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Contents

Bimonthly Volume 1 Number 1 December 30, 2011

EDITORIAL

1 What is the purpose of launching the *World Journal of Ophthalmology*?
Inan UU

BRIEF ARTICLE

4 Changes in peripapillary retinal nerve fiber layer thickness in patients with primary open-angle glaucoma after deep sclerectomy
Ghanem AA, Mady SM, El-wady HE

11 Evaluation of laser *in situ* keratomileusis for myopic correction performed under thin flaps
Ghanem AA, Nematallah EH

World Journal of Ophthalmology
Volume 1 Number 1 December 30, 2011

Contents

ACKNOWLEDGMENTS I Acknowledgments to reviewers of *World Journal of Ophthalmology*

APPENDIX I Meetings

I-V Instructions to authors

ABOUT COVER Inan UU. What is the purpose of launching the *World Journal of Ophthalmology*? *World J Ophthalmol* 2011; 1(1): 1-3
http://www.wjgnet.com/2218-6239/full/v1/i1/1.htm

AIM AND SCOPE

World Journal of Ophthalmology (*World J Ophthalmol, WJO,* online ISSN 2218-6239, DOI: 10.5318) is a bimonthly peer-reviewed, online, open-access (OA), journal supported by an editorial board consisting of 103 experts in ophthalmology from 27 countries.

The aim of *WJO* is to report rapidly new theories, methods and techniques for prevention, diagnosis, treatment, rehabilitation and nursing in the field of ophthalmology. *WJO* covers diagnostic imaging, optometry, ocular fundus diseases, cataract, glaucoma, keratopathy, ocular trauma, strabismus, and pediatric ocular diseases, blindness prevention, traditional medicine, integrated Chinese and Western medicine, evidence-based medicine, epidemiology and nursing. The journal also publishes original articles and reviews that report the results of applied and basic research in fields related to ophthalmology, such as immunology, physiopathology, cell biology, pharmacology, medical genetics, and pharmacology of Chinese herbs.

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EDITORIAL

What is the purpose of launching the *World Journal of Ophthalmology*?

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Figure 1 Editor-in-Chief of the *World Journal of Ophthalmology*. Umit Ubeyt Inan, MD, Professor of Ophthalmology, Department of Ophthalmology, Kocatepe University, 03200 Afyonkarahisar, Turkey.

Abstract

Welcome to the *World Journal of Ophthalmology* (*WJO*), a new general ophthalmology journal from Baishideng Publishing Group. The aim of the journal is to promote high quality research for and from eye-care practitioners all over the world. The *WJO* is a new member of the World Journal series of peer-reviewed, international English-language, open-access journals that are designed to provide a fast peer review process for all submitted manuscripts. We intended to provide the most up-to-date electronic means of articles in all fields of ophthalmology. New journal that is available on internet for everyone will provide a forum for publication and free access of high quality scientific papers documenting clinical and experimental advances in the areas of ophthalmology. All subspecialties within ophthalmology, visual sciences, pharmacology and drug therapy in eye diseases, primary and secondary eye care, patient safety reports, surgical techniques, and improvements in quality of care will be accepted for publication. We look forward in the future to your fascinating contributions to the *WJO*.

Key words: Inaugural; Aims; Ophthalmology; General; Journal; Peer-reviewed; Open-access; Online

Peer reviewers: Stephen Andrew Vernon, Professor, Department of Ophthalmology, University Hospital, Nottingham, NG7 2UH, United Kingdom; Yoshihiro Hotta, MD, Professor, Department of Ophthalmology, Hamamatsu University School of Medicine, 1-20-1 Handayama, Higashi-ku, Hamamatsu 431-3192, Japan

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INTRODUCTION

I am Umit Ubeyt Inan, Professor of Ophthalmology from University of Afyon Kocatepe, Turkey (Figure 1) and the Editor-in-Chief of the *World Journal of Ophthalmology* (*World J Ophthalmol*, *WJO*, online ISSN 2218-6239, DOI: 10.5318). It is my great honor to introduce the *WJO* as a new peer-reviewed journal for sharing ideas and experiences about all subjects of eye diseases as well as any particular ophthalmic issue remaining to be solved. I would like to welcome you to the *WJO* that is a general ophthalmology journal and is international.

I am very happy to announce that the first issue of the *WJO*, whose preparatory work was initiated on December 1, 2010, is officially published on December 30, 2011. We hope you will enjoy our inaugural issue. The *WJO* Editorial Board has now been established and consists of 103 distinguished experts from 27 countries. While the *WJO* is introducing itself to the ophthalmology community worldwide with the first issue, I guess that some of you are thinking: why do we need a new journal in ophthalmology? What is the purpose of launching the *WJO*?

We are observing many scientific, surgical and technological advancements occurring in ophthalmology. So, all healthcare professionals like clinicians and researchers in this field need regular, quality-based publishing resources where they can read newest and original studies and publish their own papers. Now we will have a new journal, the *WJO*, dedicated solely to our specialty, published by the Baishideng Publishing Group. It aims to provide the practicing ophthalmologist with information on the latest clinical and laboratory-based research. Our main focus is to make the journal of interest to all eye care practitioners. Basic and visual scientists are invited to submit clinically relevant articles.

CHARACTERISTICS OF THE *WJO*

The *WJO* is a peer-reviewed, open-access journal that publishes original research articles, review articles, and clinical studies in all areas of ophthalmology. We aim at concise, rapid reporting and very fast review and decisions upon manuscripts and also fast publication that is made by paperless workflow of the journal and its digital and networked structure. A relatively large, international Editorial Board of experts in ophthalmology collaboratively runs the *WJO*. Well-written and informative articles that have been reviewed by at least one peer will be heart of the *WJO*. All we can see these expectations by following the *WJO* over the forthcoming months and years.

AIMS, SCOPE AND COLUMNS

The aim of the *WJO* is to serve as a resource for ophthalmologists and vision scientists throughout the world. It aims to provide the most complete and reliable source of information on current developments in the field. The emphasis will be on publishing high-quality papers rapidly and freely available to researchers worldwide. All areas of eye disease will be covered (diagnostic imaging, optometry, ocular fundus diseases, cataract, glaucoma, keratopathy, ocular trauma, strabismus, and pediatric ocular diseases, blindness prevention, traditional medicine, integrated Chinese and Western medicine, evidence-based medicine, epidemiology and nursing). The journal also publishes original articles and reviews that report the results of applied and basic research in fields related to ophthalmology, such as immunology, physiopathology, cell biology, pharmacology, medical genetics, and pharmacology of Chinese herbs). Manuscripts are welcome for both clinical and basic science topics. Original papers, short communications, original case reports and reviews of important areas and perspectives on recent developments can be submitted. Letters to the Editor on papers or any aspect of the *WJO* are welcomed.

CONTENTS OF PEER REVIEW

In order to guarantee the quality of articles published in the journal, the *WJO* usually invites three experts to comment on the submitted papers. The contents of peer review include: (1) whether the contents of the manuscript are of great importance and novelty; (2) whether the experiment is complete and described clearly; (3) whether the discussion and conclusion are justified; (4) whether the citations of references are necessary and reasonable; and (5) whether the presentation and use of tables and figures are correct and complete.

BENEFITS OF OPEN ACCESS SYSTEM

The *WJO* is an international English-language open-access online journal available on Internet for everyone. New journal will provide a forum for publication and free access of high-quality scientific reports documenting clinical and experimental advances in all areas of ophthalmology. There are many ophthalmological journals in the printed form or online form that necessitates subscription with fee. Thus there is restricted access to the material published by these subscription-based journals. In the open-access policy, all articles become freely and universally accessible online, and anyone can read one's work at no cost[1]. There are some other benefits of open-access system. Authors are assured that their work is disseminated to largest audience by knowing that there are no barriers to access their work. Any information that is available freely is generally more likely to be looked at than information that is subscription-based. Moreover, because of easier availability, free online articles have a more chance of being cited[2,3]. Authors consider open access as an important factor in deciding to which journal to submit their work[4]. In addition, the worldwide availability of articles can further increase literature searching[5]. Other benefit is educational. Achievement to the results of research by physicians of training in ophthalmology is limited by their Library's budget. Better quality of education in ophthalmology can be possible with open access to publications. Another benefit is economical. The audience in economically poor institutions or countries can read the same material like ones in well-developed institutions or countries[6]. You can also find more information about maximization of benefits of journals by open-access model under the title of the "aims and scope" of the *WJO* at http://www.wjgnet.com/2218-6239/navdetail_39.htm.

