Glaucoma Implant Surgery With Autogenous Fascia Lata in Scleromalacia Perforans

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Abstract. A 51-year-old woman with bilateral scleromalacia perforans and advanced glaucoma in the left eye was evaluated. Glaucoma implant surgery with autogenous fascia lata graft for reinforcement of the underlying sclera and a patch graft overlying the tube to prevent tube erosion was planned because of insufficient response to medical glaucoma therapy. Intraocular pressure decreased from 55 to 15 mm Hg and remained under 20 mm Hg throughout the follow-up period of 24 months. No complication was noted. Glaucoma implant surgery using autogenous fascia lata to form a healthy ground and a patch graft to prevent tube erosion seems to be a safe and effective method when normal sclera is lacking, such as in scleromalacia perforans. [Ophthalmic Surg Lasers Imaging 2004;35:338-342.]

INTRODUCTION

Inflammation of the sclera includes a spectrum that ranges from harmless simple episcleritis to painful, sight-threatening, destructive necrotizing scleritis.1,2 Watson and Hayreh3 proposed a classification based on the anatomic site and clinical appearance of the inflammation at presentation. This classification is useful because the majority of patients remain in the same clinical type throughout the course of their disease. According to this classification, anterior scleritis includes a diffuse, nodular, necrotizing type with inflammation and a necrotizing type without inflammation (scleromalacia perforans). Inherently in this classification is the fact that diffuse scleritis is usually a moderately benign and self-limited condition, whereas necrotizing scleritis is usually a severe and destructive disease.

Increased intraocular pressure (IOP) was reported in 9% to 19% of all patients with scleritis, including patients with steroid-induced ocular hypertension, coexisting primary open-angle glaucoma, a transient increase in IOP during active inflammation, and scleritis-associated ocular hypertension or glaucoma.4 Excluding the patients with IOP that normalized after medical control of scleritis, an increased IOP was found in 2% to 13% of all patients.4

Concerning the classification of glaucoma associated with scleritis, several aspects have to be considered. First, primary open-angle glaucoma and primary angle-closure glaucoma can coexist with scleritis. Second, treatment of inflammatory scleritis or treatment of inflammation following anterior segment surgeries with corticosteroids causes an increase in intraocular pressure in a substantial number of patients (steroid responders). This is not a disease-specific phenomenon but influences rates of prevalence of secondary glaucoma reported in the literature. Third, scleritis-associated glaucoma is induced by several pathogenic mechanisms. For open-angle glaucoma subtypes of secondary glaucoma, proposed pathogenic mechanisms are obstruction of the trabecular meshwork by inflammatory debris, trabecular inflammation by inflammatory cells, obstruction of outflow pathways by scleral edema, and destruction of outflow pathways by limbal scleritis and raised episcleral venous pressure by vasculitis.4 For angle-closure glaucoma subtypes of secondary glaucoma, proposed pathogenic mechanisms are peripheral anterior synchysis,
pupil block from posterior synechiae, iris and angle neovascularization, and forward rotation of the ciliary body after choroidal effusion.\textsuperscript{4}

The percentage of scleromalacia perforans (necrotizing scleritis without inflammation) was reported as 3\% among patients with scleritis.\textsuperscript{5} The disease is characterized by an almost total lack of any symptoms. It occurs almost exclusively in patients with long-standing polyarticular rheumatoid arthritis, the majority of whom are female.\textsuperscript{1,2} During the course of the disease, the anterior portion of the sclera loses its covering of episclera. A necrotic, slough, and yellow–white area develops that eventually leaves the underlying choroid covered by either conjunctiva or nothing at all. For scleromalacia perforans, destruction of outflow pathway or a steroid-induced increase in IOP are possible mechanisms of glaucoma. The IOP may increase at any stage of the disease, but the lack of normal sclera at the anterior portion of the globe hinders trabecular filtering surgeries.

