

Chapter 58

Transscleral Diode Laser Cyclophotocoagulation (CPC)



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Indications

Glaucoma refractory to medical or surgical interventions or eyes with poor visual potential are good candidates [1]. Patients need to be informed that the goal of transscleral diode laser CPC is to normalize the IOP, reduce the financial and physical burden of dependence upon medication, and in turn improve the quality of life. The procedure is not meant to improve or restore visual loss from glaucoma. They also need to be informed of potential risks including a decrease or loss of vision, scleral burns, and need to repeat the procedure should the IOP rise post-laser or remain elevated [2].

Essential Steps

1. Lay the patient in supine position (or reclined in examination chair).
2. Retrobulbar block.
3. Lid speculum (can also use Q-tip instead to expose perilimbal area).
4. Inspect fiber-optic G-Probe footplate/tip for defects (Fig. 58.1).
5. Wear company-approved protective goggles.
6. Turn machine “on” from “standby” position on “zero” power setting and project laser beam from probe onto palm of hand and adjust beam brightness and point of focus.

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Fig. 58.1 The transscleral diode laser delivers a continuous 810 nm beam of energy via a customized delivery tip called the G-Probe. *Note the fiber-optic tip protrusion at the base of the G-Probe* (IRIDEX Corp, CA)— (Taylor Pannell, CRA, OCT-C) [1]

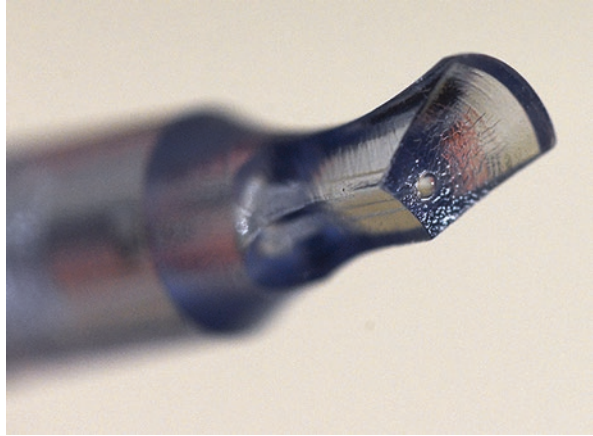
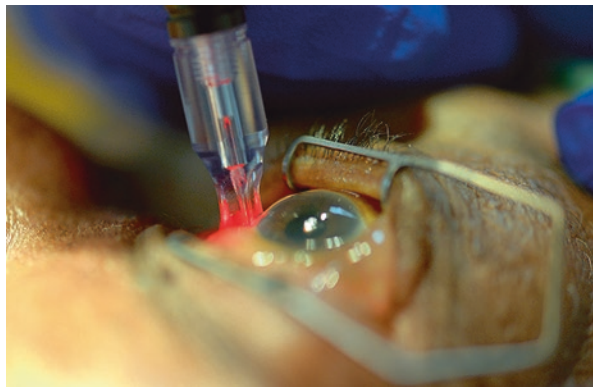


Fig. 58.2 The presence of a fiber-optic tip protrusion at the base of the probe is designed to optimally deliver energy to the ciliary body by indenting the sclera 1.2 mm posterior to the limbus. *The “heel” of the G-Probe is aligned with the limbus to deliver energy 1.2 mm posteriorly over the ciliary body*— (Taylor Pannell, CRA, OCT-C)



7. Place laser module on “standby” and enter recommended laser settings for power and duration. Place counter on zero. Select laser delivery using the “continuous”-wave mode on the Cyclo G6 Glaucoma Laser System.
8. Align “heel” of G-Probe along the limbus (Fig. 58.2) parallel to visual axis to directly treat the ciliary body to reduce aqueous production [3]. If there is alteration of limbal anatomy, place a transilluminator light source onto the scleral surface to identify the anterior edge of the ciliary body 180 degrees away to guide proper placement of the G-probe prior to delivering the energy. Repeat this step over the 360-degree surface until the intended number of treatment spots are delivered [4].
9. Wet corneal surface with balanced saline solution periodically throughout laser procedure to dissipate heat, and clear away any debris on the probe tip to reduce any scleral thinning (Fig. 58.3) or conjunctival/scleral (Fig 58.4) burns [5, 6].

