

# Slow Coagulation Transscleral Cyclophotocoagulation for Postvitrectomy Patients With Silicone Oil–induced Glaucoma

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**Precis:** Slow coagulation transscleral cyclophotocoagulation (TSCPC) is an effective and safe glaucoma surgery in patients with medically uncontrolled silicone oil (SO)-induced glaucoma.

**Purpose:** The purpose of this study was to report the outcomes of slow coagulation continuous wave TSCPC in patients with medically uncontrolled secondary glaucoma following pars plana vitrectomy (PPV) and intravitreal SO injection.

**Patients and Methods:** This retrospective study enrolled patients with medically uncontrolled glaucoma secondary to PPV with SO injection who underwent TSCPC using slow coagulation TSCPC settings (power of 1250 mW and duration of 4 s). The primary outcome measure was surgical success at 12 months. Surgical success was defined as an intraocular pressure 6 to 21 mm Hg and reduced  $\geq 20\%$  from baseline, no reoperation for glaucoma, and no loss of light perception vision. Secondary outcome measures included number of glaucoma medications, visual acuity changes, and surgical complications.

**Results:** A total of 18 eyes of 18 patients were included in the study. The mean age and follow-up of the patients were  $51.94 \pm 14.5$  years and  $16.3 \pm 3.5$  months, respectively. The mean intraocular pressure decreased from  $29.7 \pm 9.6$  mm Hg preoperatively to  $14.6 \pm 6.5$  mm Hg at 12 months postoperatively ( $P < 0.001$ ). Glaucoma medications were reduced from  $4.2 \pm 0.9$  at baseline to  $1.9 \pm 1.3$  at 12 months after TSCPC ( $P < 0.001$ ). A nonsignificant change of logarithm of the minimum angle of resolution visual acuity was observed at 12 months ( $P = 0.722$ ). The success rate at 12 months was 72.2%. No major complications were reported during the first year of follow-up.

**Conclusion:** Slow coagulation TSCPC had high efficacy and minimal complications when used as an initial glaucoma surgical procedure in patients with SO-induced glaucoma.

**Key Words:** transscleral cyclophotocoagulation, secondary glaucoma, silicone oil–induced glaucoma

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Glaucoma is a common complication following vitreoretinal surgeries. Various mechanisms in the early or late postoperative course of pars plana vitrectomy (PPV) can result in intraocular pressure (IOP) elevation and subsequent glaucomatous optic neuropathy.<sup>1</sup> Surgical procedures frequently combined with PPV such as scleral buckling and endophotocoagulation might play a role in the postoperative increase of IOP.<sup>2</sup> Furthermore, silicone oil (SO) is a surgical adjunct that is used for intraocular tamponade during PPV in complex retinal detachment surgeries.<sup>3</sup> SO-induced IOP elevation can range in incidence from 4.8% to 56%, with lower rates in more recent studies probably associated with improvements in vitreoretinal surgical techniques.<sup>4,5</sup>

In cases of glaucoma secondary to PPV and intravitreal silicone oil injection (SOI), medical therapy is commonly initiated as the first line of treatment for IOP lowering.<sup>6,7</sup> When IOP is poorly or unable to be controlled with medications, surgical interventions are considered. Transscleral cyclophotocoagulation (TSCPC) is one of the surgical treatment options used in the management of post-vitrectomy glaucoma. TSCPC causes coagulative necrosis of the ciliary body, which leads to a decrease in aqueous humor production.<sup>8</sup> The conventional titration of laser energy to the production of the audible “pop” of TSCPC energy delivery to the ciliary body was the endpoint for the amount of high, brief power of the continuous wave transscleral cyclophotocoagulation (CW-TSCPC) settings. CW-TSCPC applies continuous laser energy power, titrated according to the “pop” sound, over a period of time to the ciliary body. The slow coagulation CW-TSCPC settings have recently been introduced. Slow coagulation CW-TSCPC delivers photocoagulative laser energy to the ciliary body using a fixed lower power of energy over a longer duration, thereby theoretically decreasing the risk of collateral damage surrounding the ciliary body and severe inflammation from necrotic high energy disruption of the ciliary body.<sup>9</sup>

The tendency by clinicians to use the fixed slow coagulation CW-TSCPC settings has been anecdotal, and scarce data is available regarding its efficacy and safety in the management of glaucoma caused by vitreoretinal surgeries. Thus, this retrospective case series addresses the clinical

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outcomes of slow burn CW-TSCPC as a primary treatment modality for secondary glaucoma following PPV and SOI that is poorly controlled with medical therapy.