CONCLUSION

We hope you will appreciate and find the new open-access journal of ophthalmology as very beneficial for all ophthalmology community, as well as for our patients.

We also hope you will let us know how it can be improved. We look forward in the future to your fascinating contributions by submitting your valuable scientific work to the *WJO*. I have great confidence in the dedication and skill of our editorial board. On behalf of the entire editorial board, I would like to welcome you to this exciting new journal.

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BRIEF ARTICLE

Changes in peripapillary retinal nerve fiber layer thickness in patients with primary open-angle glaucoma after deep sclerectomy

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Abstract

AIM: To assess changes in peripapillary retinal nerve fiber layer (RNFL) thickness and visual field (VF) in patients with glaucoma after reduction of intraocular pressure (IOP).

METHODS: Thirty-five consecutive patients with bilateral high tension glaucoma were included in the study. Thirty-five eyes underwent monocular deep sclerectomy (surgery group) and the medically treated fellow eyes served as controls (control group). Quantitative analyses of the peripapillary RNFL thickness by optical coherence tomography (OCT) and global VF indices by automated perimetry were performed before surgery and six months after surgery in both eyes. The changes in RNFL thickness overall and by quadrant were evaluated and studied with respect to age, best-corrected visual acuity (BCVA), preoperative global VF indices, postoperative IOP changes, and postoperative changes in global VF indices. Changes observed in RNFL thickness and VF indices were compared between eyes after surgery and fellow eyes.

RESULTS: Six months after surgery, the overall IOP decreased from a baseline mean of 24.5 ± 3.2 mmHg to 11.5 ± 2.7 mmHg ($P < 0.001$) at the time of OCT testing. A significant increase in the overall mean RNFL thickness was observed after surgery ($P < 0.001$). The preoperative VF mean deviation was significantly correlated with a postoperative increase in the RNFL thickness ($P < 0.075$). No correlation was found between RNFL thickness changes and age, BCVA, or changes in the global VF indices. There was no significant difference between eyes with an IOP reduction of more than 50% and those with a reduction in IOP less than 30% ($P = 0.312$).

CONCLUSION: A significant increase in the peripapillary RNFL thickness was associated with IOP reduction by glaucoma filtration surgery as measured by OCT.

Key words: Peripapillary retinal nerve fiber layer thickness; Optical coherence tomography; Visual field indices; Glaucoma medication; Deep sclerectomy

Peer reviewers: Colin Ian Clement, BSc, MBBS, PhD, FRANZC, Glaucoma Unit, Sydney Eye Hospital, 8 Macquarie Street, Sydney, NSW 2000, Australia; Necip Kara, MD, Department of Ophthalmology, Kanuni Sultan Suleyman Education and Research Hospital, 34290 Istanbul, Turkey

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INTRODUCTION

Glaucoma is characterized by clinically detectable tissue loss in the nerve fiber head and retinal nerve fiber layer (RNFL). Defects in the peripapillary RNFL may even precede changes in optic nerve head appearance and visual field (VF) loss[1]. The optic disc sometimes is seen to be less excavated when the intraocular pressure (IOP) falls. This anatomic change has been documented previously after trabeculectomy by stereoscopic disc photography, computer-assisted planimetry, optic nerve head analysis, and confocal scanning laser ophthalmoscopy (CSLO)[1-4].

There is controversy about the effect of IOP reduction on the peripapillary RNFL, which also is considered a marker of structural optic nerve damage. However, the effect of IOP reduction on peripapillary RNFL is still unclear. Some studies have found no significant changes in the retinal cross-sectional area using CSLO and an optic nerve analyzer[4-5], whereas others have shown a significant increase in mean retinal height at the optic disc margin by CSLO[6,7].

Optical coherence tomography (OCT) evaluates and quantifies the peripapillary RNFL thickness in vivo. Aydin *et al*[8] reported a significant increase in the mean peripapillary RNFL thickness assessed by OCT scans performed with a noncommercial, prototype device in eyes undergoing filtering surgery, while Leung *et al*[9] reported structural and functional recovery in a patient with juvenile open-angle glaucoma, which was documented quantitatively by OCT after trabeculectomy.

Deep sclerectomy is a non-penetrating filtering procedure that facilitates IOP control with fewer complications than trabeculectomy[10,11]. The purpose of the present study was to assess changes in the peripapillary RNFL thickness and global VF indices in a prospective manner using a third generation OCT device in patients with primary open-angle glaucoma (POAG) after IOP lowering by surgical or medical treatment.

MATERIALS AND METHODS

This prospective controlled study was performed in Mansoura Ophthalmic Center, Mansoura, Egypt, and was approved by Mansoura University Trust Ethics in accordance with the Declaration of Helsinki (1989) of the World Medical Association. Consecutive patients with bilateral high tension glaucoma scheduled for unilateral deep sclerectomy were enrolled. Informed consent was obtained from each patient. Eyes were scheduled for deep sclerectomy when the IOP exceeded the target pressure and/or VF defect and glaucomatous optic nerve damage showed progression despite maximum tolerated medical therapy.

Full ophthalmic examination was done, including assessing visual acuity, slit-lamp anterior and posterior segment biomicroscopy, IOP measurement by Goldmann applanation tonometry, gonioscopy using Goldmann three mirror contact lens, OCT, automated perimetry (Humphrey visual field analyzer, program 24-2), and cup/disc ratio estimation. A detailed medical history including age, gender, glaucoma medications, systemic hypertension, systemic medications, and previous ocular surgery was recorded

The IOP measurements were taken at least 5 times throughout the day from 8 am to 5 pm. Highest and lowest measured IOP values were used to determine IOP diurnal range. The VF categories were: (1) normal; (2) mild, an arcuate defect; (3) moderate, abnormal in one hemifield and not within 5 degrees of fixation; and (4) severe, abnormal in both hemifields or within 5 degrees of fixation. VF grading was done on the basis of the last reliable Humphrey VF test before surgery.

Changes in the RNFL thickness and VF indices in eyes undergoing deep sclerectomy (surgery group) were compared with those in the contralateral eyes in which the IOP was controlled medically (control group). The postoperative change in RNFL thickness was analyzed for several potential related factors (age, preoperative overall RNFL thickness, postoperative IOP change, and VF global indices).

Patients were selected based on their ability to perform reliable perimetry and on the clarity of the ocular media. Only patients with high tension glaucoma were included in this study. Patients were excluded if they had ocular pathologic features other than glaucoma such as diabetic retinopathy, age-related macular degeneration, parapapillary atrophy extending beyond 1.7 mm from the disc center, and inability to obtain adequate OCT images. Both Humphrey VF testing and OCT scanning were done preoperatively and six month postoperatively for all patients.

VF testing

All patients underwent Humphrey VF testing using standard Humphrey 24-2 full threshold perimetry (Humphrey Instruments, Carl Zeiss Meditec, San Leandro, Dublin). A reliable VF test was defined as one with less than 30% fixation loss and false-positive or false-negative responses. The preoperative and postoperative mean deviation (MD) and pattern standard deviation (PSD) were used for the analysis.

OCT scanning

Cross-sectional imaging of peripapillary RNL was performed with the Stratus OCT (model 3000, software version 4.4; Carl Zeiss Meditec, Dublin, CA) after pupillary dilation with 1% tropicamide to a minimum diameter of 5 mm. Circular 360° OCT scans were obtained using the fast RNFL thickness scan, with a diameter of 3.46 mm on the peripapillary RNFL. The scans include the single mean RNFL thickness, the average thickness within each of four quadrants (temporal, superior, nasal, and inferior), and average thickness within each of 12 sectors corresponding to clock hours.

Good scans were defined as focused images from the ocular fundus, with an adequate signal-to-noise ratio and a centered, circular ring around the optic disc. Images with less than 90% satisfactory A scan or a signal-to-noise ratio of less than 25 dB were excluded. If the amount of peripapillary atrophy exceeded the scan circle, which was visible and controlled by the operator, the patient was excluded. The average of the three qualified circular scans was used to calculate the mean and quadrantic RNFL thickness[12].

