RJNMSR
Review Journal of Neurological & Medical Sciences Review
Volume 4, Issue 1, 2026

SELECTIVE LASER TRABECULOPLASTY OUTCOMES IN A REAL-WORLD UK NATIONAL HEALTH SERVICE COHORT

Muhammad Ihtisham[*1], Mustafeez Qaiser[1], Abdel Daoud[2], Imad Zakieh[3]

[*1]*Designation: Specialty Doctor Ophthalmology, Stockport NHS Foundation Trust*
[1]*Designation: Senior House Officer, Department of Psychiatry, St. Fintans Hospital Portlaoise*
[2]*Specialty Doctor Ophthalmology Stockport NHS Foundation Trust*
[3]*Designation: Consultant Ophthalmology, Department of Ophthalmology Stockport NHS Foundation Trust*

[*1]mihtisham123@gmail.com

Corresponding Author: *
Muhammad Ihtisham
DOI: https://doi.org/10.5281/zenodo.18357917

Received	Accepted	Published
18 November 2025	25 December 2025	14 January 2026

ABSTRACT
Background: *Selective laser trabeculoplasty (SLT) is an established intervention to reduce intraocular pressure (IOP) in ocular hypertension and open-angle glaucoma. In addition to randomized trial evidence, routine-service outcome reporting helps departments understand real-world performance and variability of response.*
Methods: *We conducted a retrospective observational analysis of consecutive eyes undergoing SLT in a UK National Health Service (NHS) glaucoma service. Eyes were included if baseline (pre-treatment) IOP and the first available post-treatment follow-up IOP were documented. The primary outcome was change in IOP from baseline to first follow-up. Absolute IOP reduction was calculated as baseline IOP minus follow-up IOP, and percentage IOP reduction as absolute reduction divided by baseline IOP multiplied by 100. The analysis evaluated overall outcomes and was not designed for glaucoma subtype comparisons.*
Results: *A total of 117 eyes met inclusion criteria. Mean baseline IOP was 21.0 ± 5.2 mmHg, reducing to 15.5 ± 6.4 mmHg at first follow-up. Mean absolute IOP reduction was 5.5 mmHg, corresponding to a mean percentage reduction of 24.9%. The baseline-versus-follow-up scatter plot demonstrated that most eyes lay below the line of equality, indicating IOP reduction after SLT in the majority of treated eyes.*
Conclusions: *In a real-world NHS cohort, SLT achieved a clinically meaningful reduction in IOP at first follow-up. The magnitude of IOP lowering is consistent with published evidence, supporting SLT as an effective option within routine glaucoma care pathways.*
Keywords: *selective laser trabeculoplasty; glaucoma; ocular hypertension; intraocular pressure; National Health Service*

INTRODUCTION
Glaucoma is a major cause of irreversible visual impairment worldwide, and its prevalence is projected to increase as populations age.1 Lowering intraocular pressure (IOP) remains the principal modifiable strategy to reduce the risk of glaucoma progression and associated visual loss.2
Topical IOP-lowering medications have traditionally been used as first-line therapy for ocular hypertension and open-angle glaucoma. In routine practice, long-term adherence is often suboptimal because of ocular surface side effects, treatment burden, and difficulties with correct instillation technique. Observational studies have linked poorer adherence and poor drop technique with worse clinical outcomes, including more severe visual field defects.3
Selective laser trabeculoplasty (SLT) was developed to lower IOP by enhancing trabecular outflow

while minimizing collateral thermal damage compared with earlier argon laser trabeculoplasty. SLT uses a frequency-doubled 532-nm Q-switched Nd:YAG laser to selectively target pigmented trabecular meshwork cells (selective photothermolysis), triggering biologic responses that improve aqueous outflow facility.4

Across randomized trials and prospective observational studies, SLT commonly produces clinically meaningful IOP reductions (often in the range of 20% to 30%), both as initial therapy and as an adjunct to topical medications.5-7 The Laser in Glaucoma and Ocular Hypertension (LiGHT) randomized controlled trial demonstrated that an SLT-first pathway can provide effective IOP control with reduced reliance on topical medications and favorable cost-effectiveness compared with medication-first strategies, with sustained clinical effectiveness at longer-term follow-up.8,9

Because real-world clinical cohorts and follow-up practices differ from trial settings, local outcome reporting remains valuable for service planning, patient counseling, and benchmarking. This study reports short-term IOP outcomes after SLT in a consecutive cohort treated within a UK NHS glaucoma service, reflecting routine clinical practice.

MATERIALS AND METHODS

This retrospective observational study conducted within a UK NHS ophthalmology department providing secondary care glaucoma services. The analysis was undertaken as a service evaluation of IOP outcomes after SLT delivered as part of routine care.

Consecutive eyes undergoing SLT during the study period were eligible for inclusion. Eyes were included if baseline (pre-treatment) IOP and the first available post-treatment follow-up IOP were available in the clinical record. Eyes with missing IOP at either time point were excluded from the analytic cohort.

