MAR Ophthalmology and Ocular Therapeutics (2024) 7:4

Research Article

Safety and Efficacy of Selective Laser Trabeculoplasty among Ethiopian Open-Angle Glaucoma and Ocular Hypertension Patients

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Received: 02 July 2024

Published: 17 Aug 2024

Abstract:

Objectives*: To assess efficacy of SLT in terms of mean baseline IOP reduction and safety of SLT among Ethiopian patients.*

Methods: *A prospective Cohort Hospital based study conducted at SPHMMC in Addis Ababa, Ethiopia. The study included consecutive patients aged 40 years or older diagnosed with POAG, PXG, or OHT and had an IOP ranging from 21 to 33 mmHg. Each patient had a six-month follow-up after Laser Procedure. Successful SLT define as ≥ 20% reduction in IOP or a decrease in the number of glaucoma medication ≥ 1 and IOP spike define as ≥ 6 mmHg increase from baseline at first hour of Post-SLT.*

Results: *Study included 95 eyes of 95 patients with 92 completed 6-month follow-up. POAG account for 45, OHT for 26, and PXG for 21 cases. Baseline mean IOP was 25.06±2.62 mmHg, and the mean number of medications was 1.109±0.94. After 6 months, the mean IOP reduced by 7.96±3.0 mmHg (31.63%), and the mean number of medications by 0.14±0.5. 81 patients (88.04%) experienced successful treatment. Patients reported transient ocular pain, brow ache, photophobia, and/or blurring of vision after undergoing the laser procedure. AC reaction of grade 0.5 or above was observed in 73 (80.6%) patients and 17 eyes (18.5%) experienced an IOP spike but no patient requires medical intervention.*

Conclusion: *SLT effectively reduced mean baseline IOP and Mean antiglaucoma medication among Ethiopian patient with minimal and transient complication*

Background

Glaucoma refers to a collection of diseases marked by a gradual loss of retinal ganglion cells, leading to alterations in the optic nerve head and visual field defects [(1).] The loss of these ganglion cells is primarily associated with IOP, although other factors may contribute as well. Intraocular pressure is found to be the only modifiable risk factor identified and lowering the IOP is associated with lesser progression of the disease. There are multiple ways to lower intraocular pressure, which include medical, surgical, and laser therapies.

Laser trabeculoplasty is a specific technique that involves using laser energy on the trabecular meshwork, targeting specific areas. Typically, the treatment covers the entire 360-degree circumference with the aim of improving the flow of fluid out of the eye, consequently reducing IOP

Laser trabeculoplasty (LT) is a treatment option for open-angle glaucoma and pseudoexfoliative glaucoma that has the potential to reduce intraocular pressure without causing systemic side effects. Instead of relying on medication, LT uses various laser wavelengths and delivery systems such as argon laser, diode laser, and Q-switched Nd: YAG laser. The specific energy of the frequency-doubled Q-switched Nd: YAG laser used in SLT can effectively target and treat the trabecular meshwork, offering an alternative primary therapy for patients who cannot tolerate or comply with initial medical treatments. Latina and Park introduced selective laser trabeculoplasty in 1995 as an alternative to argon laser trabeculoplasty (ALT). SLT utilizes a very short pulse duration (3 ns), which is shorter than the thermal relaxation time of melanin. This allows for selective photo thermolysis, specifically targeting the pigmented TM. SLT delivers significantly lower energy levels compared to ALT, specifically less than 1% of ALT. SLT delivers a range of 0.6 to 1.2 MJ per pulse, while ALT delivers a higher range of 40 to 70 MJ per pulse, making SLT safer laser treatment with minimal Histological scarring or coagulative damage to the trabecular meshwork (TM) or conjunctiva. This minimizes collateral damage to surrounding tissues. SLT is considered a potentially repeatable procedure, suitable for patients who have previously undergone unsuccessful SLT or ALT. Additionally, SLT does not interfere with future micro invasive angle or external filtration surgeries.

