Evaluation Of Choroidal Thickness and Choroidal Vascular Index In Patients Undergoing PRK and FS-LASIK

Sefa Ünal[1], *Zeynep Duru*[2]

ABSTRACT

Purpose: To investigate the changes of subfoveal choroidal thickness (SFCT) and subfoveal and submacular choroidal vascularity index (CVI) in eyes underwent photorefractive keratectomy (PRK) and femtosecond laser-assisted in situ keratomileusis (FS-LASIK) surgery.

Methods: In this single-center, retrospective cross-sectional study, 32 eyes from 32 patients in FS-LASIK and 38 eyes from 38 patients in PRK were included. All participants were examined by enhanced depth imaging optical coherence tomography (EDI-OCT) for SFCT and subfoveal and submacular CVI measurements at pre-operatively and post-operative 1st and 7th day.

Results: The mean spherical equivalent was higher in FS-LASIK group than PRK group in the pre-operative period ($p < 0.001$), but similar in both groups in the post-operative period ($p > 0.05$, for both). The mean SFCT and subfoveal CVI statistically significant increase in both groups on the 1st post-operative day compared to the pre-operative period ($p < 0.05$, for both). There was no significant difference in submacular CVI in both groups between pre-operative and post-operative period ($p > 0.05$, for both).

Conclusion: We found an increase in SFCT and subfoveal CVI in both groups on the first post-operative day. This may be due to increased inflammatory response and vascular permeability after surgery. Additionally, in the FS-LASIK group, mechanical stretching of the choroid during the vacuum phase and the temporary increase in IOP may have contributed to this increase.

Keywords: Femtosecond laser- assisted laser in situ keratomileusis; Photorefractive keratectomy; Spectral-domain optical coherence tomography; Enhanced depth imaging; Choroidal thickness; Choroidal vascularity index

1. INTRODUCTION

Described in 1983 by Trokel et al., the PRK method offered safe and good visual results and has continued to be used in patients for many years.[1] However, pain in the early postoperative period and corneal haze and myopic regression in the late postoperative period have been the main disadvantages of PRK, so new research has been conducted.[2] In 1989, Pallikaris described the "Laser in situ keratomileusis" (LASIK) technique.[3] As LASIK has become more popular and has been performed on more patients, there has been an increase in publications about the method and it has become clear that LASIK also has important complications. Among these complications, flap complications play an important role.[4] In addition, studies have shown that there is a significant increase in intraocular pressure (IOP) during the vacuum phase of LASIK.[5] Acute IOP elevation can lead to macular and optic nerve head ischaemia, resulting in photoreceptor and ganglion cell damage.[6]

1 Health Sciences University, Kayseri Training and Research Hospital, Department of Ophthalmology, Kayseri, Türkiye

2 Health Sciences University, Kayseri Faculty of Medicine, Department of Ophthalmology, Kayseri, Türkiye

Received: 10.02.2026
Accepted: 24.06.2026
J Ret-Vit 2026; 35: 228-238
DOI:10.37845/ret.vit.2026.35.29

Correspondence author:
Sefa Ünal
Email: drsefaunal@gmail.com

Copyright © 2026 The author(s). This is an open-access article under the terms of the Creative Commons Attribution License (CC BY) which permits unrestricted use, distribution, and reproduction in any medium or format, provided the original work is properly cited.

Enhanced Depth Imaging optical coherence tomography (EDI-OCT), which provides high-resolution cross-sectional images, is a non-invasive technology used to evaluate not only retinal structures but also choroidal tissue. The choroidal vascular index (CVI) is calculated as the ratio of the luminal area of the vascular structures in the choroid to the total choroidal area using parameters obtained by binarization of these images. In this way, choroidal vascular structures can be quantitatively evaluated. It provides a more comprehensive evaluation compared to choroidal thickness measurement alone.[7]

Although many studies have investigated changes in the anterior segment after refractive surgery, there are few studies evaluating changes in CVI after refractive surgery.[8,9] We suggest that choroidal thickness and CVI may change after refractive surgery techniques including aspiration. Therefore, the aim of this study was to compare the changes in choroidal thickness and CVI in patients undergoing PRK and FS-LASIK using EDI-OCT.

2. MATERIAL AND METHODS

This cross-sectional, retrospective study was conducted in the Department of Refractive Surgery at Kayseri City Training and Research Hospital. The patients who underwent refractive surgery for myopia and myopic astigmatism between January 2022 to August 2022 were included in our study. The study was performed according to the Declaration of Helsinki and was approved by the local ethics committee in Kayseri City Training and Research Hospital (No:744).

2.1. Inclusion and exclusion criteria

The cases between the ages of 18-40 years conducted refractive surgery for myopia or myopic astigmatism, had myopia below -7.00D and myopic astigmatism below -5.00D were included in this study.

