

Three days later, the left eye was treated with gas tamponade and postural positioning. The detachment resolved, and her visual acuity improved to 20/40 OS.

Preoperatively, the biomicroscopic examination of the left eye revealed the subjective appearance of an irregular endothelial surface similar to, but more coarse than, the beaten-metal appearance of the endothelium in iridocorneal endothelial syndrome (**Figure**). In comparison with 10 age-matched controls from a previous study of healthy patients (mean age, 73 years; range, 70-79 years), our patient had a higher mean cell area (mean, 473 μm^2 compared with mean \pm SD, 348.8 \pm 36.1 μm^2), a higher coefficient of variation (34% compared with 27%), and a lower percentage of hexagonal cells (mean, 60% compared with mean \pm SD, 65.5% \pm 3.1%). The endothelial morphologic characteristics were not consistent with iridocorneal endothelial syndrome or Fuchs dystrophy.

Comment. In 1964, the idea of an intrinsic abnormality was first proposed in an article on Descemet membrane detachments by Scheie,¹ as discussed by John McLean, MD. Since then, additional cases of bilateral detachments have been reported with further speculation on an anatomic predisposition but without supporting evidence.²⁻⁴ In our patient, we noted abnormalities in the results of both the biomicroscopic examination and the morphometric analysis of her endothelium that may have contributed to her subsequent membrane detachment. Given the paucity of data available for this rare complication, our 1 case suggests an underlying defect leading to its occurrence, although this idea may not be generalizable to the population as a whole.

In light of this information, we recommend additional preoperative counseling and careful examination of the contralateral eye in patients with Descemet membrane detachment prior to undertaking additional surgery. For cataract surgery, we recommend considering incision into the anterior chamber superiorly, rather than temporally,

to facilitate gas tamponade of the endothelial break should a detachment occur.

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1. McLean J. In discussion of: Scheie HG. Stripping of Descemet membrane in cataract extraction. *Trans Am Ophthalmol Soc.* 1964;62:140-152.
2. Sparks GM. Descemetopexy: surgical reattachment of stripped Descemet membrane. *Arch Ophthalmol.* 1967;78:31-34.
3. Kim T, Sorenson A. Bilateral Descemet membrane detachments. *Arch Ophthalmol.* 2000;118:1302-1303.
4. Kansal S, Sugar J. Consecutive Descemet membrane detachment after successive phacoemulsification. *Cornea.* 2001;20:670-671.

Iatrogenic Corneal and Conjunctival Toxic Reaction From Hydrogen Peroxide Disinfection

Goldmann applanation tonometer tips and contact fundus laser lenses can be disinfected using various means. Tonometer tips are commonly cleansed by rubbing briskly with a 70% isopropyl alcohol wipe. Alternative methods of disinfection include soaking in either 3% hydrogen peroxide, a 1:10 dilution of sodium hypochlorite (household bleach), or 70% isopropyl alcohol, followed by rinsing and thorough drying (see "Comment" section). Proper use of these solutions requires soaking for 5 to 10 minutes. At our institution, tonometer tips and fundus laser lenses are routinely soaked in hydrogen peroxide, rinsed with sterile water or an isotonic sodium chloride solution, then left to air dry. We report 2 cases of toxic reactions from exposure to instruments disinfected in a 3% hydrogen peroxide solution.

Report of Cases. *Case 1.* A 30-year-old woman with newly diagnosed proliferative diabetic retinopathy was scheduled for a planned session of panretinal photocoagulation. The patient was not receiving any ocular medications. Visual acuity of the involved eye was 20/20 OS. There was no history of diabetic keratopathy in either eye. One to 2 minutes after placing the fundus laser lens on the patient's eye, the physician noted a short-term onset of corneal edema with the presence of discrete, subepithelial bubbles measuring 0.1 to 0.3 mm in diameter and extending into the conjunctiva (**Figure 1**). There was a large epithelial defect on removal of the lens. The patient did not note significant pain. She was referred to the cornea service, where she was instructed to use frequent lubrication and to return the next day to her referring specialist. She returned to our clinic 3 weeks later with a visual acuity of 20/30 OS. She had moderate diffuse punctate epithelial erosions with faint subepithelial and anterior stromal corneal haze superior to the visual axis. Her epitheliopathy resolved over the next 6 weeks, and her visual acuity remained stable with persistent anterior corneal haze over the ensuing 3-month follow-up period.