Surgical technique

Local anesthesia was achieved using a peribulbar injection of 4 mL of a mixture of 4% xylocaine, and 0.75% marcaine. A fornix based conjunctival flap was made, the sclera was exposed, and hemostasis by wet-field cautery was performed. A one-third scleral thickness superficial flap (5.0 mm × 5.0 mm) was dissected at the 12-o'clock position at least 1.0 mm into the clear cornea. A second flap of deep sclera was dissected, Schlemm's canal was deroofed, and a trabeculo-Descemet membrane window was created. The deep scleral flap was excised, and the juxta-canalicular trabeculum and Schlemm's endothelium were removed using small blunt forceps. The superficial scleral flap was sutured with 2 to 4 interrupted nylon 10-0 buried sutures.

Postoperative treatment included a combination of dexamethasone and tobramycin 4 times daily for 2 wk. The dosage was tapered by one drop weekly until discontinuation after 8 wk. When the vessel density increased or flattening occurred, we intensified the postoperative anti-inflammatory treatment (prednisolone acetate every 1 h to 2 h during waking hours). When filtration through the trabeculo-Descemet membrane was insufficient because of an elevated IOP, a goniopuncture was performed with the neodymium:yttrium-aluminum-garnet (ND:YAG) laser in the thin driest anterior portion of the trabeculo-descemet membrane.

Statistical analysis

A statistics program (SPSS version 15.0 for Windows; SPSS Inc., Chicago, IL) was used for all analyses. The distribution of data was determined using the Kolmogorov-Smirnov test. A paired *t* test was used to analyze RNFL thickness differences in individual eyes basis and to compare parameters before and after surgery. A comparison between the two study groups was carried out, and Pearson's correlation was used to analyze the association between parameters. The number of glaucoma medications and the visual acuity were compared using the Wilcoxon signed rank test. Since multiple correlations were investigated, the *P* value was adjusted using the Bonferroni correction. A *P* value of 0.05 or less was considered to be statistically significant.

RESULTS

Thirty-five eyes of 35 patients were qualified for this study; thirty-five eyes underwent deep sclerectomy and the fellow eyes served as the control eyes. The patient demographics and baseline characteristics for both groups are presented in Table 1.

Table 1 Demographic and clinical features of the studied patients

Parameters	Surgery group	Control group	*P* value[1]
No. of patients	35		
Age (yr)	62.2 ± 2.5		
Gender			
Male	18 (51%)		
Female	17 (49%)		
Diabetes mellitus	8		
Hypertension	25		
Cup/Disc ratio	0.76 ± 2.4	0.57 ± 2.1	$F = 3.52$ $P = 0.012$[1]
IOP diurnal range[2]	12.17 ± 2.21	8.26 ± 3.31	$F = 4.64$ $P = 0.015$[1]
Preoperative IOP (mmHg)	23.4 ± 6.1	18.5 ± 2.3	$F = 3.54$ $P = 0.015$[1]
Preoperative medication	3.1 ± 0.5	1.7 ± 0.4	$F = 2.56$ $P = 0.021$[1]
Preoperative VF MD (dB)	-9.2 ± 5.3	-4.5 ± 4.1	$F = 4.21$ $P = 0.017$[1]
Preoperative VF PSD (dB)	5.7 ± 3.1	4.8 ± 2.9	$F = 4.56$ $P = 0.25$
Preoperative VA (logMAR)	0.73 ± 0.4	0.86 ± 0.2	$F = 3.61$ $P = 0.36$

[1]Significant at $P < 0.05$; [2]Difference between the lowest and highest recorded intraocular pressure (IOP). One-way ANOVA test (*F*) and χ^2 test were used. VF: Visual field; MD: Mean deviation; VA: Visual acuity; PSD: Pattern standard deviation; logMAR: Logarithm of minimal angle of resolution.

The mean IOP, the mean number of medications used, and VF indices before surgery were significantly lower in the control group than in the surgery group (P = 0.001). The mean preoperative IOP in the surgery group was 23.4 ± 6.1 mmHg; 6 mo after surgery, the mean IOP decreased to 10.6 ± 25 mmHg ($P < 0.001$). The mean percent change in IOP was 45.4% ± 16.5% (range, 16% to 65%). In 24 eyes (68.6%), the IOP reduction exceeded 30%.

At six months, complete success, defined as IOP of 21 mmHg or less and IOP reduction of greater than or equal to 20% without anti-glaucoma medication, was achieved in 91.4% (32/35) of the patients, qualified success, defined as having an IOP of 21 mm Hg or less and an IOP reduction of greater than or equal to 20% with anti-glaucoma medication, was achieved in 5.7% (2/35) of the patients, and failed surgery, defined as having an additional surgery, occurred in one patient (2.8%). ND:YAG laser goniopuncture was performed in 6 eyes (17.1%).

The mean number of medications used decreased significantly from 3.1 ± 0.5 before surgery to 0.9 ± 0.2 after deep sclerectomy ($P < 0.001$). No significant change was found between the visual acuity before and 6 months after surgery (P = 0.365).

The mean preoperative and postoperative MD was -9.2 ± 5.3 and -8.6 ± 4.6, respectively (P = 0.361). The mean preoperative and postoperative PSDs were 5.7 ± 3.1 and 5.3 ± 3.1, respectively (P = 0.325). These results revealed no difference between preoperative and postoperative MD and PSD of the VF results in the study group.

Table 2 Mean peripapillary retinal nerve fiber layer thickness measurements in eyes that underwent deep sclerectomy compared with the contralateral eye of the same patient as measured by optical coherence tomography

Parameter	Pre-operative (μm)	Post-operative (μm)	*P* value[1]
Overall			
Surgery group	71.6 ± 18.6	89.5 ± 21.2	0.015[1]
Control group	72.5 ± 17.8	71.7 ± 20.3	0.165
Superior quadrant			
Surgery group	85.8 ± 25.1	96.7 ± 23.2	0.021[1]
Control group	85.7 ± 24.1	86.5 ± 21.5	0.114
Nasal quadrant			
Surgery group	54.6 ± 21.5	72.0 ± 25.1	0.014[1]
Control group	56.5 ± 18.9	58.2 ± 22.1	0.356
Inferior quadrant			
Surgery group	81.3 ± 25.1	69.2 ± 22.5	0.023[1]
Control group	83.1 ± 18.2	83.3 ± 20.1	0.453
Temporal quadrant			
Surgery group	56.2 ± 19.2	75.2 ± 20.1	0.016[1]
Control group	57.0 ± 18.5	58.1 ± 21.5	0.451

[1]Significant at $P < 0.05$.

Table 3 Pearson's correlation between change in mean retinal nerve fiber layer thickness and age, intraocular pressure, and global visual field indices in the surgery group

	r	*P* value[1]
Age	-0.164	0.276
IOP change (mmHg)	-0.235	0.023
IOP change (%)	-0.453	0.036
BCVA	-0.153	0.216
Preoperative VF MD (dB)	0.374	0.075
Preoperative VF PSD (dB)	-0.182	0.383
Change in VF MD	0.395	0.064
Change in VF PSD	0.186	0.625

[1]Significant at $P < 0.05$. IOP: Intraocular pressure; BCVA: Best corrected visual acuity; VF: Visual field; MD: Mean deviation; PSD: Pattern standard deviation.

Table 2 summarizes the mean peripapillary RNFL thickness measured by OCT for the entire study. A significant increase was found in the mean overall and quadrantic RNFL thickness in the surgery group. The mean overall RNFL thickness change in the surgery group was 7.5 ± 9.6 μm (range, -28.3 μmto 15.2 μm; median, -1.35 μm, $P = 0.001$). In the surgery group, the RNFL thickness increased in 32 eyes (91.4%) after surgery. In the control group, the mean overall RNFL thickness change was -4.3 ± 5.4 μm (range, -17.8 μm to 10.5 μm, $P = 0.145$).

The correlations between the RNFL changes after surgery and age, IOP change (mmHg), percent change in IOP, preoperative MD, PSD, BCVA, and the change in the VF MD and PSD are shown in Table 3. A significant correlation was found between the RNFL thickness changes after surgery and the preoperative MD ($P = 0.374$ and $P = 0.075$, respectively). There were no significant changes in the control group in the MD ($P = 0.132$), PSD ($P = 0.145$), or IOP ($P = 0.127$) at the 6-mo follow up.

In the present study we did not found a significant correlation between BCVA and overall or segmental RNFL thickness in the study group. There was a significant correlation between BCVA and overall RNFL thickness, and also between BCVA and the RNFL thickness by quadrants (temporal, inferior, and superior) in the control group (Figure 1).