Exclusion criteria were an increase of 0.5 D or more in refractive error in 1-year, corneal diseases (keratitis, keratoconus, corneal degenerations), dry eye, glaucoma, vitreoretinal pathologies, ocular inflammation, optic neuropathies, any optic media opacities, ocular trauma, history of previous intraocular surgery or laser therapy. Also, the patients with any associated systemic disease (eg, neurological disorders, connective tissue disease, diabetes mellitus) were excluded. Additionally, eyes were excluded from the study when the EDI-OCT images did not allow clear delineation of anterior and posterior borders of the choroid.

2.2. *Study design and optical coherence tomography*

The age, sex and history of systemic or ocular diseases of the patients included in the study were recorded. Best corrected visual acuity (BCVA), spherical and cylindrical refractions, spherical equivalent (SE) and IOP values measured by Goldmann applanation tonometry were recorded preoperatively and on postoperative 7th day. Anterior and posterior segment examination findings evaluated by biomicroscopy were recorded. Preoperative corneal topographies (Pentacam HR, Oculus, Wetzlar, Germany) were evaluated.

EDI-OCT data (software version 5.6.4.0; Spectralis OCT Heidelberg Engineering, Dossenheim, Germany) including the foveal centre were obtained preoperatively and on postoperative 1st and 7th days. Images with a signal strength of greater than 25 dB and complete central focusing were selected for inclusion in the study. Subfoveal choroidal thickness (SFCT) was obtained by measuring the distance between the outer edge of the hyperreflective retinal pigment epithelium and the choroidal-sclera border on an EDI-OCT image. The measurement was performed by using the measurement tool of the software and a line starting from the outer edge of the retinal pigment epithelium and perpendicular to this edge was brought to the choroid-sclera border (Figure 1). The measurements were repeated on three times and the resulting mean value was calculated.

The preoperative and postoperative 1st and 7th days EDI-OCT images were used to calculate CVI using Image J software (provided in the public domain by the National Institutes of Health, Bethesda, MD, USA; http://imagej.nih.gov/ij/), a publicly available software developed for image processing and analysis.[10] Firstly, the images were loaded into Image J programme for CVI calculation. The 'Line' tool was selected and the length scale at the bottom left of the EDI-OCT image was calibrated to the number of pixels. The images were then converted to 8-bit format and the Niblack setting was selected from the 'automatic local threshold' to make the choroid-sclera interface easier

to select. The polygon tool was used to select the region of interest (ROI) from the EDI-OCT images. The upper boundary of this region was the intersection of the retina and choroid, and the lower boundary was the intersection of the choroid and sclera. For each image, 2 different selections of 1500 microns and 6000 microns width were made using the central fovea as the centre. Each selected area was registered in the ROI manager. To better visualise the vascular bed, the first bar in the colour threshold was set to 0 and the second bar to 250 and this second image was also saved in the ROI manager. These two images were merged and the first and last areas were measured and recorded using the ROI manager. After dividing the last area obtained by the first area, the CVI was obtained. The CVI values obtained from preoperative and postoperative EDI-OCT images on day 1 and day 7 at 1500 microns (subfoveal) and 6000 microns (submacular) distance from the fovea were repeated 3 times and the mean was recorded (Figure 2).

