Reversal of Siderosis

Retained metallic intraocular foreign bodies (IOFBs) may cause toxic effects such as cataract and retinal damage. We describe an unexpected course of siderosis in a patient who had undergone removal of an IOFB shortly after injury and then had siderosis develop, which subsequently disappeared spontaneously. To our knowledge reversal of siderosis has not been previously reported.

Report of a Case. A 32-year-old man was seen with an IOFB in the left eye after he had hammered a nail. On admission, visual acuity was 20/20 OD and 20/30 OS. Findings from examination of the right eye were unremarkable. Findings from biomicroscopy of the left eye were normal. A 2-mm scleral laceration was noted 3 mm temporally to the limbus. Funduscopy disclosed a metallic IOFB impacted in vitreal hemorrhage nasally to the optic disc. The entry wound was repaired immediately, and the next day laser photocoagulation was applied around the IOFB. After 5 days, pars plana vitrectomy and removal of the IOFB via sclerotomy, using a foreign-body forceps, were performed. Visual acuity returned to 20/20 OS, the lens remained clear, the retina was attached, and laser scars were seen nasally to the optic disc.

Three years later the patient complained of a gradual decrease of vision in the left eye. Examination findings revealed that the right eye had remained stable, whereas visual acuity in the left eye had deteriorated to counting fingers. The 2 pupils were of equal size, but the left eye showed a relative afferent pupillary defect and heterochromia with a rust-colored discoloration of the iris (Figure 1, A). Fine rust-like deposits were seen on the left interior lens as well as progressive cataract (Figure 1, B). Findings from funduscopy through the cataract disclosed a flat retina. Results of electroretinography revealed markedly reduced amplitude even after moderate-intensity stimulus. Computed tomographic findings showed no IOFB. Results of repeated diagnostic x-ray spectrometry demonstrated no metal dissolution in the eye. The patient underwent an uneventful left extracapsular cataract extraction with intraocular lens implantation, after which visual acu-
ity improved to 20/30. Funduscopy findings showed a slight pallor of the optic disc, attenuation of retinal vessels, and fine yellow deposits around the fovea. The visual field examination results were normal, but findings on electroretinography remained unchanged. Although findings from repeated x-ray spectrometry disclosed no metal dissolution in the eye, heterochromia persisted and new, fine, rustlike deposits were seen on the intraocular lens (Figure 1, C). Two years later (5 years from initial admission) he returned because vision in that eye had again deteriorated. Reexamination showed a visual acuity of 20/200 OS due to opacification of the posterior lens capsule. However, the rust-colored discoloration of the left iris and the resulting heterochromia had disappeared (Figure 2). The patient underwent Nd:Yag capsulotomy and visual acuity improved to 20/30.

Comment. This report describes an unusual case in which, despite the removal of an IOFB, siderosis unexpectedly developed but was subsequently arrested and resolved spontaneously. The course this condition took would appear to contraindicate the commonly recommended treatment involving IOFB removal concomitantly with or soon after repair of the entry site,1,2 to avoid the development of siderosis and its possible devastating effects. Our patient underwent vitrectomy with thorough cleansing of dust particles from the eye shortly after injury, and the eye exhibited no metal dissolution in the eye on repeated diagnostic x-ray spectrometry testing. He nevertheless developed siderosis manifested by heterochromia, cataract, and retinal abnormalities. Furthermore, even after the extraction of the lens and washing of the anterior chamber the siderosis continued to progress, manifested by an accumulation of rustlike deposits on the implanted lens. Siderosis can occur in cases of retained IOFB, especially in the absence of clear ocular trauma.3 However, it is very unusual to have siderosis develop after extrusion of the IOFB. Even more unexpected was the fact that the siderosis was arrested and resolved spontaneously. One possibility is that the short delay of 5 days in the removal of the IOFB contributed to the development of siderosis. Another possibility is that there was a second minute foreign body that was initially undetected and caused siderosis. Although results of electroretinography remained abnormal, the final outcome in visual acuity was good. Other authors4 have also reported a favorable outcome even in cases with a retained metallic IOFB and have elected to do follow-up on the retained IOFB with use of serial electroretinography and spectrometry.

In summary, this report describes a favorable outcome of siderosis.

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Archer: Effects of Latanoprost on Patients With Medically Resistant Glaucoma

Latanoprost is a topical ocular hypotensive medication (prostaglandin F2 analog) that is used for the reduction of intraocular pressure (IOP) in patients with glaucoma. To our knowledge, an association between cystoid macular edema (CME) and the use of latanoprost in patients with glaucoma has not been investigated nor reported in the literature. We report 2 cases of patients with glaucoma who were diagnosed as having CME after 1 month of treatment with latanoprost.