Fig. 58.3 Scleral thinning following standard transscleral diode laser CPC. Note the scleral thinning along the limbus months postoperatively— (Rachel Hollar, CRA, OCT-C)

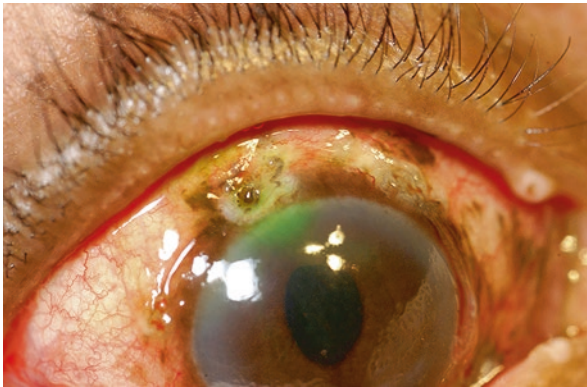
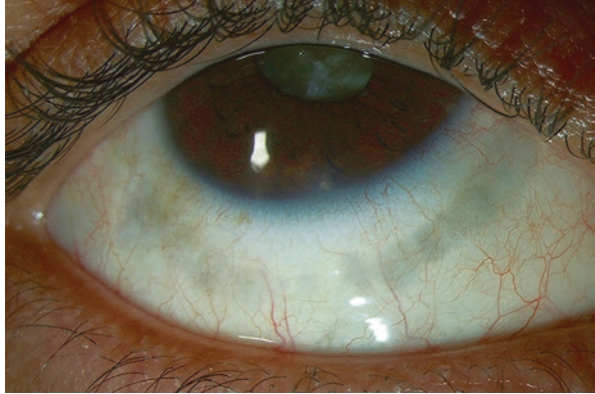


Fig. 58.4 Conjunctival and scleral burns can occur on the surface either due to accumulation of debris on the fiber-optic tip or the presence of perilimbal conjunctival pigment absorbing the laser energy. Note the surface burn involving the conjunctiva and sclera occurred within the pigmented area of perilimbal conjunctival melanosis (Dorothea Castillo, CRA)

10. Turn machine to “on” position.
11. Slightly scleral depress the G-Probe downward and simultaneously fully engage foot pedal for entire duration without moving or lifting probe until accompanying sound of laser delivery stops. If popping sound is made during delivery, consider decreasing power stepwise by 250 mW.
12. Move clockwise or counterclockwise approximately $\frac{1}{2}$ width of probe base and proceed with laser application in a similar manner treating six to seven spots per quadrant.
13. Treat 270° – 360° of circumference sparing 9 and 3 o’clock.
14. If aggressive treatment needed, consider placing 27–30 spots. If mild, 18–20 spots.

15. Inject 20 mg Kenalog (0.5 cm³) in the sub-Tenon or subconjunctival space inferiorly.
16. Remove lid speculum (if one used).
17. Place 1 gtt atropine and choice of antibiotic/steroid ointment.
18. Patch eye.
19. Have patient sit up in upright position, take vitals, and discharge home with post-op instructions.
20. Advise patient to remove eye patch in AM and begin taking post-op medications

Complications [1, 7]

- Atonic pupil
- Bleeding
- Chemosis
- Decrease/loss of vision (usually multifactorial)
- Hyphema (common with neovascular glaucoma)
- Hypotony (particularly with multiple treatments)
- Inflammation (acute/chronic)
- IOP spikes
- Pain
- Progressive cataract
- Subconjunctival hemorrhage
- Chronic Flare (due to breakdown of blood aqueous barrier)
- Sympathetic Ophthalmia (rare)

Template Operative Dictation

Preoperative diagnosis: (*Refractory/neovascular/end-stage/uncontrolled/absolute*) glaucoma (*OD/OS*)

Procedure: Transscleral diode laser cyclophotocoagulation (*OD/OS*)

Postoperative diagnosis: *Same*

Indication: This ____-year-old *male/female* was diagnosed with *refractory* glaucoma with uncontrolled IOP despite prior (*medical/surgical*) intervention with poor visual potential.