## PATIENTS AND METHODS

### Study Design

This is a retrospective study involving consecutive patients with a history of secondary glaucoma associated with PPV and SOI who underwent CW-TSCPC at the Bascom Palmer Eye Institute from February 2015 to June 2019. This study was approved by the Institutional Review Board of the University of Miami and adheres to the tenets of the Declaration of Helsinki and the requirements of the United States Health Insurance Portability and Accountability Act (HIPAA).

Patients were identified using Current Procedure Terminology (CPT) codes. Patients with age above 18 years who developed medically uncontrolled secondary glaucoma attributed to prior PPV and SOI, regardless of glaucoma severity, were included in the study. Exclusion criteria were patients with glaucoma diagnosed before vitreoretinal surgery, postoperative follow-up period <1 year, previous incisional glaucoma surgery or cyclodestructive procedures, and visual acuity (VA) of no light perception.

In addition to demographic and clinical characteristics, the preoperative and postoperative IOP, number of glaucoma medications, best-corrected visual acuity (BCVA), complications at 1 week, 1, 3, 6, and 12 months of follow-up were recorded. Postoperative complications included: anterior chamber (AC) inflammation (any degree of cells or flare), hypotony (IOP  $\leq$  5 mm Hg), cystoid macular edema (CME) (either diagnosed clinically or using optical coherence tomography), corneal decompensation, loss of light perception, abnormal pupillary changes, persistent pain, and conjunctival scarring. In cases that underwent glaucoma reoperation, additional information was collected including the time of surgery and type of glaucoma surgical procedure.

### Surgical Technique

Patients received retrobulbar anesthesia for all CW-TSCPC procedures. The G-Probe (Iridex Corp., Mountain View, CA) was used with a power setting of 1250 mW of 810 nm infrared diode laser and a duration of 4 seconds. The G-Probe footplate was held perpendicular to the sclera, with the curved edge of the footplate placed at the limbus so that the laser beam was directed 1.2 mm posteriorly toward the ciliary processes. Balanced salt solution was used as the coupling agent. Successive applications were spaced one half the width of the G-Probe footplate apart, sparing the 3 and 9 o'clock meridians to avoid injury of the long ciliary blood vessels and nerves. All patients tolerated the procedure. After the procedure, a shield and patch were applied. Postoperatively, prednisolone acetate 1% drops were used for 3 to 4 weeks. In general, steroid drops were started at 6 to 8 times a day for at least 1 week and then tapered slowly. Variations to this regimen were made at the surgeon's discretion based on the patient's response to treatment.

### Outcome Measures

The primary outcome measure is the cumulative rate of surgical success at 12 months. Failure was defined as an IOP of > 21 mm Hg and IOP reduced by < 20% from baseline on 2 consecutive follow-up visits, IOP of 5 mm Hg or less on 2 consecutive follow-up visits, reoperation for glaucoma, or loss of light perception vision. Secondary outcome measures

include change in the number of glaucoma medications, change in VA, and postoperative complications. Additional TSCPC treatment was not considered a glaucoma reoperation and hence not a failure as surgeons in our institution use TSCPC in a titratable fashion. Reoperation for glaucoma was defined as additional glaucoma surgery requiring a return to the operating room.

### Statistical Analysis

Statistical analysis was performed using SPSS software, version 25.0 (SPSS Inc., Chicago, IL). Categorical variables are presented as frequencies and percentages meanwhile continuous variables are presented as means and SDs. A paired *t* test was used to compare IOP values before and after TSCPC. The Wilcoxon signed-rank test was used to compare the preoperative and postoperative number of glaucoma medications and logarithm of the minimum angle of resolution (logMAR) VA. The overall success rate of the procedure was analyzed using the Kaplan-Meier survival analysis. A *P*-value < 0.05 was accepted as statistically significant.

