

Brief Communications

Corneal edema following diode laser cyclophotocoagulation in an eye with secondary glaucoma

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A 70-year-old man had undergone a complicated cataract extraction followed by repair of iris prolapse ending up with secondary glaucoma. Refusing routine filtering surgery, patient underwent contact transconjunctival diode laser cyclophotocoagulation. This report highlights the occurrence of corneal edema restricted to the inferior half of cornea following a diode laser cyclophotocoagulation performed in the inferior 180 degrees. The necessity to perform a routine specular microscopy in all such cases is highlighted, especially in eyes with good visual acuity.

Key words: Corneal edema, cyclophotocoagulation, diode laser

Indian J Ophthalmol 2008;56:317-8

Transscleral diode laser cyclophotocoagulation (cyclodiode) has been established as a relatively safe and effective intervention for glaucoma resistant to conventional management.¹⁻⁴ The procedure has become increasingly popular in recent years for refractory glaucoma as an alternative to the surgical options such as antimetabolite augmented trabeculectomy and tube shunt surgery. Reported success rates by various criteria ranged from 38-85%.¹⁻⁴ Usually, it is performed at a fixed distance from the corneoscleral limbus with a specially designed contact probe, without visualization of the ciliary body.^{5,6} The desired effect (as with other lasers used in this field) is thermal heating and coagulation necrosis of the ciliary epithelium (laser cyclophotocoagulation). However, the laser scleral transmission is increased by the contact method (compared with the non-contact method), allowing for less total energy application while obtaining the same desired effect.⁷ Complications reported include phthisis, chronic hypotony, corneal graft decompensation, macular pucker, cystoid macular edema, hyphema, vitreous hemorrhage, loss of visual acuity, retinal detachment, conjunctival burns, uveitis, and ocular pain.^{5,6}

We report a case of corneal edema following contact diode laser cyclophotocoagulation. There exist very few reports of corneal edema⁸ and corneal decompensation following this procedure in world literature.⁹

Case Report

A 70-year-old male patient presented to us with pain and redness in right eye for one month. He had undergone cataract operation elsewhere following which he had iris prolapse. Repeat surgery was done for iris prolapse, after which he developed macular scarring and secondary glaucoma. Medications had failed to control his intraocular pressure.

Visual acuity of the right eye was finger-counting two meters. Intraocular pressure (IOP) of the right eye was 40 mm Hg on maximal medical therapy (dorzolamide-timolol combination in twice daily dosage, bimatoprost at night, brimonidine eye drops in thrice daily dosage and oral acetazolamide in four times daily dosage).

The examination of the right eye revealed a clear cornea with a 12 o'clock cataract wound. The pupil was irregular with 6 mm dilatation and an intraocular lens (IOL) in the sulcus. The macula showed retinal pigment epithelial changes with macular scarring. The disc revealed a cup to disc ratio of 0.6:1 in the right eye.

Examination of left eye revealed a visual acuity of 20/20 and IOP of 14 mm of Hg. The eye had undergone an IOL implantation a year back with cornea being clear, IOL in position and the fundus revealing no abnormality.

Patient refused trabeculectomy for the right eye. We performed transconjunctival diode laser cyclophotocoagulation (Nidek DC 3300) under local anesthesia with the consent of the patient. The patient received 16 applications in the inferior 180 degrees using power of 1700 mW for 2 seconds per application. Postoperatively, IOP ranged between 7 and 10 mm Hg on no antiglaucoma medication.

The cornea was clear on the first postoperative day but became hazy inferiorly from the third postoperative day and covered inferior three-fourths of the cornea by the first week [Fig. 1]. The patient was started on hyperosmotic saline drops



Figure 1: Right eye of the patient showing inferior corneal edema following inferior 180 degrees of transconjunctival diode laser cyclophotocoagulation

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Manuscript received: 15.06.07; Revision accepted: 19.09.07

along with frequent topical steroids and atropine eye drops. The corneal edema cleared gradually over six weeks and the patient regained preoperative visual acuity. The IOP was maintained at 8 to 10 mm of Hg without any antiglaucoma medications. The specular microscopy of the right eye was done at six weeks when the cornea was clear enough to allow it. It revealed a gross polymorphism and pleomorphism with an endothelial cell count of 880 cells per mm². We suspected poor endothelium health to be the cause and to corroborate our suspicion, we did the specular microscopy of the left eye too. It revealed some polymegathism and pleomorphism with an endothelial cell count of 1600 cells per mm².

Discussion

Dealing with patients of secondary glaucoma is a difficult task, especially those who have already undergone multiple surgical procedures. Diode laser cyclophotocoagulation offers a relatively easy to perform procedure which is being used with greater confidence on the seeing eyes. There exist very few reports of corneal edema⁸ and corneal decompensation following this procedure in world literature.⁹

The importance of this case report lies in the fact that in eyes with good visual acuity the procedure of diode laser cyclophotocoagulation should be approached with caution and obtaining the endothelial cell status by specular microscopy would aid in determining the likelihood of post laser corneal decompensation. Though in our case the cornea did return to normal, it may not always be so and one would then be saddled with the task of dealing with a hazy cornea.

The reported complications of diode laser cyclophoto-coagulation include graft rejection and thus we already know that corneal endothelium is at risk during this procedure. The above report is further augmented by a study, which has reported late endothelial changes even in fellow eyes of angle closure glaucoma undergoing YAG laser iridotomies.¹⁰ All this does point to the vulnerability of the endothelium in dealing with external laser procedures.

Factors possibly associated with corneal decompensation include episodes of glaucoma with pressure elevations and inflammation, corneal guttate, presence of diabetes, and the need for multiple treatments requiring a high-laser energy/surgery. Though in our case we are not aware of any preexisting guttate, multiple interventions along with inflammation and fluctuating IOP may have led to a lower endothelial cell count. The subsequent diode laser cyclophotocoagulation may have

finally resulted in an insult which caused the endothelial cell count to go below what is needed for the maintenance of clear cornea.

The eyes which are taken up for diode laser cyclophotocoagulation are those which have already undergone primary surgeries or are complicated in some other manner. It thus stands to reason that we do a specular microscopy to document the health of the corneal endothelium prior to the procedure. It would help us to predict and thereby forewarn the patient of the possible corneal complications in case diode laser cyclophotocoagulation is the chosen option.

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