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Subsequent Receipt of Interventions for Glaucoma Among a Nationwide Sample of Patients Who Underwent Laser Peripheral Iridotomy

Surbhi Bansal¹, S. Asha Balakrishnan¹, Taylor Blachley¹, Jennifer S. Weizer¹, Paul P. Lee^{1,2}, and Joshua D. Stein^{1,2}

¹Department of Ophthalmology and Visual Sciences, University of Michigan Medical School, Ann Arbor, MI

²Institute for Health Policy and Innovation, University of Michigan, Ann Arbor, MI

Abstract

Purpose—To evaluate use of medical, laser, or incisional surgical interventions for glaucoma after laser peripheral iridotomy (LPI).

Design—Retrospective longitudinal cohort study.

Methods—All enrollees aged ≥ 21 years in a U.S. managed-care network who underwent bilateral LPIs in 2001–2011 were identified. The mean numbers of pre- and post-LPI glaucoma medication classes prescribed and the proportion of enrollees requiring cataract or glaucoma surgery within 2 years after the LPIs were determined. Multivariable logistic regression assessed factors associated with enrollees' prescription of ≥ 1 glaucoma medication class after bilateral LPIs.

Results—Of the 1660 patients undergoing bilateral LPIs, 1280 (77.1%) had no pre- or post-LPI prescriptions for any glaucoma medication class. Of the remaining patients, 251 (66.1%) required more glaucoma-medication classes after than before the procedures, whereas 44 (11.6%) used fewer after the procedures; 85 (22.4%) were prescribed the same number before and after the

Corresponding Author: Joshua D. Stein, MD, MS, University of Michigan, Department of Ophthalmology and Visual Sciences, Director, Center for Eye Policy and Innovation, W.K. Kellogg Eye Center, 1000 Wall Street, Ann Arbor, MI 48105, jdstein@med.umich.edu, Phone: 734-763-7246, Fax: 734-232-8181.

Surbhi Bansal presently is an Assistant Professor in the Department of Ophthalmology at Virginia Commonwealth University Medical Center in Richmond, VA. S. Asha Balakrishnan is presently an Assistant Professor at the University of Louisville Department of Ophthalmology, Louisville, KY

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LPIs. 167 patients (10.1%) underwent cataract surgery and 79 (4.8%) received glaucoma surgery over the 2-year follow-up. Black patients had a 130% increased odds for glaucoma-medication-class prescriptions after bilateral LPIs, compared with whites ($p=0.02$). The odds of post-LPI glaucoma-medication use increased by 21% for every additional 5 years of age ($p<0.0001$).

Conclusion—Most patients undergoing bilateral LPIs received no pre- or post-LPI glaucoma-medication-class prescriptions and had no cataract or additional glaucoma surgery within 2 years after LPIs. Clinicians should alert black or older patients, and those already taking glaucoma medications before the procedure of their higher odds of requiring medications afterward.

INTRODUCTION

Anatomically narrow- or closed-angle entities are defined by a spectrum of findings including iridotrabecular meshwork contact, trabecular meshwork dysfunction, and occasionally elevated intraocular pressure (IOP).¹ Most eyes with angle closure possess a component of relative pupillary block² with increased iridolenticular resistance to aqueous movement from its site of production in the posterior chamber to its site of egress at the anterior chamber angle. A laser peripheral iridotomy (LPI) often successfully eliminates the relative pupillary block component of the angle-closure process.² Creation of the LPI allows aqueous to flow more freely from the posterior chamber to the anterior chamber with a change in the iris configuration such that it often opens up the angle. LPI is also recommended as prophylactic treatment for primary angle-closure suspects (PACS) or patients with occludable angles.³

Most studies of patients undergoing LPIs have focused on the impact of the procedure on IOP and anatomic outcomes (i.e. ultrasound biomicroscopy, anterior chamber optical coherence tomography, gonioscopic findings) such as changes in anterior chamber depth, changes in angle appearance, and progression to angle closure.^{4–18} A few small studies have described the incidence of progression of persons considered PACS to primary angle closure (PAC) or primary angle closure glaucoma (PACG) after LPI, recurrence of angle closure due to plateau iris syndrome, lens relocation, or ciliary block^{19–20}, or complications of LPI such as corneal damage.^{21–24} However, little is known about the need for additional interventions for glaucoma following LPI, such as IOP-lowering medications, cataract extraction, or laser or incisional glaucoma surgery; or if there are factors that increase or decrease the probability of requiring additional interventions following LPIs. Such information is important for clinicians to adequately advise patients what to expect after the procedure. Using data from a large managed care network, we identified 1660 patients who underwent bilateral LPIs and followed them continuously for 2 years to determine the need for medical, laser, or incisional glaucoma surgery following the iridotomies.