We developed the idea of using autogenous fascia lata to support the sclera and cover the tube, a procedure that enables the insertion of the Molteno implant securely. In addition to scleromalacia perforans, this technique may be applied to eyes without sufficiently thick sclera for glaucoma surgeries, such as in extremely high myopia, severe chemical burns, and scleral thinning following multiple retinal detachment operations.

**CASE REPORT**

A 51-year-old woman presented to the outpatient clinic with the complaint of sudden onset of blurred vision in her left eye. She had had bilateral phacoemulsification and foldable intraocular lens implantation 2 years previously. The visual acuity was 10/10 in the right eye and 2/10 in the left eye. Slit-lamp examination revealed a very thin sclera covered by conjunctiva and increased scleral transparency in both eyes. The pupil was round, the posterior chamber intraocular lens was centrally located, and anterior chamber depth was normal in both eyes. Moderate corneal edema was present in the left eye. Intraocular pressure was 15 mm Hg in the right eye and 55 mm Hg in the left eye. The cup-to-disc ratio was 0.4 in the right eye and 0.8 in the left eye.

She had a history of joint findings suggestive of rheumatoid arthritis. Results of a systemic work-up including complete blood cell count and erythrocyte sedimentation rate were within the normal range. Rheumatoid factor and other antibodies related to connective tissue diseases were negative.

The patient’s IOP remained in the 40 to 45 mm Hg range despite a combined drug regimen including topical betaxolol hydrochloride 0.5\% two times daily, dorzolamide 2\% three times daily, and brimonidine tetrarate 0.2\% two times daily.

Glaucoma implant surgery with autogenous fascia lata graft for reinforcement of the underlying sclera and a patch graft overlying the tube to prevent tube erosion was planned. Under general anesthesia, autogenous fascia lata (30 × 40 mm) was obtained from the patient’s right thigh and any subcutaneous tissue adhering to the fascia was excised with a Wescott scissors and soaked in tobramycin with sterile saline solution until used. A fornix-based conjunctival flap was prepared in the upper temporal quadrant. A 10 × 15 mm graft was secured with 10-0 nylon sutures to the anterior sclera from the limbus anteriorly to the normal-appearing equatorial sclera posteriorly where the Molteno implant insertion was planned.

The Molteno implant was placed in the upper temporal quadrant over the fascia. The plate of the implant was secured to the episclera approximately 12 mm posterior to the limbus with a 10-0 nylon suture. The tube was secured to the graft with 10-0 nylon sutures. A 22-gauge needle was used to create the needle-track for tube insertion. After tube placement into
the anterior chamber, a slightly smaller (8 × 10 mm) fascia lata graft was placed over the Molteno implant tube and sutured with four 10-0 nylon sutures to the underlying tissue (Fig. 1). Conjunctival ends were reappposed to cover the graft completely and sutured with 8-0 polyglactin 910 sutures.

At the end of the procedure, topical cyclopentolate hydrochloride 1% and subconjunctival injection of antibiotic and corticosteroid were administered. Topical tobramycin was used for 3 weeks and topical prednisolone acetate 1% was used for 6 weeks (four times daily). The eye was patched for 1 week after the procedure to allow immobilization and thereby maximize vascularization of the graft.

At postoperative visits, no signs of tube erosion, scleral or conjunctival breakdown, graft melting, or graft-related conjunctival inflammation or infection were noted. By 2 months postoperatively, the patient's best spectacle-corrected visual acuity in the left eye was 0.5 and IOP was 15 mm Hg without any antiglaucomatous medication (Fig. 2). Visual acuity and IOP remained stable for a further follow-up period of 24 months. There was no evidence of necrosis of any portions of the graft and the overlying conjunctiva did not contract during the follow-up period of 24 months (Fig. 3).