DISCUSSION

Several studies reported less cupping of the optic disc after IOP reduction in some patients after glaucoma surgery. This observation is more likely to be due to a simple shift in anatomic structures rather than recovery or reversal of damage. This anatomic change has been documented by stereoscopic disc photography, computer-assisted planimetry, optic nerve head analysis, and conofocal scanning laser ophthalmoscopy[1-4]. When IOP is lowered, there is less stretch on the lamina cribrosa, and the disc is able to return to its normal position. However, there is no consensus regarding whether the changes associated with IOP reduction occur only in the optic nerve head or also in the peripapillary RNFL[4].

Until recently, the assessment of the RNFL has been largely subjective. OCT, developed to assess tissue thickness in vivo, is a non-invasive imaging technique that allows high-resolution cross-sectional ocular imaging and evaluates and quantifies the peripapillary RNFL thickness. OCT provides real-time, immediate, objective, and reproducible quantitative measurements of the RNFL within a short time during first visit and offers a reproducible technique with a standard deviation of measurements of 10 μm to 20 μm for the mean overall RNFL thickness[13,14].

In the present study, we prospectively assessed the functional changes in peripapillary RNFL thickness by OCT and global VF indices by automated perimetry in 35 patients who underwent monocular deep sclerectomy. In addition, our purpose was to evaluate the correlation of global indices with the structural glaucomatous damage. We used OCT with fast RNFL thickness scan, which reduces the examination time and improves the accuracy and centration of the scans[13].

We found a significant change in the peripapillary RNFL thickness in the surgery group. The RNFL thickening was significant for the overall measurement and in all quadrants. These results are consistent with those reported by Aydin *et al*[8], who found a significant increase in the overall peripapillary RNFL from 72.8 μm to 81.7 μm after filtration surgery measured by OCT in 18 eyes that underwent trabeculectomy and in 20 eyes that underwent combined trabeculectomy and cataract extraction.

Several studies reported no significant changes in the peripapillary RNFL thickness. Using a Rodenstock optic nerve head analyzer, Sogano *et al*[5] found that although the cup volume decreased and the rim area increased significantly after trabeculectomy, the RNFL height did not change 2 mo to 6 mo after surgery. Moreover, Irak *et al*[4]

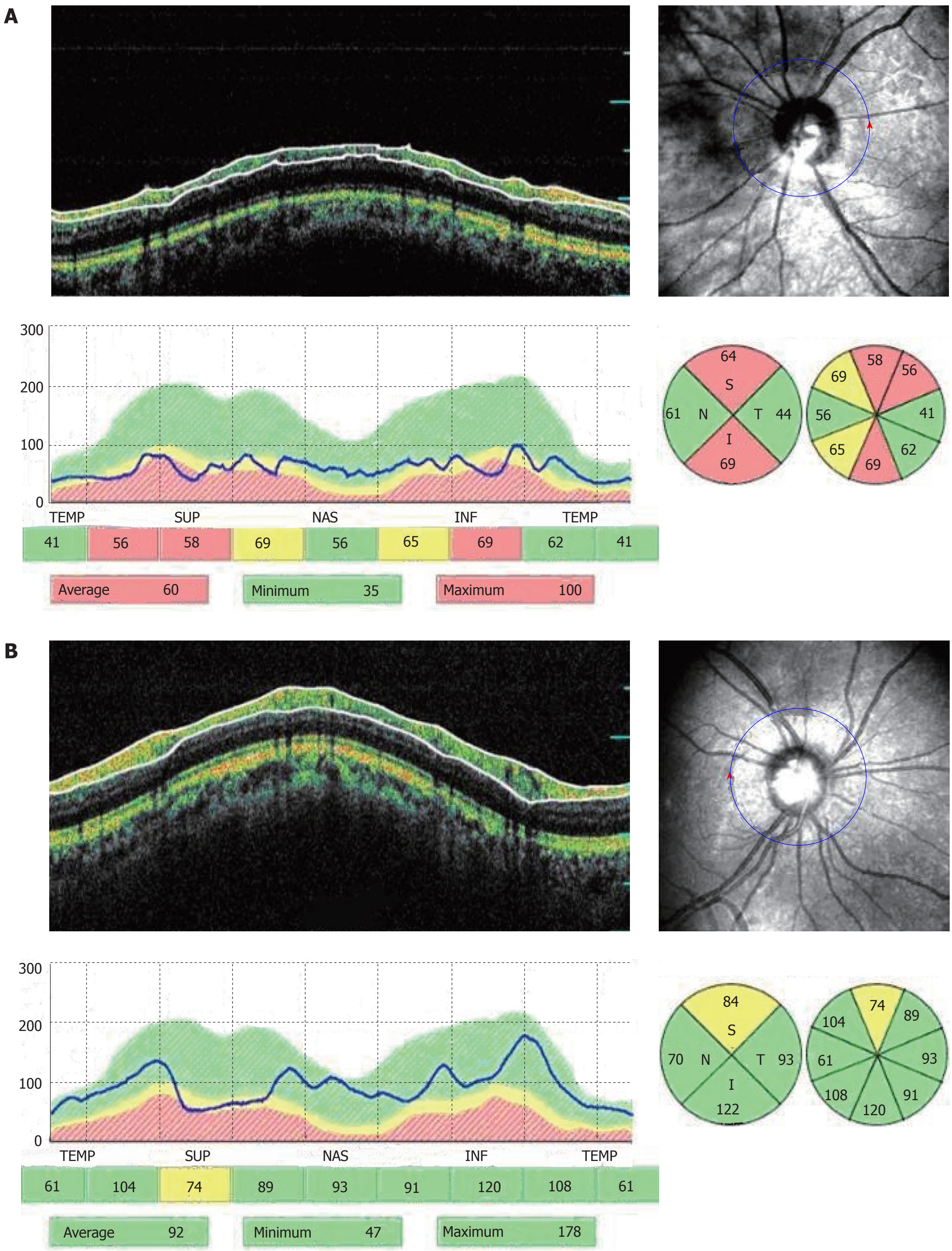

Figure 1 A female patient aged 45 years with high tension glaucoma undergoing deep sclerectomy. A: Preoperative peripapillary circular optical coherence tomography (OCT) tomograms; B: Postoperative peripapillary circular OCT tomograms. TEMP: Temporal; SUP: Superior; NAS: Nasal; INF: Inferior.

used confocal scanning laser ophthalmoscopy to evaluate 49 eyes 3 mo after filtration surgery and did not find a significant change in the RNFL cross-sectional area.

The differences between our findings and those of Aydin *et al*[8] could be attributed to several factors. First, the absence of a control group in their study precluded achieving definite conclusions. Moreover, their study was retrospective and the results obtained should be interpreted cautiously. In addition, those authors assumed that the RNFL thickness does not change after cataract surgery, and they combined the data obtained from trabeculectomy or combined cataract extraction and trabeculectomy.

The mean preoperative RNFL thickness was 6.2 μm lower in our study than in the study of Aydin *et al*[8]. Curiously, despite a higher mean thickness before surgery than in our patients, the mean preoperative MD was worse. This finding can be explained partially by an increase in the diffuse VF defects as the result of cataract artifacts. In fact, to avoid the effect of cataract removal on the VF test, they analyzed the data in only 35 eyes that had undergone only deep sclerectomy.

It has been reported that glaucomatous progression is more likely to be detected using OCT compared to HVF. This may reflect OCT hypersensitivity or true damage identified by OCT before detection by conventional methods[15]. In addition, the differences may be the result of different degrees of preexisting glaucomatous damage. Some experimental and clinical studies have shown that restoration of anatomic position is more likely to occur in the early stages of glaucoma[6,16,17].

The physiological basis of the improvement in optic nerve head appearance and RNFL thickness with IOP reduction is not clear. It has been suggested that IOP reduction results in less posterior bowing of the lamina criborsa[18,19].

Our results revealed that overall and segmental RNFL thickness seems to be more reliable index. Deep structural alterations revealed by OCT constitute an important indication of early functional changes. The VF MD seems to be more sensitive for the patients with POAG.

Several studies have shown a high correlation between the degree of improvement in the morphologic features of the optic nerve head and the percent of IOP reduction[2-4]. Aydin *et al*[8] reported that after filtration surgery, a 0.5-μm increase in the mean RNFL could be expected for each 1-mmHg decrease in IOP. Although a difference in IOP reduction could explain different results, the mean IOP change after surgery obtained in our study was 1.5 mmHg more than that obtained by Aydin *et al*[8]. Moreover, in the present study, the mean percent change in IOP was 45.3% ± 16.4%. Twenty-seven eyes (77.1%) had an IOP reduction of more than 30%, which is similar to data (73.7%) reported by Aydin *et al*[8].