METHODS

Data Source

The Clinformatics Data Mart database (OptumInsight) contains detailed claims data of all beneficiaries in a nationwide U.S. managed care network. The dataset contains healthcare claims data for all individuals with 1 International Classification of Diseases, 9th Revision,

Clinical Modification (ICD-9-CM)²⁵ codes for eye-related diagnoses (360–379.9); 1 Current Procedural Terminology²⁶ codes for any eye-related visits, diagnostic, or therapeutic procedures (65091–68899 or 92002–92499); or any other claim submitted by an ophthalmologist or optometrist from 2001–2011. For each enrollee, we had access to all medical claims for ocular and non-ocular conditions and sociodemographic information, including age, sex, race, education level, and income.

The database also captures information on all outpatient medications filled. All persons in the medical plan were also fully enrolled in the pharmacy plan. The database has been used in the past to study patients with glaucoma.^{27–29} Since all the data for these analyses were de-identified to the investigators, the University of Michigan Institutional Review Board approved this retrospective longitudinal cohort study as a non-regulated study.

Participants and Sample Selection

Individuals were included in the analysis if they met the following criteria: age ≥ 21 years, continuous enrollment in the medical plan, and the receipt of bilateral LPIs (CPT code 66761) within a 3 month period. Eligible enrollees were also required to have ≥ 2 years in the plan prior the first LPI and ≥ 2 years in the plan after the second LPI. (Supplemental Figure #1 at AJO.com)

Individuals were excluded if they had any record of cataract surgery or laser or incisional glaucoma surgery during their time in the plan prior to the LPIs. Also excluded were those with non-continuous enrollment and those who did not undergo bilateral LPIs within a 3 month time frame. Because this data source does not reliably capture the laterality of the eye undergoing the LPI, we limited our study to those undergoing this procedure on 2 separate occasions within a 3 month period so that if either or both eyes required subsequent medical or surgical interventions for glaucoma, we would know with greater certainty the interventions were performed on at least one eye which had undergone LPI surgery. Since this study's focus was on the effectiveness of LPI, we did not consider enrollees who underwent surgical iridectomy.

Reason for the Laser Peripheral Iridotomy

To attempt to understand the reason why each enrollee underwent LPI, we queried the database to determine the primary ICD-9-CM diagnosis code listed on the encounter when the initial LPI was performed for each patient.

Outcomes

In the two years following the second LPI, we assessed the proportion of enrollees who were prescribed glaucoma medications or underwent cataract or glaucoma surgery. Eight medication classes were identified: topical beta-blockers, alpha-agonists, prostaglandin analogues, topical carbonic anhydrase inhibitors, oral carbonic anhydrase inhibitors, miotics, adrenergics, and combination medications. We quantified the number of medication classes ever prescribed for a given patient during the time period of interest. For example, during the two-year period prior to first LPI, if a patient was taking a prostaglandin analogue for 6

months followed by a topical beta-blocker for 3 months, we considered him/her to have taken two medication classes during that period.

Likewise, if she took both medications simultaneously during the two-year interval, she would also be considered to have taken two classes. Patients taking a fixed combination were treated as taking each individual component. Similar quantification of medication use was done for the 2 year interval after the LPs. The following surgeries were also considered: cataract surgery, laser glaucoma surgery (iridoplasty, laser trabeculoplasty), or incisional glaucoma surgery (trabeculectomy, glaucoma drainage device). (Supplemental Table #1 at [AJO.com](#))