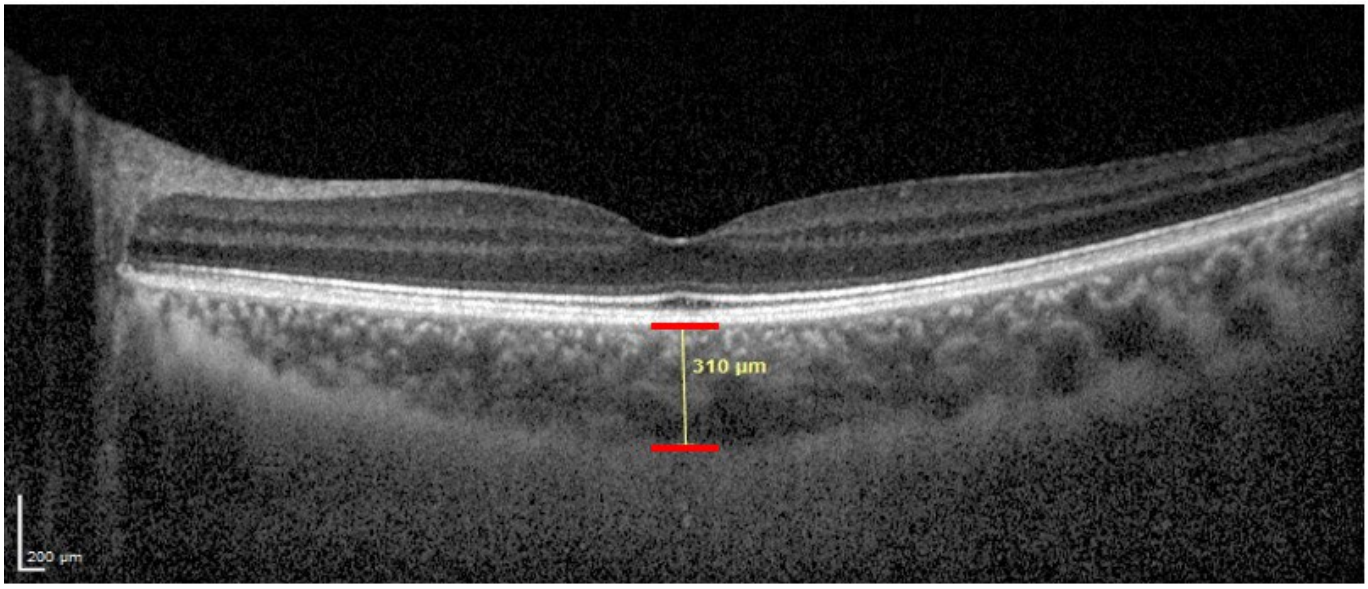

Figure 1: *The enhanced depth imaging optical coherence tomography (EDI-OCT) image shows anterior and posterior borders of choroid (red lines). The subfoveal choroidal thickness (SFCT) was measured as the perpendicular distance between the outer border of the hyperreflective retinal pigment epithelium and choroidal scleral border at fovea (yellow line).*

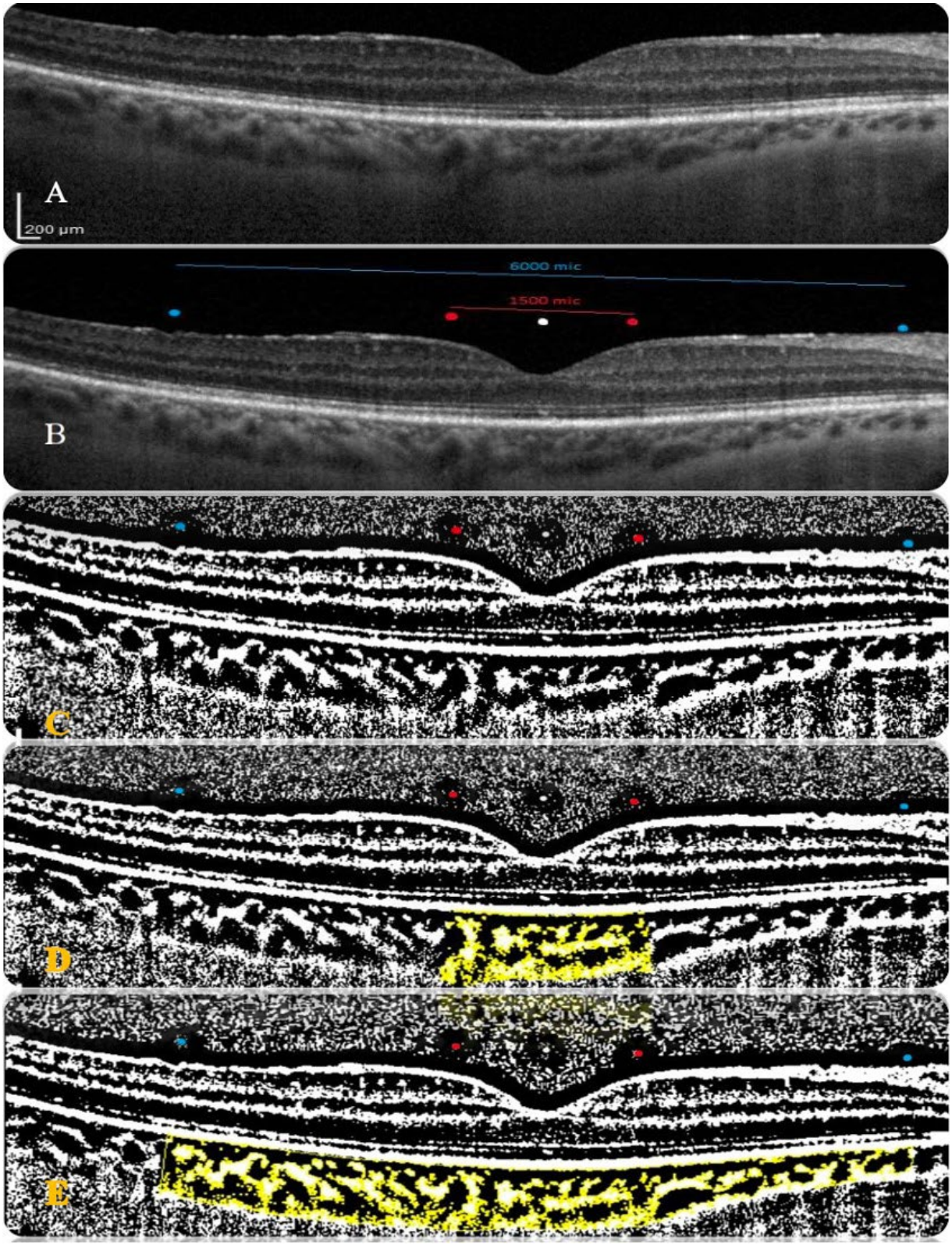

Figure 2: *Stages of CVI calculation A) loading the EDI-OCT image into Image J, B) after defining the horizontal length scale in the lower left quadrant, adding markers indicating the length of 1500 and 6000 microns, C) the image after conversion to Niblack local threshold, D) merging the subfoveal (1500 microns) and E) submacular (6000 microns) images in the ROI manager.*

