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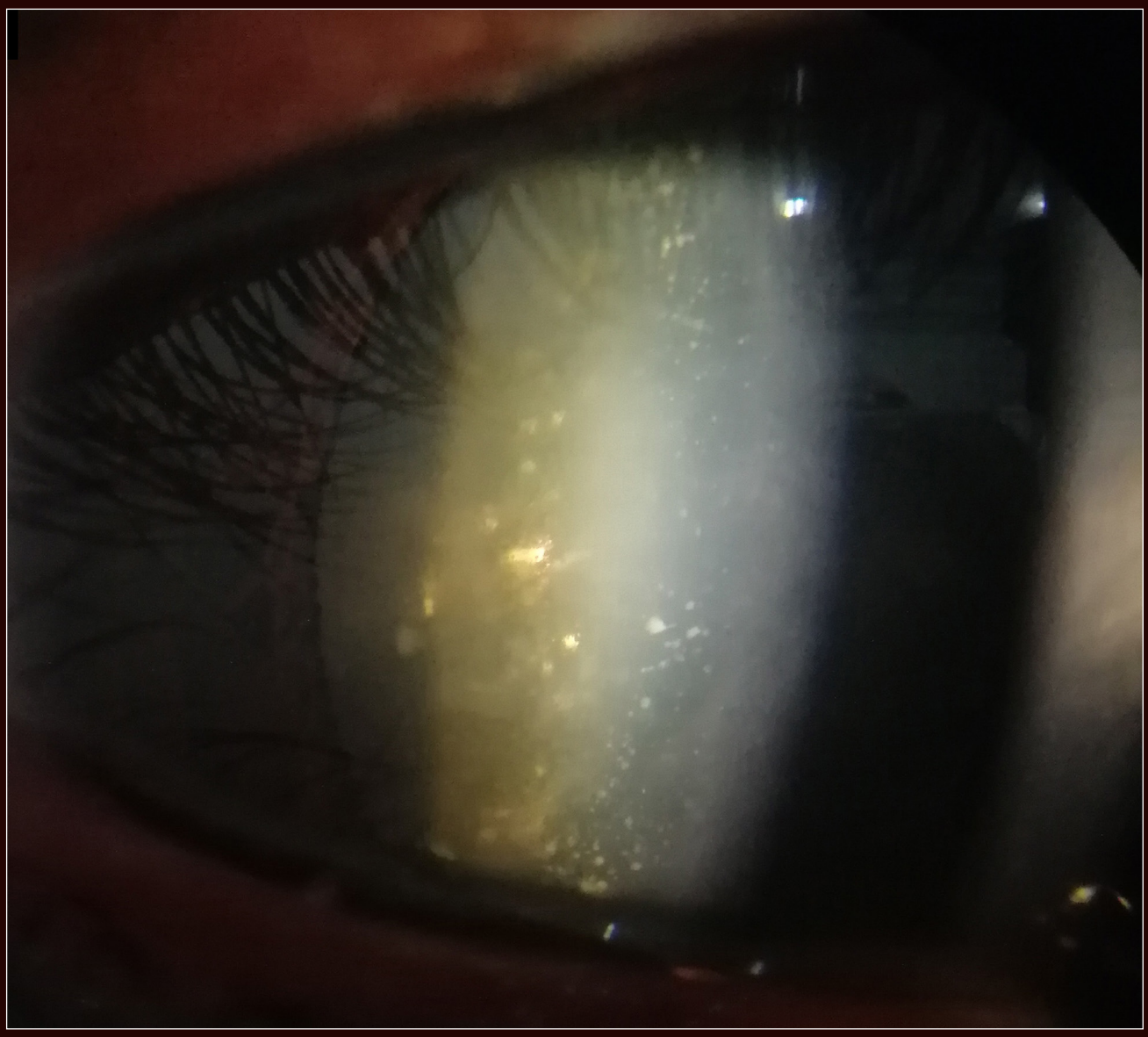

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FAITS CLINIQUES

Micropulse transscleral cyclophotocoagulation in neovascular glaucoma aggravated by silicone oil tamponade

Laser cyclodiode micropulse dans le traitement d'un glaucome néovasculaire aggravé par le tamponnement à l'huile de silicone

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Introduction

Cyclodiode laser has now become the mainstay treatment of ciliary body destruction. Trans-scleral cyclophotocoagulation (TCP) delivers laser energy in a continuous manner that decreases effectively the intraocular pressure (IOP) but exposes to many complications related to the surrounding tissue damage due to the spread of the thermal energy. Unlike the continuous-wave TCP, a micro pulse delivery is set with specific on-off times. "Off" periods, allow the adjacent structures to dissipate the heat, protecting them from the thermal effect. This technique should be considered in eyes at higher risk of postoperative complications because of its more favorable safety profile [1].
Micropulse transscleral cyclophotocoagulation (MP-TCP) has been successfully used in neovascular glaucoma (NVG) [1-9] characterized with high IOP, closed iridocorneal angle, resistance to different therapeutic means, and poor visual prognosis. The treatment objectives were often, to lower the intraocular pressure (IOP), relieve the pain, preserve the globe and stop oral anhydrase carbonic inhibitors.