Analyses

Statistical analyses were performed using SAS software, version 9.3 (SAS Institute, Cary, NC). Participant characteristics were summarized for the entire sample using mean values and standard deviations for continuous variables and frequencies and percentages for categorical variables. We determined the proportion of enrollees who were prescribed IOP-lowering medications and the number of agents prescribed in the 6, 12, and 24 months prior to bilateral LPI and during the 6, 12, and 24 months after the LPs. Since glaucoma medication use can fluctuate due to addition, substitution, or discontinuation of medications, to help simplify the quantification of medication use prior to and after the LPs, we looked at the number of glaucoma medication classes each enrollee was prescribed on the specific date corresponding to 6, 12, and 24 months prior to the initial LPI and 6, 12, and 24 months afterwards and determined means for each time point. The proportion of enrollees who required cataract extraction or laser or incisional glaucoma surgery following bilateral LPI was also captured, along with the timing of these procedures relative to the LPs. In order to explore the rate of complications such as aqueous misdirection or corneal decompensation after LPI, we also assessed the proportion of patients who underwent vitrectomy or keratoplasty after the bilateral LPs. A sub-analysis was performed to determine whether receipt of cataract and glaucoma surgery following LPI varied by race. If a patient underwent more than 1 of these surgeries, only the first was considered. Only 15 patients (0.9%) underwent more than 1 of these surgeries within 2 years following bilateral LPs. If a patient underwent a combined cataract and glaucoma surgery on the same day, both were captured.

Multivariable logistic regression was performed to assess the impact of sociodemographic characteristics of the patients and other factors on the odds of receiving IOP-lowering medication after bilateral LPI. Covariates included in the model were maximum number of glaucoma medication classes prescribed in the 2 years prior to the initial LPI, primary diagnosis on the date of the initial LPI, age, sex, race, education, income, and Charlson Comorbidity Index, a measure of overall health.³⁰ Model covariates were determined to be non-collinear by checking correlation coefficients.

RESULTS

A total of 1,660 beneficiaries met the inclusion criteria. (Figure 1) The mean $\pm$ standard deviation age of the beneficiaries at enrollment was 56.9 ± 11.2 years. There were 1,142

females (68.8%) and the racial distribution included 1,244 whites (82.3%), 50 blacks (3.3%), 122 Latinos (8.1%), 75 Asian Americans (5.0%), and 20 individuals of other races (1.3%). There were 1,065 patients (65.8%) who had higher than high school level education and 390 patients (24.7%) had incomes >\$100,000. (Table 1) A total of 1,373 persons (82.7%) underwent gonioscopy (CPT code 92020) at least once while in the plan. The primary diagnosis listed on the date of the initial LPI was most commonly anatomical narrow angle (n= 955, 47.9%), followed by PACG (n=300, 15.1%) and chronic angle-closure glaucoma (CACG), (n=220, 11.0%). Some patients saw more than one eye provider on the date of the initial LPI and may have received different diagnoses by the different providers so the total number of diagnoses adds up to more than 1,660. (Supplemental Table #2 at AJO.com)

Classes of Glaucoma Medications Prescribed Before and After Bilateral LPIs

Of the 1,660 enrollees who underwent bilateral LPIs, 1,280 (77.1%) had no record of any classes of glaucoma medications prescribed before or after the LPIs and 380 (22.9%) required glaucoma medications either before and/or after the procedure. Thirty (1.8%) were prescribed 1 medication class before the first LPI, but were not prescribed glaucoma medications after the second LPI; 205 (12.3%) did not use any classes of glaucoma medications prior to the first LPI, but were prescribed 1 glaucoma medication class after the second LPI and 145 (8.7%) were prescribed medications both before the first and after the second LPI. Among the 380 patients taking 1 classes of glaucoma medications either before and/or after the LPIs, 251 (66.1%) required more glaucoma medication classes after the LPIs, 85 (22.4%) required the same number of medication classes before and after, while 44 (11.6%) required fewer glaucoma medication classes following the LPIs. Among those on IOP-lowering medication prior to LPI, 30 patients (17.1%) were not prescribed any classes of glaucoma medication post-LPI and 145 patients (82.9%) were prescribed 1 glaucoma medication class post-LPI. Table 2 shows the proportion of patients taking medications at 6,12, and 24 months before and after the LPIs and among those taking medications, and the mean and standard deviation number of classes taken at each time point.