## RESULTS

### Baseline and Demographic Characteristics

A total of 18 eyes of 18 patients were included in the study. The baseline characteristics of the study participants are presented in Table 1. The mean  $\pm$  SD age of the patients

**TABLE 1.** Baseline Characteristic of Study Participants

Characteristics	
Age (y)	
Mean $\pm$ SD (range)	51.94 $\pm$ 14.5 (25-74)
Follow-up (mo)	
Mean $\pm$ SD (range)	18.1 $\pm$ 4.7 (13-31)
Sex, n (%)	
Male	11 (61.1)
Female	7 (38.9)
Race, n (%)	
White	7 (38.9)
Hispanic	6 (33.3)
African American	4 (22.2)
Asian	1 (5.6)
Laterality, n (%)	
Right	10 (55.6)
Type of glaucoma, n (%)	
Open-angle glaucoma	7 (38.9)
Angle-closure glaucoma	3 (16.7)
Mixed mechanism glaucoma	8 (44.4)
Lens status, n (%)	
Pseudophakic	16 (88.8)
Phakic	1 (5.6)
Aphakic	1 (5.6)
Indication of surgery, n (%)	
RRD	7 (38.9)
TRD	6 (33.3)
Combined TRRD	3 (16.7)
Other	2 (11.1)
Duration of SO endotamponade (mo)	
Mean $\pm$ SD (range)	9.3 $\pm$ 6.6 (1-21)
Eyes with $\geq$ 2 vitreoretinal surgeries n (%)	8 (44.4)

RRD indicates rhegmatogenous retinal detachment; SO, silicone oil; TRD, tractional retinal detachment; TRRD, tractional rhegmatogenous retinal detachment.

**TABLE 2.** Clinical Outcomes Over Consecutive Follow-up Visits (N = 18)

	Baseline	1 Week	1 Month	3 Months	6 Months	12 Months
IOP (mm Hg)						
Mean ± SD	29.7 ± 9.6	12.3 ± 4.4	14.1 ± 5.4	14.3 ± 8.8	14.4 ± 5.5	14.6 ± 6.5
P*		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Range	13-47	6-20	4-23	4-35	7-27	8-29
Change (mean ± SD)		-17.3 ± 10.4	-15.6 ± 10.7	-15.3 ± 13.8	-15.2 ± 11.0	-15.1 ± 11.5
Mean % change		-53.2	-48.2	-44.1	-46.5	-45.8
No. medications						
Mean ± SD	4.2 ± 0.9	2.2 ± 1.5	1.6 ± 1.5	1.4 ± 1.4	1.8 ± 1.5	1.9 ± 1.5
P†		0.002	0.001	0.001	< 0.001	< 0.001
Range	2-5	0-4	0-4	0-4	0-4	0-4
Change (mean ± SD)		-2.0 ± 1.9	-2.6 ± 1.8	-2.7 ± 1.7	-2.3 ± 1.6	-2.3 ± 1.7
Mean % change		-43.9	-59.7	-61.6	155.3	-52.8
LogMAR VA						
Mean ± SD	1.36 ± 0.68	1.33 ± 0.77	1.32 ± 0.73	1.36 ± 0.79	1.24 ± 0.78	1.30 ± 0.79
P‡		0.937	0.929	0.732	0.582	0.772
Range	0.30-2.70	0.2-2.70	0.4-2.70	0.3-2.70	0.2-2.70	0.2-2.7
Retreatment (n)			1	1		

\*Paired t test.

†Wilcoxon rank-sum test.

IOP indicates intraocular pressure; logMAR, logarithm of the minimum angle of resolution; VA, visual acuity.

at the time of surgery was 51.94 ± 14.5 years (range, 25 to 74 y). Eleven patients (61.1%) were males, and 7 patients (38.9%) were white. The mean ± SD follow-up duration was 16.3 ± 3.5 months (range 13 to 31 mo). Rhegmatogenous retinal detachment in 7 eyes (38.9%), followed by tractional retinal detachment in 6 eyes (33.3%), and combined tractional rhegmatogenous detachment in 3 eyes (16.7%) were the indications for PPV.

At the time of TSCPC, all eyes were SO filled, with a mean ± SD duration of SO endotamponade of 9.3 ± 6.6 months (range, 1 to 21 mo). Eight eyes (44.4%) had ≥ 2 vitreoretinal surgeries. Sixteen eyes (88.8%) were pseudophakic, meanwhile 1 eye (5.6%) was phakic, and 1 eye (5.6%) was aphakic and had surgical inferior peripheral iridotomy. Mixed mechanism glaucoma was the most common glaucoma type in 8 eyes (44.4%). None of the patients had SO removal during the follow-up period. At baseline, IOP was 29.7 ± 9.6 mm Hg (range, 13 to 47 mm Hg), number of glaucoma medications was 4.2 ± 0.9 (range, 2 to 5) and logMAR of BCVA was 1.36 ± 0.68 (range, 0.3 to 2.7).