2.3. Refractive Procedures

2.3.1.PRK

For topical anaesthesia, 0.5% proparacaine hydrochloride (Alcaine eye drops, Alcon, Canada) was instilled. A 9.00 mm diameter alcohol holding chamber was used to remove the central corneal epithelium. The chamber was filled with 20% alcohol solution and kept for 20 seconds. The alcohol-soaked epithelium was debrided with a spatula to expose the stromal bed. The VISX STAR S4-IR platform (Abbott Medical Optics, Inc., Santa Ana, CA, USA) was used for photoablation. The optical zone was maintained at 6.0 mm and the transition zone at 8.0 mm. Ablation was performed at a depth appropriate for the amount of refraction. After the ablation was completed, the ocular surface was washed extensively with pre-cooled Balanced salt solution. After the ablation was completed, a previously prepared 0.2mg/ml Mitomycin C (MMC) impregnated sponge was placed on the ablated surface to reduce the risk of postoperative corneal haze in all cases. Moxifloxacin 0.5% drops were instilled. The procedure was completed by applying a bandage contact lens. All patients were treated bilaterally in the same surgical session unless there were contraindications.

2.3.2. FS-LASIK

The corneal tissue, including epithelium and stroma, to be lifted as a flap was created using a femtosecond laser on the IntraLase FS60 platform (Abbott Medical Optics Inc, Santa Ana, California). An 8.8mm diameter, 100 micron deep corneal flap was created. The hinge of the flap was at 12 o'clock and the hinge angle was 45 degrees. The bed energy was set at 0.85 and the spot size was set at 7. The lateral incision angle is 110 degrees. Laser ablation was performed with a VISX STAR S4-IR (Abbott Medical Optics, Inc., Santa Ana, CA, USA). 6.0 mm optical zone and 8.0 mm transition zone were used. After washing the stroma, the lifted flap was returned to its original position. All patients were treated bilaterally in the same surgical session unless there were contraindications.

The patients were examined on the 1st day and the 1st week after the surgery. After confirming that the epithelial opening was closed, contact lenses were removed in patients undergoing PRK. Anterior segment examination and EDI-OCT were performed on 1st day. On 7th day, BCVA, IOP measurement, anterior segment and fundus biomicroscopic examinations and EDI-OCT scans were performed.

2.4. *Statistical analysis*

Descriptive statistics were tabulated as mean ± standard deviation to summarise the data obtained from the study. Normality of numerical variables was tested using Shapiro-Wilk test. The Pearson chi-squared test was used to compare differences between categorical variables by group in 2x2 tables with expected observations of 5 and above. Independent samples t-test was used when numerical variables were normally distributed, and Mann-Whitney U test was used when numerical variables were not normally distributed. For statistical comparisons between pre and post-operative measurements, the Wilcoxon test was used when numerical variables were not normally distributed, and the paired samples t-test was used when they were normally distributed. Statistical analyses were performed using Jamovi (version 2.3.24.0) and JASP (version 0.17.1), and the significance level for statistical analyses was set at 0.05 (p-value).

3. RESULTS

A total of 70 right eyes of 70 patients (32 FS-LASIK and 38 PRK) were included in the study. The mean age of the patients was 26.2 ± 4.6 years in the PRK group and 27.8 ± 5.3 years in the FS-LASIK group. There was no significant difference in mean age between the groups (p=0.856). In the PRK group 14 were male and 24 were female and in the FS-LASIK group 12 were male and 20 were female. There was no significant difference in gender between the groups (p=0.999). The preoperative mean central corneal thickness was 537.1 ± 25.5 in the PRK group and 549.2 ± 28.5 in the FS-LASIK group and there was no significant difference between the groups (p=0.068). The laser ablation depth was significantly greater in the FS-LASIK group (71.0 ± 20.9) than in the PRK group (49.9 ± 15.4) (p<0.001) (Table 1).

Pre- and post-operative measurements of spherical value, cylindrical value and spherical equivalent showed a statistically significant reduction in the PRK and FS-LASIK groups (p<0.05 for each). Preoperative spherical, cylindrical and spherical equivalent measurements were significantly higher in the FS-LASIK group than in the PRK group (p=0.016, p=0.009, p<0.001, respectively),

while no significant difference was found between the FS-LASIK and PRK groups in postoperative measurements (p>0.05 for each). In the PRK and FS-LASIK groups, there was no significant difference in BCVA and IOP between the pre and post-operative measurements (p>0.05 for each group) (Table 2).