Report of Cases. Case 1. An 83-year-old woman with primary open-angle glaucoma was seen in the clinic in 1995. The patient underwent cataract extraction with phacoemulsification of the right eye, complicated by a posterior capsular tear and prolapsed vitreous that required anterior vitrectomy and anterior chamber intraocular lens placement.

Over the next year, there was increasing difficulty in controlling the patient’s IOPs, and eventually latanoprost was added to her therapeutic regimen. She was prescribed latanoprost eyedrops every night, in addition to 5% timolol maleate (Timoptic XE) every night.

Findings from the initial visit after the administration of latanoprost demonstrated a decrease in IOP from 25 to 10 mm Hg OD and 15 mm Hg OS. Snellen visual acuity measured 20/25-3 in each eye. The slitlamp examination findings were unremarkable. The patient was instructed to follow up in 3 weeks, when results of clinical examination revealed an IOP of 14 mm Hg OD and 17 mm Hg OS. Visual acuity, however, had dropped to 20/200 OD and 20/25 OS. Results of a dilated fundus examination revealed a glaucomatous disc, and macular changes consistent with CME. Fluorescein angiography was not performed. Treatment with the latanoprost eyedrops was discontinued and the patient was instructed to return in 1 week.

At the return examination, visual acuity improved to 20/30 OD.
with IOPs of 29 mm Hg and 21 mm Hg OD and OS, respectively. Results of fluorescein angiography at this time revealed mild hyperfluorescence in the right eye, suggesting moderate CME. An area of hyperfluorescence consistent with window defect was observed inferior and temporal to the macula, which corresponds with old retinal pigment epithelium changes. No other abnormalities were noted.

An explanation of the risks and benefits of restarting latanoprost therapy was discussed with the patient. She requested to continue therapy and was reevaluated 2 weeks later. Visual acuity decreased to 20/70+2 OD, and 20/25+1 OS with IOP measurements of 18 mm Hg and 17 mm Hg in each eye, respectively. Findings from slitlamp biomicroscopy of the right fundus showed CME in the right eye. Fluorescein angiography findings revealed increased perifoveal leakage in the right eye indicative of CME. Therapy with latanoprost eyedrops was discontinued, and the patient was instructed to return in 2 weeks. Intracocular pressure increased to 27 mm Hg OD and 23 mm Hg OS, but there was no change in visual acuity. Diclofenac sodium (Voltaren) eyedrops were prescribed for the right eye, and the patient was instructed to return to the office in 1 month. Subsequent visits on January 3, 1997, and January 28, 1997, saw improved visual acuity to 20/30-1 and 20/25 OD, respectively. Final IOP measurement OD was 23 mm Hg.

Case 2. An 84-year-old woman received a diagnosis of primary open-angle glaucoma in both eyes in January 1984. Her surgical history involving the right eye included cataract extraction with phacoemulsification with posterior chamber intraocular lens placement in November 1995, and argon laser trabeculoplasty in January 1996. Surgical procedures on her left eye were cataract extraction with phacoemulsification with posterior chamber intraocular lens placement in June 1996 and endoscopic cyclophotocoagulation for glaucoma in July 1996.

The patient was started on treatment with latanoprost in October 1996. Baseline IOP measurements were 16 mm Hg OD and 19 mm Hg OS. The optic nerve examination findings indicated broad rim defects in both eyes. Snellen visual acuity was 20/25-2 OD and 20/40-1 OS. The therapeutic regimen included betaxolol hydrochloride drops twice daily, 4% pilocarpine drops 4 times a day, and latanoprost drops every night in each eye.

Findings from the first week follow-up visit were unremarkable. Initial IOP was 14 mm Hg OD and 17 mm Hg OS and decreased to 12 mm Hg OD and 14 mm Hg OS 2 weeks later. Two months later, the patient’s visual acuity measured 20/30-3 OD and 20/200 OS while IOP measurements remained unchanged. Findings from fluorescein angiography conducted in the left eye revealed CME. The treatment with latanoprost eyedrops was discontinued, and 48 hours later, visual acuity measured 20/70 in the affected left eye. There was no change in the IOP measurements. Two months later, visual acuity improved to 24/40+2 OS.