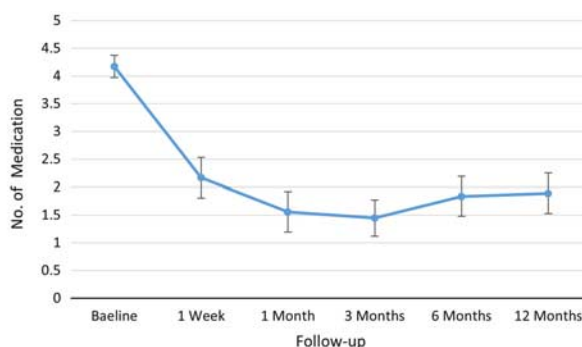
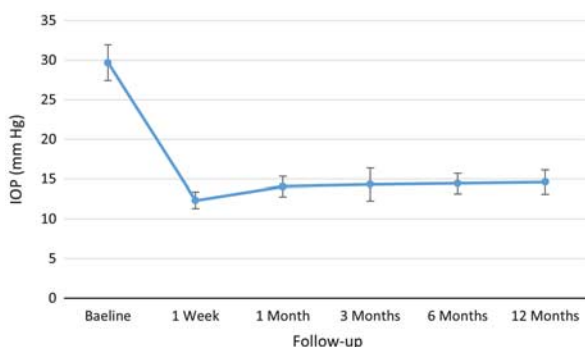
**IOP, Number of Medications, and VA Outcomes**

Table 2 and Figure 1 present the IOP, number of medications, and VA outcomes. Following TSCPC, the

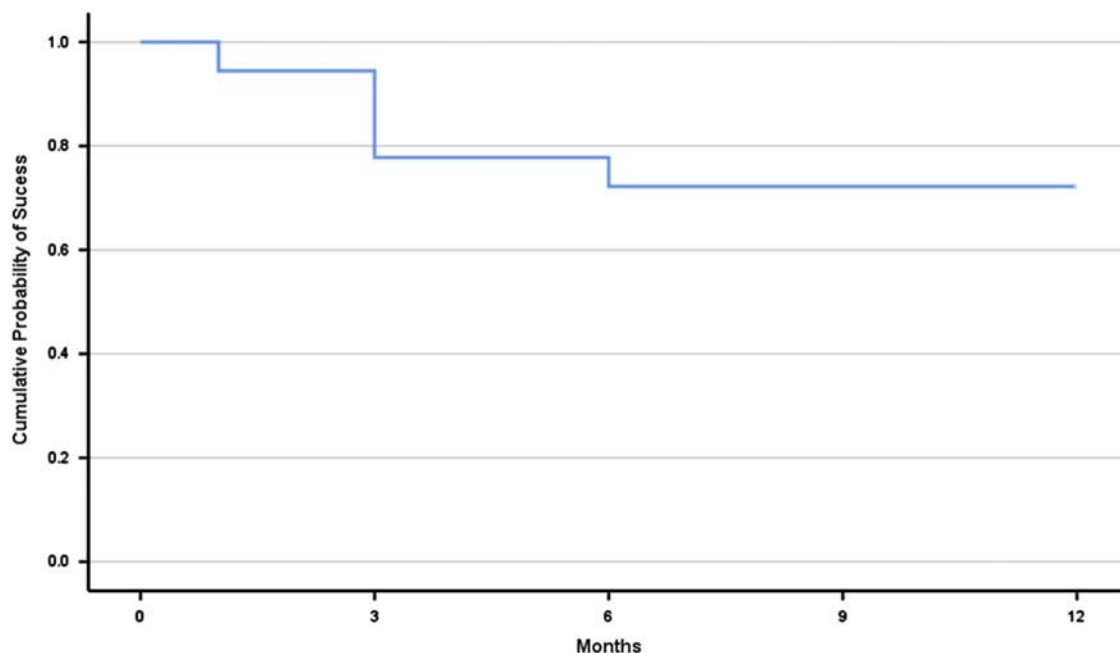
mean ± SD of IOP declined from 29.7 ± 9.6 mm Hg at baseline to 12.3 ± 4.4 at the 1-week, 14.1 ± 5.4 at the 1-month, 14.3 ± 8.8 at the 3-month, 14.4 ± 5.5 at the 6-month, and 14.6 ± 6.5 at the 12-month follow-up visits (P < 0.001 at all follow-up visits). The mean percent reduction of IOP ranged from 44.1% to 53.2% at different time points. At the 12-month visit, the mean ± SD of IOP reduction from baseline was 15.1 ± 12.0 mm Hg and 13 eyes (72.2%) achieved ≥ 20% reduction from the pretreatment IOP.