Case 2. A 32-year-old woman was seen in follow-up by the cornea service for chronic graft rejection. She had an ocular history of 3 penetrating keratoplasties in the left eye, first due to penetrating ocular trauma, then subsequently due to graft rejections. She also had a history of aphakic glaucoma. The patient was not receiving any ocular medications in the involved right eye. Visual acuity was 20/15 OD. Applanation tonometry was performed without the patient experiencing pain, first in the right eye, followed by the left eye. During applanation of the right eye, bubbles were observed within the area of the mires. Applanation progressed without incidence in the left eye. On ophthalmic examination by the staff physician 10 minutes later, the right eye exhibited moderate hyperemia along with few subepithelial corneal and conjunctival bubbles (**Figure 2**). The patient was instructed to use lubrication in the right eye and to call with worsening symptoms. Her symp-

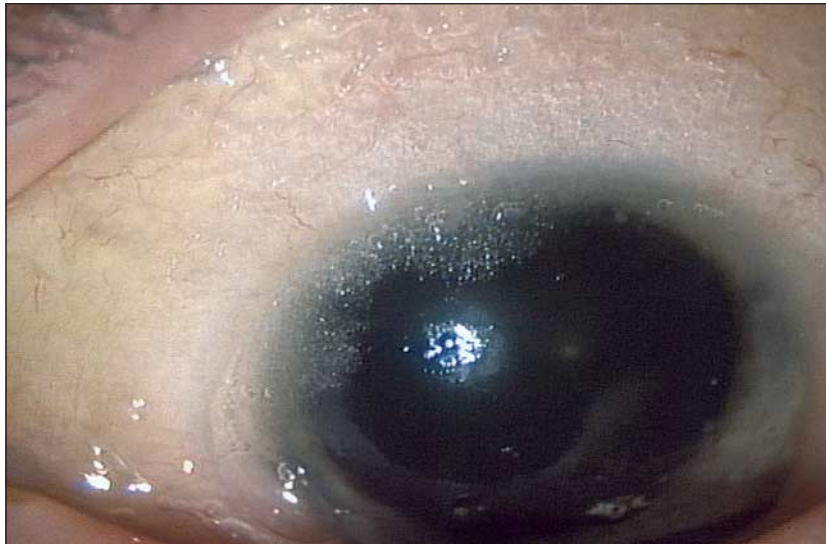


Figure 1. Patient 1. Note the presence of diffuse corneal and conjunctival emphysema superiorly and temporally.



Figure 2. Patient 2. A milder presentation of conjunctival emphysema inferonasally. The slitlamp beam confirms the subepithelial location of the bubbles.

toms worsened later that night despite using artificial tears every hour. She, therefore, was treated by her local optometrist who irrigated her right eye and started therapy with a 0.3% ciprofloxacin hydrochloride solution. Her symptoms resolved after another 24 hours, and findings from the examination with the local optometrist were normal at the 72-hour follow-up. On return to our clinic 2 weeks later, her visual acuity remained 20/15 OD; the results of the slitlamp examination were normal.

Comment. At the time of the first case, fundus laser lenses were disinfected at our institution by soaking in a hydrogen peroxide solution for at least 5 to 10 minutes, then rinsing with sterile water. The second case occurred after contact with a Goldmann applanation tonometer tip that had been soaked in hydrogen peroxide and rinsed with an isotonic sodium chloride solution, then left to air dry. In both cases, standard disinfecting technique was reported after questioning person-

nel. In the second case, the bulk hydrogen peroxide solution was analyzed (Institute for Rural and Environmental Health, Department of Preventive Medicine, Iowa City, Iowa), and no impurities were found. The applanation tip did not contain any residue or material that could be analyzed.