Comment. The results of these case studies suggest a possible association between latanoprost therapy and CME. Although CME is a common clinical side effect of complicated ocular surgeries, the inclusion of latanoprost therapy increased the likelihood of development of CME in the cases we reported herein. Visual acuity improved after latanoprost therapy was discontinued, and a noticeable increase in IOP was observed in the 2 cases, most notably when treatment was rechallenged in case 1.

Latanoprost is a prostaglandin analog that has been shown to be effective in the reduction of IOP in patients with glaucoma. The association between prostaglandins and their role in CME has been clearly defined by Woodward et al.1 Latanoprost has only weak affinity for the receptor sites which are known to mediate the vascular effects of prostaglandins; however, it has been postulated by Hoyng et al2 that selected prostaglandin analogs may have a direct or indirect effect on the blood-retinal barrier and induce CME.

Use of latanoprost therapy while managing these patients may have exacerbated these prostaglandin effects. Our findings suggest that latanoprost therapy should be prescribed with caution in high-risk patients who have a history of complicated ophthalmic surgical procedures. The use of latanoprost in these patients may exacerbate subclinical macular edema. There is a need to conduct further clinical epidemiological studies to ascertain the relationship between latanoprost and CME.

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Cystoid Macular Edema Associated With Latanoprost Use

Latanoprost is a prostaglandin analog that is being used to reduce intraocular pressure in patients with glaucoma. The convenience of its once-a-day dosing, relative safety, and apparent efficacy have resulted in wide acceptance of latanoprost as a valuable adjunct in the treatment of glaucoma.1

Common adverse effects of latanoprost use include conjunctival hyperemia, topical irritation, and changes in iris pigmentation.2 We report a case in which cystoid macular edema (CME) occurred after the initiation of topical latanoprost. The CME resolved after discontinuation of the drug, without additional intervention.

Report of a Case. An 81-year-old white woman had decreased vision in the left eye 3 weeks after being prescribed latanoprost for chronic open-angle glaucoma. Her ocular history, in addition to glaucoma, was remarkable for pseudophakic bullous keratopathy after cataract extraction of the left eye in 1993 with placement of an anterior chamber intraocular lens because of intraoperative capsular rupture. She
underwent penetrating keratoplasty and intraocular lens exchange with transcleral sutureing in of a posterior chamber intraocular lens in 1994.

The patient's visual acuity stabilized at 20/30 OS, but the intraocular pressure remained in the range of the mid-20s mm Hg (despite treatment with 0.5% timolol twice daily). Latanoprost treatment was started, once daily in the left eye.

The patient was seen 3 weeks later complaining of decreased vision in the left eye. Examination revealed best-corrected visual acuity of 20/60 OS. Intraocular pressure was 13 mm Hg. Anterior segment examination of the left eye showed a clear and compact graft, a deep and quiet anterior chamber, and a well-centered posterior chamber intraocular lens. Biomicroscopic fundus examination of the left eye revealed prominent cystoid spaces in the macula. Fluorescein angiography revealed numerous perifoveolar punctate hyperfluorescent lesions in the left macula in the early phases (Figure 1). These lesions became increasingly more prominent in the mid phase of the angiogram, and showed leakage in a petalloid pattern in the late phase (Figure 2). In addition, there was mild staining of the optic disc. The diagnosis of CME was made. Because of the sudden occurrence of the CME with the initiation of latanoprost therapy, the medication was stopped and no additional treatment was initiated.

The patient noted improvement in vision within days of stopping latanoprost treatment. Three weeks after discontinuing latanoprost treatment, her visual acuity had improved to 20/40 OS and the CME was less prominent. Seven weeks later, her vision had recovered to her pre-CME level of 20/30 OS. The fundus appeared normal. Fluorescein angiography revealed mild leakage in the left macula (Figure 3 and Figure 4).

Comment. Latanoprost is a prostaglandin analog developed to reduce intraocular pressure in patients with glaucoma. The ocular adverse effects of latanoprost have been relatively mild, and have largely consisted of topical irritation, conjunctival hyperemia, and changes in iris pigmentation.