There was no statistically significant difference between the FS-LASIK and PRK groups in preoperative, postoperative 1st day and postoperative 7th day measurements of CFCT, subfoveal CVI and submacular CVI (p>0.05 for each group) (Table 3).

In the FS-LASIK group, there was a statistically significant increase in SFCT on postoperative 1st day compared to the preoperative period (p<0.01). No significant change was observed between preoperative period and postoperative 7th day. However, postoperative 1st day SFCT was significantly thicker than postoperative 7th day SFCT (p<0.001). In the PRK group, preoperative SFCT was significantly thinner than on postoperative 1st and 7th days (p<0.05 for each). No significant change in SFCT was observed between postoperative 1st and 7th days (p=0.997). A statistically significant increase in subfoveal CVI was observed in the FS-LASIK and PRK groups on postoperative 1st day compared to the preoperative period (p<0.05 and p<0.001, respectively). There was no significant difference between preoperative and postoperative 7th day measurements (p=0.548, p=773). Postoperative 1st day subfoveal CVI was statistically significantly higher in both groups compared to postoperative 7th day (p<0.05 for each group). There was no significant difference between preoperative, postoperative 1st day and postoperative 7th day measurements of submacular CVI in the FS-LASIK and PRK groups (p>0.05 for each) (Table 4).

Table 1. *Demographic and ocular characteristics of groups.*

	FS-LASIK (n:32)	PRK (n:38)	P value*
Age (years) †	27.8 ± 5.3	26.2 ± 4.6	0.856
Gender (male/female)(n)	12/20	14/24	0,999
CCT (µm) †	549.2 ± 28.5	537.1 ± 25.5	0,068
Ablation Depth (µm) †	71.0 ± 20.9	49.9 ± 15.4	< 0,001
CCT :Central corneal thickness			

Bold value indicates the p value < 0.05
†: Mean ± standard deviation
*:Mann Whitney U test

Table 2. *Comparison of ocular characteristics between groups, and preoperative and post-operative periods in-group.*

	FS-LASIK (n:32)	PRK (n:38)	P value*
Spherical (D)			
PreOp §	-3.6 [-6.0 – -0.5]	-2.9 [-5.2 – -0.2]	**0,016**
PostOp §	-0.1 [-1.0 – 1.0]	-0.2 [-0.8 – 1.2]	0,586
*p-value***	**< 0,001**	**< 0,001**	
Cylinder (D)			
PreOp §	-1.4 [-4.2 – 0.0]	-0.8 [-3.0 – 0.0]	**0,009**
PostOp §	-0.2 [-1.0 – 0.5]	-0.2 [-2.2 – 0.8]	0,086
*p-value***	**< 0,001**	**< 0,001**	
Spherical equivalent (D)			
PreOp §	-4.6 [-6.2 – -2.0]	-3.1 [-5.5 – -1.0]	**< 0,001**
PostOp §	-0.2 [-1.0 – 0.8]	-0.2 [-1.0 – 75.0]	0,161
*p-value***	**< 0,001**	**< 0,001**	
BCVA			
PreOp §	1.0 [0.8 – 1.0]	1.0 [0.8 – 1.0]	0,570
PostOp §	1.0 [0.8 – 1.0]	1.0 [0.8 – 1.0]	0,085
*p-value***	0,325	0,524	
IOP (mmHg)			
PreOp §	17.5 [12.0 – 27.0]	17.0 [11.0 – 21.0]	0,677
PostOp §	15.0 [12.0 – 23.0]	16.5 [11.0 – 23.0]	0,545
*p-value***	0,088	0,187	

Preop:Preoperative, Postop:Postoperative , BCVA:Best corrected visual acuity, IOP: Intraocular pressure
§: median (minimum-maximum)
Bold values indicate the p-value < 0.05
*. Mann-Whitney U test.
**. Wilcoxon test.

Table 3. *Comparisons of subfoveal choroidal thickness, subfoveal and submacular choroidal vascular index measurements between groups.*

	FS-LASIK (n:32)	PRK (n:38)	P value*
Subfoveal choroidal thickness			
PreOp †	279.1 ± 73.8	274.5 ± 60.9	0,779
PostOp 1st day†	283.9 ± 74.5	276.9 ± 60.8	0,675
PostOp 7th day †	276.7 ± 72.6	277.0 ± 59.9	0,986
Subfoveal CVI			
PreOp†	0.624 ± 0.45	0.631 ± 0.38	0,453
PostOp 1st day †	0.634 ± 0.43	0.637 ± 0.38	0,764
PostOp 7th day†	0.624 ± 0.42	0.631 ± 0.38	0,476
Submacular CVI			
PreOp †	0.631 ± 0.42	0.639 ± 0.35	0,397
PostOp 1st day †	0.632 ± 0.49	0.639 ± 0.34	0,530
PostOp 7th day †	0.629 ± 0.40	0.638 ± 0.35	0,312