In the present study we did not find a significant correlation between BCVA and overall or segmental RNFL thickness in the study group. There was a significant correlation between BCVA and overall RNFL thickness, and also between BCVA and the RNFL thickness in all quadrants (temporal, inferior and superior) in the control group. The highest correlation between BCVA and the RNFL thickness in the temporal sector (r = 0.432, P < 0.001) was most likely due to the location of the maculopapillary bundle in this region of the optic disc.

Mechanisms that explain an improvement in RNFL thickness with IOP reduction are unclear. After the retinal nerve fiber is damaged, it cannot regenerate. One plausible explanation is recovery of compressed RNFL. Moreover, it is possible that some axons are able to function marginally while the IOP is high and can recover some physiologic functions when the IOP is lowered, but this is a biomechanical or physiologic restoration, not an anatomic one.

In the present study, we found a significant increase in peripapillary RNFL thickness after successful deep sclerectomy. The only factor significantly correlating with changes in the RNFL thickness was the preoperative VF MD.

In conclusion, our results showed an increase in RNFL thickness after deep sclerectomy that correlates with IOP reduction. OCT measurements are affected by IOP reduction after deep sclerectomy as these changes may have some clinical significance in long-term follow-up. Thus, we recommend obtaining OCT images after deep sclerectomy procedure as a baseline for follow-up of POAG patients.

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COMMENTS

Background

There is controversy about the effect of intraocular pressure (IOP) reduction on the peripapillary retinal nerve fiber layer (RNFL), which also is considered a marker of structural optic nerve damage. However, the effect of IOP reduction on peripapillary RNFL is still unclear. Some studies have found no significant changes in the retinal cross-sectional area using confocal scanning laser ophthalmoscopy (CSLO) and an optic nerve analyzer, whereas others have shown a significant increase in mean retinal height at the optic disc margin by CSLO.

Research frontiers

The study found a significant change in the peripapillary RNFL thickness in the surgery group. The RNFL thickening was significant for the overall measurement and in all quadrants.

Innovations and breakthroughs

The mean preoperative RNFL thickness was 6.2 μm lower in our study than in the study of Aydin *et al*. Also, the authors found a significant change in the peripapillary RNFL thickness in the surgery group. The RNFL thickening was significant for the overall measurement and in all quadrants. These results are consistent with those reported by Aydin *et al*, who found a significant increase in the overall peripapillary RNFL from 72.8 μm to 81.7 μm after filtration surgery.

Applications

The results showed an increase in RNF thickness after deep sclerectomy that correlates with IOP reduction. optical coherence tomography (OCT) measurements are affected by IOP reduction after deep sclerectomy as these changes may have some clinical significance in long-term follow-up. Thus, the authors recommend obtaining OCT images after deep sclerectomy procedure as a baseline for follow-up of primary open-angle glaucoma patients.

Peer review

This manuscript describes a study in which retinal nerve fiber layer thickness was measured before and after deep sclerectomy using optical coherence tomography. This study is generally well designed.

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BRIEF ARTICLE

Evaluation of laser *in situ* keratomileusis for myopic correction performed under thin flaps

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Abstract

AIM: To evaluate the efficacy and safety of laser-assisted subepithelial keratectomy (LASIK) for myopic correction done under thin flaps (120 μm) and compare with results obtained under thick flaps (150 μm).

METHODS: The study included 150 myopic eyes of 75 patients without previous refractive surgery who underwent LASIK prospectively. Two microkeratome heads (90 and 130) were used to create a flap with thickness of 120 μm and 150 μm, respectively. Thin flap group (120 μm) included 75 eyes while thick flap group included 75 eyes. Follow-up period was 12 mo. Efficacy, safety, and stability were evaluated and compared between the two groups.

RESULTS: In 150 eyes, the mean preoperative spherical equivalent refraction was -8.65 ± 2.6 D, mean sphere was -4.4 ± 3.5 D, and mean cylinder was -1.0 ± 1.3 D. The amount of ablation was significantly larger in the thin flap (88.5 ± 32.21 μm) group than in the thick flap group (64 ± 28.13 μm). Percentage of safety was higher in the thin flap group (94.8%) than in the thick flap group (91.7%). There were no intraoperative complications, especially flap-related problems. Subjective symptoms of dry eye occurred in 20.7% and 33.3% of eyes in the thin and thick flap groups, respectively.

CONCLUSION: Thin-flap LASIK is effective and safe in correcting myopic defects. It achieves better visual results, rapid visual recovery, and stable postoperative refraction than LASIK with thick flaps.

Key words: Laser *in situ* keratomileusis; Myopia; Thin flap; Thick flap

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INTRODUCTION

Recent reports of post-laser-assisted subepithelial keratectomy (LASEK) ectasia have produced a renewed interest in surface ablation techniques, such as photorefractive keratectomy, LASEK and Epi-LASIK, to eliminate the need to perform a corneal flap and to preserve a thicker stromal bed less prone to mechanical destabilization[1]. Despite good refractive results, surface techniques are associated with greater pain, discomfort, and slower visual recovery in the immediate postoperative period.

Currently, LASIK is still the main refractive procedure performed because of its rapid and comfortable visual rehabilitation, good refractive stability, and lower potential for haze formation. Recent controversies concerning the advantages of surface versus lamellar refractive procedures have led to the development of thin-flap LASIK (in which LASIK is performed after creating intended regular thin flaps), which blends the advantages of both techniques by providing a faster and more comfortable visual recovery. Thin-flap LASIK also serves to preserve more stromal tissue, inducing less compromise of the corneal architecture and thereby theoretically reducing the possibility of ectasia secondary to thin stromal beds[2-5]. Additionally, thin-flap LASIK permits higher myopic and astigmatic corrections and allows wider optical zones that minimize unwanted scotopic visual symptoms.

The purpose of the present study was to evaluate the efficacy, safety, and stability of LASIK for myopic correction done under thin flaps and compare the results with those achieved with thick flaps using the Moria M2 microkeratome and the Allegretto wave eye Q excimer laser.

MATERIALS AND METHODS

Clinical setting

All procedures in this prospective, randomized, double-masked, controlled clinical study were performed in Mansoura Ophthalmic Center, Mansoura, Egypt. Patients included in the study were given a detailed explanation of the procedure and the risk/benefits of laser refractive surgery. Visual, verbal, or written informed consent was obtained from each patient. This study was approved by the human subjects committee and was performed in accordance with the Declaration of Helsinki (1989) of the World Medical Association.

Patients

The study included 150 eyes of 75 patients having spherical myopia, simple or compound myopic astigmatism without a history of previous refractive surgery. The mean age of the patients was 31 ± 9.2 years (range, 18-44 years). Forty-five patients were females and thirty patients were males.

Inclusion criteria were: (1) stable refraction for at least one year; (2) absence of any ocular pathology or surgical complications that might compromise the final visual outcome; (3) normal tear film with absence of dry eye; and (4) best-corrected visual acuity of 6/6 or 6/9 preoperatively.

Exclusion criteria were: (1) patients with previous intraocular surgery, corneal scarring, or active inflammation; (2) pachymetry value of less than 500 μm; (3) keratoconus; (4) schirmer test of less than 5.0 mm; and (5) associated posterior segment pathology.

Preoperative evaluation

All patients had a complete preoperative evaluation, including uncorrected and best-corrected visual acuity (UCVA, BCVA) using Landolt's broken ring chart, manifest and cycloplegic refraction, slit lamp biomicroscopy, Goldmann applanation tonometry, direct and indirect ophthalmoscopy, ultrasonic pachymetry (Nidek Up 1000), and corneal topography (Shin-Nippon CT-1000). The evaluation included dry eye symptoms (soreness, scratchiness, dryness and burning), tear film stability (break-up time), ocular surface staining and tear excursion (Schirmer Ⅰ test). Contact lenses were discontinued two weeks before surgery.

The selected eyes were randomly divided into two groups according to the intraoperative flap thickness created: (1) thin flap (120 μm) group included 75 eyes; (2) thick flap (150 μm) group included 75 eyes. The measurements of actual flap thickness were done by intraoperative subtraction pachymetry.

Surgical procedure

Data of the operated eye were introduced into the computer of the excimer Laser machine. The calculated treatment data included optic zone, ablation zone, ablation depth and residual stromal depth. They were selected on the basis of the degree of refractive error, central corneal thickness, and microkeratome head used so as to achieve postoperative emmetropia with a minimum residual stromal bed depth of 275 μm[6].

