SURGICAL ROUNDS FROM THE HAMILTON GLAUCOMA CENTER

Managing Neovascular Glaucoma With Bevacizumab

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CASE PRESENTATION
A 59-year-old white male presented in September 2005 for a routine diabetic retinal examination. He had a 20-year history of insulin-requiring type 2 diabetes with coexisting hypertension, coronary artery disease, and dyslipidemia. The patient had undergone panretinal photocoagulation bilaterally in 1996 for proliferative diabetic retinopathy. In 2001, he was diagnosed with macular ischemia in his right eye, and he underwent cataract surgery in both eyes in 2002.

The patient’s visual acuities were hand movements in his right eye and 20/70 in his left. Florid neovascularization of the iris extended from the pupillary margin to the angle in his right eye with 270º degrees of synechial angle closure. Dense posterior capsular opacification obscured visualization of the vitreous, optic nerve, and retina. There was no iris neovascularization in the patient’s left eye, the ocular media were clear, and there was evidence of prior panretinal photocoagulation. The patient’s IOPs were 40 mm Hg OD and 20 mm Hg OS. An ultrasound B-scan performed on his right eye demonstrated that the retina was attached, and there was no ocular tumor or vitreous opacities.

Comments on the Options for Initial Management
JGC: My initial goals would be to lower the IOP medically and to perform further panretinal photocoagulation to induce regression of the iris vessels and prepare the eye for subsequent filtration surgery. In this case, an Nd:YAG capsulotomy might provide a sufficient view of the retina to permit panretinal photoocoagulation. In cases where there is no view of the retina, I would perform transscleral diode laser cyclophotocoagulation with concomitant transscleral diode retinopexy to four retinal quadrants via a transconjunctival approach while avoiding treatment over the recti muscles.

MG: If a diode laser is not available, an alternative is to perform transscleral cryotherapy to the ciliary body and anterior retina, although cryotherapy tends to cause more pain and swelling compared with treatment using a diode laser.

DM: An alternative approach is first to perform a cyclo-destructive procedure to lower the IOP. Once the pressure has decreased, one would perform a pars plana vitrectomy, remove the posterior capsule with the vitrector, and perform endolaser photocoagulation of the retina. With this approach, one can ensure that the retina is adequately photocoagulated.

JGC: After the initial management, what is the next step if the IOP remains elevated?
RNW: Diode laser cyclophotocoagulation often does...
not provide long-term IOP reduction, and subsequent filtration surgery is frequently required. If the iris neovascularization has regressed, I perform a trabeculectomy with intraoperative mitomycin C. If iris neovascularization persists, I place a glaucoma drainage device.

**JGC:** A recent report from New Zealand documented the long-term outcomes in 145 eyes with neovascular glaucoma that underwent glaucoma drainage device surgery (Molteno Implant; Molteno Ophthalmic Limited, Dunedin, New Zealand). The overall success rate, defined as an IOP below 21 mm Hg with or without glaucoma medications, was 72% at 1 year, 60% at 2 years, and 40% at 5 years. IOP control at all three time points was significantly worse for eyes with persistent iris neovascularization. These findings further highlight the importance of achieving regression of the neovascularization.

The surgeon administered a pars plana injection of bevacizumab (Avastin; Genentech, Inc., San Francisco, CA). The eye was first prepped with a 10% povidone-iodine solution. Anesthesia was a combination of topical tetracaine, and the surgeon administered a 1.00-mL subconjunctival injection of lidocaine over the pars plana injection site. Next, the ophthalmologist performed a pars plana injection of bevacizumab (1.25 mg in 0.05 mL) with a 1.00-mL syringe attached to a 30-gauge needle. The patient received a prescription for topical brimonidine, timolol, and bimatoprost for his right eye together with oral acetazolamide (500 mg).

The patient returned 5 days after the bevacizumab injection. The iris neovascularization had resolved, and the IOP in the patient’s right eye had decreased to 24 mm Hg (Figures 1 and 2). A repeat injection has not been necessary in the 6-month follow-up period, and his IOP has remained controlled on topical glaucoma medications.

**CONCLUSION**

Both the rapidity and persistence of the regression of the iris neovascularization in this case were remarkable. As ophthalmologists’ experience with bevacizumab in neovascular glaucoma increases, it will be important to determine the long-term outcome of treatment with respect to the duration of IOP control and the recurrence of iris neovascularization.

The use of bevacizumab for the treatment of glaucoma is an off-label application.

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