Corneal and conjunctival bubbles from hydrogen peroxide exposure have been described before.^{1,2} Pogrebniak and Sugar² reported a case of a reversible toxic reaction resulting from a tip that was soaked in hydrogen peroxide overnight, then dried, but not rinsed prior to use. They suggest that the act of drying overnight might lead to concentration of the solution to a toxic level. Levenson³ reported a case of permanent corneal scar after tonometry from a tip that was still moist from 3% hydrogen peroxide when applanation was performed. The development of gas bubbles results from the breakdown of hydrogen peroxide into water and oxygen. This reaction causes release of free oxygen radicals, which can cause damage to tissues. Hydrogen peroxide is directly toxic to corneal epithelial cells, decreasing cell proliferation and causing breaks in DNA.⁴ This damage has been demonstrated in vitro to cause death of corneal epithelial cells.⁵

Hydrogen peroxide solution is widely used for disinfecting tonometer tips and fundus laser lenses. The Centers for Disease Control and Prevention recommend the use of a soaking solution—either hydrogen peroxide, dilute sodium hypochlorite, or isopropyl alcohol—instead of wiping tonometer tips with alcohol.⁶ The American Academy of Ophthalmology guidelines allow for the use of a 5-second isopropyl alcohol wipe in place of the soaking solutions.⁶ The alcohol wipe, however, may not be adequate for complete removal of certain viruses, including hepatitis B and C viruses.^{6,7} The disadvantage of using soaking solutions is the damage that can be caused to the glue and the prism in the tonometer tip.⁶ Careful use of hydrogen peroxide should include rinsing and drying of the surface of the tonometer tip or fundus laser lens by the physician or technician just prior to use, rather than relying on

adequate rinsing and drying to have been performed.

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1. Lavery KT, Cowden JW, McDermott ML. Corneal toxicity secondary to hydrogen peroxide-saturated contact lens [letter]. *Arch Ophthalmol.* 1991;109:1352.
2. Pogrebniak AE, Sugar A. Corneal toxicity from hydrogen peroxide-soaked tonometer tips [case report]. *Arch Ophthalmol.* 1988;106:1505.
3. Levenson JE. Corneal damage from improperly cleaned tonometer tips [letter]. *Arch Ophthalmol.* 1989;107:1117.
4. Tripathi BJ, Tripathi RC. Hydrogen peroxide damage to human corneal epithelial cells in vitro. *Arch Ophthalmol.* 1989;107:1516-1519.
5. Grant WM, Schuman JS. Toxicology of the eye: effects on the eyes and visual system from chemicals, drugs, metal and minerals, plants, toxins and venoms; also systemic side effects from eye medications. *Encyclopedia of Chemicals, Drugs, Plants, Toxins, and Venoms.* 4th ed. Springfield, Ill: Charles C Thomas Publishers; 1993:791-797.
6. Smith CA, Pepose JS. Disinfection of tonometers and contact lenses in the office setting: are current techniques adequate? *Am J Ophthalmol.* 1999;127:77-84.
7. Segal WA, Pirnazar JR, Arens M, Pepose JS. Disinfection of Goldmann tonometers after contamination with hepatitis C virus. *Am J Ophthalmol.* 2001;131:184-187.

Congenital Iris Bombé Induced by Large Iris Cysts

Primary cysts of the iris pigment epithelium (IPE) are uncommon and usually cause no ocular symptoms.

We describe an infant with large congenital IPE cysts surrounding the entire pupillary area, which required surgical treatment. Based on an extensive MEDLINE search, we believe that this is the first report of a case of total posterior synechia causing secondary angle-closure glaucoma from birth.

Report of a Case. A 2-month-old Japanese boy was first seen at our hospital for a corneal opacity in his right eye. It had been present since birth and seemed to be getting worse. The patient's birth was normal, and his mother reported no remarkable history for the infant or his family. He could not fix or follow with his right eye, but his left eye was normal. The horizontal corneal diameters were approximately 12.5 mm OD and 10.5 mm OS. Slitlamp examination of his right eye revealed a corneal stromal opacity (**Figure 1A**). The peripheral anterior chamber was collapsed, suggesting the existence of iris bombé. B-mode ultrasonography and computed tomography (CT) revealed no remarkable abnormalities in the posterior and periocular lesions in both eyes. In the 0.5-mm slice of the CT scan, the axial lengths were estimated to be 20 mm OD and 17 mm OS.

