Objective: To determine if the intraocular pressure (IOP) response to selective laser trabeculoplasty (SLT) in one eye predicts long-term response to SLT in the fellow eye.

Methods: A retrospective medical record review was performed of patients who underwent SLT as primary treatment in both eyes and who completed at least 30 months of follow-up visits. Pearson product moment correlation analysis was performed to determine correlations between the 3-month percentage of IOP reduction in the first treated eye and long-term percentages of IOP reduction in the fellow eye.

Results: Medical records of 80 eyes in 40 patients were reviewed. In patients with ocular hypertension, the 3-month percentage of IOP reduction in the first treated eye correlated strongly with long-term percentages of IOP reduction in the fellow eye ($r = 0.652$). In patients with primary open-angle glaucoma, the 3-month percentage of IOP reduction in the first treated eye correlated moderately with percentages of IOP reduction in the fellow eye up to 9 months ($r = 0.367$).

Conclusions: In patients with ocular hypertension, the 3-month percentage of IOP reduction in the first treated eye in response to SLT was predictive of response in the fellow eye up to 30 months. In patients with primary open-angle glaucoma, the 3-month percentage of IOP reduction in the first treated eye in response to SLT was predictive of response in the fellow eye up to 9 months.


Ocular Hypertension (OHT) and primary open-angle glaucoma (POAG) are predominantly bilateral diseases, with some degree of asymmetry. Medical treatment, laser trabeculoplasty, and surgery can be used to control the intraocular pressure (IOP). Selective laser trabeculoplasty (SLT) was first reported by Latina et al1-3 to be clinically effective in lowering IOP among patients with open-angle glaucoma. The procedure is often used to treat both eyes, with variable intervals between treatments depending on the IOP, symmetry of glaucoma, and rate of glaucomatous visual field progression. No published studies to date correlate the IOP-lowering effect of SLT in the first treated eye with that in the fellow eye of patients who received SLT as primary treatment for OHT or POAG. This information may be helpful to better predict the fellow eye response to SLT based on response of the first treated eye. The objectives of this study were to investigate the predictive value of response to SLT in the first treated eye and to develop realistic expectations of response in the fellow eye IOP among patients with OHT and with POAG.

METHODS

This retrospective medical record review included all patients who underwent SLT in both eyes between February 1, 2002, and December 1, 2005, by one of us (M.A.L.). Data were reviewed from postoperative visits at 2 weeks and at 3, 6, 9, 12, 18, and 30 months. Inclusion criteria were performance of SLT in both eyes, diagnosis of OHT or POAG in both eyes, and recording of data at all time points. Patients included in the study were diagnosed as having high-risk OHT or mild to moderate POAG. Patients were excluded if they used an ocular hypotensive medication or had an intraocular surgical procedure performed during the 30 months following SLT. Patients with a history of SLT or argon laser trabeculoplasty were also excluded.
The SLT procedure was performed in a standard fashion among all patients. An initial power setting between 0.6 and 0.9 mJ was selected. The procedure was then completed for 180°. The end point was to visualize fine bubbles at the laser-treated area, and the intended number of spots was 700 or through identifiers linked to the subjects. These adjustments were made to avoid spurious positive correlations. The P value for the entire set of comparisons was calculated by dividing the P value for each comparison (P < .05) by the number of comparisons (n = 7), so correlations were considered significant at P < .007.

Classical review board approval for the study was not required. We retrospectively studied existing data recorded by us in such a manner that subjects cannot be identified directly or through identifiers linked to the subjects.

### RESULTS

The age and sex of the 40 patients were consistent with a population having glaucoma (Table 1). The indication for SLT was POAG in 26 patients (65%), while the indication for SLT was OHT in 14 patients (35%).

The mean (SD) baseline IOP in the first treated eyes was 23.53 (3.34) mm Hg, while it was 23.66 (3.08) mm Hg in the fellow eyes. The mean (SD) decrease in IOP from baseline to 2 weeks in the first treated eyes was 6.46 (3.46) mm Hg (mean [SD] decrease from baseline, 26.41% [11.77%]), while in the fellow eyes it was 5.72 (3.88) mm Hg (mean [SD] decrease from baseline, 23.11% [14.73%]).

The interval between SLT in the first treated eye and in the fellow eye among the OHT cohort ranged from 2 weeks to 28 months (mean [SD], 154.9 [274.0] days). Among the POAG cohort, it ranged from 2 days to 26 months (mean [SD], 150.7 [244.1] days).

### OHT COHORT

As summarized in Table 2, the success rates in the fellow eye of patients with OHT who had successful SLT in the first treated eye were 100% at 2 weeks after SLT, 92% at 6 months, and 83% at 12 to 30 months. In contrast, patients with OHT who had failed SLT in the first treated eye had lower success rates in the fellow eye of 67% at 2 weeks to 12 months and 33% at 18 to 30 months.

### POAG COHORT

As summarized in Table 2, the success rates in the fellow eye of patients with POAG who had successful SLT in the first treated eye were 88% to 100% at 2 weeks to 9 months after SLT and 75% to 81% at 12 to 30 months. Patients with POAG who had failed SLT in the first treated eye had lower success rates in the fellow eye.

