Intravitreal Triamcinolone Injection in Patients With Surgically Controlled Glaucoma

In recent years, intravitreal triamcinolone acetonide (IVT) injection has emerged as an important therapeutic modality and has been evaluated as treatment of a large range of macular pathologic abnormalities, including cystoid macular edema, choroidal neovascularization, and diabetic macular edema. Even though the functional and anatomical improvement observed is promising, in particular when treating macular edema, the therapeutic efficacy is somewhat shadowed by the fact that IVT treatment also results in elevated intraocular pressure (IOP) in approximately 40% of eyes treated. High baseline IOP and history of glaucoma are associated with greater incidence of post-IVT IOP elevation, and as many as 50% of glaucomatous eyes have been reported to develop an IOP of 24 mm Hg or greater following the procedure. This observation has led to a common practice of considering glucocorticoids as a relative contraindication to using IVT for treatment of cystoid macular edema, diabetic macular edema, or choroidal neovascularization. Given the limited therapeutic options available for those maculopathies, and considering that in patients with pre-existing glaucoma the peripheral vision is also under serious threat, we believe that the concept of treating glaucomatous eyes with IVT is worth reconsidering. Herein, we report the clinical course of 11 patients with glaucoma who subsequently developed macular disease and were injected with 4 mg of triamcinolone acetonide.

Nine patients had undergone filtering surgery between 2 weeks and 12 years before their first IVT injection, and all blebs and shunts were assessed to be functional at the time of triamcinolone treatment. Follow-up period in this study ranged from 3 to 13 months; visual acuity (VA) changes reported were calculated using the baseline VA and the VA recorded at the last visit. The maximum increase of IOP after administering IVT to eyes with surgically controlled glaucoma was 6 mm Hg; the mean difference between pre-IVT and maximum post-IVT IOP was 1 mm Hg. Two patients required additional medication to achieve control of their IOP (patients 2 and 6 in the Table); 3 others were already receiving topical medications, which were continued following IVT. All but 1 subject showed at least short-term improvement in their visual function as well as anatomical regression of macular lesion. The clinical characteristics of the patients, their responses to IVT, and the measures used to achieve IOP control are summarized in the Table; in addition, the clinical course of 2 patients treated with triamcinolone before and after filtering surgery is described.

Report of Cases. Case 1. An otherwise healthy 96-year-old man (patient 1) with a history of primary open-angle glaucoma controlled with travoprost and dorzolamide complained of recently deteriorating vision in his left eye; his right eye had reportedly had very poor vision for 60 years. Visual acuity was 20/400 OD and 20/60 OS. The diagnosis was central retinal vein occlusion in the left eye; its IOP at the time was 16 mm Hg. Optical coherence tomography revealed cystoid macular edema and a central macular thickness of 376 µm. Three weeks later, his vision deteriorated to 20/200 and macular thickness increased to 548 µm. The decision was made to treat him with IVT. Four weeks later, his vision had improved to 20/80, his macular thickness was 234 µm, and his IOP was elevated at 24 mm Hg. During the following 3 months, his VA remained stable, but his IOP was above normal despite medical treatment, reaching a maximum of 34 mm Hg. Four months after IVT, the cystoid macular edema recurred and the patient's VA deteriorated to 20/150. Since adequate control of IOP had not been achieved, a second IVT was deemed unacceptable despite favori-
able visual outcome after the first treatment. To facilitate further steroid treatment, the patient elected to undergo trabeculectomy 2 months later (7 months after the first triamcinolone injection) after his vision deteriorated to counting fingers and an additional IVT injection was given. His IOP at the last visit (5 months postsurgery) was 7 mm Hg and VA was 20/150.

**Case 2.** An 87-year-old woman (patient 5) with a history of primary open-angle glaucoma and long-standing vision loss in her left eye from wet, age-related macular degeneration was found to have similar exudative changes in her right eye. Visual acuity was 20/100 OD and counting fingers OS, and further examination revealed classic choroidal neovascularization and subretinal hemorrhage extending beneath the right fovea. The patient was scheduled for photodynamic therapy; however, the treatment session could not be completed because she had severe back pain. Two months later, her VA had deteriorated to 20/200 and she was treated with IVT injection with subsequent improvement in her VA to 20/60. The patient’s IOP increased from 15 mm Hg pre-IVT to 23 mm Hg but was controlled with brimonidine only. Four months later, a recurrence of choroidal neovascularization was observed and a second IVT treatment administered. During the following 6 months, the patient’s IOP continued to rise despite maximum medical therapy, leading to the decision to perform a trabeculectomy, which resulted in successful control of the IOP. This patient received a third IVT treatment 8 months later without any associated elevation in IOP on this occasion. At her latest visit, her VA was 20/60 and IOP was 16 mm Hg.

**Comment.** For more than 50 years steroids have been known to elevate the IOP in sensitive individuals presumably because of increased outflow resistance induced by biochemical and morphological changes in the trabecular meshwork. Given that patients who have undergone filtering surgery have an alternate outflow pathway, it is possible that their IOP should not be largely affected by administration of IVT. This assumption has found some confirmation in this small retrospective study where the mean difference between pre-IVT and maximum post-IVT IOP was 1 mm Hg. The results contrast dramatically with the reported mean IOP increase of 8 mm Hg observed in normal and medically controlled glaucomatous eyes treated with IVT injection.