We aimed to discuss the effectiveness of MP-TCP in treating a monophtalmic diabetic patient with NVG aggravated by silicone oil tamponade.

Case report

A 51-year-old man presented in 2015 to our department with an NVG of the right eye. His medical history included type 2 diabetes mellitus, hypertension, diabetic nephropathy, and proliferative diabetic retinopathy. Furthermore, he was monophtalmic and lost the left eye after an ancient cranial traumatism.
On initial examination, his vision was 4/10 in the right eye, he had active iris rubeosis and the IOP was 40 mmHg (**figure 1**). He was put on maximal topical and oral anti-glaucomatous medications. He underwent urgent pan-retinal photocoagulation (PRP) and had an Anti-VEGF intravitreal injection.
The iris rubeosis improved but the treatment failed to lower the IOP because of extended peripheral anterior synechiae on gonioscopy. The patient underwent cataract surgery with Ahmed's

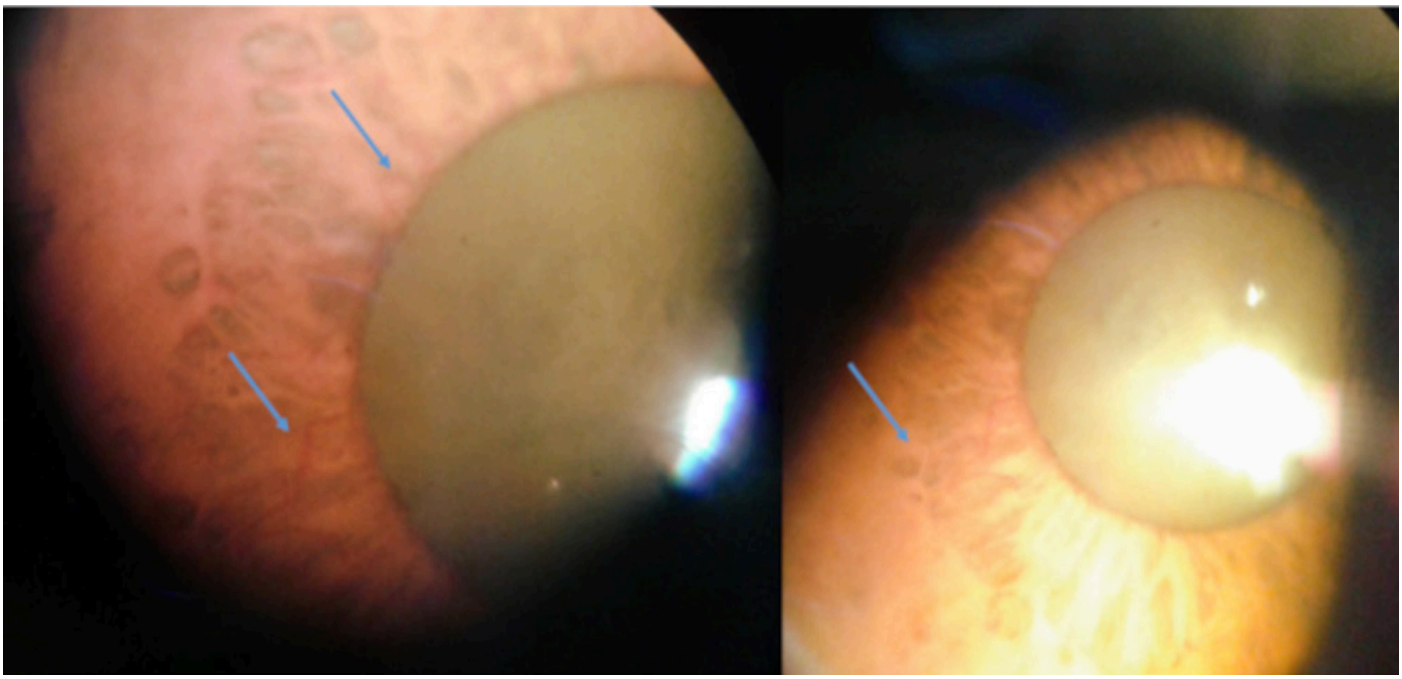

Figure 1. Neovascular glaucoma in a monophthalmic diabetic patient.

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glaucoma valve implantation. After one month, the IOP decreased and the patient dropped out of the medication.
After six months, he developed a vitreous hemorrhage that required pars plana vitrectomy and silicone oil tamponade. The intraocular pressure increased gradually to reach 30 mmHg, which required silicone oil removal with an endolaser and an intravitreal injection of Bevacizumab. After one year of evolution, the patient had therapeutic escalation to maximum topical and oral anti-glaucomatous medications.
Since this was a case of a young monophtalmic patient with refractory NVG, we chose a safe alternative using MP-TCP. We used an MP P3 handpiece of the Iridex Cyclo G6 (IRIDEX Laser System). The power was set at 2000 mW and a duty cycle of 0.33. The probe was applied using firm, moderate pressure in a continuous, sweeping motion over the superior and inferior quadrants, 80 sec for each hemiglobe. We avoided 3 and 9 o'clock meridians and the Ahmed valve site.
After the procedure, Visual acuity was 3/10, and the IOP had decreased to 12 mmHg. The IOP remained stable without medication for six months. Then it started to increase gradually under topical anti-glaucomatous medication. The MPTCP was repeated twice in three years until the patient died from leukemia. It allowed maintaining a visual acuity of 3/10 with a stable visual field and a certain degree of autonomy in carrying out daily tasks.

