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ORIGINAL ARTICLE

The effect of repeat 360-degree selective laser trabeculoplasty on intraocular pressure control in open-angle glaucoma

L'effet de la trabéculoplastie au laser sélective répétée sur le contrôle de la pression intraoculaire dans le glaucome à angle ouvert

G.M. Durr[a,*], P. Harasymowycz[a,b,c]

[a] *Department of Ophthalmology, University of Montreal, Montreal, QC, Canada*
[b] *Maisonneuve-Rosemont Hospital Research Center, Montreal, QC, Canada*
[c] *Montreal Glaucoma Institute, Montreal, QC, Canada*

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KEYWORDS
Glaucoma;
Open-angle;
Trabeculoplasty;
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Repeat;
360-degree

Summary
Objective. — To evaluate the effect of repeat 360-degree selective laser trabeculoplasty (SLT) on intraocular pressure (IOP) with short-term follow-up.
Methods. — This study was based on clinical practice (25 females and 13 males) with a history of primary open-angle glaucoma (27), normotensive glaucoma (6) or pseudoexfoliative glaucoma (5). We measured the IOP at baseline before the first and second 360-degree SLT at 1 month, 6 months and 15 months. Follow-up was concluded earlier if the SLT failed (an increase in IOP over the baseline value), if a new medication was introduced or if an IOP lowering surgery was performed.
Results. — Baseline IOP prior to SLT1 was 19.0 ± 3.7 mmHg, which dropped to 16.0 ± 3.7 mmHg (17.0% reduction), 16.9 ± 3.8 mmHg (12.5% reduction) and 17.2 ± 3.3 mmHg (8.7% reduction) at 1, 6 and 15 months respectively ($P < 0.01$). For SLT2, baseline IOP was 18.0 ± 4.5 mmHg, which dropped to 15.1 ± 3.8 mmHg (15.1% reduction), 15.1 ± 4.3 mmHg (15.6% reduction) and 16.0 ± 3.6 mmHg (10.3% reduction) at 1, 6 and 15 months respectively ($P < 0.01$).

* Corresponding author. Department of Ophthalmology, Maisonneuve-Rosemont Hospital, 5415, boulevard de L'Assomption, Montreal, QC H1T 2M4 Canada.
E-mail address: georges.durr@gmail.com (G.M. Durr).

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Conclusion. — In a cohort of patients who underwent 360-degree SLT 4 years previously, a second SLT resulted in IOP lowering similar to the first treatment with a possibly more sustained response.

MOTS CLÉS
Glaucome à angle ouvert ;
Trabéculoplastie ;
Pression intraoculaire ;
Répétée ;
360 degrés

Résumé
But. — Évaluer l'effet de la trabéculoplastie au laser sélective (TLS) répétée de 360 degrés sur le contrôle de la pression intraoculaire (PIO) pendant un suivi à court terme.
Méthodologie. — Cette étude a été menée sur 38 patients (25 femmes et 13 hommes) avec des antécédents de glaucome à angle ouvert (27), glaucome normotensif (6) ou glaucome pseudoexfoliatif (5). Nous avons mesuré la PIO initialement avant le 1er et 2e TLS et puis à 1 mois, 6 mois et 15 mois. Le suivi a été cessé plus tôt si la TLS a échoué (augmentation de la PIO au-dessus de la PIO initiale), si une nouvelle médication a été introduite ou si une chirurgie diminuant la PIO a été effectuée.
Résultats. — La PIO initiale avant la TLS1 était de $19{,}0 \pm 3{,}7$ mmHg et elle a diminué à $16{,}0 \pm 3{,}7$ mmHg (17,0 % réduction), $16{,}9 \pm 3{,}8$ mmHg (12,5 % réduction) et $17{,}2 \pm 3{,}3$ mmHg (8,7 % réduction) à 1, 6 et 15 mois ($p < 0{,}01$). Pour la TLS2, la PIO initiale était de $18{,}0 \pm 4{,}5$ mmHg et elle a diminué à $15{,}1 \pm 3{,}8$ mmHg (15,1 % réduction), $15{,}1 \pm 4{,}3$ mmHg (15,6 % réduction) et $16{,}0 \pm 3{,}6$ mmHg (10,3 % réduction) à 1, 6 et 15 mois ($p < 0{,}01$).
Conclusion. — Dans notre cohorte de patients ayant reçu 2 TLS en 4 ans d'intervalle, la seconde TLS a mené à une réduction de la PIO similaire au premier traitement avec une réponse possiblement plus soutenue.

The introduction of selective laser trabeculoplasty (SLT) in the late 1990s by Latina et al. has since become the primary laser treatment for the control of intraocular pressure (IOP) [1]. Its effectiveness has been tested and proven numerous times in the past. However, few studies examine the effect of the repeat use of SLT in the treatment of open-angle glaucoma.

There seems to be some evidence of the beneficial effect on IOP of a repeat SLT. A study by Avery et al. on 42 eyes of 42 patients with primary open-angle glaucoma (POAG), shows a similar reduction of IOP between the first and second SLT with a statistically significant longer reduction of IOP after the second SLT treatment [2]. Another study by Hong et al. on 44 eyes with POAG and secondary glaucoma shows a reduction of IOP that is similar between the first and second SLT but that was not as marked as the first [3]. When comparing the effect of pigmentation and myopia, one study found no difference between the groups with regards to IOP response after SLT treatment. However, they confirmed the similar reduction in IOP response after the second SLT treatment [4].

The objective of the current study is to demonstrate the effect of the repeatability of 360-degree SLT and examine the IOP reduction after a second 360-degree treatment several years after the initial SLT.

Methods

The research protocol of this study adhered to the tenets of the declaration of Helsinki. It was approved by the Maisonneuve-Rosemont Hospital human experimentation committee (Montreal, QC, Canada).

A retrospective chart review was performed. We measured the IOP with Goldmann applanation tonometry at baseline and before the first and second SLT at 1 month, 6 months and 15 months. The two initial IOP values were averaged to estimate the baseline IOP. Follow-up was concluded earlier if the SLT failed (an increase in IOP over the baseline value), if a new medication was introduced or if a surgery to reduce IOP was performed (cataract surgery, trabeculectomy).

An Ellex solo SLT laser (Ellex Inc, Mineapolis, MN, USA), a frequency doubled, q-switched Nd:YAG laser emitting at 532 nm was used, with a pulse duration of 3 ns and 400 μm spot size. Primary (SLT1) and secondary (SLT2) SLT were performed over 360-degrees with 40 to 60 shots of 0.8—1.2 mJ with energy level titrated until there was the typical appearance of champagne bubbling over the trabecular meshwork. Treatment failure was defined by a return to pre-treatment IOP or above target IOP.