**DISCUSSION**

Scleromalacia perforans is a rare but serious condition characterized by a slowly progressive, noninflammatory, painless scleral thinning at the anterior sclera, which could lead to uveal prolapse.1,2 Des-
truction of outflow pathway or a steroid-induced increase in IOP are possible mechanisms of glaucoma. Glaucoma is more serious in eyes with scleralodermal perforans than in normal eyes because high IOP accelerates scleral decompensation and the lack of normal sclera becomes a troublesome situation for filtering surgery if medical therapy fails to control the IOP. The absence of healthy sclera at the surgical area hinders scleral filtering procedures such as trabeculectomy and nonpenetrating deep sclerectomy. Only single reports can be found that used trabeculectomy for scleritis-associated glaucoma. Filtering surgeries may be associated with risk of scleral melting. The adjunctive use of antimetabolites seems to be contraindicated.

Cyclocryotherapy has been the cyclodestructive procedure of choice for many decades. The success rate has ranged between 30% and 100% depending on the type of glaucoma.5 Experiences with the value of cyclocryotherapy in inflammatory glaucoma are limited.4 Therefore, cyclocryotherapy should be performed only if all other medical and surgical interventions have failed to decrease the IOP.

Since their introduction by Molteno in 1969, glaucoma drainage implants have gained acceptance for treating complicated glaucomas.6 However, early experience with this procedure showed that tube erosion through the overlying conjunctiva could occur.6 Minckler et al.7 reported using a lamellar host scleral flap to cover the tube, but erosions still occurred in 3% of eyes. The use of glycerin-preserved donor sclera to cover the glaucoma implant tube has proved effective; however, the rising cost and concerns about infectious disease transmission with banked sclera have led to a search for alternative grafting materials.4 Tanji et al.6 reported that preserved donor fascia lata was well tolerated as a grafting material in glaucoma implant surgery and no sign of tube erosion was observed in their study group of 22 eyes of 21 patients for a mean of 19 months of follow-up.

Tube erosion through the underlying sclera is another potential problem for patients with scleromalacia perforans. In this case, we combined Molteno implant surgery with autogenous fascia lata grafting for both reinforcement of the underlying thin sclera and for covering the subconjunctival portion of the tube. In this way, we created a strong, healthy ground to insert and fixate the glaucoma implant tube and prevented a downward erosion of the tube. Covering the glaucoma implant tube with fascia lata as the overlying layer prevented an upward erosion.

**Figure 3.** No evidence of graft necrosis was observed at 24 months postoperatively. The thin arrow indicates the first layer of autogenous fascia lata and the thick arrow indicates the second layer. The asterisk is located over the thin scleral area where the uveal tissue could be seen under the conjunctiva.

Fascia lata graft and dura mater, auricular cartilage, homologous sclera, periosteal graft, and split-thickness dermal graft have been used successfully in the treatment of scleral defects.8-13 However, all of these materials except dermal graft are often covered by recipient conjunctiva to prevent necrosis of the grafted material.12,13 In our case, autogenous fascia lata grafts were covered with the patient's conjunctiva to prevent graft necrosis. However, split-thickness dermal graft undergoes self-epithelialization and does not necrose when left exposed.13 In the absence of enough conjunctival tissue at the recipient's eye, the dermal graft seems to be superior to other materials. In our case, there was sufficient conjunctiva to cover the fascia lata, which prevented graft necrosis and supported vascularization of the graft. Because small grafts were sufficient for scleral reinforcement and covering the glaucoma implant tube, autogenous fascia lata can be harvested without any specific equipment (eg, a stripper) using a small incision. However, harvesting of the split-thickness dermal graft necessitates a specific dermatome.12,13

Fascia lata patch graft and glycerin-preserved donor sclera have been used in glaucoma tube surgery to prevent tube erosion.6,7 However, to the best of our knowledge, using autogenous fascia lata to form a healthy ground for the glaucoma implant in patients with scleromalacia perforans has not been reported. In our case, the IOP was under control without any medications and there were no signs of tube erosion, exposure, graft melting, or graft-related inflammation during the follow-up time of 24 months.
Glaucma implant surgery using autogenous fascia lata to form a healthy ground and a patch graft to prevent tube erosion seems to be safe and effective in patients who have scleromalacia perforans.

REFERENCES