SLT was performed for glaucoma-related indications (for example ocular hypertension and open-angle glaucoma) based on clinician assessment and standard service pathways. This study evaluated overall outcomes in a heterogeneous service population; it was not designed to compare outcomes between glaucoma subtypes, disease severities, or medication strata.

SLT was delivered using a frequency-doubled 532-nm Q-switched Nd:YAG laser according to standard departmental technique. Treatment was applied to the trabecular meshwork (typically 360 degrees). Energy was titrated by the treating clinician to achieve an appropriate tissue endpoint. Peri-procedural practice (including topical anesthesia and any immediate post-procedure drops if indicated) followed local standards of care.

The primary outcome was change in IOP from baseline to first follow-up. Absolute IOP reduction was calculated as baseline IOP minus follow-up IOP. Percentage IOP reduction was calculated as (baseline IOP x follow-up IOP) / baseline IOP × 100.

Analysis was performed through SPSS version 27. Descriptive statistics are presented as mean ± standard deviation. The work was framed as a service evaluation; no hypothesis testing or subgroup comparisons were pre-specified. The analysis used anonymized retrospective clinical data and did not alter patient care. The work followed local governance processes for audit/service evaluation activities.

RESULTS

A total of 117 eyes met inclusion criteria and were analyzed. Mean baseline IOP was 21.0 ± 5.2 mmHg. Mean IOP at first follow-up after SLT was 15.5 ± 6.4 mmHg, corresponding to a mean absolute IOP reduction of 5.5 mmHg and a mean percentage reduction of 24.9%.

Figure 1 displays baseline versus first follow-up IOP for all eyes. The diagonal line represents no change. Most points lie below the line of equality, demonstrating an overall tendency toward lower IOP after SLT. A smaller number of eyes lie on or above the line, reflecting expected variability of response in routine practice.

Table 1: Baseline and Clinical Characteristics

Outcome	Value
Number of eyes	117
Baseline IOP (mmHg), mean ± SD	21.0 ± 5.2
First follow-up IOP (mmHg), mean ± SD	15.5 ± 6.4
Absolute IOP reduction (mmHg), mean	5.5
Percentage IOP reduction (%), mean	24.9

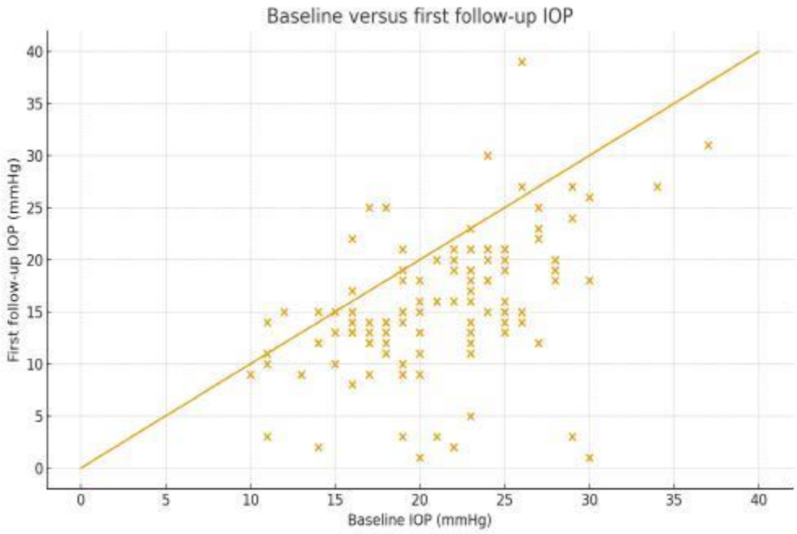

Figure 1. Scatter plot of baseline versus first follow-up intraocular pressure (IOP) after selective laser trabeculoplasty (SLT). The diagonal line represents no change; most points lie below the line, indicating IOP reduction after treatment.

DISCUSSION

In this real-world NHS cohort, SLT was associated with a clinically meaningful reduction in IOP at first follow-up, with an average reduction of approximately one quarter of baseline IOP. This magnitude is broadly consistent with prior randomized and prospective observational studies reporting clinically relevant IOP lowering following SLT [8].

The observed effect aligns with evidence supporting SLT as an early treatment option. The LiGHT trial demonstrated that an SLT-first pathway can provide effective IOP control with reduced need for topical therapy and favorable cost-effectiveness compared with medication-first care, with sustained clinical effectiveness at 6 years [8,9]. Contemporary clinical guidance has increasingly incorporated SLT as an initial treatment option for eligible patients with ocular hypertension or chronic open-angle glaucoma [10].

A practical advantage of SLT is the potential to reduce long-term dependence on topical drops. In routine care, adherence and correct instillation technique can be challenging, and poor adherence has been associated with worse outcomes in observational datasets [3]. For patients with ocular surface symptoms, high drop burden, or barriers to adherence, SLT can offer IOP lowering that is less reliant on daily patient behavior.