We performed Pearson product moment correlation analysis between the percentage of IOP reduction in the first treated eye and the percentage of IOP reduction in the fellow eye. Comparison of the percentage IOP reductions in the first treated eye at 2 weeks vs at 3 months showed that the 3-month percentage of IOP reduction in the first treated eye correlated better with the percentage of IOP reduction in the fellow eye in response to SLT. The explanation for this finding may be that the maximum IOP-lowering effect of SLT takes 2 to 8 weeks.
COMMENT

A review of the literature indicated that SLT is a viable option as primary or adjuvant treatment for patients with OHT, POAG, or pseudoxfoliation glaucoma. Selective laser trabeculoplasty is not only as effective as medical therapy but also a more economical treatment option. Johnson et al observed that the 2-week follow-up visit results after SLT predicted findings at the 4-week and 3-month visits in the same eye if the 2-week visit had recorded a decrease in IOP. Studies have shown that the baseline IOP is predictive of successful SLT. Selective laser trabeculoplasty lowers IOP not only in the treated eye but also in the untreated eye.

Our study shows that among patients with OHT, the 3-month percentage of IOP reduction in the first treated eye in response to SLT was predictive of response in the fellow eye up to the 30-month visit. This is reflected by correlations of the IOP in the first SLT-treated eye at the 3-month visit with IOPs in the fellow eye at 3 months after SLT (r = 0.886) and at 30 months after SLT (r = 0.804).

Similarly, among patients with POAG, the 3-month percentage of IOP reduction in the first treated eye in response to SLT was predictive of response in the fellow eye up to the 9-month visit. This is reflected by correlations of the IOP in the first SLT-treated eye at the 3-month visit with IOPs in the fellow eye months (r = 0.652) and 9 months (r = 0.367) after SLT.

An IOP-lowering effect of SLT in the contralateral eye is well known and is a confounder that cannot be completely eliminated in a study that compares the outcome of SLT in both eyes. However, we believe that such confounding in our study is minimal based on 2 published studies on the crossover IOP effect of SLT. Kirzhner et al noted that 31% of untreated eyes demonstrated greater than 20% reduction in IOP following SLT treatment of the other eye. This effect was transient, with only 18% of eyes maintaining greater than 20% reduction in IOP at the 1-year follow-up visit. Rhodes et al observed that the mean IOP reduction in the fellow untreated eye of 43 patients was 11.2% over 6 months of follow-up after SLT. In our study, we reviewed SLT outcomes over 30 months and found that SLT success in the first treated eye of patients with OHT was highly predictive of SLT success in the fellow eye up to 30 months. Based on the aforementioned studies, the crossover IOP effect of SLT is minimal beyond 12 months, which weakens the role of this factor as a confounder. In addition, the mean intervals herein between SLT of the first treated and fellow eyes were 154.9 and 150.7 days in the OHT and POAG cohorts, respectively. This allows time to attenuate the contralateral effect of SLT.

It is possible that our results are subject to selection bias if patients who had successful SLT in the first treated eye are more likely to undergo SLT in the fellow eye. However, the practice has been to perform SLT in both eyes regardless of the SLT response in the first treated eye. In addition, the success rate of SLT in the first treated eye among this sample was 70% (56 of 80 eyes), which is equivalent to or slightly lower than the success rates of SLT reported in prior publications. If patient selection bias was significant, the success rate in the first treated eye would be expected to be higher than the published rates.

In conclusion, among patients with OHT, the 3-month IOP response to SLT in the first treated eye was predictive of response in the fellow eye up to 30 months, while among patients with POAG, it was predictive of response in the fellow eye only up to 9 months. These findings suggest that the magnitude of IOP response at 3 months following SLT (ie, the percentage of IOP reduction from baseline) in the first treated eye of patients with OHT can predict long-term response to SLT in the fellow eye. However, in patients with POAG, the percentage of IOP reduction at 3 months following SLT in the first treated eye cannot predict response to SLT in the fellow eye beyond 9 months.

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Financial Disclosure: Dr Latina has financial interest in SLT technology and receives patent royalties related to it.

Abbreviations: OHT, ocular hypertension; POAG, primary open-angle glaucoma.

aStatistically significant at adjusted P < .007.

Table 3. Pearson Product Moment Correlation Between the Percentage of Intraocular Pressure Reduction in the First Treated Eye at 3 Months and That in the Fellow Eye

<table>
<thead>
<tr>
<th>Correlation at</th>
<th>OHT Cohort</th>
<th>POAG Cohort</th>
</tr>
</thead>
<tbody>
<tr>
<td>r Value</td>
<td>P Value</td>
<td>r Value</td>
</tr>
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<td>&lt; .001</td>
</tr>
<tr>
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<td>.001</td>
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</table>

Value

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REFERENCES


Archives Web Quiz Winner

Congratulations to the winner of our January quiz, Arun Lakshmanan, MS, DNB, FRCS, MRCOphth, Department of Ophthalmology, Queens Medical Centre, Nottingham, England. The correct answer to our January challenge was herpes simplex virus–associated iritis. For a complete discussion of this case, see the Research Letters section in the February *Archives* (Dastrup BT, Cantor L, Moro-thy RS, Vasconcelos-Santos D, Rao N. An unusual manifestation of herpes simplex virus–associated acute iris depigmentation and pigmentary glaucoma. *Arch Ophthalmol*. 2011;129[2]:253-254).

Be sure to visit the *Archives of Ophthalmology* Web site (http://www.archophthalmol.com) and try your hand at our Clinical Challenge Interactive Quiz. We invite visitors to make a diagnosis based on selected information from a case report or other feature scheduled to be published in the following month’s print edition of the *Archives*. The first visitor to e-mail our Web editors with the correct answer will be recognized in the print journal and on our Web site and will also be able to choose one of the following books published by AMA Press: *Clinical Eye Atlas*, *Clinical Retina*, or *Users’ Guides to the Medical Literature*.