Methods and Procedure

This Study was Prospective cohort hospital-based study conducted at the Glaucoma Clinic of SPHMMC, Department of Ophthalmology, located in Addis Ababa, Ethiopia. The college is a medical institution affiliated with a tertiary hospital, and it serves a population of over 5 million people. All patients who fulfill the inclusion criteria and who undergo SLT as a procedure for IOP control at SPHMMC during the study period and who can attain schedule follow up period were included to the study.

Eligibility Criteria

Inclusion criteria:

Individuals aged 40 years or older diagnosed with early to moderate primary open-angle glaucoma or early to moderate pseudoexfoliative glaucoma. Ocular Hypertension. Patients who, upon Gonioscopy examination, exhibit an open angle with visible angle structure in all four quadrants, extending up to the posterior level of

the trabecular meshwork.

Patients with intraocular pressure ranging from 21 to 33, which has been measured on at least two occasions prior to selective laser trabeculoplasty, either with or without prior medical therapy.

Exclusion Criteria

Individuals with congenital, juvenile, inflammatory, pigment dispersion, traumatic, neovascular glaucoma, or ICE syndrome. Those with corneal edema or corneal pathology that prevents accurate measurement of intraocular pressure and visualization of the anterior chamber angle structure. Patients with advanced glaucoma with VCD greater than 0.85 and visual field defects involving the central 10 degrees of vision.

Individuals with media opacity that prevents examination of the posterior segment, cataracts requiring surgery, vitreous opacity, or vitreous hemorrhage.

Individuals with evidence of mental impairment that hinders their understanding of the study protocol or their ability to provide informed consent.

Patients who are unable to attend scheduled follow-up visits.

Individuals who have undergone any form of surgical glaucoma treatment in the past including LASER

Individuals who are pseudophakic or aphakic.

All patients who met the inclusion criteria were selected for enrollment. The purpose of the study was explained to them in their native language, with the help of an efficient translator, and they provided informed consent by signing a written document. In cases where both eyes of a patient were eligible, one eye was chosen for participation based on the patient's preference. Information regarding the patients' socio-demographic and clinical background, such as age, gender, medical history, and details about the type and duration of antiglaucoma eye drops used, was collected from patient records for all participants. The phone numbers of the patients and close family members were taken for follow-up tracking. The Snell Visual Acuity test was used to initially measure the baseline visual acuity (VA). The Goldmann Applanation Tonometry was used to measure the intraocular pressure, and the time of recording was clearly noted as a reference for future measurements. Before deciding on Selective Laser Trabeculoplasty during follow-up visits within a two-week period, two measurements of IOP were taken and averaged. This average was considered as the baseline for further assessment. To assess the status of the anterior chamber angle, a Gonioscopy examination was carried out using a Sussman Four-Mirror Gonio lens. The degree of pigmentation in the angle was assessed using the Spaeth grading system. Furthermore, after dilating the pupil with Tropicamide 1%, a fundus examination was

conducted with a 90D lens under a slit-lamp microscope to assess the retina and optic nerve head. Once written consent was obtained, the procedure was performed by a skilled glaucoma specialist at the Glaucoma Clinic. The principal investigator administered the initial and post-SLT questionnaires. To minimize the risk of post-procedural IOP spike, a single drop of Brimonidine 0.2% was applied one hour before and immediate after SLT. Topical anesthesia (Tetracaine 0.5%) was applied shortly before the procedure. The SLT laser, specifically the Ultra Q Reflex laser system emitting at 532 nm with a pulse duration of 3 nanoseconds and a spot size of 400 µm, along with a Latina SLT Gonio lens by Ocular Instruments, was used for the procedure. The energy level of the laser was adjusted until fine campaign bubbles were observed, and this energy level was utilized for subsequent spots. The treatment involved delivering single non-overlapping pulses, placing 100 continuous spots along the trabecular meshwork (360°). After undergoing the laser procedure, any complications that occurred afterward, such as brow ache, ocular pain, headache, or blurred vision, were documented. One hour following the procedure, the patient's intraocular pressure was measured, and a slit lamp examination was performed to check for signs of conjunctival injection, corneal edema, anterior chamber reaction, or hyphema. These evaluations were conducted by the principal investigator. Following the laser treatment, patients were instructed to use topical nonsteroidal anti-inflammatory drugs (NSAIDs), 0.03% Flurbiprofen Sodium, four times a day for one week. If the patients were already using glaucoma medication, they were instructed to continue their usual glaucoma drops. The principal investigator arranged the patients' follow-up appointments through telephone calls.