Discussion

We reported the case of a young monophtalmic patient with refractory NVG aggravated by silicone tamponade, where conventional treatment approaches have failed to achieve IOP control. MPTCP successfully managed NVG and preserved the visual function and the quality of life by relieving the ocular pain and withdrawing anhydrase carbonic inhibitors.
MPTCP lowers the IOP by destroying parts of the ciliary body responsible for aqueous humor production. It delivers a series of short, pulsed repetitive bursts of laser energy in on/off phases, in which the 'off-phase' minimizes the heat buildup and hence thermal damage to adjacent tissues [1]. MPTCP increases the meshwork and the uveoscleral outflow [2], and it has been proposed for both pediatric and adult populations. Primary open-angle glaucoma was the most frequently included. MPTCP has an established place in the management of high-pressure glaucoma that resisted other treatment modalities, as in our case. This method shows promising results with a consistent reduction in IOP and a decrease in anti-glaucoma medications.
The average IOP change (between baseline and 12 months) was 8.04 mmHg with a success rate of 70.8% after the first week, 66.6% after the first month, and 58.3% after three months, according to Zemba and al.[3]. In Williams et al. series, the success rates were 75% after three months, 66% after six months, and 67% at the last visit [4, 5]. The therapeutic effect of MPTCP can decline over time, as in our case. Consequently, Patients with advanced NVG may require higher laser energy or longer application time [3,5]. We chose to retreat our patient to obtain a stable IOP. The retreatment was as safe and successful every time.
MPTCP decreased the number of patients requiring oral acetazolamide from 58.3% of patients at baseline to 20.8% at 12 months in Zemba series [3]. Kuchar et al, showed a decrease in antiglaucoma medication number from 2.6 preoperatively to 1.9 postoperatively at two months follow-up [6]. Emanuel et al, reported a decrease in antiglaucoma medications from 3.3 preoperatively to 1.9, 2.0, 2.0, and 2.3 at months 1, 3, 6, and 12, respectively [7]
MP TSCPC has many advantages. It is incision free with a very low risk of infection, it is easy to perform with a very short learning curve, there is no need to stop anti-coagulants, there is a rapid onset of the effect and it is repeatable [3].
The efficacy and safety of MPTCP for patients who previously underwent other glaucoma surgery (trabeculectomy, tube shunt surgery), is very promising [4].
Compared with continuous TCP, adverse effects (i.e., the decrease in VA, hypotony, and phthisis bulbi), were significantly lower in MPTCP. An increased mean treatment session time (319 s), may explain some of the adverse effects noted by certain authors [7-9].
The expansion of diode laser delivery devices has led to the development and refinement of cyclodiode laser as a primary procedure for managing glaucoma.

Competing interests

The authors declare that there is no conflict of interest regarding the publication of this article.

References

[1] Ma A, Yu SWY, Wong JKW. Micropulse laser for the treatment of glaucoma: A literature review. Surv Ophthalmol. 2019; 64: 486 97
[2] Abdelmassih Y, Tomey K, Khoueir Z. Micropulse Transscleral Cyclophotocoagulation. J Curr Glaucoma Pract. 2021;15(1):1-7.
[3] Zemba M, Dumitrescu O-M, Vaida F, Dimirache E-A, Pistolea I, Stamate A, et al. Micropulse vs. continuous wave transscleral cyclophotocoagulation in neovascular glaucoma. Exp Ther Med. 2022; 23(4):278.
[4] Williams AL, Moster MR, Rahmatnejad K, Resende AF, Horan T, Reynolds M, et al. Clinical efficacy and safety profile of micropulse transscleral cyclophotocoagulation in refractory glaucoma. J Glaucoma. 2018; 27: 445 9.
[5] Souissi S, Baudouin C, Labbé A, Hamard P: Micropulse transscleral cyclophotocoagulation using a standard protocol in patients with refractory glaucoma naive of cyclodestruction. Eur J Ophthalmol. 2021; 31: 112 9
[6] Kuchar S, Moster MR, Reamer CB, et al. Treatment outcomes of micropulse transscleral cyclophotocoagulation in advanced glaucoma. Lasers Med Sci. 2016;31:393-6.
[7] Emanuel ME, Grover DS, Fellman RL, et al. Micropulse cyclophotocoagulation: initial results in refractory glaucoma. J Glaucoma. 2017;26(8):726- 9.
[8] Dumbrăveanu L, Cușnir V, Bobescu D. A review of neovascular glaucoma . Etiopathogenesis and treatment . 2021;65(4):315-29.
[9] Al Habash A, AlAhmadi AS. Outcome Of MicroPulse® Transscleral Photocoagulation In Different Types Of Glaucoma. Clin Ophthalmol. 2019; 2;13:2353-60.