Corneal Toxicity Associated With Latanoprost

Latanoprost is a new topical prostaglandin analog used to lower intraocular pressure. Adverse effects reported with use of latanoprost include cystoid macular edema, anterior uveitis, choroidal effusions, facial rash, hyperpigmentation of eyelashes, and iris hyperpigmentation.1,2 We describe 4 patients who developed pseudodendrites during treatment with latanoprost.

Report of Cases. Case 1. A 77-year-old woman was referred to us with a suspected diagnosis of herpes simplex keratitis. Her ocular history was significant for bilateral diabetic retinopathy necessitating vitrectomy and retinal laser treatments, followed by glaucoma for which the patient was treated with levobunolol hydrochloride twice daily to both eyes. Treatment with latanoprost was then added to the right eye for intraocular pressure control. Three weeks after treatment with latanoprost, the patient experienced symptoms of pain and irritation secondary to a corneal abrasion in the right eye. The abrasion was treated with a bandage contact lens for 1 week, followed by preserved artificial tears and lubricating ointment for 1 month, which failed to heal the epithelium. Her medical history was significant for type 1 diabetes mellitus of 40 years’ duration, aortic valve replacement, and a stroke. Systemic medications included insulin, warfarin sodium, lisinopril, bumetanide, and aspirin.

On examination, visual acuity was counting fingers at 2 ft OD and 20/400 OS. The right cornea showed an inferonasal linear dendritiform lesion. The lesion was composed of swollen, hazy epithelial cells without typical epithelial ulceration and terminal bulbs of dendritic herpes simplex keratitis. There was mild edema of the adjacent cornea, with a few filaments. The left cornea showed focal central epithelial map changes. A diagnosis of toxic keratitis was made. Latanoprost was discontinued, and the levobunolol regimen was decreased to once daily in the right eye. Therapy with preservative-free artificial tears and erythromycin ointment were started. Follow-up 2 weeks later showed a dendritiform epithelial haze in the affected area with no residual discomfort. Follow-up at 3 months showed a completely healed epithelium with no surface abnormality.

Case 2. An 87-year-old woman was referred for a hyphema and secondary glaucoma 6 weeks after cataract surgery in the right eye. Her ocular history was unremarkable. Her medical history included diet-controlled diabetes of 10 years’ duration and hypertension. Systemic medications included enalapril maleate, verapamil hydrochloride, and acetazolamide sodium. Ocular medications included 1% prednisolone acetate, dorzolamide, and timolol maleate to the right eye.

On initial examination, visual acuity was 20/200 OD and 20/50 OS. Anterior segment examination of the right eye was significant for a 15% hyphema and a diffuse vitreous hemorrhage with an intraocular pressure of 24 mm Hg. The patient was referred for glaucoma and retina consults.

Three months later, the patient was reexamined for complaints of irritation and tearing in the right eye. Ocular medications had been modified to include latanoprost once daily in the right eye. Visual acuity was now 20/40 OD, with no evidence of residual hyphema. Corneal examination showed a linear pseudodendritic pattern across the inferior cornea. The left eye was normal.
A diagnosis of toxic keratopathy was made. Latanoprost was discontinued, and treatment with preservative-free tears and erythromycin ointment started. Four weeks later, the dendritiform lesion had healed completely, leaving a few residual superficial punctate erosions.

Case 3. A 63-year-old man was referred for evaluation of a dendritiform lesion and chronic conjunctivitis in the left eye. He had a primary open-angle glaucoma, for which he had undergone trabeculectomy in the right eye and argon laser trabecuoplasty in the left. Medical history included depression, which was treated with lithium carbonate and nortriptylene hydrochloride. Nine months prior to presentation, his topical glaucoma regimen was switched from a combination of timolol, pilocarpine, and dorzolamide hydrochloride to a combination of timolol, brimonidine tartrate, and latanoprost in the left eye. A follicular conjunctivitis developed and treatment with brimonidine was discontinued. Despite this, the patient continued to have symptoms of irritation, and 2 weeks later developed an epithelial defect with a dendritiform border. Our examination showed visual acuities of 20/400 OD and 20/80 OS. The left conjunctiva showed a fine papillary response. The cornea had central confluent superficial punctate erosions with an inferior dendritiform lesion overlying a mild stromal haze (Figure 1 and Figure 2).

Toxic reaction to eyedrops was suspected; all glaucoma medications to the left eye were stopped and treatment with erythromycin ointment started. Four days later, the visual acuity had improved to 20/50 OS; the central abrasion had healed with a faint residual pseudo-dendritic pattern.

Case 4. A 79-year-old man was referred for evaluation of persistent irritation and blurred vision in his only eye. His right eye was phthisical following trauma, and his left eye had undergone trabeculectomy for advanced glaucoma. Topical medications included latanoprost, timolol, and erythromycin ointment in the left eye.

Visual acuity was 20/100 OS. The conjunctiva showed a fine papillary response. The cornea had central confluent superficial punctate erosions with an inferior dendritiform lesion overlying a mild stromal haze (Figure 3 and Figure 4).

Toxic epitheliopathy was diagnosed and treatment with latanoprost was discontinued. Three weeks later there was complete resolution of the dendritiform lesion.

