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Original article

Influence of pregnancy on refractive parameters after laser in situ keratomileusis surgery☆

M.J. López-Prats[a,*], J.J. Hidalgo-Mora[b], E. Sanz-Marco[a], A. Pellicer[b], A. Perales[b], M. Díaz-Llopis[a]

[a] Servicio de Oftalmología, Hospital Universitario La Fe, Valencia, Spain
[b] Servicio de Ginecología y Obstetricia, Hospital Universitario La Fe, Valencia, Spain

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ABSTRACT

Objectives: Different ocular changes and complications of refractive surgery such as photorefractive keratectomy (PRK) due to pregnancy have been described in the last few years. However there is no information about the possible problems of laser in situ keratomileusis (LASIK) in pregnant women. Our objective was to study how physiological changes secondary to pregnancy could alter the refractive situation in pregnant women who have undergone LASIK surgery. We show the results obtained due to the changes between the first two trimesters of the pregnancy.

Methods: A prospective and observational study was conducted in which one study group, made up of 9 patients who had undergone LASIK surgery before becoming pregnant, was compared with a control group of 9 patients with non-surgically corrected refractive problems. The following measurements were made in both groups in the first and second trimesters of the pregnancy; visual acuity, the best corrected visual acuity, tonometry, ocular anatomical characteristics by biometry, and refractive and corneal study by Pentacam®.

Results: Significant changes were observed in the cylinder and spherical equivalent between the two trimesters in both groups. Visual acuity and spherical equivalent show a strong trend towards worsening, which was more significant in the study group. The patients of this group who had a larger pre-surgical defect showed lower modifications during the six first months of pregnancy.

Conclusions: The majority of women who require laser refractive surgery are between 20 and 30 years old, thus in many cases corneal surgery is followed by at least one pregnancy, with different possible ophthalmological effects.

The conclusions that may be derived from this study are that the assessment of the refractive changes in surgically operated corneas may be biomechanically weakened on being subjected to physiological hormone stimulation as it happens during gestation.

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* *Corresponding author.*
E-mail address: susa_lpl@hotmail.com (M.J. López-Prats).

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Influencia del embarazo sobre los parámetros refractivos tras cirugía *laser in situ keratomileusis*

Palabras clave:
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Laser in situ keratomileusis
Embarazo
Miopía

RESUMEN

Objetivos: Diversos cambios oculares y complicaciones de la cirugía refractiva corneal del tipo queratectomía fotorrefractiva (PRK) asociados al embarazo han sido estudiados en los últimos años. Sin embargo, no se han descrito en gestantes las posibles complicaciones derivadas de la realización de cirugía tipo *laser in situ keratomileusis* (LASIK). Nuestro objetivo fue valorar cómo los cambios fisiológicos oculares secundarios a la gestación pueden alterar el estado refractivo en gestantes sometidas a cirugía tipo LASIK. Presentamos los resultados correspondientes a las modificaciones observadas entre los dos primeros trimestres de embarazo.

Métodos: Estudio observacional prospectivo en el que comparamos un grupo de estudio formado por 9 gestantes sometidas a cirugía refractiva LASIK previamente al embarazo y un grupo control con 9 gestantes con alteraciones refractivas no corregidas quirúrgicamente. Se realizó en los dos primeros trimestres de gestación un estudio de agudeza visual, máxima agudeza visual corregida, tonometría, características anatómicas oculares mediante biometría y estudio corneal y refractivo mediante Pentacam©.

Resultados: Fueron observados cambios significativos en el cilindro y el equivalente esférico entre los dos primeros trimestres en ambos grupos. La agudeza visual y el componente esférico mostraron una clara tendencia al empeoramiento, mayor en el grupo de estudio. Las pacientes de este grupo con un defecto prequirúrgico mayor presentaron menores modificaciones en el curso de los dos primeros trimestres.

Conclusiones: Las mujeres con una mayor demandan de cirugía refractiva mediante láser se encuentran entre los 20 y los 30 años, con lo que en muchos casos la práctica de la cirugía corneal se sigue de, al menos, una gestación, con los efectos que ello puede conllevar a nivel ocular.

Las conclusiones que se pueden derivar de este proyecto suponen la valoración de los cambios refractivos que sufrirían las córneas operadas y por tanto biomecánicamente debilitadas, al ser sometidas a estímulos hormonales fisiológicos como los propios de la gestación.

Introduction

Different ocular changes associated to pregnancy, such as diminished ocular pressure, diminished tear production and alterations in structures such as the cornea and lens have been studied in the past decades with unconclusive and even contradictory results.[1,2]

Estrogen receptors have been proposed as the cause of the physiological modifications in the cornea and the lens, with the ensuing increase of stimulation for said modifications.[2] The cornea could exhibit an increase of its central thickness between 1 and 16 μm, also due to its edematization secondary to liquid retention typical of gestation. In addition, corneal curvature could also increase in an average of 1 dpt during the second half of pregnancy. Both changes could be resolved after labor or lactation. Furthermore, changes have been described in the lens morphologies such as increased curvature, which could give rise to a temporary loss of accommodation capacity.[2–6]

However, there is no consensus on these proposals. Whereas some studies have not found significant changes in corneal sensitivity, others have demonstrated alterations in these parameters during pregnancy.[5,7] In the latter type of study, it is frequent to find in clinical practice contact lens intolerance among pregnant patients, which could be explained by the changes in corneal curvature and thickness as well as the reduction of tear production during the third quarter of gestation, demonstrated in 18% of studied patients.[5–8] Some authors have postulated that, despite their presence, these changes do not involve significant variations in visual acuity or refractive error during pregnancy.[9,10]

On the other hand, various complications in corneal refractive surgery associated to pregnancy have been pointed out. One is myopic regression, consisting in lower efficacy of the technique, associated to the normal cicatrization process of the surgical wound. In order to compensate for the defect created by the laser, a proliferation of keratocytes would occur together with growth of epithelial and stromal tissue, which could partially or totally reverse the refractive defects obtained with the surgery, particularly in severely myopic patients.[11,12] Accordingly, pregnancy could involve increased risk in this regard due to the physiological changes that occur at the corneal level and cause its thickening and edematization.

Corneal haze constitutes an additional complication described in pregnancy and is associated to laser refractive surgery. Its cause is not known although it is believed to be related with alterations in the cicatrization of the interface created during surgery.[13] Other complications have been