Trans-Scleral Cyclophotocoagulation in Refractory Pigment Dispersion-Like Glaucoma Secondary to Ciliary Body Melanoma

Mohammad Banifatemi1, Naveed Nilforushan1, Ahad Sedaghat1, Arezoo Miraftabi1, Navid Abolfathzadeh1
1Eye Research Center, The Five Senses Institute, Rassoul Akram Hospital, Iran University of Medical Sciences, Tehran, Iran

Abstract

Purpose: To report a case of ciliary body melanoma with acute high intraocular pressure (IOP) due to pigment dispersion, treated by limited trans-scleral cyclophotocoagulation (TSCPC) and plaque radiotherapy.

Methods: A 33-year-old woman was referred to clinic with acute ocular pain and decreased visual acuity from 1 week before presentation. The IOP was 55 mmHg accompanied by red eye, perilimbal injection, mild corneal edema (stromal and epithelial), scattered pigment dust on central corneal endothelium, 4+ anterior chamber pigments, and pigmented cells. Gonioscopy revealed a bulging mass posterior to the iris root, about 2 o’clock width alongside a heavy dark brown pigmentation of all angle structures. Ultrasound biomicroscopy confirmed a ciliary body mass of about 4.5 mm × 4 mm × 3.3 mm in the superior ciliary region, in favor of melanoma. Due to no response to maximal antiglaucoma therapy, a limited TSCPC in the inferior hemisclera was done. After control of the IOP, plaque radiotherapy with Ru-106 was done.

Results: Three days after the cyclophotocoagulation, IOP decreased to 18 mmHg. Visual acuity reached to 20/25 and IOP remained 18 mmHg, with timolol/dorzolamide drop twice a day. Anterior chamber pigments gradually decreased, and antiglaucoma and steroid drops were tapered during 1 month, thereafter. The IOP was 14–16 mmHg with timolol/dorzolamide bid at months 3 and 6 of follow-up and 21–22 mmHg without any drop at months 12 and 18, with no sign of glaucomatous optic neuropathy.

Conclusion: Limited cyclophotocoagulation may be a good choice for controlling the high refractory IOP in cases of intraocular neoplasms such as ciliary body melanoma, which are planned for salvage therapy such as plaque radiotherapy.

Keywords: Cyclophotocoagulation, Melanoma, Pigment dispersion, Plaque radiotherapy

How to cite this article: Banifatemi M, Nilforushan N, Sedaghat A, Miraftabi A, Abolfathzadeh N. Trans-scleral cyclophotocoagulation in refractory pigment dispersion-like glaucoma secondary to ciliary body melanoma. J Curr Ophthalmol 2022;34:118-20.
Here, we present a case of ciliary body melanoma with acute high intraocular pressure (IOP), refractory to maximal medical therapy, which was planned to be treated by plaque radiotherapy. After limited trans-scleral cyclophotocoagulation (TSCPC), we could control the IOP without any complications.

**Case Report**

A 33-year-old White Caucasian woman with acute pain and decreased vision in the left eye from 1 week ago, accompanying with ipsilateral headache, was referred to Khodadoust Eye Clinic, a subspecialty eye center in Shiraz, Iran. Informed consent form was obtained from the patient for the preparation of this case report.

Uncorrected visual acuity in the left eye was 20/40, relative afferent pupillary defect was negative, and IOP was 55 mmHg. Slit-lamp examination of the left eye revealed perilimbal congestion, mild corneal edema (both stromal and epithelial), fine pigment dust on the corneal endothelium, and four plus anterior chamber pigments and pigmented cells, mid-dilated pupil, sectoral bulging of peripheral iris at 12 o’clock, clear lens and vitreous, and normal optic disc configuration with no signs of glaucomatous neuropathy. The visual acuity, slit-lamp examination, and IOP of the right eye were completely within normal limits. In gonioscopy, there were peripheral anterior synchiae at 12 o’clock, and behind the iris root, there was a mass of about 2 h’ width which was pushing the iris anteriorly. Other parts of the angle were open, and there was a heavily dark brown pigmentation all around the 360° of angle structures, including trabecular meshwork.

From 1 week earlier and before referral, with diagnosis of the acute anterior uveitis, she was receiving steroid and cycloplegic drops with no improvement in signs and symptoms. We continued prednisolone drop qid and started eye drops Cosopt (dorzolamide and timolol) bid, brimonidine tid, and Xalatan (latanoprost) qid, as well as oral acetazolamide 250 mg 4 times a day.

The patient underwent ultrasound biomicroscopy (UBM) (Ellex Eye Cubed™, Ophthalmic Ultrasound, CLARION Medical Technologies) and revealed a solid round ciliary body mass about 4.5 mm × 4 mm × 3.3 mm in the superior ciliary region between 11 and 1 o’clock. The mass was limited to uveal tissue with no invasion to sclera [Figure 1]. By considering the ocular and imaging findings, the first diagnosis was ciliary body melanoma and complete systemic workup by an oncologist was performed to rule out the systemic metastasis. Fortunately, the systemic evaluation was negative, and the ocular oncologist planned the patient for plaque radiotherapy. However, the IOP remained 40 mmHg 2 days after initiation of antiglaucoma medications (Cosopt, brimonidine, latanoprost), and ocular pain and conjunctival injections remained unchanged. Therefore, to improve the ocular signs and IOP, we decided first to do limited TSCPC at the inferior 180° of sclera opposite the site of the tumor before the session of plaque radiotherapy. TSCPC was done in the operating room using IRIDEX laser, with pop titration method starting with 1000 mw, duration of 1.5 s, and application of 20 spots.

