Irvine-Gass syndrome after cataract surgery resolved by topical therapy with bromfenac eyedrops

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A 69-year-old white woman developed cystoid macular edema (CME) 16 days after cataract surgery (Irvine-Gass syndrome). Surgery included phacoemulsification with a small-incision technique, stop-and-chop, and implantation of an intraocular lens in the right eye. No complications occurred during surgery, and the standard treatment of tobramycin 0.3%–dexamethasone 0.1% and diclofenac was started postoperatively. Spectral-domain optical coherence tomography showed a central retinal thickness of 857 μm. Bromfenac 0.9 mg/mL was initiated, and the symptoms improved after 5 days. Approximately a month after the initiation of bromfenac, the CME resolved with a reduction of central retinal thickness to 203 μm. Bromfenac eyedrops have proven to be an effective and noninvasive treatment option in Irvine-Gass syndrome.

Financial Disclosure: No author has a financial or proprietary interest in any material or method mentioned.

JCRS Online Case Reports 2014; 2:e1–e4 © 2014 ASCRS and ESCRS

Irvine-Gass syndrome, first described by Irvine in 1953,1 is a condition in which cystoid macular edema (CME) develops in a patient after cataract surgery. Irvine-Gass syndrome is recognized as one of the most common causes of poor visual outcome following cataract surgery. It is thought that cataract surgical procedures cause a rapid increase in the intraocular levels of proinflammatory mediators (mainly prostaglandins); because of the blood–retinal barrier breakdown, these can spread toward the posterior pole. Although the number of CME cases after cataract surgery has declined over the past year, mainly due to the introduction of phacoemulsification and small-incision surgery, it is still recommended that a patient be evaluated before surgery to identify possible risk factors.2

The best way to diagnose and treat CME following cataract surgery is still debated; however, the ability to diagnose this disorder has improved, especially with the application of spectral-domain optical coherence tomography (OCT), a noncontact noninvasive reproducible investigation.3–8 Treatment options for Irvine-Gass syndrome include nonsteroidal antiinflammatory drugs (NSAIDs), corticosteroids, acetazolamide, and antivascular endothelial growth factor agents.9–14 We report a case of CME resolution and significant improvement of visual function following treatment with bromfenac topical therapy in a patient with Irvine-Gass syndrome.

CASE REPORT

On January 9, 2012, a 69-year-old white woman had cataract surgery in her right eye in our clinic. The surgery was conducted using phacoemulsification with a small-incision technique, stop-and-chop, and in-the-bag implantation of an intraocular lens (IOL). No complications occurred during surgery, and the standard treatment—tobramycin 0.3%–dexamethasone 0.1% 3 times daily for 7 days and diclofenac 0.9 mg/mL 3 times daily for 7 days and then twice daily for the next 21 days—was started postoperatively. At the first examination on January 16, 2012 (7 days after surgery), the patient had no apparent complications from the surgery; she was still receiving the standard therapy.
Sixteen days after the surgery, on January 25, 2012, the patient presented with a reduction in visual acuity, metamorphopsia, and a reduction in color perception. The OCT linear scans showed an increase in foveal thickness (857 μm). In the operated eye, the corrected distance visual acuity (CDVA) was 0.60 (logMAR) with +1.75 diopters (D) sphere; in the contralateral eye, it was 0.10 (logMAR) with 4.50 D sphere. The intraocular pressure (IOP) was 14 mm Hg in both eyes. Spectral-domain OCT showed an increase in retinal thickness, optically empty intraretinal spaces typical of CME, pigment epithelial detachments, a regular retinal profile with conservation of foveal depression, and diminished retinal reflectivity (Figure 1). At this time, standard therapy with 1.0 mg/mL diclofenac was discontinued and 0.9 mg/mL bromfenac eyedrops twice daily, 1 drop per eye, was initiated.