Preop:Preoperative, Postop:Postoperative, CVI: Choroidal vascular index
†: Mean ± standard deviation
*: Independent Samples T-Test

Table 4. *Comparisons of subfoveal choroidal thickness, subfovel and submacular choroidal vascular index measurements preoperative and postoperative 1st and 7th days in both groups*

			FS-LASIK	PRK
Subfoveal choroidal thickness			P values*	
PreOp	-	PostOp 1st day	**<0.05**	**<0.001**
PreOp	-	PostOp 7th day	0.268	**0.003**
Postop 1st day	-	PostOp 7th day	<0.001	0.943
Subfoveal CVI				
PreOp	-	PostOp 1st day	**<0.05**	**<0.001**
PreOp	-	PostOp 7th day	0.548	0.773
PostOp 1st day	-	PostOp 7th day	**<0.05**	**<0.05**
Submacular CVI				
PreOp	-	PostOp 1st day	0.881	0.792
PreOp	-	PostOp 7th day	0.740	0.661
PostOp 1st day	-	PostOp 7th day	0.545	0.781

Preop:Preoperative, Postop:Postoperative, CVI: : Choroidal vascular index
Bold values indicate the p-value < 0.05

*: Paired Samples T-Test

4. DISCUSSION

With the widespread use of refractive surgery worldwide, there is considerable concern about posterior segment complications, especially in myopic eyes. Therefore, the effects of refractive surgery on the retina have been investigated.[11] However, there is a paucity of data on the potential effects of different refractive procedures on the choroid. Therefore, we evaluated the morphological changes in the choroid to determine the potential effects of refractive surgery on the choroid. In our study, we investigated the effects of refractive surgery on choroidal thickness and choroidal vascular index in eyes with myopic/myopic astigmatism.

In our study, we found a significant decrease in spherical equivalents in patients who underwent PRK and FS-LASIK on postoperative 7th day compared to preoperative measurements. There was no statistically significant difference in BCVA and IOP between the two groups on post-operative 7th day when compared to the pre-operative period. In a study by Filipeka et al. in myopic eyes, in contrast to our study, they found a significant decrease in IOP values at 1 month after PRK and LASIK compared to pre-laser values.[12] They attributed this to a decrease in corneal thickness.

In this study, we compared the changes in SFCT and CVI in PRK and FS-LASIK patients in the preoperative period and postoperative 1st day and 7th day. In the FS-LASIK group, a statistically significant increase in SFCT was observed on 1st day compared to the preoperative period and this increase returned to normal on 7th day. In the PRK group, an increase in SFCT was observed on the 1st day and it did not return to preoperative values on the 7th day. For subfoveal CVI, a statistically significant increase was observed in both groups on postoperative 1st day compared to the preoperative period, and this increase was similar to the preoperative values on postoperative 7th day. However, there was no statistically significant difference between groups. For submacular CVI, no statistically significant difference was observed between the groups and within the groups between the preoperative and postoperative periods.

The reason for the increase in SFCT on 1st day in the FS-LASIK group compared to the preoperative period may be that the transient increase in IOP during refractive surgery stimulates the choroid, which is a highly vascularised tissue.[13] An increase in IOP leads to a decrease in ocular perfusion pressure and a partial decrease in oxygen, resulting in increased synthesis of nitric oxide by the vascular endothelium. Nitric oxide may therefore trigger choroidal thickening, possibly through changes in blood flow or relaxation of non-vascular smooth muscle[14] which may play a role in the autoregulation of choroidal blood flow. Similarly, in the FS-LASIK group, mechanical stretching of the choroid and a transient increase in IOP during the vacuum phase may be the reason for the increase in choroidal thickness, but this increase returned to preoperative values 1 week after surgery.

Secondly, the increase in choroidal thickness may be related to the postoperative inflammatory response and vascular permeability. Surgical trauma causes the release of prostaglandins in the aqueous humour, damages the blood-aqueous barrier and causes the release of inflammatory mediators.[15] These mediators spread into the vitreous cavity and reach the retina, disrupting the inner blood-retinal barrier and may cause choroidal thickening by secreting inflammatory mediators elsewhere and increasing perifoveal capillary permeability.[16] This may explain the increase in choroidal thickness in both FS-LASIK and PRK.

