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THE RESULTS OF WFG FS- LASIK PROCEDURE IN TREATMENT OF MYOPIA AND MYOPIC ASTIGMATISM

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ABSTRACT

Purpose: To present the results of wavefront guided femtosecond-assisted laser in situ keratomileusis (WFG FS-LASIK) procedure in treatment of myopia and myopic astigmatism. **Material and Methods:** One hundred and seventy four eyes of 87 patients with myopia and/or myopic astigmatism who had undergone WFG FS-LASIK procedure are examined retrospectively. **Results:** Postoperative spherical, cylinderical and spherical equivalent values were significantly lower than those of preoperative values (P=0.000) and postoperative uncorrected distance visual acuity (UDVA) and corrected distance visual acuity (CDVA) levels were significantly greater than those of preoperative values (P=0.000). **Conclusion:** WFG FS-LASIK is an efficient, safe and predictable procedure for correction of myopia and myopic astigmatism.

KEYWORDS: WFG FS-LASIK, spherical value, cylenderical value, visual acuity.

INTRODUCTION

The purpose of refractive surgery is to reduce dependence on contact lense or spectacles. A variety of surgical techniques and technologies are present. LASIK is currently the most frequently performed keratorefractive procedure due to its safety, efficacy, quick recovery of vision and minimal patient discomfort.[1] In FS-LASIK procedure femtosecond laser is used to create corneal flaps. Its main advantage over mechanical microkeratomes is that femtosecond laser allows surgeons to customize the parameters of corneal flap, such as diameter, thickness and hinge position, which may reduce the incidence of intraoperative complications, including irregular or buttonholed flaps and epithelial defects. The femtosecond laser-created flaps also show stronger adhesions at the interface and flap edge than microkeratome flaps.[2-5] However, LASIK or FS-LASIK can treat only lower order aberrations such as myopia, hyperopia and astigmatism and frequently increases higher-order aberrations (HOAs) of cornea which may cause loss of contrast sensitivity, monocular diplopia, halos and glare in night vision and decreased vision quality.[6-8] Wavefront-guided LASIK with iris-registration may improve visual performance by reducing or eliminating both induced and preexisting higher-order aberrations.[9]

In this study, the results of WFG FS- LASIK procedure in treatment of myopia and myopic astigmatism are evaluated retrospectively.

MATERİAL AND METHODS

One hundred and seventy four eyes of 87 patients with myopia and/or myopic astigmatism who had undergone WFG FS-LASIK procedure between February 2017 and June 2017 were examined retrospectively. Their mean age was 26.43 ± 5.85 (SD) (19-42) years. Fourty-three of them were males (49%) and 44 (51%) were females.

All of the surgeries were performed by a single surgeon (SC). Patients included in the study did not have Diabetes Mellitus, Connective tissue diseases or any ocular diseases that might affect the vision. Patients wearing soft contact lenses were instructed to stop wearing them at least 1 week prior to the surgery. This duration was four weeks for hard contact lens wearers.

WFG FS-LASIK procedures were performed by the Visumax femtosecond laser system (Carl Zeiss, Meditec AG, Jena, Germany) with a repetition rate of 500 Khz and a pulse energy of 150 nj, for flap creation. Refraction and wavefront information gathered by Wavelight Oculyzer II (Alcon, GmbH-Am, Wolsfmatel S-91058 Ertagen, Germany) and Wavelight Allegro Topolyzer-VARIO (Alcon, GmbH-Am, Wolsfmatel S-91058 Ertagen, Germany) was transferred to Wavelight EX500 (Alcon) Laser system. The ablation was performed, an eye tracker was used to perform accurate ablation on the centre of pupil. After irrigation, the flap was repositioned.

After the surgical procedures, patients used topical antibiotic (Moxifloxacin 0.5 %, Vigamox, Alcon, USA) 4 times a day for a week, topical steroid (Dexametasone Na Phosphate 0.1 %, Dexa-sine, Liba, USA) 4 times a day for 2 weeks and a preservative-free topical lubricating drop (Na Hyaluronate 0.15%, Eyestil, SIFI, Italy) 4 times a day for 3 months.

Full opthalmological examinations including uncorrected distance visual acuity (UDVA), corrected distance visual acuity (CDVA), intraocular pressure measurement, fundus examination and topographic measurements were performed preoperatively and 1st day, 1st week, 1st month, 3rd month and 6th month after the operation. Efficacy index was calculated by postoperative UDVA/preoperative CDVA. Safety index was calculated by postoperative CDVA/preoperative CDVA. Predictability was presented as percentage of eyes within ±0.50 D, postoperatively.

For statistical analysis, SPSS version 22 programme was used. For comparison of data Chi- square test and paired t test were used. A $p<0.05$ value was accepted as statistically significant.

RESULTS

Postoperative spherical, cylinderical and spherical equivalent values were significantly lower than those of preoperative values (P=0.000) and postoperative uncorrected distance visual acuity (UDVA) and corrected distance visual acuity (CDVA) levels were significantly greater than those of preoperative values (P=0.000). The predictability values, efficacy and safety indexes of the patients were high.

DISCUSSION

LASIK has become a widespread and effective surgical treatment to correct myopia and myopic astigmatism. Like other corneal refractive surgeries such as radial keratotomy and photorefractive keratectomy, it is designed to modify central corneal curvature, making it flatter to correct myopia and steeper to correct hyperopia.[10] FS-LASIK creates flaps with good predictability of thickness and eliminates flap-related complications. WFG FS-LASIK corrects high-order aberrations such as spherical aberrations, coma and trefoil to increase retinal image resolution, offering a more accurate refractive correction with fewer optical side effects.[11,12] There are two main methods of using wavefront measurements in laser eye surgery. The first is the wavefront-optimized ablations in which the adjustments are done on average population data and the ablation profile is based on an ideal model without evaluating the patient's own aberrometry. Its aim is to optimize the asphericity of cornea to precompansate for the expected high-order aberrations in the average eye. The second is the wavefront-customized ablations, also known as wavefront-guided ablations in which, the patient's own aberration profile is taken into consideration to correct both induced and preexisting HOAs.[13]

In this study, we evaluated the results of WFG FS-LASIK procedure in treatment of myopia and myopic astigmatism. Postoperative spherical, cylinderical and spherical equivalent values were significantly lower than those of preoperative values and postoperative uncorrected distance visual acuity (UDVA) and corrected distance visual acuity (CDVA) levels were significantly greater than those of preoperative values.

Liu[14] et al. stated that four-year follow-up outcomes indicated that the myopic patients after LASIK had the long-term stable corneal aberration and satisfaction of daily visual functions. Keir[15] et al. obseved that despite an increase in higher-order aberrations, wavefront-guided LASIK yields excellent visual acuity and contrast sensitivity. Spherical aberration, which increases the most following non-wavefront-guided LASIK, showed no significant change. Manche et al. reported that wavefront-guided LASIK is a well-tolerated and effective keratorefractive procedure with a trend superiority.[16]

CONCLUSİON

In conclusion, WFG FS-LASIK is an efficient, safe and predictable procedure for correction of myopia and myopic astigmatism.

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