Five days after bromfenac was initiated (on January 30, 2012), the OCT showed a reduction in central foveal retinal thickness (205 μm) and optically empty intraretinal spaces (Figure 2). The CDVA was 0.10 (logMAR) with +0.50 D sphere in the right eye, and the IOP was 12 mm Hg in both eyes. The patient reported a subjective improvement in the

Figure 1. Spectral-domain OCT scan of CME in the right eye at presentation 16 days after cataract surgery.

Figure 2. Spectral-domain OCT scan of the right eye 5 days after bromfenac was initiated.
metamorphopsia and color perception. Therapy with bromfenac was continued for another 14 days, with 2 drops administered to the eye twice daily.

At the follow-up examination on February 23, 2012, the central foveal retinal thickness was restored (203 µm) and the optically empty intraretinal spaces had disappeared on the OCT scan (Figure 3). The CDVA was 0.00 (logMAR) in the right eye, and the IOP remained 2 mm Hg in both eyes. The patient reported complete resolution of subjective visual symptoms.

**DISCUSSION**

The underlying cause of CME after cataract surgery (Irvine-Gass syndrome) is unknown; however, various hypotheses have been proposed. One is that mechanical trauma from the surgery promotes the expression of cyclooxygenase (COX) at the mRNA and enzyme levels, which triggers the synthesis of various prostaglandins and other inflammatory mediators.15 These inflammatory mediators alter the blood–retinal barrier postoperatively, leading to increased permeability of perifoveal capillaries and fluid accumulation in the perifoveal retina.10,16 To prevent the development of CME after cataract surgery, NSAIDs have been shown to be effective in reducing the incidence of CME.10–13

Bromfenac is a NSAID that is marketed in Europe for the treatment of ocular inflammation and pain after cataract surgery, although it is often prescribed in an off-label manner by physicians. Bromfenac inhibits the activity of COX, which in turn reduces the production of prostaglandins and inflammation. Bromfenac has a high degree of penetration through cell membranes, including ocular tissues, which can be attributed to the lipophilicity of the molecule.17,18 This allows rapid, sustained drug levels of bromfenac in ocular tissues following drug administration. When administered as an ophthalmic solution, bromfenac has demonstrated significant efficacy at reducing inflammation in the eye following cataract surgery.19,20 Although the efficacy of bromfenac for the treatment of CME following cataract surgery is unknown, the efficacy of NSAIDs in cataract surgery has been shown and on this basis, it was decided to treat our patient with bromfenac eyedrops.

In this case of a 69-year-old white woman with CME following cataract surgery, bromfenac resolved CME with a reduction of central retinal thickness after 15 days of therapy, suggesting it is an effective and non-invasive treatment option in Irvine-Gass syndrome. To our knowledge, no other cases of bromfenac for the treatment of CME following cataract surgery have been reported; however, a prospective study investigating the prophylactic use of bromfenac in 62 patients after phacoemulsification and IOL implantation has been published.15 This study demonstrated that bromfenac suppressed anterior chamber inflammation and retinal thickening after cataract surgery, particularly in patients with diabetes. However, the study’s sample size was relatively small and given that, the authors proposed further investigations to clarify the usefulness of bromfenac after cataract surgery. Another study investigated the addition of a topical NSAID (diclofenac, ketorolac, nepafenac, or bromfenac) to intravitreal corticosteroid treatment in

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**Figure 3.** Spectral-domain OCT scan of the right eye at the follow-up examination approximately 1 month after initiation of bromfenac.
patients with chronic pseudophakic CME.21 Similar to the results in our case, the study showed that adding bromfenac reduced retinal thickness in these patients. While the results of the case presented here support the findings of the previous studies of bromfenac for CME following cataract surgery, further studies investigating the effectiveness for the treatment of Irvine-Gass syndrome are warranted.

This case demonstrated that bromfenac resolved CME that developed following cataract surgery in an elderly white woman. Given this, we propose introducing it into standard therapy after cataract surgery to prevent retinal inflammation and edema.

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