These appointments were scheduled at the 1-week, 2-month, and 6-month intervals following the procedure. During these visits, the patient's vision was assessed using best-corrected visual acuity, and their intraocular pressure was measured within a 2-hour window from the baseline measurement time. The patient also underwent a slit lamp examination to check for potential long-term complications such as corneal decomposition, persistent anterior chamber reaction, hyphema, and posterior synechiae. Additionally, changes in the optic nerve head were monitored through dilated fundus examination. Any patient who did not achieve the desired level of intraocular pressure during their second visit, which took place two months after undergoing SLT, had an additional two weeks of consecutive follow-up to monitor their intraocular pressure and were provided with supplementary methods. These methods included the use of antiglaucoma medication or a repeat SLT procedure, in order to effectively manage their intraocular pressure. These patients were automatically categorized as having failed SLT. Furthermore, patients who experienced a persistent spike in intraocular pressure for more than a week were monitored for two consecutive weeks to track their intraocular pressure level and anterior chamber reaction. Patients who underwent cataract extraction surgery after the SLT

procedure or those who were lost to follow-up were not included in the study group.

Data Analysis:

The data analysis involved computing different statistics like range, mean with standard deviation, frequencies (count of cases), relative frequencies (percentages), and inter-eye correlation. When appropriate, Huber regression was utilized to calculate the inter-eye correlation. A probability value (p-value) below 0.05 was considered statistically significant.

All statistical computations were performed using SPSS (Statistical Package for the Social Sciences) version 26, developed by SPSS Inc.

Operational Definition:

Ocular hypertension is when the IOP level is higher than 21mmHg, but there are no signs of optic nerve damage or visual field loss

Early glaucoma is characterized by early signs of Glaucomatous damage to the optic disc (such as vertical cup-to-disc ratio less than 0.65) and/or mild visual field defects outside the central 10 degrees of fixation.

Moderate glaucoma is defined by moderate signs of Glaucomatous damage to the optic disc (such as vertical cup-to-disc ratio between 0.7-0.85) and/or moderate visual field defects outside the central 10 degrees of fixation.

POAG is diagnosed when the anterior chamber angle appears normal on Gonioscopy, there are elevated IOP levels, and evidence of Glaucomatous damage to the optic disc without any other identifiable underlying cause.

Pseudoexfoliation glaucoma is diagnosed when white powdery deposits (PXF material) are observed on the lens capsule or at the pupillary margin during slit lamp examination, along with elevated IOP levels and Glaucomatous disc damage.

A successful selective laser trabeculoplasty treatment is defined as achieving a minimum 20% reduction in intraocular pressure levels from the initial measurement after six months of undergoing SLT. Additionally, it may also involve ≥1 medication reduction while maintaining a targeted IOP level

The failure of Selective Laser Trabeculoplasty treatment is deemed as a decrease in IOP levels below 20% from the initial measurement, or the requirement of further medications or surgical intervention to manage IOP levels subsequent to SLT.

Post-SLT IOP spike refers to an increase in IOP levels of at least 6mmHg from baseline within the first hour after undergoing SLT

Result

In the study, a total of 95 eyes from 95 patients were included. Out of these, 92 patients successfully completed a six-month follow-up period. The average age of the participants was 54.4 ± 10.3 years, ranging from 40 to 80 years old. Among the 92 patients, 85 (92.4%) were under the age of **70.** In terms of gender, there were 47 (51.01%) females and 45 (48.9%) males. The most commonly diagnosed conditions were POAG, OHT, and PXG, accounting for 45 cases (48.9%), 26 cases (28.26%), and 21 cases (22.83%), respectively This information is illustrated in Table 1. Among the individuals involved in the study, some of them had additional health conditions. Out of all the participants, 5 individuals (5.43%) were identified as having diabetes, and an equal number (5.43%) were diagnosed with systemic hypertension. Additionally, 2 individuals (2.1%) were found to have RVI. both diabetes and hypertension coexisted in 8 participants (8.69%)

Table 1: Demographic and Clinical: characteristics of patients underwent selective laser trabeculoplasty (SLT) at the glaucoma clinic of SPHMMC between January 2022 and June 2022.

