A Case of Primary Open-angle Glaucoma With Conjunctival Laceration After Micropulse Transscleral Cyclophotocoagulation

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Purpose: We report a case of primary open-angle glaucoma with conjunctival laceration after micropulse transscleral cyclophotocoagulation (MP-CPC).

Patients and Methods: A 74-year-old man with primary open-angle glaucoma underwent MP-CPC using a Cyclo G6 device (IRIDEX) due to an increase in intraocular pressure (IOP) to 25 mm Hg in his left eye. At 1 week after surgery, IOP had decreased to 12 mm Hg.

FIGURE 1. Photographs of the anterior segment of the eye after micropulse transscleral cyclophotocoagulation (MP-CPC). A, At 1 day after MP-CPC, an arc-shaped conjunctival epithelial erosion and a brown lesion were observed in the MP-CPC-irradiated area. B, Enlarged view of the wound at 1 day after MP-CPC. C, At 19 days after MP-CPC, the wound was enlarged. D, The upper conjunctiva and sclera did not show any effect of MP-CPC.
However, at 2 months after surgery, IOP had increased again to 25 mm Hg. MP-CPC was performed again at 3 months after the first surgery using a Cyclo G6 device, in accordance with treatment guidelines outlined by the manufacturer. Before the MP-CPC treatment, the patient received anesthesia with 2% lidocaine in the sub-Tenon space. A large amount of subconjunctival hemorrhage was observed in the sub-Tenon space.

**Results:** At 1 day after the second MP-CPC treatment, an arc-shaped conjunctival erosion and a brown lesion were observed in the MP-CPC-irradiated area in the lower hemisphere. The possibility of scleral laceration was considered. The IOP was 25 mm Hg and no aqueous humor leakage was observed. The wound had become enlarged. At 20 days after the second MP-CPC, the patient was hospitalized to close the wound. During the repair surgery, the brown lesion was easily detached from the sclera. There was conjunctival laceration, but no scleral laceration. Pathologic examination revealed that the exfoliated tissue contained abundant clots, connective tissue, and elastic fibers.

**Conclusion:** Special care and consideration are required when performing MP-CPC in cases of severe subconjunctival hemorrhage.

**Key Words:** cyclophotocoagulation, micropulse, primary open-angle glaucoma, scleral laceration, subconjunctival hemorrhage

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**Glaucoma** is a progressive disease that is one of the main causes of blindness worldwide. Currently, intraocular pressure (IOP)-lowering therapies are the main treatment options for glaucoma. These include various medications, laser treatment, and incisional surgery. Transscleral cyclophotocoagulation has been performed for refractory glaucoma but carries a risk of serious complications, such as hypotony and ptosis. Micropulse transscleral cyclophotocoagulation (MP-CPC) is considered safe because the 810 nm infrared irradiation used in the procedure is emitted in on/off cycling mode to avoid tissue destruction. Here, we report a case of primary open-angle glaucoma with conjunctival laceration after MP-CPC.

**CASE DESCRIPTION**

A 74-year-old man was referred from a local clinic due to uncontrolled IOP in both eyes. He had been diagnosed with primary open-angle glaucoma and trabeculectomy had been performed in both eyes at 51 years of age. Cataract surgery had been performed in both eyes at 71 years of age. After the trabeculectomy, the IOP in both eyes remained in the mid-teens. However, it gradually increased over time, exceeding 25 mm Hg by the age of 73 years. After eye-drop treatment with bimatoprost, brimonidine tartrate, ripasudil hydrochloride hydrate, and a fixed combination of dorzolamide hydrochloride and timolol maleate, the left IOP decreased to <20 mm Hg; however, the right eye did not respond to treatment. Therefore, MP-CPC was performed on the right eye using a Cyclo G6 device (IRIDEX, Mountain View, CA), according to the manufacturer’s instructions. Briefly, before the MP-CPC procedure, the patient was given sub-Tenon anesthesia with 2 mL of 2% lidocaine. MP-CPC was performed with the Cyclo G6 using a preset power of 2000 mW at 810 nm, and a duty cycle of 31.3%. The MP3 probe of the Cyclo G6 was applied with continuous sliding for 80 seconds per hemisphere. After the surgery, the right IOP decreased; however, the left IOP increased gradually to 25 mm Hg. Thus, the first MP-CPC for the left eye was performed according to the manufacturer’s instructions at the age of 74 years. At 1 week after the surgery, the left IOP decreased to 12 mm Hg. However, by 2 months after the surgery, it had increased again to 25 mm Hg. At 3 months after the first MP-CPC, a second MP-CPC was performed on the left eye in accordance with the manufacturer’s instructions. Although a large amount of subconjunctival hemorrhage was observed at the