The surgical procedure was performed with benoxinate hydrochloride 0.4% eye drops. The Moria M2 automated microkeratome (Moria, Antony, France) was used in all cases. Two heads (90 and 130) were used to create a flap thickness of 120 μm and 150 μm in the thin and thick flap groups, respectively. In all cases the standard speed (speed 2) was used. Suction rings and stop were used according to the M2 microkeratome nomogram on the basis of the keratometric readings. Superior hinged flap was created. After the cut, suction was released and the corneal flap was lifted with a spatula. The ablation was performed in the stromal bed using the Allegretto wave eye Q excimer laser (Wave-light, Amswolfsmantel, Erlanger, Germany). The corneal flap and hinge were irrigated with balanced salt solution and the flap was gently repositioned and stretched onto the eye. A therapeutic contact lens (Acuvue, base curve 9.1 m) was applied for corneal flap protection.

Postoperative treatment involved topical moxifloxacin 0.5% and prednisolone acetate 1% eye drops four times daily for 1 wk together with artificial tears eye drops three times per day for 6 wk. Gradual withdrawal of topical steroids was done over 2 wk. Patients were followed up postoperatively at first week, and then every month until 12 mo.

Patients' data were recorded at each postoperative examination. To minimize bias all measurements were taken by the same examiner, who was masked with regard of two groups.

The follow-up examinations included: uncorrected visual acuity, slit-lamp biomicroscopy, keratometry, pachymetry, and corneal topography. A questionnaire was used at each visit to record the patient's subjective symptoms of dry eye: dryness, fluctuations of vision, blurring

Table 1 Preoperative data in the two groups

	Thin flap group (120 mm) n = 75	Thick flap group (150 mm) n = 75	P value[1]
Sphere (D)			
Mean ± SD	-5.0 ± 1.48	-3.0 ± 2.18	0.0701
Range	-2.0 to -14.0	-1.25 to -12.0	
Cylinder (D)			
Mean ± SD	-1.0 ± 1.21	-1.0 ± 1.85	0.0604
Range	0.0 to -5.0	0.0 to -3.0	
Spherical equivalent (D)			
Mean ± SD	-8.0 ± 4.06	-7.75 ± 2.37	0.8063
Range	-2.0 to -15.0	-1.5 to -13.0	
Pachymetry (mm)			
Mean ± SD	530 ± 35.88	545 ± 32.7	0.0006[2]
Range	450 to 625	495 to 634	
Keratometric value			
Mean ± SD	43.62 ± 1.3	44.72 ± 1.6	0.0122[2]
Range	40.0 to 47.1	40.80 to 47.50	

[1]Unpaired t test; [2]Significant P value.

of vision, and foreign body sensation. Postoperative results were assessed as follows:

Visual outcome: (1) Efficacy was represented as the percentage of eyes having no difference between postoperative UCVA and preoperative BCVA at one-week follow-up[3]; and (2) safety was assessed as the ratio postoperative BCVA /preoperative BCVA at the end of follow-up period[6].

Refractive outcome: Stability of the surgical procedure was measured as the percentage of eyes with postoperative manifest refractive spherical equivalent within ± 1.0 diopter at the end of follow-up period[7].

Statistical analysis

Data were collected and analyzed using the Statistical Program for the Social Sciences (SPSS) software (version 15; SPSS, Chigao, IL, United States). The quantitative variables were expressed as range or mean ± SD . Student t test was used to compare the quantitative data of the two groups while chi-square test was used to compare qualitative frequencies. A P value of less than 0.05 was considered to be statistically significant.

RESULTS

In all 150 eyes, the mean preoperative spherical equivalent refraction was -8.65 ± 2.6 D (range, -1.5 to -15 D), mean sphere was -4.4 ± 3.5 D (range, -1.25 to -14.0 D), and mean cylinder was -1.0 ± 1.3 D (range, 0 to 5.0 DC). The mean central corneal thickness was 546 ± 36.18 µm (range 500 µm to 645 µm).

Table 1 shows the preoperative data by group. There were significant differences between the thin (120 µm) and thick (150 µm) flap groups regarding pachymetry (thicker corneas had thicker flaps) and keratometric value (steeper cornea had thicker flaps). Although thin

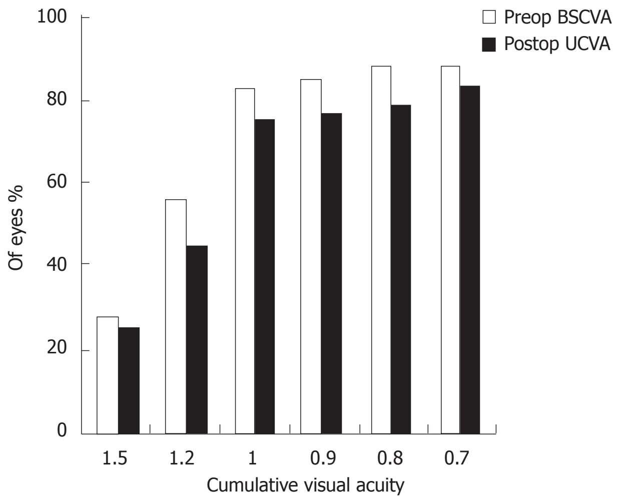

Figure 1 Cumulative visual acuity in the thin flap group. BSCVA: Best- corrected visual acuity; UCVA: Uncorrected visual acuity.

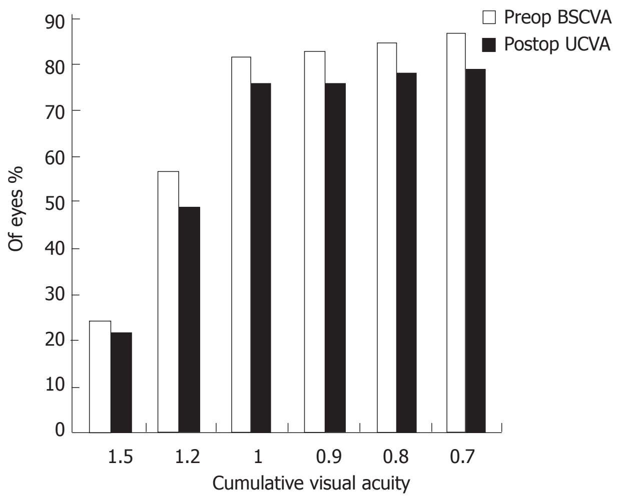

Figure 2 Cumulative visual acuity in the thick flap group. BSCVA: Best-corrected visual acuity; UCVA: Uncorrected visual acuity.

flaps were associated with higher degree of sphere and spherical equivalents to be corrected, the differences were insignificant.

LASIK was performed on 75 eyes with thin flaps (120 µm) using the 90 microkeratome head. The mean ablation depth was 88.6 ± 31.21 µm (range, 28-158 µm), and mean optic zone was 6.5 mm. Sixty-five eyes (43.3%) were operated after 150 µm flap creation using the 130 microkeratome head. The mean ablation depth was 66 ± 28.16 µm (range, 28-134 µm), and mean optic zone was 6.0 mm. The amount of ablation was significantly larger in the thin flap group than in the thick flap group (P = 0.004). The difference in the optic zone was insignificant.

Figures 1 and 2 show the cumulative visual acuity in the thin and thick flap groups, respectively. No significant differences were found between the thin and thick flap groups.

Seventy-one eyes in the thin flap group achieved the preoperative BCVA with efficacy percentage of 94.8% as

Table 2 Percentages of efficacy, safety and stability of the studied groups

	Thin flap group (%)	Thick flap group (%)	*P* value[1]
Efficacy	94.8	90.8	0.003[2]
Safety	94.8	91.7	0.004[2]
Stability	90.1	86.3	0.005[2]

[1]χ^2 test; [2]Significant *P* value.

compared to 90.8% in the thick flap group (67 eyes). This difference was statistically significant ($P < 0.05$). Three month postoperatively, all the operated eyes had UCVA equal to the preoperative BCVA in the two groups with efficacy percentage of 100% (Table 2).

Figures 3 and 4 show the sphere, cylinder, and spherical equivalent in the thin and thick flap groups 12 mo postoperatively, respectively. No significant differences were found between the thin and thick flap groups.