At age 2.5 months, the infant underwent examination and surgical intervention under general anesthesia. Intraocular pressure was 35 mm Hg OD (by pneumatonometer). Ultrasound biomicroscopy revealed a large iris cyst surrounding the pupillary area (**Figure 1B**). The pupillary margin adhered posteri-

orly to the lens. After the examination, the cysts were surgically resected. A small incision was made at the corneal limbus, and peripheral iridotomy was performed to form the peripheral anterior chamber. Viscoelastics were introduced, and the iris was cut circumferentially around the posterior synechia with Zaldivar iridectomy scissors (American Surgical Instruments Corp, Westmont, Ill). Adherent cyst tissue was gently removed from the lens surface with microforceps. The pupil was reconstructed with a suture. Histopathological analysis of the removed tissue confirmed the presence of IPE cysts. (**Figure 2**)

Three months postoperatively, intraocular pressure was 20 mm Hg OD without medication. The corneal opacity had diminished, and the angle was open with scattered peripheral anterior synechia. The corneal diameter was 12 mm OU. No remarkable abnormalities were observed in the lens, vitreous body, and fundus, including the optic nerve head. The patient could fix and follow with the involved eye. One year after normalization of intraocular pressure, the axial lengths of the eyes showed no apparent bilateral difference by estimation from a CT scan.

Comment. Among the primary iris cysts of childhood, stromal (nonpigmented epithelial) cysts are reported to be progressive and to cause complications. On the other hand, IPE cysts, which are more commonly found, rarely cause severe complications,^{1,2} although Bron et al³ described a 28-year-old woman who

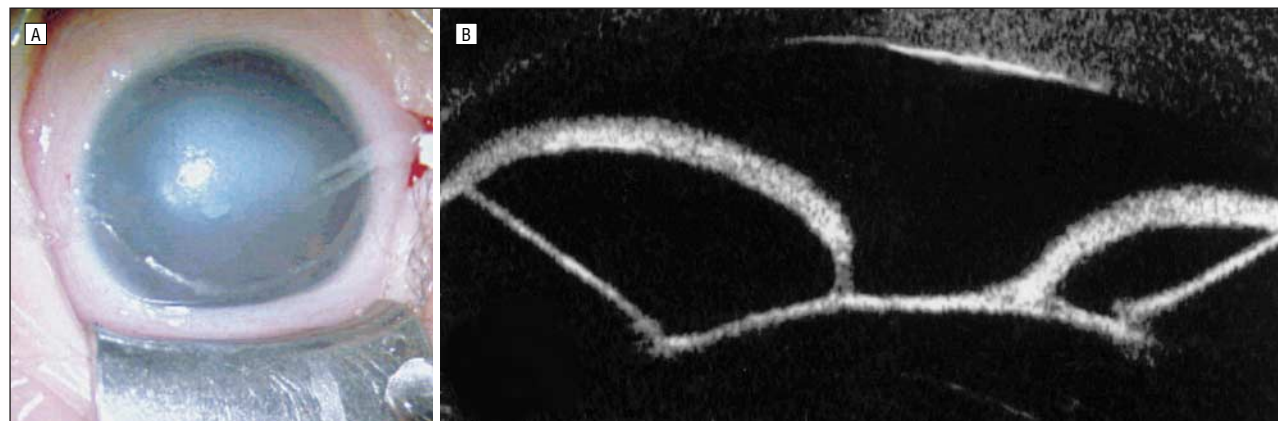


Figure 1. A, Slitlamp examination revealed a corneal opacity. B, A cross-sectional ultrasound biomicroscopy image of iris cysts at the 3-o'clock and 9-o'clock positions on the meridian. The cysts surround the whole pupillary area and appear to be thin walled, with no internal reflectivity. The margin of the anteriorly bowed iris adheres to the lens surface.