In contrast to the FS-LASIK group, the persistence of increased SFCT on the 7th day after surgery in the PRK group may be related to differences in the two procedures' postoperative wound healing and inflammatory responses. PRK involves the complete removal of the corneal epithelium, resulting in a more extensive healing process and the prolonged release of inflammatory mediators, including cytokines and prostaglandins. These mediators can increase vascular permeability and lead to sustained choroidal thickening beyond the immediate postoperative period. In contrast, FS-LASIK preserves the corneal epithelium and is generally associated with faster recovery and less pronounced postoperative inflammation. Therefore, the prolonged elevation of SFCT observed in the PRK group may reflect a more persistent inflammatory response affecting the choroidal vasculature. Additionally, postoperative topical medications may interact differently with the healing process following PRK and FS-LASIK. Surface ablation procedures often require longer periods of epithelial regeneration and tissue remodelling, which

may contribute to prolonged biological activity within ocular tissues. While the exact mechanism is unclear, these differences may explain why SFCT remained elevated on postoperative day 7 in the PRK group, whereas it returned to baseline levels in the FS-LASIK group.

Another important factor that may influence choroidal thickness measurements is axial length. Previous studies have demonstrated a significant negative correlation between axial length and choroidal thickness, particularly in eyes with myopia, where longer axial lengths are associated with thinner choroidal tissue.[17] While spherical equivalent was recorded and analysed in our study, axial length measurements were unavailable for some participants and could therefore not be included in the statistical analysis. As axial length can provide information about the eye's structure beyond refractive error, the absence of axial length data should be considered when interpreting our findings. Future prospective studies that incorporate axial length measurements may help to clarify the independent effects of refractive surgery on choroidal morphology and vascularity.

In a study of 116 patients evaluating the change in choroidal thickness after LASIK and phakic intraocular lens implantation in highly myopic patients by Jing Zhang et al, it was found that the choroidal thickness measured 2 hours after surgery was higher than in the preoperative period and this increase returned to the preoperative level in the first week.[18] In another study of 70 patients, M Li et al. found an increase in choroidal thickness in the postoperative period in patients who underwent LASIK.[19]

In an article published in 2016, Agrawal et al. proposed that CVI can be used as a measure of the vascular status of the choroid, based on their measurements in 345 healthy eyes. They mentioned that choroidal thickness is affected by more variables and shows more variability, but CVI is a more stable marker to observe the choroid. In their measurements, they mentioned that choroidal thickness was thicker in younger patients with shorter axial length, higher IOP and lower systolic blood pressure, that CVI was not affected by these systemic conditions but was only associated with CFCT, and that patients with thicker CFCT were associated with higher CVI.[20]

Until now, only one study has been published evaluating CVI after refractive surgery. Yalçınkaya et al. compared 29 LASIK and 30 SMILE patients and found an increase in macular vessel density on postoperative day 1 using optical coherence tomography angiography (OCT-A). In their study, choroidal thickness was not mentioned and no difference was found between the preoperative period and the postoperative periods on the 1st and 7th postoperative days in CVI evaluated by OCT.[21] In our study, there was a statistically significant increase in subfoveal CVI in the FS-LASIK and PRK groups on postoperative 1st day compared to the preoperative period, and this increase returned to the preoperative values on postoperative 7th day. Accordingly, the increase in SFCT on postoperative 1st day was found to correlate with the increase in subfoveal CVI.

This study has some limitations, such as a small sample size and a relatively short follow-up period. Therefore, long-term follow-up studies are needed to evaluate vascular and morphological changes in the choroid. Secondly, real-time IOP could not be measured because of the need for aseptic conditions during surgery. Thirdly, we could not evaluate the microcirculation of the choroidal region with the OCT-A device after FS-LASIK. Assessment of choroidal microcirculation using OCT-A can confirm the effect of sudden IOP elevation on thickness and vascular changes. Another limitation of this study is the absence of AL measurements. As AL is known to influence choroidal thickness and may affect choroidal vascular parameters, the absence of these measurements may have introduced a potential confounding factor when interpreting our findings.

5. CONCLUSION

To the best of our knowledge, this is one of the few studies to compare SFCT and CVI changes after PRK and FS-LASIK in eyes with myopia. Demonstrating transient postoperative choroidal alterations could improve our understanding of choroidal responses to refractive surgery and contribute to future studies investigating the long-term effects of these procedures on posterior segment structures.

6. REFERENCES

1. Trokel SL, Srinivasan R, Braren B. Excimer laser surgery of the cornea. Am J Ophthalmol. 1983;96(6). doi:10.1016/S0002-9394(14)71911-7

2. Alio JL, Artola A, Claramonte PJ, Ayala MJ, Sanchez SP. Complications of photorefractive keratectomy for myopia: Two year follow-up of 3000 cases. J Cataract Refract Surg. 1998;24(5). doi:10.1016/S0886-3350(98)80256-3

3. Pallikaris LG, Papatzanaki ME, Stathi EZ, Frenschock O, Georgiadis A. Laser in situ keratomileusis. Lasers Surg Med. 1990;10(5). doi:10.1002/lsm.1900100511