Two of our patients did not undergo filtering surgery until after their first IVT treatment. Both patients were satisfied with the visual results achieved after IVT and sought additional injections despite the increase in IOP they experienced.

A definitive conclusion about the safety of treating surgically controlled glaucoma patients with IVT injection cannot be reached from small case series; however, because a history of primary open-angle glaucoma usually constitutes an exclusion criterion for large randomized studies, we believe that our expe-
Chorioretinal Changes Heralding Metastatic Malignancy

Here we report 2 cases of choroidal disease and subretinal fluid heralding metastatic malignancy. The first case was in a patient with central nervous system Burkitt lymphoma who was positive for human immunodeficiency virus (HIV) and the second was a patient with metastatic non–small cell lung carcinoma.

Report of Cases. Case 1. A 54-year-old man experienced decreased vision in his right eye for 1 week. His medical history was notable for HIV without AIDS with a CD4 count of 714 one month prior to initial examination. He reported recent rhinitis and jaw, back, and hip pain as well as numbness of his face. Visual acuity was 20/40 OD and 20/20 OS. Anterior segment examination was unremarkable. There was no vitreous cell. Fundus examination results were normal OS with areas of subretinal fluid and creamy retinal pigment epithelium lesions OD (Figure 1). Fluorescein angiogram (FA) showed pinpoint subretinal leaks, which coalesced into larger subretinal plaques (Figure 1). Physical examination results, complete blood count findings, tuberculin skin testing, blood testing for syphilis, and chest x-ray were negative. One week later, the visual acuity was 20/640 and systemic prednisone was started. Two weeks after initial examination, the visual acuity was 20/500 with decreasing subretinal fluid and leakage on FA.

One week later, the patient was admitted for abdominal pain, myalgias, paresthesias, and bilateral cranial nerve VI palsies. CD4 count was 379 with HIV RNA polymerase chain reaction of greater than 100,000. Magnetic resonance imaging revealed abnormal enhancing material in the brain, pachymeninges, and spine. A computed tomographic scan revealed pleural effusion, mediastinal lymph nodes, and a thickened gallbladder. Lumbar puncture revealed a massive lymphocytosis with plasmacytoid variant Burkitt-type cells. Fluorescent in situ hybridization revealed MYC rearrangement of chromosome 8; myc abnormalities are seen in virtually all cases of Burkitt lymphoma. Epstein-Barr nuclear antigen antibodies were detected. The diagnosis of Burkitt lymphoma with central nervous system involvement was made. The patient began receiving highly active antiretroviral therapy and hyperfractionated cyclophosphamide, vincristine, doxorubicin, and dexamethasone but achieved only partial remission. There was no further ophthalmic follow-up before the patient died of his disease 9 months later. Autopsy was refused.

Case 2. A 78-year-old white woman underwent cataract extraction in her right eye 30 days prior to initial examination. Preoperative visual acuity was 20/70 OD and 20/60 OS, and she was noted to have “subtle retinal pigmented changes.” Her visual acuity improved only slightly to 20/60 following surgery.

Her medical history was notable for presumed polymyalgia rheumatica diagnosed by her internist, for which she was taking 5 mg of prednisone daily, as well as borderline Mediterranean anemia. She had a smoking history of 10 cigarettes per day. Review of symptoms was otherwise negative for abnormalities.

At the time of the patient’s initial examination by the retina department, her visual acuity was 20/100 OD and 20/125 OS. She was noted to have optic nerve hyperemia, macular edema, and tortuous, dilated retinal vessels bilaterally (Figure 2). The anterior segment was normal and there was no vitreous cell. Fluorescein angiogram showed bilateral multiple areas of punctate hyperfluorescence with leakage in later frames (Figure 2). B-scan showed bilaterally thickened choroids with high reflectivity. Laboratory testing revealed normal complete blood count and blood chemistry results and an erythrocyte sedimentation rate of 63. Total protein and albumin test results were normal with a minimally elevated α-globulin of 1.5 g/dL (normal range, 0.5–1.0 g/dL) and β-globulin of 1.1 g/dL (normal range, 0.5 to 1.0 g/dL). Her prednisone dose was increased to 60 mg per day.

Two weeks later, a right neck mass was noted. Computed tomographic scan showed a heterogenous mass at the right thoracic inlet with paratracheal and mediastinal adenopathy. Fine-needle aspiration results were consistent with non–small cell carcinoma, which stained positive for keratin and negative for S100, HMB-45, carcinoembryonic antigen, and thyroid transcription factor-1. She was referred to a cardiothoracic surgeon and oncologist and diagnosed as having advanced non–small cell lung carcinoma.

Final ophthalmic follow-up revealed a visual acuity of 20/320 OU with decreasing serous retinal detachments and presence of trace panuveitis. Topical and systemic