The scatter plot demonstrates expected variability in response. Variability may be influenced by baseline IOP, concurrent topical therapy, trabecular meshwork pigmentation, and the timing of follow-up. Recognizing this heterogeneity is important for counseling: some eyes will require escalation after SLT, while others may achieve sufficient control to reduce medication burden where clinically appropriate.

Durability and repeatability are clinically relevant because SLT effects may diminish over time. Repeat SLT has been evaluated in retrospective series and trial-based analyses, suggesting that repeat treatment can achieve further IOP lowering in selected patients and may be incorporated into stepwise escalation strategies [11-14]. Our study focused on the first follow-up outcome and did not evaluate durability or repeat SLT; future service analyses could examine longer-term trajectories, predictors of response, and downstream outcomes such as medication changes or need for surgery.

LIMITATIONS

This study has limitations inherent to retrospective observational analyses. Follow-up was limited to the first documented post-treatment visit; therefore, durability of IOP reduction, repeat SLT, medication changes, and glaucoma progression outcomes (for example visual field change) were not assessed.

The cohort reflects routine clinical practice and is heterogeneous with respect to indication and co-existing therapy. The work was not designed or powered to compare outcomes between glaucoma subtypes, disease severities, or medication strata. Consequently, no diagnosis-specific inference should be drawn from these results.

IOP measurements in routine care are subject to physiological fluctuation and measurement variability. In addition, the timing of the first follow-up visit may vary in real-world pathways, which can influence the observed magnitude of IOP change.

CONCLUSIONS

Selective laser trabeculoplasty produced a clinically meaningful reduction in intraocular pressure at first follow-up in a real-world UK NHS cohort. The observed IOP reduction is consistent with prior randomized trial and observational evidence and supports SLT as an effective treatment option within routine glaucoma care pathways.

REFERENCES

Tham YC, Li X, Wong TY, Quigley HA, Aung T, Cheng CY. Global prevalence of glaucoma and projections of glaucoma burden through 2040. Ophthalmology. 2014;121(11):2081-2090.

Heijl A, Leske MC, Bengtsson B, Hyman L, Hussein M. Reduction of intraocular pressure and glaucoma progression: results from the Early Manifest Glaucoma Trial. Arch Ophthalmol. 2002;120(10):1268-1279.

Sleath B, Blalock S, Covert D, Stone JL, Skinner AC, Muir K, Robin AL. The relationship between glaucoma medication adherence, eye drop technique, and visual field defect severity. Ophthalmology. 2011;118(12):2398-2402.

Latina MA, Park C. Selective targeting of trabecular meshwork cells. Exp Eye Res. 1995;60(4):359-371.

McIlraith I, Strasfeld M, Colev G, Hutnik CM. Selective laser trabeculoplasty as initial and adjunctive treatment for open-angle glaucoma. J Glaucoma. 2006;15(2):124-130.

Nagar M, Ogunyomade A, O'Brart DP, Howes F, Marshall J. A randomized, prospective study comparing selective laser trabeculoplasty with argon laser trabeculoplasty in patients with open-angle glaucoma. Br J Ophthalmol. 2005;89(11):1413-1417.

Katz LJ, Steinmann WC, Kabir A, et al. Selective laser trabeculoplasty versus medical therapy as initial treatment of glaucoma: a prospective, randomized trial. J Glaucoma. 2012;21(7):460-468.

Gazzard G, Konstantakopoulou E, Garway-Heath D, et al. Selective laser trabeculoplasty versus eye drops for first-line treatment of glaucoma and ocular hypertension (LiGHT): a randomised controlled trial. Lancet. 2019;393(10180):1505-1516.

Gazzard G, Konstantakopoulou E, Garway-Heath D, et al. Laser in Glaucoma and Ocular Hypertension (LiGHT) Trial: Six-Year Results of Primary Selective Laser Trabeculoplasty versus Eye Drops for the Treatment of Glaucoma and Ocular Hypertension. Ophthalmology.
2023;130(2):139-151.
doi:10.1016/j.ophtha.2022.09.009.

National Institute for Health and Care Excellence (NICE). Glaucoma: diagnosis and management (NG81). First published 2017; evidence review updated 2022. Available at: nice.org.uk/guidance/ng81 (accessed 2026-01-05).

Hong BK, Winer JC, Martone JF, Wand M, Altman B, Shields MB. Repeat selective laser trabeculoplasty. J Glaucoma. 2009;18(3):180-183.

Khouri AS, Lari HB, Berezina TL, et al. Long-term efficacy of repeat selective laser trabeculoplasty. J Ophthalmic Vis Res. 2014;9(4):444-448.

Garg A, Vickerstaff V, Nathwani N, et al. Efficacy of repeat selective laser trabeculoplasty in medication-naive open-angle glaucoma and ocular hypertension during the LiGHT trial. Ophthalmology. 2020;127(4):467-476.

Wong MO, Lee JW, Choy BN, Chan JC, Lai JS. Systematic review and meta-analysis on the efficacy of selective laser trabeculoplasty in open-angle glaucoma. Surv Ophthalmol. 2015;60(1):36-50.