Investigators have speculated that prostaglandins can cause retinal damage, and the development of CME following latanoprost use in this patient supports this speculation. The exact mechanism by which latanoprost induces CME is unknown. It is possible that the prostanoids may alter the permeability of the blood-retinal barrier, leading to leakage of fluid into the macula.
vasodilation and vascular leakage, resulting in CME. While some prostaglandins are known mediators of ocular inflammation and can disrupt the blood-retinal barrier, other prostaglandins are effective in reducing intraocular pressure and may decrease rather than potentiate ocular inflammation. Animal and human studies have suggested that latanoprost falls into the latter category of prostaglandins. However, the occurrence of CME within days of initiation of topical treatment with latanoprost, and the subsequent resolution of CME on discontinuation of treatment without additional intervention, is of concern. Warwar et al described 2 patients with CME who were receiving latanoprost therapy. Both, however, were treated with topical nonsteroidal anti-inflammatory drugs after diagnosis. Our patient did not receive treatment other than discontinuation of latanoprost, resulting in full recovery of vision. Patients receiving latanoprost who complain of decreased vision should be evaluated for this potential adverse effect. Aphakic and pseudophakic patients with complex prior surgical histories may be at increased risk.

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### Persistence of Fetal Vasculature in the Eyes of Patients With Incontinentia Pigmenti

Incontinentia pigmenti is a rare X-linked disorder that affects the eyes, central nervous system, skin, and teeth. Ocular abnormalities are seen in approximately 35% of patients and include conjunctival pigmentation, strabismus, cataracts, optic atrophy, and retinal abnormalities. The main retinal findings include macular capillary dropout, peripheral avascularity, arteriovenous anastomoses at the junction of the vascular and avascular retina, preretinal neovascularization, and retinal detachment. We now report 2 cases of persistence of fetal vasculature (PFV) in the eyes of patients with incontinentia pigmenti.

**Report of Cases.** Case 1. An 8-month-old female infant was referred from the Department of Dermatology with the diagnosis of incontinentia pigmenti having been made 1 month prior to our initial examination. The family history was unremarkable. She was the product of a full-term vaginal delivery and had no neonatal oxygen therapy. She was healthy except for the presence of an erythematous vesicular rash since birth. An irregular pupil had been noted in the right eye since age 6 months. She did not respond to a bright light shining in the right eye but was able to fix and follow objects with the left eye. Irregular hyaloid vessels (signs of PFV) were present in the right eye at 1-o’clock and 10-o’clock meridians. The anterior chamber was formed and deep. A posterior synchia was observed at the 2-o’clock meridian. A dense white retinal plaque did not allow a view of the fundus. Findings from ultrasonography of the right eye revealed a thin threadlike echogenic density extending from the disc to the retrolental space (between the arrows), representing a hyaloid artery; on indicates optic nerve. Bottom, Artist’s depiction.

vitreous, also known as persistent fetal vasculature. The patient underwent examination under general anesthesia with fluorescein angiography at 9 and 12 months of age. The anterior segment of the left eye was normal. The posterior pole of the left eye appeared normal on ophthalmoscopy, although an irregularity of the foveal avascular zone was present on the fluorescein angiogram. Examination of the retinal periphery of the left eye disclosed widespread areas of peripheral nonperfusion, with a scalloped preretal whitish tuff present at the equator in the 2-o’clock meridian. The angiographic evidence of leakage in the area of the white preretal tissue supported the clinical impression of the presence of neovascularization (Figure 2). Findings from ultrasonography of the right eye, repeated at 9 months of age, revealed evidence of dense retroenal blood and fibrous tissue and a total tractional retinal detachment (Figure 3). The axial lengths were 17 mm OD and 19 mm OS.

Results of ultrasound examination at 12 months of age dis-
matogenous retinal detachment was detected inferonasally in the left eye. The patient underwent a successful scleral buckling procedure.

Comment. These 2 cases illustrate the simultaneous occurrence of 2 distinct and rare diseases with intraocular vascular abnormalities. This association of incontinentia pigmenti with PFV (in various stages of maturation) has been previously described in 3 patients.\(^2\)\(^7\) Zweifach\(^7\) reported the presence of an iridohyaloid artery in a patient with incontinentia pigmenti. Pollard\(^6\) described a child with incontinentia pigmenti and a “combination of anterior and posterior PHPV.” A persistent hyaloid artery in a case of incontinentia pigmenti was also described in the German literature by von Krummel and Rausch.\(^7\) The PFV in incontinentia pigmenti may thus be more prevalent than previously believed.

The exact relationship between these rare coexisting diseases is not clear, but it may not necessarily be one of chance. Persistence of fetal vasculature has been associated with various neonatal states of abnormal or deficient retinal vascularization. These disorders include Norrie disease, retinopathy of prematurity, prematurity per se (without retinopathy of prematurity), and familial exudative vitreoretinopathy.\(^8\) Retinal vascular insufficiency is a feature common to all of these disorders, including incontinentia pigmenti.\(^1,3\) The poorly vascularized, ischemic retina in these conditions may possibly elaborate angiogenic factors that facilitate PFV, which, in the absence of such factors, would ordinarily involute prior to birth.