Characteristic	Value
Age: Mean (SD):	54.4± 10.3 years
Gender	No (%)
Male	45(48.9)
Female	47(51.09)
Diagnosis	No (%)
POAG	45(48.9)
OHT	26(28.2)
PXg	21(22.8)

In terms of treatment, 62(67.4%) participant were already using topical antiglaucoma medication but for 30 (32.6%) patients SLT was performed as the primary therapy. Among patients who are already receiving topical glaucoma medication, 28 patients are on a single medication regimen, an equal number are on dual therapy, and 6 patients are receiving triple therapy

Pre-SLT baseline mean IOP was 25.06 ± 2.62 mmHg (range between 21 and 32 mmHg) and mean baseline antiglaucoma was 1.108 ± 0.942, with a range from zero to three. The mean vertical cup-to-disc (VCD) ratio

was measured at 0.59 ± 0.115. Lastly, the procedure on average consumed a total energy of 81.91 ± 9.1 mJ, ranging from 40 to 100 mJ as shown in Table 2

Table 2: Showing the average baseline value of patients who undergo SLT therapy at SPHMMC from January 2022 to June 2023

Clinical Feature			
Mean Baseline IOP: No (SD)	Mean Baseline Medication No (SD)	Mean Baseline VCD: No (SD)	Mean energy Used: No (SD)
25.06 ±2.62	1.1O8 ±0.942	0.59 ±0.115	81.9 ±9.1

Mean Post-SLT IOP measurements were 24.6 ± 7.6 mmHg, 20.0 ± 4.6 mmHg, 17.25 ± 3.18 mmHg, and 17.1 ± 3.01 mmHg at 1 hour, 1st week, 2nd months, and 6th months respectively. The mean decreases in IOP and the corresponding percentages during each follow-up were 5.01 mmHg (19.67%) after one week, 7.8 mmHg (31%) after two months, and 7.9 mmHg (31.6%) after six months. After six months, the average vertical cup-to-disc ratio (VCD) was measured to be 0.592 ± 0.115. The mean change in VCD was found to be 0.0054 ± 0.021, which was not considered statistically significant (p value = 0.155). Out of a total of 92 patients, 86 (93.5%) did not exhibit any changes in their VCD when observed at the end of the six-month period.

Table 3: display of mean baseline and post SLT IOP level at subsequent visit

Clinical feature				
Mean Average Baseline IOP(SD): 25.059 ± 2.62 mmHg				
	After 1st hour	After 1st week	After 2nd month	After 6th month
Mean IOP after SLT	24.6 ± 7.6	20.0 ± 4.6	17.25 ± 3.18	17.1 ± 3
Mean IOP change, No (%)		5.09 (19.6%)	7.8 (31%)	7.9 (31.6%)

From a total of 92 eyes that completed a six-month follow-up period, 80 eyes (41 males and 39 females) successfully achieved a reduction in their IOP by at least 20%. One patient experienced a reduction of IOP by 16.67% in their IOP levels and was able to decrease their reliance on glaucoma medication. This resulted in a success rate of 88.04% (81 eyes). Among these successful cases, 66.66% (54 eyes) were initially treated with medication, while 33.33% (27 eyes) received primary laser therapy. Overall, after SLT, 69 patients (75%) were able to achieve a reduction of 25% or more in their average baseline IOP by the end of the six-month period. Mean Pre-SLT IOP in men was 25.2 ± 2.74 mmHg, and had mean reduction of 7.82 ± 2.62 mmHg

(31.2%) by end of 6th month with success rate of 93.3%. In women baseline IOP of 24.94 ± 2.53 mmHg and had an average reduction of 8.09 ± 3.3 mmHg (32%) from the baseline with success rate of 82.97%. Notably, the mean reduction in IOP did not show any statistically significant difference between men and women, with a p-value of 0.711.

