye that had LASIK. Cyanoacrylate may be used to repair small traumatic corneal perforations with a favorable visual outcome in eyes that have had LASIK. J Cataract Refract Surg 2005; 31:2224–2226 © 2005 ASCRS and ESCRS

With the increasing popularity of refractive surgery, more patients will present to ophthalmologists with unusual types of corneal injuries. In patients who have had laser in situ keratomileusis (LASIK), there will always be about concern accidental trauma to the cornea that may result in flap dislocation, striae, or even amputation. Although rare, eye injuries by serpent bites can be visually devastating. We report an unusual case of a penetrating corneal injury caused by a boa constrictor to a post-LASIK eye that was repaired with cyanoacrylate tissue adhesive. To our knowledge, this is the first reported case of a snake bite injury to an eye that had had LASIK or any other corneal refractive procedure.

CASE REPORT

A 30-year-old man presented to the emergency room with severe pain, photophobia, and tearing in the left eye after being bitten by his pet boa constrictor. The patient was able to partially block the attack and dislodge the snake from his face and eye. The medical history was unremarkable. Approximately 1 year before this injury, the patient had uneventful myopic LASIK correction with a superiorly hinged corneal flap. Ophthalmic examination in the emergency room revealed a visual acuity of 20/20 in the right eye and 20/200 in the left eye. Several superficial skin abrasions were noted around the left cheek and brow (Figure 1), but the animal was not attached to the patient, as reported in a prior case report.

Slitlamp examination of the right eye did not disclose any ocular injury or anomalies within the LASIK flap. The left eye, however, revealed moderately injected conjunctiva with a nasal subconjunctival hemorrhage. Using topical fluorescein benoxinate hydrochloride, a pinpoint area of aqueous leakage was noted in the mid peripheral cornea nasally from the central visual axis within the LASIK corneal flap. The superiorly hinged LASIK flap did not show evidence of dislocation, striae, or prior epithelial ingrowth. At this point, a protective eye shield was placed over the left eye and preparations were made for the patient to have emergency explorative surgery under general anesthesia.

Under general anesthesia, a fluorescein strip was used to stain the cornea and conjunctiva and isolate the perforation site. Inspection under high magnification with the operating microscope revealed a full-thickness corneal perforation within the LASIK flap located nasally beyond the visual axis (Figure 2). There was no evidence of flap striae or dislocation, and the boundary of the flap remained adherent. The anterior chamber was formed, and there was no evidence of lenticular damage. A corneal swab around the perforation site was taken and sent for gram stain and bacterial cultures. A bandage contact lens was initially attempted, but this did not seal the perforation. Owing to the brisk leakage, the bandage lens was abandoned. Cyanoacrylate tissue adhesive (2-ocetyl cyanoacrylate, Dermabond, Ethicon Inc.) was applied to the perforation site using a 30-gauge needle. Once the adhesive solidified, a fluorescein strip was
applied to the area to confirm that the leakage had been sealed. A conjunctival peritomy was then performed around the area of the subconjunctival hemorrhage to explore for other perforation sites. There were no other areas of perforation noted in the sclera and cornea, and the peritomy was closed with interrupted 8-0 Vicryl sutures. A bandage contact lens was applied over the cornea to prevent tarsal irritation from the solidified cyanoacrylate adhesive. Subconjunctival injections of cefazolin and gentamicin were administered to the inferior fornix, and an eye patch was applied. Postoperatively, the patient was discharged with 400 mg oral gatifloxacin daily for 1 week.

On postoperative day 1, the visual acuity in the left eye measured 20/50 with the plano contact lens in place (Figure 3). There was no evidence of leakage, and the anterior chamber was formed with minimum inflammation. The patient was placed on topical gatifloxacin every 2 hours pending culture results. After 72 hours, the eye remained quiet with no evidence of infection or leakage and the cornea cultures were negative for growth. The contact lens was left in place for the next 3 weeks, and the topical antibiotic was decreased to 4 times a day. The patient was monitored frequently over the next few weeks because concern about infectious keratitis while the cyanoacrylate adhesive and contact lens remained in place.

After 4 weeks, the cyanoacrylate adhesive dislodged from the corneal bed as a result of corneal tissue healing. The contact lens was removed and there was no corneal leakage noted with application of fluorescein drops. The cornea remained clear without signs of infection. The visual acuity measured 20/25.

Six months after the injury, the eye remained healed (Figure 4). The uncorrected visual acuity was 20/20 and there was no evidence of epithelial ingrowth with minimum corneal scarring. The LASIK flap remains attached without striae.

**DISCUSSION**

Any blunt or penetrating traumatic injury to the eye will pose a threat to the corneal flap throughout the life of a patient who has had LASIK. This is becoming evident...
in the numerous case reports involving late trauma to post-LASIK eyes. Depending on the mechanism and direction of impact, the trauma to the cornea can result in flap dislocation, amputation, or perforation. With the increasing number of refractive surgery cases performed each year, the number of injuries that occur to eyes that have had LASIK will increase. It has been estimated that 50 000 people per year in the United States are attacked by snakes. Based on a MEDLINE search dating to 1966, we were able to find 4 reported cases of ocular injuries resulting from snake bites. Two of these cases involved corneal perforations that were managed with contact lens or suture closure. This case of a snake bite eye injury is unique because the patient had had LASIK and the corneal perforation was treated with cyanoacrylate tissue adhesive.

Boa constrictors are nonvenomous serpents and have been reported to strike humans and possibly remain attached to the victim, as in 1 reported ocular injury case. The location of the injury in our patient was also serendipitous in that the central cornea and visual axis were spared. Infectious stomatitis has also been reported to be a common infection among snakes held in captivity, but the boa constrictor involved in our case was not infected. Because boa constrictors often eat their prey alive and whole, their mouths are frequently colonized with coliform bacteria such as gram-negative rods. Our patient was thus immediately started on prophylactic broad-spectrum oral and topical antibiotics.

Cyanoacrylate tissue adhesive has been widely used to treat corneal perforations. Alternative modalities to treat small corneal perforations include simple patching, contact lens use, and suture closure. In our case, a contact lens was not able to seal the perforation because of the large nature of the leakage. Primary closure of the wound by suture repair was not considered because of the close proximity to the visual axis and the small nature of the wound. Cyanoacrylate adhesive seals the perforation site at the superficial layers of the cornea and does not cause corneal striae or dislocation. Also, if applied properly, the adhesive can avoid inducing irregular corneal astigmatism such as a nylon suture. Cyanoacrylate tissue adhesive may be a useful modality in treating small traumatic corneal perforations in eyes that have had LASIK without disturbing the corneal flap. Further clinical studies are necessary to demonstrate its usefulness in traumatic post-LASIK injuries.

REFERENCES