IOP lowering drops (Cosopt, brimonidine, and latanoprost), topical prednisolone and cycloplegic (atropine 1%), and oral acetazolamide (250 mg twice a day) continued after TSCPC. Three days after the laser, IOP decreased to 18 mmHg.

Five days after performing TSCPC and achieving the control of IOP, plaque radiotherapy with RU-106 (CLA0372) was performed. The patient received 100.3 Gy for 98.28 h with 1.0175 Gy/h dose rate on apex of tumor and 4.134 Gy/h at the surface of sclera.

Floating anterior chamber pigments gradually decreased during 1 month after the TSCPC and antiglaucoma drops were gradually tapered off. Visual acuity reached 20/25, and IOP remained 18 mmHg with timolol/dorzolamide drop twice a day.

The patient was closely followed up, and IOP at 3 and 6 months was between 14 and 16 mmHg with timolol/dorzolamide twice daily with no signs of optic neuropathy. Ciliary body tumor also regressed according to the clinical examination and UBM findings [Figures 2 and 3].

At months 12 and 18 after TSCPC, the following findings were detected: uncorrected visual acuity of 20/25, IOP 21–22 mmHg without any drop, mild posterior subcapsular cataract, no anterior chamber floating pigments, and stable size of regressed tumor with no signs of metastasis and normal liver function tests and ultrasonography.

**Discussion**

This case illustrates the importance of diagnosis of ciliary body melanoma, masquerading as unilateral pigmentary-like glaucoma which was treated successfully with laser cyclodestructive procedure and plaque radiotherapy. In any case of pigmentary glaucoma, we should consider laterality, configuration of iris, and transillumination defects. These three components can help us differentiate the true pigment dispersion glaucoma which is bilateral, usually with concave iris and mid-peripheral iris transillumination defects from other secondary pigmentary glaucoma, which is unilateral and without transillumination defects.
In this case, the mechanism of high IOP is possibly related to release of the iris pigment epithelial cells from contacting tumor and also release of pigmented tumor cells, which both could block the outflow from the trabecular meshwork. When we choose the salvage therapy for uveal melanoma, management of secondary glaucoma which is unresponsive to maximal medical therapy becomes problematic and tricky due to limitation of the possible procedures.

As a rule, incisional procedures such as trabeculectomy or tube shunts are contraindicated in the active intraocular tumors because of the chance of extraocular spread of the tumor cells through the filtering pathways. Kaliki et al. reported five cases of inadvertent tube shunt implantation in eyes with intraocular neoplasms, such as melanoma and medulloepithelioma, that led to extraocular extension of tumor in 4 of 5 cases and documented tumor cells in tube reservoir in 3 eyes. Pasternak et al. reported a case of subconjunctival spread of ciliary body melanoma through trabeculectomy site.

Therefore, laser procedures, such as TSCPC which is usually the last resort in other types of glaucoma, become the only solutions for refractory glaucoma associated with active intraocular neoplasms. Although the effect of these procedures may not last for a long time, they let us save extra time to see the results of tumor destructive procedures. It is very important to notice that before any cyclodestructive procedures, we have to locate the exact tumor area. The laser applications should also be at the noninvolved areas; otherwise, the chance of tumor seeding and extraocular extension would be high. We performed partial TSCPC successfully, before plaque radiotherapy in the quadrants far from the site of tumor, with no effect on the process of treatment of the melanoma and no significant complication in 18 months of follow-up.

In conclusion, although long-term follow-up and more cases need to be evaluated in future studies, partial and limited TSCPC could be a good choice for controlling the high IOP in cases of intraocular neoplasms such as ciliary body melanoma, accompanied by refractory glaucoma.

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understand that name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

REFERENCES
1. Yonekawa Y, Kim IK. Epidemiology and management of uveal melanoma. Hematol Oncol Clin North Am 2012;26:1169-84.
2. Kaliki S, Shields CL. Uveal melanoma: relatively rare but deadly cancer. Eye (Lond) 2017;31:241-57.
3. Siempis T, McTaggart Y, Sidiki SS. Ciliary body melanoma manifesting as unilateral ocular hypertension and early cataract. Clin Exp Ophthalmol 2018;101:305-7.
4. Diwo E, Merle H. Ciliary body melanoma presenting as uveitis in a West Indian woman: Case report and review of the literature. J Fr Ophtalmol 2013;36:e191-5.
5. Shields CL, Shields JA, Shields MB, Augsburger JJ. Prevalence and mechanisms of secondary intraocular pressure elevation in eyes with intraocular tumors. Ophthalmology 1987;94:839-46.
6. Camp DA, Yadav P, Dalvin LA, Shields CL. Glaucoma secondary to intraocular tumors: Mechanisms and management. Curr Opin Ophthalmol 2019;30:71-81.
7. Kaliki S, Eagle RC, Grossniklaus HE, Campbell RJ, Shields CL, Shields JA. Inadvertent implantation of aqueous tube shunts in glaucomatous eyes with unrecognized intraocular neoplasms: Report of 5 cases. JAMA Ophthalmol 2013;131:925-8.
8. Pasternak S, Erwenne CM, Nicolela MT. Subconjunctival spread of ciliary body melanoma after glaucoma filtering surgery: A clinicopathological case report. Can J Ophthalmol 2005;40:69-71.