

Uveitic Glaucoma

An update on how to manage these patients.

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Although the majority of patients with uveitis present with normal or low IOP, approximately 25% of them will develop elevated IOP at some time during their clinical course.¹ Uveitic eyes in general do not have primary glaucoma or optic nerve disease but develop damage after the IOP rises. This article provides an update on the management of glaucoma associated with uveitis.

ELEVATED IOP

Elevated IOP associated with uveitis may be chronic or acute, and it may not be associated with changes in the optic disc or visual field. The term *uveitic glaucoma* indicates that glaucomatous optic nerve atrophy or field changes are associated with increased IOP. Less commonly, glaucomatous disc and field changes may be associated with normal pressure.

IOP may rise as a consequence of one or more mechanisms. Active inflammation may cause an acute or permanent reduction in the outflow of aqueous despite an open anterior chamber angle. With chronic inflammation, the anterior chamber angle may ultimately close due to the formation of extensive peripheral anterior synechiae. The chronic use of corticosteroids may also increase the IOP in some patients. Many different types of uveitides may be associated with glaucoma.¹

When the IOP rises in uveitic patients, nearly all require treatment with anti-inflammatory and antiglaucoma medications. Ultimately, approximately 20% to 30% require glaucoma surgery.^{2,3}

MEDICAL THERAPY

Medical therapy for uveitic glaucoma includes medications to lower the IOP. Aqueous suppressants such as beta-blockers and carbonic anhydrase inhibitors are helpful. Alpha-2 agonists may also be useful. Because the absorption of topically administered drugs may be variable with increased ocular inflammation, some clini-

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cians use systemic carbonic anhydrase inhibitors in select patients. With acutely elevated IOP, the oral or even intravenous administration of hyperosmotic drugs may be beneficial.⁴ Although prostaglandin analogs may be helpful in some patients with controlled uveitis, these drugs should be used with caution in patients who have active uveitis.

Conventional medical therapy for inflammation in patients with uveitis and glaucoma includes the use of topical and systemic steroids. The long-term side effects include elevated IOP and cataract, both of which may be difficult to distinguish from the effects of the uveitis itself. Cycloplegia may improve the patient's comfort. Nonsteroidal anti-inflammatory medications may have a role in some patients as an adjunctive therapy to steroids or as a steroid-sparing strategy.

Immunomodulatory therapy has become an important component of the medical treatment for uveitis. This approach has a clear benefit when the side effects of steroids preclude their use or when steroid therapy fails to control inflammation. In addition, the control of uveitis may be better with the judicious use of immunomodulatory drugs than with corticosteroids alone. Commonly used immunomodulatory drugs include antimetabolites (azathioprine, methotrexate, mycophenolate mofetil), T-cell inhibitors (cyclosporine, tacrolimus), and alkylating agents (cyclophosphamide, chlorambucil). Antimetabolites have the most favorable

side-effect profile, whereas alkylating agents are associated with the most severe potential adverse effects. Immunomodulatory medications have improved the outcomes for uveitic diseases (Table 1).⁵

Recent advances have increased the number of available immunomodulatory medications. These drugs may have advantages compared with corticosteroids in controlling inflammation associated with uveitis. Immunomodulatory medications may be associated with side effects, however, ranging from minor problems to major adverse effects. Clinicians should therefore be familiar with these drugs and how to monitor patients for side effects, or they should partner with clinicians (eg, rheumatologists, uveitis specialists) who are capable of safely administering these agents to patients.

SURGERY

Patients in whom medical therapy for glaucoma fails are candidates for glaucoma surgery. The anatomy of the angle determined by gonioscopy is important to the choice of procedure. Some patients will develop pupillary block that can be corrected with laser iridotomy. The majority of patients, however, will have an open angle by gonioscopy.

Although cyclophotocoagulation is an option for patients with uveitis and glaucoma,⁶ this approach is

usually reserved for eyes with poor visual potential. In general, laser trabeculoplasty is not a useful option because of its low success rate and increased risk of complications in uveitic glaucomas. Other techniques such as nonpenetrating surgery or laser endocyclophotocoagulation have no proven benefit over conventional surgical treatments.

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In uveitic glaucoma patients, trabeculectomy is indicated when their glaucoma is not adequately controlled with medications, there is minimal conjunctival scarring, and their uveitis is well controlled. Only modest success rates have been reported after trabeculectomy without antifibrotic drugs.⁷ In uveitic eyes, the success rates after trabeculectomy are higher with the adjunctive use of 5-fluorouracil and mitomycin C. Young

TABLE 1. IMMUNOMODULATORY MEDICATIONS FOR SELECTED UVEITIC DISEASES

DISEASE	MEDICATION
Birdshot retinochoroidopathy	Cyclosporine combined with mycophenolate mofetil
Juvenile rheumatoid arthritis	Methotrexate; mycophenolate mofetil; either of these combined with cyclosporine; any of these combined with intravenous infliximab
Behcet’s disease	Cyclosporine plus azathioprine; cyclophosphamide; chlorambucil
Multifocal choroiditis	Cyclosporine plus azathioprine
Wegener’s granulomatosis	Cyclophosphamide and corticosteroids
Serpiginous choroidopathy	Alkylating agents and corticosteroids

Data adapted from clinical trials in Vavvas and Foster.⁵



Figure 1. Uveitic glaucoma developed after the implantation of an Ahmed Glaucoma Valve. The patient had a history of juvenile rheumatoid arthritis and aphakia, and he developed increased IOP that was not controlled with glaucoma medications.

patients, even those in their teens, may be candidates for goniotomy or trabeculotomy.^{8,9}

Glaucoma drainage implants are helpful in patients with extensive conjunctival scarring, in patients with active uveitis, or after failed trabeculectomy (Figure 1). Even in eyes with uncontrolled uveitis, success rates of up to 57% have been reported.^{10,11} Higher success rates have been documented after conventional anti-inflammatory therapy, primarily with steroids.¹²⁻¹⁵ After conducting long-term follow-up of patients who underwent conventional anti-inflammatory therapy plus a perioperative antifibrotic regimen (prednisone, diclofenac, colchicine), Molteno et al¹⁶ described a 76% success rate at 20 years after drainage implant surgery.

We have also found that intensive anti-inflammatory therapy, including the use of immunomodulatory drugs when needed, improves the outcome of glaucoma drainage implant surgery. We evaluated uveitic eyes treated with the Ahmed Glaucoma Valve (New World Medical, Inc., Rancho Cucamonga, CA) and an aggressive approach to controlling inflammation during the pre- and postoperative periods.¹⁷ The success rate 4 years after implantation of the drainage device was 94%.

CONCLUSION

Although the pathophysiology of uveitic glaucomas varies, the majority of patients develop open-angle glaucoma. For many of them, therapy with glaucoma medications is helpful, but current management includes the aggressive and comprehensive treatment of uveitis. In patients for whom glaucoma medical therapy fails, trabeculectomy with antifibrotic drugs or glaucoma

drainage implants are often helpful.

In our experience, controlling uveitis with adjunctive medical therapy appears to improve the outcome of glaucoma surgery. The management of patients with uveitic glaucoma by clinicians who are familiar with immunomodulatory medications is especially helpful when these patients have an inadequate or poor response to corticosteroids. When managing these patients, we favor a team approach, including physicians skilled in the treatment of glaucoma and in the management of uveitis using conventional approaches and systemic immunomodulatory medications. □

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