Description of the procedure: After discussing risks, benefits, and alternatives and obtaining consent, the (*right/left*) eye was marked with a marking pen in the (*office/minor procedure room*), and after placing a drop of anesthetic, the patient

was (reclined in the exam chair/placed in a supine position on the O.R. table). A proper time-out was performed verifying patient's named and date of birth, procedure, site, positioning, and special equipment prior to starting the case.

To decrease the discomfort that may arise from a retrobulbar needle, a 1 cm³ TB syringe of 1 % lidocaine on a short (27/30) gauge needle was prepared. An alcohol wipe was used to clean the surface along the lower lid margin extending temporal to the lateral canthus. The patient was informed of the discomfort from the administration of anesthetic. The needle tip was then entered in the sub-epidermis temporal to the lateral canthus and the anesthetic injected in a controlled fashion and directed along the inferior lid margin close to its border to create a wheal incorporating the future injection site for the retrobulbar block inferotemporally. A sterile Q-tip was used to massage and spread the raised area along its length in a to and fro fashion.

Five minutes later, a retrobulbar block consisting of _____ was prepared and placed on a _____ gauge long needle. The patient was directed to look in primary gaze at a light source with the nonsurgical eye in order to fixate the surgical eye. By temporarily placing the index finger between the inferior orbital notch and the globe of the surgical eye in order to create a pocket of space, the needle was entered gently into the (*right/left*) orbital space initially along the orbital floor and then directed toward the direction of the optic nerve. A total of _____ cc of anesthetic was administered. The eye was massaged for a few minutes until akinesia was confirmed.

A protective paper tape was used to close the lids of the nonoperative eye in order to avoid exposure to the laser. Recommended protective eyewear gear was worn. (A *Q-tip/lid speculum*) was used to expose the perilimbal region of the (*right/left*) eye for laser application. The G-Probe was removed from its sterile package and inspected for any defects. Recommended treatment parameters were entered into the laser display module into the laser display module (1750–2000 mW power, 2000–2500 msec duration). The “heel” of the probe was aligned along the limbus at 6 o'clock hours (Fig. 58.2). The laser was switched to the “on” position and in continuous-wave delivery mode [8]. With firm scleral depression, the foot pedal was completely depressed for the entire duration (2000–2500 msec) without moving the probe in order to deliver the laser burn to the ciliary body. The probe was then moved by ½ width of its base to an adjoining spot along the limbus. Drops of balanced saline solution were placed on the ocular surface prior to initiating each laser application. Each quadrant had a total of (6/7) spots placed. The 3 and 9 o'clock positions were spared to avoid damaging the ciliary nerves. If an audible popping sound was heard during laser delivery, the power was decreased in 200–250 mW steps until it was no longer audible. Upon completion (*if a speculum was used, the lid speculum was removed*), the laser system was placed on “standby,” and 20 mg of Kenalog in a 1 cm³ TB syringe on a short needle was injected in the (*sub-Tenon/subconjunctival*) space inferiorly. A drop of 1 % atropine was placed, and a strip of (*steroid/antibiotic*) ointment was placed in the inferior cul-de-sac. The lasered eye was then pressure patched, and the paper tape was removed from the nonoperative eye. The patient was made to sit up, vitals were taken, and the postoperative instructions were reviewed. The patient was advised to remove the patch in the AM and to follow the following medication schedule:

Atropine 1 gtt bid x 7 days
Pred Forte 1 gtt qid x 7 days
(Cosopt/Dorzolamide) 1 gtt bid until follow up visit

The patient was advised to follow up in 2 weeks for IOP check and need for glaucoma medication adjustment. The Patient was escorted out of the (office/operating) room in satisfactory condition.

Additional Resource

<http://eyetu.be/sirip>; <https://www.youtube.com/watch?v=C9eqSnNjPk>.

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