Comment. The development of dendritiform epitheliopathy as a sign of corneal toxicity has been previously described with the use of topical antiviral, antibiotic, β-blocker administration and preservatives in contact lens solutions. In each of our cases, latanoprost can be singled out as the inciting medication since symptoms and signs followed addition of latanoprost to the medication regimen. Furthermore, specific discontinuation of the drug was associated with prompt resolution of signs.

Prostanoids have been shown to produce an increase in conjunctival hyperemia and ocular irritation. Their effect on the corneal epithelium is unknown, although numerous prostaglandin receptors exist in the corneal epithelium.

Another observation was the association with diabetes (2 of 4 cases), which is itself associated with defects in corneal epithelium and epithelial healing. It is possible that diabetic corneas may be more susceptible to the additive effects of an epitheliotoxic drug.

Latanoprost may induce dendritiform corneal lesions that are reversible with discontinuation of the drug.

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Removal of a Fishhook in the Eyelid and Cornea Using a Vertical Eyelid-Splitting Technique

Ocular fishhook injuries are rare, yet potentially vision threatening. Corneal scarring, retinal detachment, and endophthalmitis may result. Prompt surgical intervention is recommended; however, the construction of a barbed fishhook makes removal of these objects difficult. We report what we believe is a new technique to remove a fishhook in a patient with penetration of both the eyelid and cornea. To our knowledge, this combined injury has not been reported previously.

Report of a Case. A 24-year-old man was first seen in the emergency department after a fishing injury in which a fishhook struck his left eye. One barbed hook of a treble fishhook was embedded in the left upper lid (Figure 1) and he was unable to open the eye. The right eye was normal. Computed tomographic (CT) scanning was performed and suggested that the hook extended through the eyelid and cornea into the anterior chamber (Figure 2). The patient was started on a regimen of intravenous cefazolin sodium and gentamicin sulfate. He was taken to the operating room and general anesthesia was administered.

The globe could not be visualized and the hook could not be cut since it was completely embedded and flush with the skin. There was also serious concern that trying to cut the thick metal could result in further injuries to the globe. The eyelid was infiltrated with 1% lidocaine hydrochloride with epinephrine 1:200,000. Using a No. 15 Beaver blade, a full-thickness eyelid incision was created from the margin of the upper eyelid vertically to the fishhook, followed by bipolar cautery for hemostasis. A 4-0 silk suture was placed through the apex of each of the 2 eyelid flaps that were created and reflected superiorly (Figure 3). The sutures were clamped to the drape to allow visualization of the globe.

The hook had entered vertically in the center of the cornea. The corneal wound was confined mainly to the stroma with a small region superiorly extending full thickness into the anterior chamber. A corneal incision was made anterior to the barb so that the hook could be removed gently. The anterior chamber was re-formed using balanced salt solution after the removal of the hook, and two 10-0 nylon sutures were used to close the corneal wound. No leakage was noted after this procedure.

The eyelid retraction sutures were removed. Multiple interrupted 5-0 polyglactin 910 (Vicryl; Ethicon, Inc, Somerville, NJ) sutures were placed at partial thickness through tarsus. At the apex, a buried interrupted suture re-formed the margin. No. 6-0 plain gut sutures were used to close the subcutaneous tissues and the skin.

Figure 1. Barbed hook of treble fishhook embedded fully in the left upper eyelid.

Figure 2. Computed tomographic scan axial image showing possible fishhook penetration into the anterior chamber of the left eye.

Figure 3. Surgical eyelid-splitting procedure performed and the upper eyelid retracted with 2 sutures to allow visibility of the cornea.

Figure 4. Well-healed corneal laceration and eyelid incision after 4 months.
On the first postoperative day, visual acuity was counting fingers at 3 ft. The anterior chamber was deep with marked inflammation, and there was significant corneal edema. The patient was maintained on a regimen of topical ofloxacin and intravenous antibiotics for 3 days. He was discharged on a regimen of oral ciprofloxacin hydrochloride and topical ofloxacin. Four months after surgery, visual acuity with a soft contact lens was 20/20. The corneal laceration and eyelid incision were well healed (Figure 4).

Comment. Removal of a fishhook penetrating the globe can be very challenging. Several techniques have been described in the literature. One such technique is the “advance and cut method,” in which the hook is grasped and rotated to create a new exit site for the tip. The barb is then cut off using wire cutters, and the barbless hook is backed out through the entry site.1 If the hook is located primarily within the corneal stroma, a perpendicular incision can be made in the corneal tissue anterior to the hook.2 In cases in which the fishhook penetrates the retina, the needle cover technique can be useful.3 A large-bore needle is inserted into the entry wound and the barb is engaged in the needle lumen. The needle and hook are then removed simultaneously to minimize tissue damage.

Aiello et al4 reported a series of ocular fishhook injuries. Similar to patients in that series, our patient was a young man with left eye involvement, which was seen in most cases. Like most cases, final visual acuity in our patient was good.