The mean use of antiglaucoma medications was 1.041 ± 0.93 at two months, and 0.96 ± 0.895 after six months with mean reduction by 0.06 ± 0.44, and 0.14 ± 0.546 by second and six months respectively period which is statistically significant with a p-value of 0.001.

Table 4: Mean number of antiglaucoma medications during both at baseline and at subsequent visits after SLT

Clinical feature		
Mean number of baseline anti-glaucoma medication (SD): 1.108±0.94		
	By 2nd month	By 6th month
Mean number of anti-glaucoma medication after SLT No (SD):	1.04±0.93	0.96±0.895
Mean Medication change No (SD)	0.06±0.44	0.14±0.5

Before the study, 30 patients (32.6%) were not using any glaucoma medication. In the second month, this number increased to 33 patients, which included 4 new patients and 29 individuals who had initially undergone primary SLT, making up 35.86% of the total. By the sixth month, this number further rose to 36 patients, with 7 new patients and the remaining 29 still undergoing primary SLT, accounting for 39.1% of the total. A notable correlation was observed between the number of anti-glaucoma medications initially used and the change in medication use at the six-month mark, with a p-value of 0.001. After six months, 29 out of 30 patients who had laser therapy as their first treatment for glaucoma remained medication-free.

Primary laser treatment was given for 30(33.4%) participant and had mean Pre-SLT IOP of 24.16±2.1 mmHg, by the end of six month mean IOP reduced by 8.2±2.9 mmHg (33.4%) with a success rate of 90%. On the other hand, among the 62 patients receiving adjuvant laser therapy mean baseline IOP was 25.27±2.8 mmHg with mean IOP reduction by 7.8±3 mmHg, (30.78%) with a success rate of 87%. The statistical analysis revealed no significant difference in terms of the mean change in IOP between the two groups (p-value of 0.5).

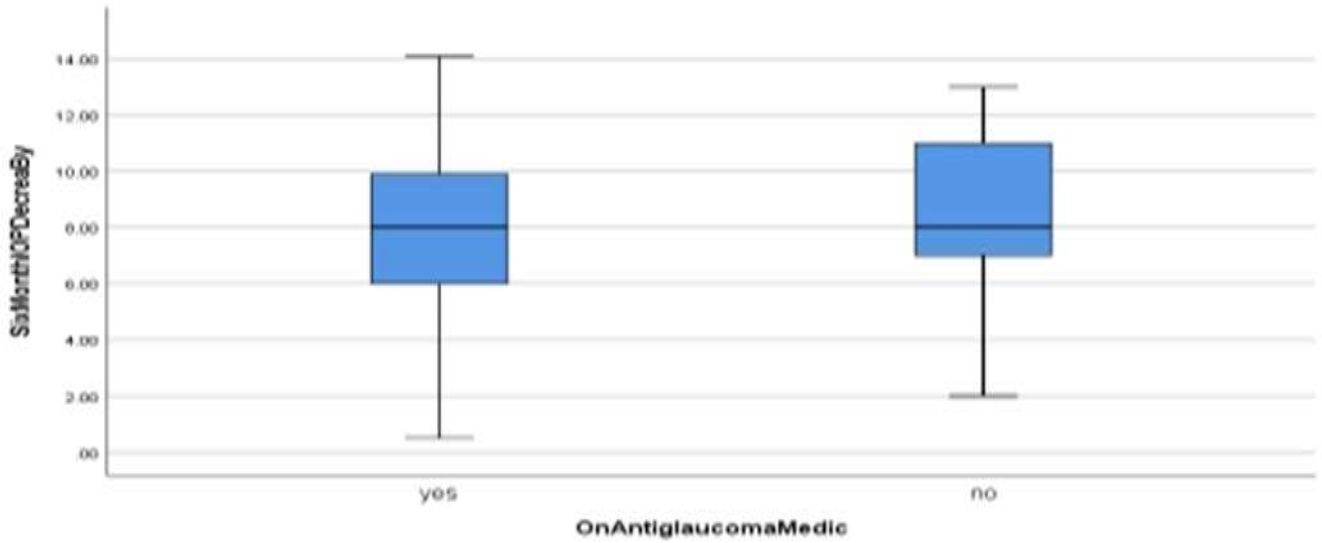

Figure 1: Box and Whisker of the comparison between primary and adjuvant laser therapy in terms of the mean reduction in IOP after six months (yes: Adjuvant SLT, No: Primary SLT)