In addition, a significant decrease in the number of medications at 1 week, 1, 3, 6, and 12 months (P = 0.02, 0.001, 0.001, < 0.001, and < 0.001, respectively) was observed after TSCPC. At the last follow-up visit, the number of glaucoma medications dropped from 4.2 ± 0.9 to 1.9 ± 1.5 with a mean percentage reduction of 52.8%. Six eyes (33.3%) were medication-free at 12 months of follow-up.

In addition, a nonsignificant change of logMAR VA from 1.36 ± 0.68 at baseline to 1.30 ± 0.79 at 12 months was observed (P = 0.722). When analyzed as a change in Snellen VA, 10 patients (55.5%) maintained the same pretreatment BCVA and 3 patients (16.7%) had a loss of 2 or more lines of Snellen VA. The reason of the decrease of VA was attributed to glaucoma progression in 2 patients and due to CME in 1 patient.



**FIGURE 1.** Intraocular pressure (IOP) and number of medications at baseline and consecutive follow-up visits (N = 18). Data are presented as mean ± SEM. Figure 1 can be viewed in color online at www.glaucomajournal.com.



**FIGURE 2.** The Kaplan-Meier plot indicates cumulative success rate during the postoperative follow-up of 12 months. Figure 2 can be viewed in color online at [www.glaucomajournal.com](http://www.glaucomajournal.com).

**Surgical Success**

The overall cumulative probability of success in our study was 72.2% at 1 year (Fig. 2) based upon Kaplan-Meier survival analysis. Of 18 patients, 5 patients met treatment failure criteria. Inadequate IOP reduction (IOP >21 mm Hg and reduction <20% of baseline IOP on 2 consecutive visits) was the most common cause of failure among patients and occurred in 4 patients. One patient (5.6%) underwent gonioscopy-assisted transluminal trabeculotomy at 12 months as a reoperation for glaucoma to control elevated IOP. One patient was labeled failure due to hypotony with IOP <5 mm Hg.

**Postoperative Complications**

Postoperative complications are presented in Table 3. Two patients (5.6%) had active AC inflammation at the postoperative 1-week visit that was controlled during the follow-up period using topical steroid drops. CME developed in 1 patient (5.6%). Hyphema occurred in 1 patient (5.6%) and resolved spontaneously. Transient hypotony was reported in 1

patient (5.6%) at the 1-week visit but resolved at 1 month. No cases of loss of light perception, conjunctival burn, choroidal effusion, sympathetic ophthalmia, pupillary abnormalities, prolonged pain, or phthisis bulbi were observed.

**DISCUSSION**

Elevated IOP can develop following PPV and SOI in the early postoperative period due to pupillary block, early postoperative inflammation, mechanical obstruction of trabecular meshwork by SO globules in the AC, steroid-induced IOP, among other etiologies. Postvitrectomy surgery glaucoma occurs also in the late postoperative period due to reasons including chronic trabeculitis, damage of the trabecular meshwork by emulsified SO, neovascular glaucoma due to associated retinal pathologies, chronic iridocyclitis, and synechial angle closure.<sup>10</sup>

Medical therapy has been shown to control IOP successfully in 30% to 78% of the patients.<sup>4,11</sup> Medical treatment options include steroids, cycloplegics, topical glaucoma eye drops, and oral systemic aqueous suppressants. In cases of medical therapy failure, laser or surgical inventions may be attempted to control IOP and prevent optic nerve damage.

The role of SO removal in controlling IOP in patients with SO-induced glaucoma is controversial. Jonas et al<sup>7</sup> found that IOP normalizes in 93% of the patients after SO removal alone. Conversely, other studies reported failure of IOP control after SO removal in ~91% of cases. Possible suggested causes include trabecular meshwork damage or obstruction by SO globules leading to IOP elevation despite SO removal.<sup>12</sup> The removal of SO should be weighed against the risk of retinal redetachment and should include a discussion between glaucoma and retinal surgeons to assess the associated risks and benefits of this decision.