The percentage of eyes that lost one or more lines of Landolt chart postoperatively was 7.3% (11 eyes). They were three eyes (4.0%) in the thin flap group (safety 94.8%) and 6 eyes (8.0%) in the thick flap group (safety 91.7%). The 11 eyes lost only one line of Landolt visual acuity chart. No eyes in the study lost two or more lines. At 12 mo after LASIK, 65 eyes (86.6%) of the thin flap group and 59 eyes (78.7%) of the thick flap group were within ±1.0 D spherical equivalent (SE) of the attempted refraction. This difference was the measure of stability which was significantly higher in the thin flap group (90.1%) than in the thick flap group (86.3%).

Enhancement was performed in only eight eyes (5.3%) 12 mo after LASIK in the study. Though insignificant, the thin flap group had a lower rate of enhancement (3 eyes, 4.0%) than the thick flap group (5 eyes, 6.6%).

There were no intraoperative complications, especially flap-related problems such as free or incomplete flap or flaps with button-holes. No postoperative complications occurred. Subjective symptoms of dry eye such as dryness, blurring of vision, and foreign body sensation occurred in 20.7% (20) of eyes in the thin flap group and 33.3% (25) of eyes in the thick flap group. However, these symptoms were transient and disappeared after the use of lubricant eye drops and gel.

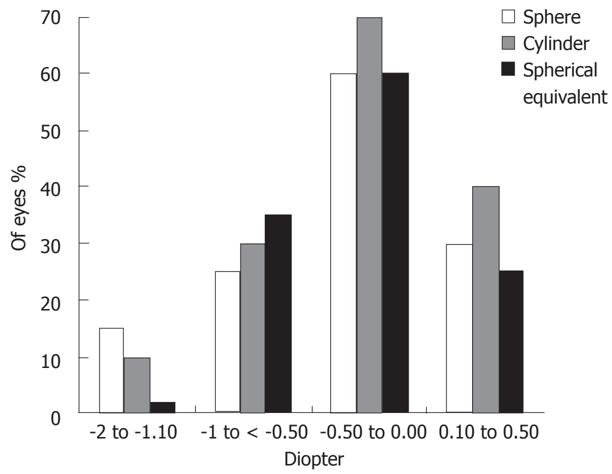

Figure 3 Postoperative refractive values in the thin flap group.

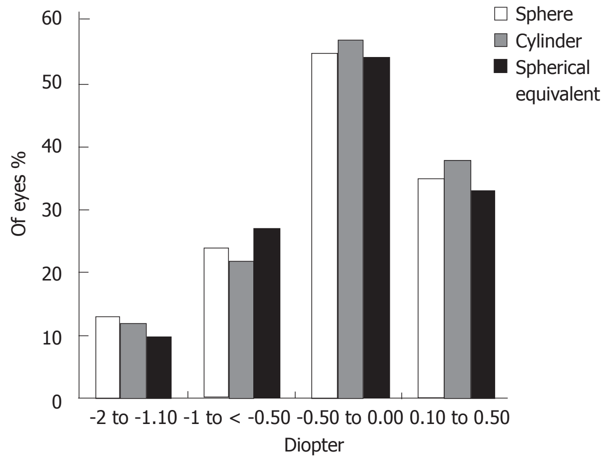

Figure 4 Postoperative refractive values in the thick flap group.

DISCUSSION

Flap thickness is a parameter in modern LASIK surgery. Innovations in excimer laser technology have improved the optical quality of the excimer laser profile. Together with the increasing use of the femtosecond laser, this has initiated the impact of flap thickness on the outcomes of LASIK.

Ectasia following LASIK surgery has been reported numerous times in ophthalmic literature, and predictability of flap thickness plays an important role in that risk[8,9]. Thin-flap LASIK is becoming more routine as refractive surgeons and patients continue to pursue the rapid healing advantages of LASIK but wish to minimize the risk for ectasia.

Studies evaluating the effect of corneal flap thickness on LASIK outcomes report conflicting results. Yi *et al*[10] found slightly better visual outcomes in the thick-flap group (> 165 μm) than in the thin-flap group (< 135 μm). Yeo *et al*[2] observed a higher incidence of central corneal opacity after LASIK with thin flaps (mean thickness 88.89 ± 8.07 μm). A possible explanation is injury to Bowman's layer by the blade or a hidden masked button-hole, camouflaged by intact epithelium, which may have caused central corneal scarring. The reason for the better outcomes achieved by thick-flap LASIK in these studies seems to be that the thin flap was an unintended complication; hence, it may have been irregular.

Recent retrospective studies evaluated the effect of intended thin flaps on the outcomes of LASIK 1, 3 and 6 mo after surgery and proposed that intended thin flaps for myopic LASIK were associated with better early visual and refractive results than thick flaps. Prandi *et al*[5] showed that thin flaps were associated with better UCVA at 3 mo and better residual spherical equivalent (SE) at 6 mo.

Eleftheriadis *et al*[11] reported faster visual recovery (UCVA at 1 wk and 3 mo) and lower postoperative myopic SE in eyes with thinner flaps. Cobo-Soriano *et al*[3] found that patients with thin flaps achieved better contrast sensitivity and lower re-treatment rates.

The present study was in agreement with these studies. It shows better UCVA in the thin flap group with higher efficacy (94.8%) as compared to the thick flap group (90.8%) one week postoperatively. However, efficacy was 100% and equal in the two groups three months postoperatively. Degree of postoperative astigmatism at 12-mo follow-up was low (mean -0.76 ± 0.42) in the thin flap group and similar to that in the thick flap group. Furthermore, thin-flap LASIK was associated with significant ablation depth, hence permitting higher degrees of myopic correction.

Preoperatively the BCVA was 6/6 in 64 eyes (85.3%) in the thin flap group and in 62 eyes (82.7%) in the thick flap group. BCVA was 6/9 in 11 eyes (14.7%) in the thin flap group *vs* 14 eyes (18.7%) in the thick flap group. One week postoperatively, 62 eyes (82.7%) in the thin flap group and 55 eyes (73.3%) in the thick flap group had uncorrected visual acuity of 6/6. Ten eyes (13.7%) and 7 eyes (9.3%) respectively had UCVA of 6/9.

No intraoperative or postoperative complications occurred either in the thin or thick flap group. This was in accordance with the finding reported by Prandi *et al*[5], who showed that thin flaps were as safe as and did not create significant postoperative complications compared with conventional flaps. Also, Azar *et al*[6] reported no flap complications in their study. However, Esquenazi *et al*[7] showed an increased incidence of intraoperative and early postoperative complications in the thin-flap group compared with the medium- and thick-flap LASIK groups. Thin flaps were associated with buttonholes in 3% and epithelial defects in 7% of cases. These results suggested that surgeons performing thin flaps should follow up those patients more closely, especially in the first week after surgery.

Other advantages exist for thin-flap LASIK beyond the decreased risk for corneal ectasia. Anatomically, the anterior stroma is more compact[12], creating a smooth flap interface and anterior stromal bed surface, which is quite noticeable intraoperatively under the laser microscope. Thinner flaps have less edema[13] and are more easily stretched back into position to minimize or eliminate microstriae. This lessens the gap noted at the outer edge of the flap.

Theoretically, less flap bulk should allow better adherence of the flap created by the endothelial pumping mechanism, and this may lessen the risk for flap slippage and macrostriae. A smaller gap may also translate into less risk for epithelium in growth. Terminal corneal nerve bulbs are cut closer to the epithelial surface and they are fewer in number in thin flap, thus requiring less nerve regeneration and perhaps inducing fewer dry eye problems than in thick-flap LASIK[4].

Although corneal sensitivity was not measured in the present study, the incidence of subjective dry eye symptoms was lower in the thin flap group than in the thick flap group. Esquenazi *et al*[7] found no differences in these symptoms among their three groups.

Although Esquenazi *et al*[7] demonstrated a higher rate of complications in thin-flap LASIK compared to medium- and thick-flap LASIK, they stated that if no complications are encountered or if they are managed successfully, thin-flap LASIK has long term stability comparable to conventional flap thickness LASIK. Also, Azar *et al*[6] found that the stability of thin-flap LASIK was similar to that of conventional thick-flap LASIK in corneas with equivalent residual stromal bed thickness. In their study, there was a trend towards a lower retreatment rate in the thin flap group than in the thick flap group. This is consistent with the present study which showed higher (90.1%) stability of thin-flap LASIK than thick-flap LASIK (87.3%) together with a lower rate of enhancement at six-month follow-up.