The mean Pre-SLT IOP measurements for individuals with OHT, POAG, and PXG were: 25.7 ± 2.86, 24.59 ± 2.3, and 25.23 ± 2.8 respectively. Over a six-month period, mean reduction in IOP was 7.95 ± 3.3 (30.65%) for OHT, 7.74 ± 2.86 (31.4%) for POAG, and 8.43 ± 2.97 (33.38%) for PXG. Furthermore, although the PXG group exhibited the largest reduction in IOP, this difference did not reach statistical significance with a p-value of 0.69

In the group, 5 eyes(patients) had DM and had Pre-SLT mean IOP of 25.2±2.28 mmHg. After six months IOP reduced by 7.38±2.54 mmHg (28.9%). Similarly, 5 eyes had HTN and had a mean baseline IOP of 26.1±2 mmHg and IOP decrease by 6±2.5 mmHg (23.3%). 8 patients had both DM and HTN with mean baseline IOP of 25.87±2.4 mmHg and IOP decrease by 6.95±3.24 mmHg (26.2%). In addition, 72 patients without any known systemic illness, had mean Pre-SLT IOP of 24.9±2.73 mmHg had mean IOP reduction 8.194±3 mmHg (32.78±11.21%) by the end of six month. No significant difference in the mean IOP change between the groups, evidenced by a p-value of 0.42.

In the study 28 patients had a baseline IOP higher than 26mmHg, ranging from 26.5 to 32mmHg with mean baseline IOP of 28.28±1.68. By the end of the six-month period, their mean IOP had decreased by 9.3±3.09 (32.75% reduction). On the other hand, 64 patients had an average baseline IOP lower than 26mmHg, ranging from 21 to 26mmHg. These patients had a mean baseline IOP of 23.65±1.44. By the end of the six-month period, their mean IOP had decreased by 7.37±2.79 (a 31.15% reduction). Importantly, the statistical analysis yielded significant results, demonstrated by a p-value of 0.004

The mean energy per spot, along with its standard deviation, was 0.819 ± 0.09 mJ (ranging from 0.4 to 1mj), and the total energy used was 81.9 ± 9.18 mJ (ranging from 40 to 100mj). However, there was no statistically significant correlation observed with the six-month mean decrease in IOP, as indicated by a p-value of 0.67. This study also examined the average IOP and mean change in IOP by the end of six months in different age groups. The average IOP level for patients aged 40-50 was 24.62±2.47, while it was 25.20±3.33 for patients aged 50-60, 25.11±3.07 for patients aged 60-70, and 26.07±2.62 for patients aged 70-80. The average change in IOP by the end of the study was 8.29±2.56 (33.58%), 7.36±3.33 (29.14%), 8.18±2.82 (32.38%), and 8.10±4.19 (31.06%) respectively. The success rates were 93.1% for the age group of 40-50, 79.3% for 50-60, 92.5% for 60-70, and 85.7% for 70-80. However, despite the higher mean change in IOP and success rates in the relatively younger age group, there was no statistically significant correlation seen between age range and mean change in IOP, with a p-value of 0.950.