The surgical management of SO-induced glaucoma is challenging, but the findings of this study demonstrate the efficacy and acceptable safety of using the slow coagulation

**TABLE 3.** Postoperative Complication After Slow coagulation Continuous Wave Transscleral Cyclophotocoagulation

Complications	n (%)
AC inflammation	2 (11.1)
CME	1 (5.6)
Hyphema	1 (5.6)
Hypotony	1 (5.6)
Loss of LP	0
Pupillary abnormalities	0
Persistent pain	0
Conjunctival burn	0
Choroidal effusion	0
Corneal decompensation	0

AC indicates anterior chamber; CME, cystoid macular edema; LP, light perception.

TSCPC technique as an initial surgical treatment option. In our study, the success rate was 72.2% at the 12-month follow-up. A significant decrease in IOP and the number of glaucoma medications needed was reported at all follow-up visits (Fig. 1, Table 2). No significant change in VA postoperatively among the retinal patients after slow coagulation CW-TSCPC was observed. In addition, no major complications were observed in this series (Table 3).

Slow coagulation CW-TSCPC is considered one of the emerging relatively noninvasive interventions that can be used in different patient populations. In a recent study evaluating the outcomes of slow coagulation TSCPC as an initial surgical treatment intervention in pseudophakic patients with glaucoma,<sup>13</sup> IOP decreased from  $27.5 \pm 9.8$  mm Hg preoperatively to  $16.1 \pm 6.3$  mm Hg postoperatively with a mean percentage reduction of IOP of 42.1% and 75.7% of eyes had  $\geq 20\%$  decrease in their baseline IOP. This is comparable to our findings in which the mean percentage reduction of IOP was 45.8% and 72.2% of the patients achieved  $\geq 20\%$  reduction from pretreatment IOP.

However, the mean decrease in glaucoma medication in the treated pseudophakic patient was 0.9 agent versus 2.3 agents in the current study. Although the rates of most postoperative complications in both studies were comparable, the incidences of CME and hyphema were higher in the present study. It is worth mentioning that the mean follow-up in that study was  $18.7 \pm 9.0$  months, which was longer than the 1-year follow-up in the current study.<sup>13</sup>

Similarly, in another study, primary slow coagulation TSCPC proved its efficacy and relative safety in patients with no previous history of incisional surgeries. The mean follow-up of this study was  $11.1 \pm 8.9$  months. At the last follow-up visit, 52.2% of the treated eyes had  $\geq 20\%$  reduction of IOP from baseline. Interestingly, the IOP reduction was noted to more in patients with higher baseline IOP ( $> 21$  mm Hg). Slow coagulation TSCPC treatment resulted in a significant decrease of glaucoma medications from  $3.8 \pm 1.0$  to  $2.8 \pm 1.4$  at baseline and last visit, respectively. No serious complications including phthisis bulbi, corneal decompensation, or choroidal hemorrhage were reported in that study.<sup>14</sup>

Although it is difficult to accurately compare success rates of different studies due to variable success criteria, the success rate in this study was comparable to previous studies that used the conventional “pop” settings of CW-TSCPC in PPV-induced glaucoma, which ranged from 55% to 81%.<sup>15–19</sup> For example, Ghazi-Nouri et al<sup>15</sup> reported a success rate (success defined as IOP  $\leq 21$  mm Hg) of 73.7% at 1 year. Similarly, in the study conducted by Bloom et al<sup>17</sup> the success rate (success defined as IOP  $< 22$  mm Hg) of TSCPC in the SO-induced glaucoma subgroup was 72% at 1 year. These results are consistent with our success rate of 72.2% at 12 months, although we used more stringent IOP success criteria.

In the present study, slow coagulation TSCPC resulted in a significant IOP reduction that ranged from 44% to 53% at different visits during 12 months of follow-up. These results are similar or better than previous studies that used the conventional “pop” TSCPC. For example, Bloom et al<sup>16</sup> found a mean IOP reduction of 51% in the SO-induced glaucoma subgroup after TSCPC at a mean follow-up period of 10 months. Besides, Kumar et al<sup>19</sup> reported a mean IOP reduction of 41% at 6 months.