In our case, advancing the fishhook was not possible owing to the deep position of the hook in the eye and the unknown position in the anterior chamber. A vertical eyelid-splitting technique allowed full visibility of the cornea with minimal manipulation of the hook. Since most of the hook was intracorneal, a corneal incision over the barb allowed for easy removal. Careful repair of the surgically created marginal eyelid laceration resulted in a well-healed eyelid with minimal scarring.

To our knowledge, a fishhook injury with simultaneous penetration of the eyelid and cornea has not been previously reported. Splitting of the upper eyelid using a full-thickness vertical eyelid incision may be a useful technique when visibility of a foreign body is limited and the risk to the globe from additional manipulation is high.

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Traumatic Total Iridectomy Due to Iris Extrusion Through a Self-sealing Cataract Incision

Blunt ocular trauma occurring in the postoperative period after cataract extraction can result in severe visual loss with extrusion of iris, vitreous, and retinal tissue through the ruptured cataract wound. We report a case of isolated iris loss in a pseudophakic patient who had undergone sutureless cataract extraction and intraocular lens implantation. There are reports of phakic patients who developed isolated traumatic aniridia after corneal and scleral ruptures.5-7 To our knowledge, this is the first case of isolated traumatic total iridectomy in a pseudophakic patient.

Report of a Case. An 82-year-old woman with age-related macular degeneration and geographic atrophy had undergone cataract extraction of the right eye and intraocular lens implantation. The scleral self-sealing cataract wound was posterior to the limbus and was 5.25 mm in length. She did well until 12 weeks later, when she fell and struck her right orbital region on a cabinet edge while on vacation. She noted an immediate loss of vision to the level of hand motions. Four days later, upon returning to Los Angeles, Calif, she came to us for an ophthalmologic examination.

Examination of the right eye showed light perception visual acuity with marked ecchymosis of the eyelids and orbital region. Slitlamp examination revealed the superior 5 clock hours positions of the bulbar conjunctiva to have a grayish discoloration. A layered hyphema occupied 75% of the anterior chamber. The remaining portion of the anterior chamber was filled with a dispersed hyphema. There was no view of the iris or posterior segment structures. Applanation pressures were 38 mm Hg in the right eye and 16 mm Hg in the left. Because of the possibility of an occult ruptured globe, the patient underwent surgical exploration of the globe that same morning.

Surgical exploration disclosed a blue-gray iris lying in the subconjunctival space adjacent to a self-sealing superior scleral cataract wound. The iris, admixed with Tenon capsule and blood, was adherent to the underlying sclera. Three interrupted 10-0 nylon sutures were placed to close the V-shaped scleral cataract wound. The anterior chamber hyphema was then evacuated. No iris was found inside the eyeball. The posterior chamber intraocular lens was in good position in the lens capsular bag (Figure).
One month later, a pars plana vitrectomy was performed to evacuate a persistent vitreous hemorrhage. Visual acuity improved from hand motions preoperatively to 20/300 postoperatively. Intraocular pressure stabilized at 21 mm Hg. The visual acuity was limited to 20/300 by geographic atrophy due to age-related macular degeneration.

Comment. Isolated traumatic expulsion of the iris has been described in association with contusion injuries to the globe in phakic patients. To our knowledge, this is the first report of traumatic total iridectomy in a pseudophakic patient with retention of a posterior chamber intraocular lens implant.

Previous reports described patients in whom the iris was expelled through a corneoscleral laceration1-3 or through a full-thickness glaucoma fistula.4 Romem and Singer1 described a man who was struck by a piece of wood and suffered a corneoscleral laceration extending from the limbus to the equator temporally. That patient was found to have isolated traumatic total iridectomy; the natural lens was intact. Follow-up during the next 6 months showed maintained 20/25 visual acuity and normal intraocular pressure.

There have been reports of 2 other patients with traumatic total iridectomy after suffering small perforating perilimbal wounds.5 In 1 patient, the iris extruded through a full-thickness glaucoma fistula when the conjunctival bleb ruptured.6 It was postulated that an abrupt rise of intraocular pressure led to extrusion of the iris through the fistula.

In our patient, we postulate that the blunt trauma led to an abrupt elevation of the intraocular pressure. As a result of the force exerted on the globe and the elevated intraocular pressure, the previously closed self-sealing corneoscleral incision opened and the iris extruded through the incision. With the sudden expansion of the eyeball after the impact, the iris, stuck in the wound, was avulsed from the iris root. The posterior structures were held back by the intraocular lens implant. This occurrence of traumatic total iridectomy due to blunt trauma in the setting of a self-sealing cataract wound has not been previously reported. Fortunately, due to the intraocular lens implant’s presence, there was a good outcome.

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From the Archives of the Archives

A look at the past . . .

COLLINS describes the views of Van Graefe, De Wecker, Nordenson, Raehlmann, as to the causes of retinal detachment and ruptures and reports two cases in which microscopic examination supported Elschnig’s theory as to the cause of ruptures in retinal detachments. In each case a small portion of retina remained attached in the yellow-spot region to which it was adherent, having been torn off the detached portion, owing to choroiditic adhesions. Whenever an eye is cut open, the edges of the retina turn in, hence the fact that the edges turn in in ruptures is of no importance as evidence for or against any particular theory.