FIGURE 2. Intraoperative photographs. The brown lesion was easily detached from the sclera using a spatula (A–C), and no tears were found in the sclera under the brown lesion (D).
anesthesia site, that is, the sub-Tenon space, the surgery was completed as expected without significant complications. On the day after the second MP-CPC, an arc-shaped conjunctival epithelial erosion and a brown lesion were observed in the MP-CPC-irradiated area and the possibility of scleral laceration was considered (Figs. 1A, B). The left IOP was 25 mm Hg, and no aqueous humor leakage was observed. As the wound had gradually become enlarged (Fig. 1C), informed consent was obtained from the patient to perform surgery on the lesion. At 20 days after surgery, the patient was hospitalized to close the wound. No effect of MP-CPC on the upper conjunctiva or sclera was seen (Fig. 1D). During the surgery, the brown lesion was easily detached from the sclera. The conjunctival laceration was observed, but there was no scleral laceration (Figs. 2A–D). Pathologic examination revealed that the brown lesion dissected by surgery was composed of clots, connective tissue, and elastic fibers (Fig. 3A). The wound healed after surgery. Although the appearance of the tissue was normal, a significant scar remained (Fig. 3B).

The Cyclo G6 has a relatively sharp tip and could cause a conjunctival laceration. In this case, thermocoagulation in the laser irradiation site was observed in addition to conjunctival lacerations. The wavelength of the laser used during MP-CPC (810 nm) has a high absorption coefficient for hemoglobin; in fact, lasers of this wavelength are often used for hemostatic purposes. In this case, when MP-CPC was performed, the subconjunctival hemorrhage was severe. It appears that the laser irradiation was absorbed by the hemorrhage, resulting in thermocoagulation of the surrounding tissues, conjunctiva, and Tenon capsule. Although the appearance of the tissue was normal, a significant scar remained. Conjunctival scars may reduce the efficacy of glaucoma filtration surgery.

Taken together, our findings suggest that MP-CPC may not be appropriate in cases showing severe subconjunctival hemorrhage.

### CONCLUSION

Careful consideration of the appropriateness of MP-CPC is necessary in cases where subconjunctival hemorrhage is severe.

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### REFERENCES

1. Quigley HA, Broman AT. The number of people with glaucoma worldwide in 2010 and 2020. Br J Ophthalmol. 2006;90:262–267.
2. The Advanced Glaucoma Intervention Study (AGIS): 7. The relationship between control of intraocular pressure and visual field deterioration. The AGIS Investigators. Am J Ophthalmol. 2000;130:429–440.
3. Collaborative Normal-Tension Glaucoma Study Group. The effectiveness of intraocular pressure reduction in the treatment of normal-tension glaucoma. Am J Ophthalmol. 1998;126:498–505.
4. Ndulue JK, Rahmatnejad K, Sanvicente C, et al. Evolution of cyclophotocoagulation. J Ophthalmic Vis Res. 2018;13:55–61.
5. Aquino MC, Barton K, Tan AM, et al. Micropulse versus continuous wave transscleral diode cyclophotocoagulation in refractory glaucoma: a randomized exploratory study. Clin Exp Ophthalmol. 2015;43:40–46.
6. Nada MA, Sheela KG, Archana RS. Open flap debridement using 810 nm diode laser and conventional surgery in patients on low dose aspirin—a comparative study. IOSR J Dent Med Sci. 2019;18:69–83.
7. Keiichiro I, Masaru I, Minako OI, et al. Restricted post trabeculectomy bleb formation by conjunctival scarring. Clin Exp Ophthalmol. 2009;27:1095–1101.