Factors Associated with Receipt of 1 Classes of Glaucoma Medications after Bilateral Laser Peripheral Iridotomies

Blacks had 130% increased odds of being prescribed 1 classes of IOP-lowering medication after bilateral LPIs compared with whites (adjusted OR=2.30, CI=1.13–4.66). Asians and Latinos did not differ from whites in their receipt of IOP-lowering medication after the LPIs (p=0.63 and 0.81, respectively). Older age (adjusted OR=1.21, CI=1.11–1.32) was associated with increased odds of requiring 1 classes of IOP-lowering medications after bilateral LPIs. Each additional 5 years of age conferred a 21% increased odds of being prescribed medications. Each additional glaucoma medication class prescribed before the initial LPI increased the odds of receiving glaucoma medications after the LPI 17 fold (adjusted OR=16.73, CI=10.59–26.44). Compared to persons carrying a diagnosis of narrow angles, those diagnosed with intermittent angle-closure glaucoma had a 124% increased odds of requiring 1 class of medications following LPI (adjusted OR=2.24, CI=1.18–4.27) and those with chronic angle-closure glaucoma had an 80% of requiring 1 classes of

medications following LPI (adjusted OR=1.80, CI=1.13–2.84). There was no association between sex, education, or income and odds of being prescribed IOP-lowering medications after bilateral LPIs. (Table 3)

Cataract Surgery After Bilateral Laser Peripheral Iridotomies

A total of 167 patients (10.1%) underwent 1 cataract surgeries after the second LPI. When distributed by age (<65 or ≥65), 70 of 1,253 patients (5.6%) younger than age 65 underwent subsequent cataract surgery while 97 of 407 patients (23.8%) age ≥65 underwent cataract surgery after the LPIs. As expected, the mean ± standard deviation age at enrollment for enrollees who did not undergo cataract surgery was younger than those who underwent surgery (55.8±10.9 years vs. 66.1±10.0 years; $p<0.0001$). (Table 4) Of those who underwent cataract surgery after bilateral LPIs, 103 patients (61.7%) had the procedure within 1 year after LPIs and 64 patients (38.3%) had the procedure during the second year following the LPIs. Supplemental Table #3 at AJO.com shows the rates of cataract surgery stratified by age, sex, and race. While the numbers are small, these rates are two to three times higher than others reported in the literature for persons of comparable demographic profiles.³¹

Glaucoma and Other Surgeries Performed After Bilateral Laser Peripheral Iridotomies

Seventy-nine patients (4.8%) underwent some form of laser or incisional glaucoma surgery within two years of bilateral LPIs. These included 10 patients (0.6%) who had trabeculectomy, 4 (0.2%) who had glaucoma drainage device surgery, 16 (1.0%) who had iridoplasty, and 49 (3.0%) who underwent laser trabeculoplasty. There were 8 patients (0.5%) who underwent vitrectomy and 2 (0.1%) with one or more records of keratoplasty after the LPIs. Supplemental Table #4 at AJO.com shows the results of a subanalysis of receipt of cataract and glaucoma surgery following LPI by race.

DISCUSSION

In this study of enrollees in a large managed-care network, capturing patients undergoing LPIs throughout the U.S. and adjusting for important confounding variables, we learned that over three-quarters of patients who underwent this procedure were not prescribed glaucoma medications before or after the procedures and only one of ten patients who underwent bilateral LPIs had subsequent cataract surgery within 2 years. These findings suggest that for many of the patients the LPIs performed effectively prevented or treated the angle closure process.

Few studies have described the need for additional medical or surgical interventions for glaucoma following LPI surgery. In our analysis, which included many patients who were classified as PACS but also a sizable number diagnosed with PACG, CACG, or other forms of glaucoma, 21% of enrollees were prescribed 1 classes of glaucoma medications during the 2 years following the LPIs. By comparison, Blondeau and colleagues³² looked at outcomes of 469 eyes classified as PACS who underwent LPIs, none of whom had been prescribed medications before the procedure and at 10 years after the laser, 17% required glaucoma medication. Rosman and colleagues, evaluated persons with CACG in New York and Asia, and found that with an average follow-up of 56 months, 41% patients required