In summary, despite the conventional LASIK procedure used in this study, thin-flap LASIK is an effective and safe technique to correct myopic defects since it blends the advantages of surface procedures with the rapid and comfortable visual recovery of lamellar approaches. It achieves better visual results, more rapid visual postoperative recovery, stable postoperative refraction with better residual spherical equivalent, low degree of astigmatism, and a lower rate of enhancement than LASIK with thicker flaps. The accepted concept is that the main reason for creating thinner flaps is to have stronger corneas with wider ablations that provide higher vision quality and not to extend the range of power correction.

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COMMENTS

Background

To evaluate the efficacy, safety, and stability of laser-assisted subepithelial keratectomy (LASIK) for myopic correction done under thin flaps and compare the results with those achieved with thick flaps. LASIK is still the main refractive procedure performed because of its rapid and comfortable visual rehabilitation, good refractive stability, and lower potential for haze formation.

Research frontiers

Thin-flap LASIK is effective and safe to correct myopic defects. It achieves better visual results, rapid visual recovery, and stable postoperative refraction than LASIK with thicker flaps.

Innovations and breakthroughs

No intraoperative or postoperative complications occurred either in the thin or thick flap group. This finding is consistent with that reported by Prandi *et al*, who showed that thin flaps are as safe as and do not create significant postoperative complications compared with conventional flaps. Also, Azar *et al* reported no flap complications in their study.

Applications

Despite the conventional LASIK procedure used in this study, thin-flap LASIK is an effective and safe technique to correct myopic defects since it blends the advantages of surface procedures with the rapid and comfortable visual recovery of lamellar approaches. It achieves better visual results, more rapid visual postoperative recovery, stable postoperative refraction with better residual spherical equivalent, low degree of astigmatism, and a lower rate of enhancement than LASIK with thicker flaps. The accepted concept is that the main reason for creating thinner flaps is to have stronger corneas with wider ablations that provide higher vision quality and not to extend the range of power correction.

Peer review

The paper is interesting and readable.

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MEETINGS

Events Calendar 2012

JaJanuary 13-15, 2012
3rd Annual Congress of ASETCIRC
Athens, Greece

January 13-15, 2012
7th Pan-Hellenic Vitreo-Retinal Meeting
Athens, Greece

January 14-15, 2012
7th Pan-Hellenic Vitreo-Retinal Meeting
St. Gallen, Switzerland

January 20-21, 2012
2nd EURETINA Winter Meeting
Madrid, Spain

January 28, 2012
16th ESCRS Winter Meeting
Rome, Italy

February 3-5, 2012
ASCRS 2012 - Winter update
Prague, Czech Republic

February 16-20, 2012
World Ophthalmology Congress 2012
Abu Dhabi, United Arab Emirates

February 16-20, 2012
World Ophthalmology Congress 2012
Play del Carmen, Mexico

February 16-20, 2012
2nd EUROLAM Macula and Retina Congress
Abu Dhabi, United Arab Emirates

March 5-7, 2012
2nd International Conference on Clinical & Experimental Ophthalmology
Omaha Marriott, NE, United States

March 16-17, 2012
3rd COPHy - Controversies in Ophthalmology
Miami, FL, United States

March 22-25, 2012
27th Asia Pacific Academy of Ophthalmology Congress - APAO/SOE
Istanbul, Turkey

March 22-25, 2012
The 3rd World Congress on Controversies in Ophthalmology
Istanbul, Turkey

March 29-April 1, 2012
International Congress of Ophthalmology and Optometry
Hangzhou, China

April 12, 2012
Conference for Ophthalmic Educators in Busan
Busan, South Korea

April 13-16, 2012
The 27th Asia Pacific Academy of Ophthalmology Congress
BEXCO, Busan, South Korea

April 13-16, 2012
ARVO 2012
Busan, South Korea

April 20, 2012
The America Conference on Pediatric Cerebral Visual Impairement
Children's Hospital and Medical Center
Omaha, Nebraska

May 5, 2012
ARVO/ISIE Imaging Conference
Fort Lauderdale, FL, United States

May 6-10, 2012
10th International Congress of Società Oftalmologica Italiana
Fort Lauderdale, FL, United States

May 23-26, 2012
16th Afro-Asian Congress of Ophthalmology - 5th Mediterranean Retina Meeting
Milan, Italy

June 13-16, 2012
25th International Congress of German Ophthalmic Surgeons
Istanbul, Turkey

June 14-17, 2012
10th European Glaucoma Society Congress
Nuernberg, Germany

June 15–16, 2012
Drug and Gene Delivery to the Back of the Eye: From Bench to Bedside
Aurora, Colorado

June 17-22, 2012
EUPO 2012
Copenhagen, Denmark

June 29-July 1, 2012
ISER 2012
Leuven, Belgium

July 22-27, 2012
12th EURETINA Congress
Berlin, Germany

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Milan, Italy

September 8-12, 2012
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Milan, Italy

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ICO 2012: International Conference on Ophthalmology
Berlin, Germany

September 21-22, 2012
92nd National Congress of Società Oftalmologica Italiana
Boston, MA, United States

October 19-20, 2012
6th International Conference on Ocular Infections
Milan, Italy

November 28-December 1st, 2012
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INSTRUCTIONS TO AUTHORS

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The columns in the issues of *WJO* will include: (1) Editorial: To introduce and comment on the substantial advance and its importance in the fast-developing areas; (2) Frontier: To review the most representative achievements and comment on the current research status in the important fields, and propose directions for the future research; (3) Topic Highlight: This column consists of three formats, including (A) 10 invited review articles on a hot topic, (B) a commentary on common issues of this hot topic, and (C) a commentary on the 10 individual articles; (4) Observation: To update the development of old and new questions, highlight unsolved problems, and provide strategies on how to solve the questions; (5) Guidelines for Clinical Practice: To provide guidelines for clinical diagnosis and treatment; (6) Review: To systemically review the most representative progress and unsolved problems in the major scientific disciplines, comment on the current research status, and make suggestions on the future work; (7) Original Articles: To originally report the innovative and valuable findings in ophthalmology; (8) Brief Articles: To briefly report the novel and innovative findings in ophthalmology; (9) Case Report: To report a rare or typical case; (10) Letters to the Editor: To discuss and make reply to the contributions published in *WJO*, or to introduce and comment on a controversial issue of general interest; (11) Book Reviews: To introduce and comment on quality monographs of ophthalmology; and (12) Guidelines: To introduce consensuses and guidelines reached by international and national academic authorities worldwide on the research in ophthalmology.

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Acknowledgments

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5 **Vallancien G**, Emberton M, Harving N, van Moorselaar RJ; Alf-One Study Group. Sexual dysfunction in 1, 274 European men suffering from lower urinary tract symptoms. *J Urol* 2003; **169**: 2257-2261 [PMID: 12771764 DOI:10.1097/01.ju.0000067940.76090.73]

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6 21st century heart solution may have a sting in the tail. *BMJ* 2002; **325**: 184 [PMID: 12142303 DOI:10.1136/bmj.325.7357.184]

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9 Outreach: Bringing HIV-positive individuals into care. *HRSA Careaction* 2002; 1-6 [PMID: 12154804]

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10 **Sherlock S**, Dooley J. Diseases of the liver and billiary system. 9th ed. Oxford: Blackwell Sci Pub, 1993: 258-296

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12 **Breedlove GK**, Schorfheide AM. Adolescent pregnancy. 2nd ed. Wieczorek RR, editor. White Plains (NY): March of Dimes Education Services, 2001: 20-34

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14 **Christensen S**, Oppacher F. An analysis of Koza's computational effort statistic for genetic programming. In: Foster JA, Lutton E, Miller J, Ryan C, Tettamanzi AG, editors. Genetic programming. EuroGP 2002: Proceedings of the 5th European Conference on Genetic Programming; 2002 Apr 3-5; Kinsdale, Ireland. Berlin: Springer, 2002: 182-191

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15 Morse SS. Factors in the emergence of infectious diseases. Emerg Infect Dis serial online, 1995-01-03, cited 1996-06-05; 1(1): 24 screens. Available from: URL: http://www.cdc.gov/ncidod/eid/index.htm

Patent (list all authors)

16 **Pagedas AC**, inventor; Ancel Surgical R&D Inc., assignee. Flexible endoscopic grasping and cutting device and positioning tool assembly. United States patent US 20020103498. 2002 Aug 1

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Write as mean ± SD or mean ± SE.

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