Immediately after undergoing SLT, individuals reported a range of symptoms, including eye pain, discomfort in the eyebrows, light sensitivity, and/or blurred vision. However, none of these symptoms were reported during the follow-up period. A follow-up examination using a slit-lamp one hour after the SLT procedure revealed that out of the total patients, 55 (59.1%) had a grade 1 reaction in the anterior chamber (AC), 12 patients (13%) had a grade 2 AC reaction, 7 patients (7.6%) had a grade 3 AC reaction, and 18 individuals (19.4%) did not display any AC reaction. There were also no signs of AC reaction seen after the first week post-SLT period. One individual developed cornea edema within the initial hour after SLT treatment, along with a post-SLT IOP of 50mmHg, but it resolved within one week without treatment. One hour after SLT, 17 eyes (18.5%) showed an increased IOP of 6mmHg or more. Two patients (2.17%) had consistently high IOP spikes that lasted over a week but spontaneously resolved in the second week. However, there were no cases of hyphema or posterior synechiae during the six-month follow-up visit, as shown in Table 12. No significant correlation was observed between the mean six-month change in IOP and the first hour post-SLT IOP, as indicated by a p-value of 0.05. However, a strong correlation was observed between the grade of post-SLT AC reaction and the change in IOP within the first hour. This correlation is supported by a p-value of 0.001

Table 5: Shows the frequency and percentage of complications observed in patients after undergoing SLT procedures

Post SLT complication	Value
Post SLT AC reaction	No (%)
Grade 1:	55 (59.1)
Grade 2:	2(13)
Grade 3:	7 (7.6)
Grade 0:	18(19.4)
Post SLT corneal edema:	1 (1.08)
1ST hour Post SLT IOP spike	17(18.5)
Post SLT IOP spike for more than a week:	2(2.1)

Discussion

In our research, we examined how effective and safe selective laser trabeculoplasty is for treating patients with ocular hypertension and different forms of open-angle glaucoma. Our patients received laser treatment as either their primary therapy or as an adjuvant therapy. We observed a significant reduction in intraocular pressure by 7.9mmHg (31.64%) and an overall success rate of 88.04% after six months of treatment.

The findings of this study suggest that the decrease in intraocular pressure observed is more favorable compared to a previous study conducted by Jibat Gemida and colleagues in Ethiopia [(10)] The previous study only reported a success rate of 60% at the end of their research, The difference in how the studies define their successful SLT therapy or the timing of reported successful results after undergoing SLT treatment as well as pseudophakic or aphakic patients were not excluded from the study could provide clarification for the variation observed. Nevertheless, our study findings align with a previous research conducted Mohamed A-M S Mahdy and colleague in Cairo, Egypt [(21)] their study demonstrated a comparable average reduction of 7.44mmHg in mean intraocular pressure. In their study, a significant 77.1% of patients achieved a mean IOP reduction of more than 25% from the baseline at the conclusion of the research. Our study's results are also comparable to a study conducted by Shlomo Melamed and colleagues in Tel Hashomer Israel [(14)]which demonstrated a mean IOP reduction of 7.7mmHg along with a success rate of 89% at the end of their study.

This study also report a comparable success rate as the study conducted in South Africa by Emil Goosen and colleagues, which demonstrated a 90% success rate among the black South African population at the 6th month and at the conclusion of the 12-month study [23]

Another similar study was conducted by Tony Realini et al in St. Lucia, focusing on patients of African descent reported comparable findings to ours, with a 93% success rate in maintaining success after 12 months. The mean change in IOP ranged from 7.3 to 8.3 mmHg (34.1%-38.8%) in right eyes and from 7.6 to 8.2 mmHg (36.0%-38.9%) in left eyes throughout the 12-month period [22]

But also, our study yielded varying success rates and mean intraocular pressure reduction compared to a study conducted by K.F. Damji at the University of Iowa in Canada. The study found that the mean IOP reduction after SLT treatment was 4.8 mmHg by the end of six months. However, this discrepancy could be attributed to several factors, including their small sample size of only 18 participants, a lower baseline IOP level of 22.8 mmHg, and the inclusion of patients who had previously undergone ALT treatment [16].