topical glaucoma medication, 31% underwent filtering surgery, and 28% underwent a glaucoma laser procedure after LPI.³³ Peng and coworkers studied the need for additional therapies (medical, laser or surgical) among patients with PACS, PAC, or PACG.³⁴ At an average of 12 years after the LPIs, the proportions requiring additional pressure-lowering therapies were 7%, 42%, and 100%, respectively. Direct comparison between these various studies and ours is challenging due to differences in the characteristics of the patients, the proportion of patients with different forms and degrees of angle closure, the extent of pre-existing glaucomatous damage, the post-LPI follow-up duration, and other factors. However, the collective findings from these studies and ours suggest that the need for pressure-lowering interventions after LPI is associated with the IOP level and extent of glaucomatous damage present before the LPI.

Although over all, most patients in our study were not prescribed glaucoma medications after bilateral LPIs, among those already taking IOP-lowering medication in one or both eyes before LPI, a large majority (82.9%) were still prescribed glaucoma medication after the procedure. Higher odds of being prescribed glaucoma medications after LPIs were associated with older age, black race, pre-existing glaucomatous damage, and number of glaucoma medication classes prescribed before the LPIs. After adjustment for other covariates, as an enrollee aged each additional 5 years, his/her odds of requiring glaucoma medication after LPI increased by 21%. Compared with whites, blacks had a 130% higher likelihood of post-LPI glaucoma-medications use, and for each additional glaucoma medication class taken before the LPI, the enrollee's odds of requiring any post-LPI medication increased more than 16-fold. We suspect these factors associated with post-LPI glaucoma-medication use pertain to the patient subset with elevated IOP or actual glaucomatous damage who underwent iridotomy, rather than PACS whose LPI was done prophylactically. Furthermore, the higher odds of requiring medications among blacks compared with whites after LPI may be attributable to a higher prevalence of CACG in this group.³⁵ However, it is worth noting that black race was an independent risk factor for requiring medications following LPI, even after adjusting for glaucoma diagnosis in the regression model. Clinicians discussing the risks and benefits of LPI surgery should counsel older and black patients about the increased likelihood of requiring glaucoma medications following the procedure, and those with intermittent or chronic angle closure or patients already taking medications should be informed that there is a strong chance they will continue to require glaucoma medications afterwards.

Another option besides LPI to relieve pupillary block to manage angle closure glaucoma is cataract surgery. Cataract surgery is effective in resolving residual angle closure after LPI.³⁶ Need for cataract surgery following bilateral LPI may be due to suboptimal IOP control from the LPIs alone, presence of pre-existing visually significant cataracts but the surgeon elected to perform the LPI to prevent intraoperative complications during cataract surgery, or worsening of cataracts subsequent to and perhaps as a result of the LPI.^{37,38} Unfortunately, without clinical data, we cannot ascertain the reasons for subsequent cataract surgery for those who underwent this procedure; however we did learn that most patients in this series (approximately 90%) did not undergo cataract surgery in the 2 years after the LPI.

Ophthalmologists who practice in developing nations face additional challenges to caring for patients with glaucoma. Patients may struggle to get regular access to glaucoma medications, and for those who can obtain access, the medications can be costly to afford for chronic use. Our finding that over three-quarters of patients who underwent LPI did not require glaucoma medications after the procedure may be useful to help justify the costs of purchasing lasers in developing countries so that LPI surgery is available to patients living in these locales. Portable lasers that are capable of performing iridotomies and capsulotomies are ideal in such settings. Clearly if a few pulses of laser can prevent the need for chronic glaucoma medications, incisional surgery, or the burden of caring for a loved one who went blind from glaucoma, the costs of making these lasers available to patients are likely to be well worth it.³⁹ That said, it is important to exercise caution when generalizing our study findings to persons residing in other countries, especially communities known to have a high prevalence of CACG, as we would expect greater proportions requiring additional interventions for glaucoma after the LPIs compared to our study.

