Real-world outcomes of selective laser trabeculoplasty in a tertiary referral glaucoma service

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Introduction

- Selective laser trabeculoplasty (SLT) is an effective IOP-lowering treatment in open angle glaucoma (OAG) and ocular hypertension (OHT).
- The LiGHT trial was a landmark trial, recommending that SLT can be offered as a first-line treatment in OAG and OHT.[1]
  - In this trial of treatment-naïve patients, 74.2% of those randomised to SLT remained drop-free at 3 years.[1]
  - At 2 months following SLT, there was a mean IOP reduction of 8mmHg in OHT eyes and 6.5mmHg in OAG eyes, representing a percentage IOP reduction of 29.7% and 26.1% respectively.[1]
  - Higher baseline IOP was a predictor for a greater IOP reduction in both OAG and OHT eyes (p<0.001).[2]
- It is also important to determine the real-world outcomes of SLT, in particular as an adjunctive IOP-lowering treatment.
- Real-world studies have demonstrated significant IOP reductions with SLT, although somewhat more modest than in clinical trials.
  - A 2020 real-world study of 831 patients, 37% of whom were treatment-naïve, demonstrated a mean IOP reduction of 4.2mmHg at 12 to 18 months after SLT, from 22mmHg at baseline (p<0.0001).[3]
  - A 2022 real-world study of 835 patients, 16.1% of whom were treatment-naïve, demonstrated a mean IOP reduction of 3.6mmHg after SLT, from 18.4mmHg at baseline (p<0.001).[4]
- The purpose of this study was to evaluate the treatment outcomes of SLT as an adjunctive treatment in patients who are already using topical IOP-lowering medications.

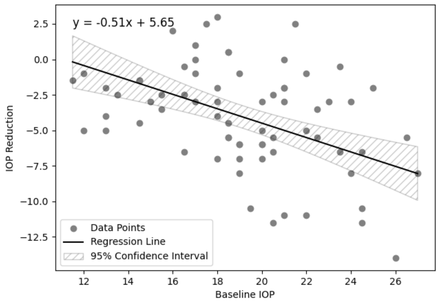
Methods

- We reviewed the medical records of consecutive patients who had undergone SLT in the glaucoma service at the Royal Victoria Eye and Ear Hospital in Dublin, between 1st August 2022 and 31st June 2023.
- All patients in this study were already using topical IOP-lowering medications prior to SLT.
- Goldmann applanation tonometry was used to obtain IOP measurements at all points in this study.
- The baseline IOP was determined using the mean of two IOP measurements prior to SLT - one at the time the decision was made, and the other on the day of attendance for SLT.
- The post-SLT IOP was measured at 6 to 8 weeks following the procedure.
- SLT procedure;[1]
  - Topical Pilocarpine 2% and Apraclonidine 0.5%.
  - 100 non-overlapping laser shots to 360º of the trabecular meshwork, using an SLT lens.
  - Laser energy (0.3mJ to 1.4mJ) titrated throughout to achieve fine "champagne bubbles" 50% of the time.
  - IOP was checked 1 hour following the procedure.
  - Topical Ketorolac 0.5% TDS for 5 days after SLT (used only if ocular discomfort symptoms)
- The primary outcome measure was the mean change in intraocular pressure (IOP) at 6 to 8 weeks following SLT.
- Pearson correlation analysis was performed to assess predictors of greater IOP reduction following SLT.
- A mixed effects model was also used, to account for interocular correlation, as both eyes of some patients were included.

Results

Baseline characteristics	n=71 eyes (44 patients)
Age, mean (years)	72.2 years
Gender	
Male	59.1%
Female	40.9%
Baseline IOP, mean (SD) (mmHg)	19.1 (3.6)
Diagnosis (% of eyes)	
Primary open angle glaucoma	69.0%
Pseudoexfoliation glaucoma	5.6%
Pigment dispersion glaucoma	2.8%
Normal tension glaucoma	5.6%
Ocular hypertension	15.5%
Pseudoexfoliation ocular hypertension	1.4%
Treatment (% of eyes)	
Topical IOP-lowering medication	100%
Prostaglandin analogue	98.6%
β-blocker	69.0%
Carbonic anhydrase inhibitor	77.5%
α-agonist	21.1%
Previous SLT	8.5%

- 71 eyes of 44 patients were included in this study.
- 100% of eyes were on topical IOP-lowering medication (mean number of agents 2.7).
- In addition, 8.5% had one previous SLT procedure.
- There was a mean reduction in IOP of 4.0mmHg (SD 3.6), from 19.1mmHg (SD 3.6) at baseline to 15.1mmHg (SD 4.0) at 6 to 8 weeks post-SLT (p<0.001).
- This represents a 20.9% reduction in IOP across the whole cohort.
- No immediate (<1 hour) post-SLT IOP spikes (>5mmHg) occurred in this study. In addition, no cases of post-SLT anterior chamber inflammation were identified.
- Pearson correlation analysis revealed a moderate correlation between higher baseline IOP and greater IOP reduction(r=-0.4021, p < 0.001).
- A mixed effects model also showed a significant correlation between higher baseline IOP and greater IOP reduction (β = -0.51, SE = 0.122, z = -4.162, p < 0.001), indicating a 0.51-unit increase in IOP reduction for each unit increase in baseline IOP.



Regression line depicting the relationship between baseline IOP and IOP reduction.

- Gender, previous SLT, lower number of IOP-lowering agents, and the presence of pseudoexfoliation did not demonstrate a significant correlation with IOP change.

Conclusion

- This real-world study supports the use of SLT as an adjunctive treatment in patients with open-angle glaucoma and ocular hypertension, who are already using IOP-lowering topical medication.
- As expected, there is a more modest IOP reduction when compared to clinical trials of treatment-naïve patients.
- We found a significant correlation between higher baseline IOP and a greater IOP reduction.

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