4. Jacobs JM, Taravella MJ. Incidence of intraoperative flap complications in laser in situ keratomileusis. J Cataract Refract Surg. 2002;28(1). doi:10.1016/S0886-3350(01)01097-5

5. Strohmaier C, Runge C, Seyeddain O, Emesz M, Nischler C, Dexl A, et al. Profiles of intraocular pressure in human donor eyes during femtosecond laser procedures-a comparative study. Invest Ophthalmol Vis Sci. 2013;54(1). doi:10.1167/iovs.12-11155

6. Cho KJ, Kim JH, Park HYL, Park CK. Glial cell response and iNOS expression in the optic nerve head and retina of the rat following acute high IOP ischemia-reperfusion. Brain Res. 2011;1403. doi:10.1016/j.brainres.2011.06.005

7. Suwan Y, Aghsaei Fard M, Geyman LS, Tantraworasin A, Chui TY, Rosen RB, et al. Association of myopia with peripapillary perfused capillary density in patients with glaucoma an optical coherence tomography angiography study. JAMA Ophthalmol. 2018;136(5). doi:10.1001/jamaophthalmol.2018.0776

8. Wang D, Liu M, Chen Y, Zhang X, Xu Y, Wang J, et al. Differences in the corneal biomechanical changes after SMILE and LASIK. Journal of Refractive Surgery. 2014;30(10). doi:10.3928/1081597X-20140903-09

9. Zhang Y, Lan J, Cao D, Yang C, Yang D, Xie W, et al. Microvascular changes in macula and optic nerve head after femtosecond laser-assisted LASIK: An optical coherence tomography angiography study. BMC Ophthalmol. 2020;20(1). doi:10.1186/s12886-020-01368-2

10. Agrawal R, Chhablani J, Tan KA, Shah S, Sarvaiya C, Banker A. Choroidal vascularity index in central serous chorioretinopathy. Retina. 2016;36(9). doi:10.1097/IAE.0000000000001040

11. Tsai YY, Lin JM. Effect of laser-assisted in situ keratomileusis on the retinal nerve fiber layer. Retina. 2000;20(4). doi:10.1097/00006982-200007000-00004

12. Filipecka I, Gierek-Ciaciura S. Influence of cornea thickness changes after refractive surgery on intraocular pressure measurements. Klin Oczna. 2001;103(1).

13. Nickla DL, Wallman J. The multifunctional choroid. Progress in Retinal and Eye Research. 2010. doi:10.1016/j.preteyeres.2009.12.002

14. Vadims P, BenJ. G, Joseph LD. Nonvascular contractile cells in sclera and choroid of humans and monkeys. Invest Ophthalmol Vis Sci. 1998 Sep;39(10):1765–74. PubMed PMID: 9727398.

15. Miyake K, Ibaraki N. Prostaglandins and cystoid macular edema. Surv Ophthalmol. 2002;47(4 SUPPL. 1). doi:10.1016/S0039-6257(02)00294-1 PubMed PMID: 12204717.

16. Pendrak K, Papastergiou GI, Lin T, Laties AM, Stone RA. Choroidal vascular permeability in visually regulated eye growth. Exp Eye Res. 2000;70(5):629–37. doi:10.1006/EXER.2000.0825 PubMed PMID: 10870521.

17. Liu B, Wang Y, Li T, Lin Y, Ma W, Chen X, et al. Correlation of subfoveal choroidal thickness with axial length, refractive error, and age in adult highly myopic eyes. BMC Ophthalmol. 2018 May 29;18(1):127-. doi:10.1186/S12886-018-0791-5/FIGURES/1 PubMed PMID: 29843668.

18. Zhang J, He FL, Liu Y, Fan XQ. Comparison of choroidal thickness in high myopic eyes after FS-LASIK versus implantable collamer lens implantation with swept-source optical coherence tomography. Int J Ophthalmol. 2020 May 18;13(5):773–81. doi:10.18240/IJO.2020.05.12 PubMed PMID: 32420225.

19. Li M, Cheng H, Yuan Y, Wang J, Chen Q, Me R, et al. Change in choroidal thickness and the relationship with accommodation following myopic excimer laser surgery. Eye (Lond). 2016 Jul 1;30(7):972–8. doi:10.1038/EYE.2016.75 PubMed PMID: 27080489.

20. Agrawal R, Gupta P, Tan KA, Cheung CMG, Wong TY, Cheng CY. Choroidal vascularity index as a measure of vascular status of the choroid: Measurements in healthy eyes from a population-based study. Sci Rep. 2016 Feb 12;6. doi:10.1038/SREP21090 PubMed PMID: 26868048.

21. Yalçınkaya G, Yıldız BK, Çakır İ, Yıldırım Y, Demirok A. Evaluation of peripapillary - macular microvascularity and choroidal vascularity index after refractive surgery. Photodiagnosis Photodyn Ther. 2022 Mar 1;37. doi:10.1016/J.PDPDT.2022.102714 PubMed PMID: 34995787.