There are several limitations to our study. Claims data lacks clinical information including visual acuity, IOP measurements, or gonioscopy findings. This clinical data is key to deciding the appropriateness of the LPIs, whether the LPI was successful by comparing gonioscopy findings before versus after the procedure, and also to better understand the circumstances why additional procedures were performed. We also lack information on the level of expertise and experience of the eye care providers in diagnosing and managing angle-closure glaucoma. It is possible that some of the patients who underwent LPIs may have been misdiagnosed with occludable angles and may not have needed the procedure. The database does not capture glaucoma medication samples that may have been provided to the enrollees after the procedure so we may be underestimating the percentage routinely taking medications after the LPIs. While all patients were required to have two LPIs within a three month interval for study inclusion, in an attempt to capture patients who underwent the procedure in both eyes, it is possible that a few patients with records of two LPIs actually had them both performed on the same eye. Such misclassification would likely have only a minimal impact on our results and would not necessarily bias in any particular direction. We also queried the database to check to see how many patients were excluded because they had record of more than 2 LPIs, indicative that one eye may have had the procedure done more than once, and determined that this occurred in only a small minority of patients, seventy total. Finally, patients were only followed for two years after the LPIs; ideally it would be useful to follow patients longer.

In conclusion, in this sample of Americans with health insurance, we found that the majority of patients receiving LPI surgery did not undergo additional medical or surgical interventions for glaucoma following the procedures. For those patients who had already been receiving pressure-lowering medications before the LPI, most continued to require the same number of medications or more afterwards. Groups of patients who were more likely to require glaucoma medications after the surgery included older patients, blacks, those with intermittent or chronic angle closure glaucoma, and those who were already taking glaucoma medications before the LPIs. Clinicians can use these findings to help counsel patients of similar sociodemographic profiles who are considering LPI surgery what to expect after the procedure.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Biographies

Surbhi Bansal, M.D. is an Assistant Professor in the Department of Ophthalmology at Virginia Commonwealth University Medical Center in Richmond, Virginia. She completed her ophthalmology residency at State University of New York at Buffalo, and a fellowship in Glaucoma and Anterior Segment at the Kellogg Eye Center, University of Michigan. Her specialties are Adult Glaucoma and Cataract Surgery.

Joshua D. Stein is an Associate Professor of Ophthalmology and Visual Sciences and Director of the Center for Eye Policy and Innovation at the University of Michigan. He is a health services researcher whose primary research interest involves using large health care claims databases to study utilization patterns and outcomes of eye care throughout the United States.

Figure 1.
Sample Selection of Enrollees in a Large Managed Care Plan who Underwent Bilateral
Laser Peripheral Iridotomy During 2001–2011
LPI=Laser peripheral iridotomy; LTP=Laser trabeculoplasty

Table 1

Characteristics of Patients Undergoing Bilateral Laser Peripheral Iridotomies.

Variable	Value	Total
Total		1660 (100.0)
Sex (N _{miss} = 0)	Male	518 (31.2)
	Female	1142 (68.8)
Race (N _{miss} = 149)	White	1244 (82.3)
	Black	50 (3.3)
	Latino	122 (8.1)
	Asian	75 (5.0)
	Other	20 (1.3)
Education (N _{miss} = 41)	Less than High School	25 (1.5)
	High School Diploma	529 (32.7)
	Some College	657 (40.6)
	College Diploma	403 (24.9)
	Advanced Degree	5 (0.3)
Income (N _{miss} = 93)	< \$30,000	151 (9.6)
	\$30,000 – \$59,999	505 (32.2)
	\$60,000 – \$99,999	521 (33.2)
	\$100,000 – \$124,999	195 (12.4)
	\$125,000	195 (12.4)
Urban/Rural Status (N _{miss} = 4)	Urban	1530 (92.4)
	Larger Rural	66 (4.0)
	Small Rural	60 (3.6)
Mean (SD) Age in Years at Enrollment (N _{miss} = 0)		56.9 (11.2)

SD = standard deviation

Glaucoma Medication Use at Various Time Points Before and After Bilateral Laser Peripheral Iridotomies

Table 2

Patients Taking Medication N (%) [‡]		Mean (SD) Number of Medication Classes for those Receiving Glaucoma Medications		p-value [†]	p-value *
Before First LPI	After Second LPI	Before First LPI	After Second LPI		
Total	175 (10.5)	350 (21.1)	145	< 0.0001	< 0.0001
6 months	57 (3.4)	127 (7.7)	24	< 0.0001	0.42
12 months	63 (3.8)	140 (8.4)	26	< 0.0001	0.17
24 months	53 (3.2)	165 (9.9)	36	< 0.0001	0.10

* paired t-test

[†] Chi-square test

[‡] The interpretation is that 175 patients were taking glaucoma medications at any point during the 2 years prior to the first LPI and 350 patients were taking glaucoma medications at any point in the 2 years after the second LPI. Likewise, there were 57 patients who were taking medications at 6 months prior to the first LPI and 127 taking medications at 6 months after the second LPI.