Ischemic retina in various diseases, including retinopathy of prematurity, induces the production of vascular endothelial growth factor.\(^8\) During intraterine development, retinal ischemia in patients with incontinentia pigmenti, and in the other conditions noted above, may trigger the production, up-regulation, or abnormal persistence of an angiogenic factor such as vascular endothelial growth factor. The endothelial growth factor may then directly support PFV, or, by down-regulating other factors responsible for the atrophy of the fetal hyaloid vascular system, prevent or retard its regression. Such an imbalance between vasoinhibitory and vasostimulatory growth factors has been proposed as an explanation for the lack of vascular regression in some cases of PFV.\(^4\) If such an explanation proves to be valid for incontinentia pigmenti, it suggests that the genetic abnormality causing retinal ischemia exerts its effects at an early stage of gestation before the spontaneous involution of fetal vessels normally occurs.

Many patients with incontinentia pigmenti develop funnel-shaped retinal detachments or phthisic eyes. It is usually assumed that such end-stage manifestations of the disease are secondary to preretinal neovascularization that leads to vitreous hemorrhage and subsequent tractional retinal detachment. This proposed sequence of events may well be valid in some patients. However, as may have been the course in case 1, a similar end point could be reached by bleeding from persistent fetal vessels within the vitreous chamber. Persistence of fetal vasculature, triggered by retinal ischemia, may be a previously unnoticed mechanism of blindness in patients with incontinentia pigmenti.

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6. Pollard ZF. Results of treatment of persistent
**Palpebral Myiasis Causing Preseptal Cellulitis**

Human cases of myiasis (infestation by fly larvae) are rarely observed in North America. We report a case of palpebral myiasis that appeared as periorbital cellulitis.

**Report of a Case.** A 32-year-old man was seen in August 1997 with redness and swelling around his right eye. The patient had noted a “stinging” sensation in his right cheek 2 weeks earlier. Periorbital edema and erythema developed 4 days before presentation in association with a site of serosanguineous drainage in the right medial canthus.

Examination results revealed a track of erythema between the initial stinging site and the site of drainage, in addition to periorbital edema and erythema (Figure 1). Results of the ocular examination were otherwise normal, including normal visual acuity, extraocular motility, and slitlamp and fundus findings. A golden, gelatinous foreign body observed at the site of drainage was removed using forceps and was revealed to be an insect larva measuring 6×2 mm (Figure 2). The larva was identified as that of a botfly (*Cuterebra* species) based on its size, shape, and pattern of spinous rings. Oral cephalexin was prescribed for possible secondary infection; the cellulitis resolved in 1 week.

**Comment.** Most reported cases of ocular myiasis have been external to the globe (ophthalmomyiasis externa). Ophthalmomyiasis externa has been associated with larvae of *Cuterebra* species (rodent or rabbit bots), *Oestrus ovis* (sheep nasal bot), *Hypoderma dama* (cattle grub), and *Dermatobia hominis* (human bot), and can be differentiated based on larval characteristics and the clinical presentation. Ophthalmomyiasis interna (involvement within the globe) presents with pathognomonic subretinal tracks or an intraocular larva. Human infection with *Cuterebra* larvae, although rare, is the most frequent cause of myiasis in North American patients who have not traveled abroad. In contrast, patients with myiasis who have recently returned from Latin America typically harbor *D. hominis*. Rodents and rabbits are natural hosts of *Cuterebra* larvae. Humans contact the tiny (about 1-mm-long) infective larvae on vegetation or outdoor pets. Larvae typically enter the host’s body through mucous membranes or skin lacerations. However, a larva may penetrate directly through the skin and develop at this site, or may sometimes migrate to another site. Once a site is established, the larva cuts a hole through the skin, producing a furuncle-type lesion, through which it obtains oxygen and excretes. Most patients are seen in August, September, or October with the typical lesion that does not respond to antibiotic therapy. Treatment involves removal of the larva and the inflammation is generally resolved within 1 week.

The patient in this report lives near a wooded area of North Carolina where *Cuterebra* is endemic. We believe the patient was infected through the skin at the site of the initial stinging sensation on the cheek, with migration of the larva to the site of presentation. Previously reported cases of ophthalmomyiasis externa have involved primary infection of the ocular surface or adnexa. Our case is unique in that the larva migrated from a distant site to produce periorbital involvement simulating preseptal orbital cellulitis.

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