Over a period of six months, individuals with pseudoexfoliative glaucoma showed a slightly better response with an average reduction in IOP of 8.43 ± 2.97 (33.38%) and success rate of 90.4% compare to OHT and POAG group which aligns with a previous study conducted in Ethiopia [10]

Furthermore, a study conducted in Iran by Arezoo Miraftabi and colleagues investigated the effectiveness of selective laser trabeculoplasty in patients with pseudoexfoliative glaucoma compared to those with primary open angle glaucoma. They observed a mean change in IOP over a six-month period, which was higher in pseudoexfoliative glaucoma compared to primary open angle glaucoma (7.8 vs. 4.5) by the end of the six-month time-frame. Additionally, the success rate for pseudoexfoliative glaucoma was 94%, whereas it was 75% for primary open angle glaucoma [24]

This study also examined the reduction of IOP in patients with diabetes, hypertension or a combination of both. Patients without any underlying systemic illnesses demonstrated higher a reduction in IOP of (8.13±3mmHg) over a six-month period. However, no statistically significant association was found with regards to this reduction, these findings align with a previous study in Ethiopia [10]. During the latest examination, it was observed that patients with higher initial IOP experienced a greater reduction in mean IOP. 9.3 ± 3mmHg, corresponding to a 32.74% decrease. Importantly, this reduction in the latter group is statistically significant with a p-value of 0.04. These findings support previous multi center Pilot study conducted by Latina et al. [11], Jibat Gemeda et al in Ethiopia [10] and study conducted in Colombia by Matthew Hirabayashi et al [25]

This study also examined the average levels of IOP and the average change in IOP after SLT over a six-month period in various age groups. However, while higher mean IOP changes and success rates were observed in the younger age group, there was no statistically significant correlation between age range and mean IOP change. The obtained p-value was 0.950, which differs from the findings of a previous study conducted in Ethiopia [10]. In their study, a significant correlation was found between the age of patients and a 20% reduction in IOP at the 12-month follow-up. This disparity in findings may be attributed to the fact that our study had relatively lower mean baseline IOP levels in the younger age group compared to other age ranges, as well as a different follow-up period after SLT. We also found a consistent decrease in the average usage of antiglaucoma medications over time. Initially, the average was 1.108±0.94, but after six months, it decreased to 0.96±0.91, a statistically significant reduction with a p-value of 0.001. Similar findings were also observed in the studies conducted in Egypt [21] and in Ethiopia [10]

During our analysis, it was observed that a majority of patients (80.6%) experienced varying levels of anterior chamber reaction after undergoing selective laser trabeculoplasty. This finding aligns with a previous multi-center study conducted by Latina et al. [11] and a review of SLT complication done by Julia Song et al.[26] In which they reported that 89% and 83% of patients respectively exhibited some degree of anterior chamber reaction. However, a significantly higher number of patients developed anterior chamber reaction compared to a study conducted in Ethiopia [10] which reported a rate of 38.6% this variance could be attributed to differences in the energy range utilized or variances in patient angle pigmentation. Different rates of ocular discomfort were reported in previous studies conducted by Latina et al [11]and study done in England by Nagar et al. [27]. 15% and 39% respectively. In contrast, all of our patients experienced some form of ocular discomfort, such as photophobia, ocular pain, headache, and/or blurred vision. The disparities in these findings can be attributed to the fact that the aforementioned studies utilized questionnaires administered one hour after SLT procedure, whereas our study examined the immediate post-SLT period. We observed that 17 eyes (18.5%) in our study exhibited spikes in IOP of ≥6 mmHg one hour after SLT. This finding is comparable with the results obtained by Latina et al [11]. Although it is slightly higher than the results conducted in Ethiopia [10] possibly due to their consistent use of Pilocarpine 2% eye drops before the laser procedure beside 0.2% brimonidine

Recommendation: Given the uncertainty surrounding the availability and affordability of eye drops in this region, SLT still presents itself as a viable treatment option for 8/17/2024Ethiopian OHT and mild to moderate Open-Angle glaucoma patients above the age of 40.

Data Availability:

Data used to support the findings of the study are available from the corresponding author.

Conflicts of Interest:

Authors declare that there are no conflicts of interest.

Authors' Contributions

Dr. Matiyas involved in selecting the research article, preparing proposal, select patients for enrollment and post procedural follow up and data entry. And also interpret the data, drafted and wrote the article.

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