Here this is indicating that among the 145 patients who were taking glaucoma medications at any point during the two years prior to the first LPI and at any point after the second LPI, the mean and standard deviation number of medications they were taking was 1.48 (0.76) before and 1.80 (0.97) afterwards. Likewise, among the 24 patients who were taking glaucoma medications at 6 months prior to the first LPI at 6 months after the second LPI, the mean number of medications taken before the first LPI was 1.21 (0.41) and 1.33 (0.56) afterwards.

LPI = laser peripheral iridotomy; SD = Standard deviation

Table 3

Factors Associated with Receiving Prescriptions for Glaucoma Medications After Bilateral Laser Peripheral Iridotomies

Covariate	Level	OR (95% CI)	p-value
Age at Enrollment	5-year increments	1.21 (1.11, 1.32) *	< 0.0001
Sex (Ref=Male)	Female	0.98 (0.70, 1.37)	0.91
Race (Ref=White)	Black	2.30 (1.13, 4.66) *	0.02
	Latino	0.93 (0.51, 1.69)	0.81
	Asian	1.20 (0.57, 2.51)	0.63
	Other	0.62 (0.14, 2.84)	0.54
Personal Income (Ref= < \$30K)	\$30K – \$60K	1.23 (0.69, 2.18)	0.49
	\$60K – \$100K	1.12 (0.60, 2.10)	0.72
	\$100K – \$125K	0.95 (0.44, 2.05)	0.90
	> \$125K	0.52 (0.23, 1.120)	0.12
Education (Ref=Less than High School)	High School Diploma	0.54 (0.18, 1.59)	0.26
	Some College	0.65 (0.22, 1.93)	0.44
	College Diploma or Higher	0.71 (0.22, 2.24)	0.55
Charlson Comorbidity Index		0.95 (0.90, 1.01)	0.08
Number of Medication Classes Before LPI		16.73 (10.59, 26.44) *	< 0.0001
Primary Diagnosis (Ref=Anatomical Narrow Angle)	Primary Angle-Closure Glaucoma, Unspecified	1.23 (0.73, 2.07)	0.44
	Chronic Angle-Closure Glaucoma	1.80 (1.13, 2.84) *	0.01
	Acute Angle-Closure Glaucoma	0.62 (0.26, 1.50)	0.29
	Intermittent Angle-Closure Glaucoma	2.24 (1.18, 4.27) *	0.01
	Multiple Diagnoses	1.33 (0.78, 2.25)	0.30
	Other Diagnoses	2.18 (1.29, 3.68) *	0.004

* Indicates a statistically significant effect at the $\alpha=0.05$ level

LPI=Laser Peripheral Iridotomy; CI=Confidence Interval; Ref=Reference

Table 4

Enrollees Receiving Cataract Surgery Within 2 years of Bilateral Laser Peripheral Iridotomies.

Cataract Surgery After Bilateral LPis				
Cataract Surgery After Second LPI				
Age at Enrollment, N (row %)	No	Yes	Total	p-value
Under 65	1,183 (79.2)	70 (41.9)	1,253 (75.5)	< 0.0001 *
65 and Over	310 (20.8)	97 (58.1)	407 (24.5)	
Total	1,493 (89.9)	167 (10.1)	1,660 (100.0)	
Age at Enrollment, Mean $\pm$ SD. (Range)	55.8 $\pm$ 10.9 (23, 89)	66.1 $\pm$ 10.0 (29, 84)	56.9 $\pm$ 11.2 (23, 89)	< 0.0001 [†]

LPI = Laser Peripheral Iridotomy; SD = standard deviation

* Chi-square test

[†] Two-sample t-test