In addition to IOP reduction, a significant decrease in the postoperative need for glaucoma medications was noted. The mean number of medications decreased from  $4.2 \pm 0.9$

at baseline to  $1.9 \pm 1.5$  at month 12, with a mean decrease of 2.3 glaucoma agents. This was comparable to the mean reduction of medications in previous reports.<sup>15–19</sup>

No major complications were observed in our study and most of the complications that occurred were mild and transient. Previously, one of the concerns that limited the broad use of cyclophotocoagulation is vision loss, but in the present study, no eyes experienced the loss of light perception with only 3 eyes (16.7%) experiencing a loss of 2 or more lines of Snellen VA. These cases were end-stage cases, and the visual decreases were related to glaucoma progression rather than complications. A decrease in VA ranging from 15% to 47% in patients undergoing TSCPC has been previously reported.<sup>20,21</sup> VA loss following TSCPC may be not only attributed to the procedure itself but might be due to glaucoma progression despite IOP control or the deterioration of other baseline ocular morbidities.<sup>22</sup>

Two eyes (11.1%) had iridocyclitis persistent at the 1-month visit. In addition, CME was reported in 1 eye (5.6%). These rates were found to be lower than previous reports.<sup>23,24</sup> This is consistent with the results of Duerr et al<sup>25</sup> who reported a lower incidence of iridocyclitis following slow coagulation technique compared with the conventional pop CW-TSCPC settings. The decrease in the incidence of postoperative iridocyclitis leads to less postoperative dependence on steroid drops in glaucomatous patients, which in turn could also decrease the risk of steroid-induced IOP elevation, economic burden, improve the adherence of patients, and limit ocular surface toxicity from prolonged use of multiple drops.

The relative lower incidence of postoperative inflammation and subsequent CME with slow coagulation compared with conventional pop TSCPC settings is probably due to lower power accompanied by a longer exposure time and avoidance of producing a pop sound, which represents microdisruptive ablation of ciliary body tissues, thereby leading to less destruction of tissue and subsequent inflammation.<sup>26</sup>

Hypotony (IOP  $\leq 5$  mm Hg) occurred in 1 eye (5.6%) but it was transient and not associated with hypotony maculopathy or choroidal effusion. This was comparable to rates of hypotony in the previous studying evaluating the outcomes of TSCPC in glaucoma secondary to PPV and SOI, which ranged from 1% to 20%.<sup>16–19</sup> In addition, no cases of sympathetic ophthalmia, choroidal detachment or effusion, phthisis, corneal decompensation, pupillary abnormalities, or conjunctival burn were reported.

The role of conventional filtration surgery is limited in the management of glaucoma following PPV and SOI. Conjunctival scarring and recession from prior surgeries limit the success of trabeculectomy in such cases.<sup>27</sup> Besides, the internal ostium may be blocked by the SO leading to failure of filtration in case of superior trabeculectomies. Trabeculectomies can be performed inferiorly to overcome this problem but this would be associated with a higher risk of infection and is therefore not performed.<sup>28</sup>

Glaucoma drainage devices (GDDs) can be used in medically uncontrolled glaucoma after PPV and SOI with 1-year success rates ranging from 62% to 80%.<sup>29,30</sup> Superior placement of GDD is associated with a risk of SO migration through the tube to the subconjunctival space so in SO-filled eyes GDD is preferably placed in inferonasal or inferotemporal quadrants.<sup>31</sup> Al-Jazzaf et al<sup>11</sup> reported a success rate of 76% at 1 year after inferonasal placement of Ahmed valve in glaucoma of SO-filled eyes.

The limitations of our study include its retrospective nature, relatively small sample size, and lack of a comparative

group. In addition, long-term complications may develop after the first year of follow-up. Also, the decision for surgical intervention was at the surgeon's judgment. To the best of our knowledge, no previous reports have evaluated the slow coagulation TSCPC outcomes in glaucoma secondary to PPV and SOI as a primary surgical glaucoma intervention. Prospective studies with a larger number of participants may be required to confirm our encouraging results, although this is not a common ophthalmic problem.

In conclusion, the high success rate noted during the first year of follow-up, the significant decrease in IOP and glaucoma medications, in addition to the absence of serious associated complications, suggest the safety and efficacy of slow coagulation TSCPC in the management of glaucoma secondary to PPV-SOI. Being a repeatable, relatively easy, minimally invasive, rapid procedure with less postoperative recovery period than more invasive surgeries (such as GDD) and which does not affect possible future surgical interventions, slow coagulation TSCPC is an important surgical treatment of choice in refractory glaucoma cases due to vitreoretinal surgeries, especially during the current COVID-19 pandemic situation where frequent patients' visits and interventions are challenging.

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