



ARCHIVOS DE LA SOCIEDAD ESPAÑOLA DE OFTALMOLOGÍA

www.elsevier.es/oftalmologia



Original article

Lens density measurement with Scheimpflug camera in vitrectomised eyes[☆]



M.A. Ibáñez-Ruiz*, P. Beneyto-Martin, M.T. Pérez-Martínez

Secciones de Retina y Polo anterior, Hospital Virgen de la Salud, Toledo, Spain

ARTICLE INFO

Article history:

Received 31 July 2015

Accepted 28 January 2016

Available online 8 May 2016

Keywords:

Crystalline
Vitrectomy
Densitometry
Scheimpflug
Cataracts

ABSTRACT

Objective: To determine whether vitrectomised eyes have a higher lens optical density, when measured with a Scheimpflug camera, compared to non-vitrectomised eyes.

Method: The peak and linear Scheimpflug optical density (DOS), and area of both eyes were measured in a sample size of 81 vitrectomised phakic patients. A comparison was made between the DOS of the vitrectomised eye lens and the contralateral non-vitrectomised eye using the Student's t-test.

Results: A significantly higher linear DOS and area was obtained in the 81 vitrectomised phakic eyes when compared to the non-vitrectomised eyes ($p < 0.001$). The peak DOS is not significantly increased in respect to non-vitrectomised eyes ($p = 0.59$).

Conclusions: The lens DOS in vitrectomised eyes is higher than in non-vitrectomised eyes. The importance of the vitreous in the maintenance of lens transparency is emphasized.

© 2016 Sociedad Española de Oftalmología. Published by Elsevier España, S.L.U. All rights reserved.

Densidad cristaliniana medida con cámara de Scheimpflug en ojos vitrectomizados

RESUMEN

Objetivo: Determinar si los ojos vitrectomizados presentan una mayor densidad óptica cristaliniana, medida con cámara Scheimpflug, con respecto a los ojos no vitrectomizados.
Método: Se selecciona a 81 pacientes fágicos vitrectomizados a los que se les mide la densidad óptica Scheimpflug (DOS) pico, lineal y de área, de ambos ojos. Comparamos las medias de DOS del cristalino del ojo vitrectomizado y del contralateral no vitrectomizado, mediante el test t de Student.

Resultados: En 81 ojos fágicos vitrectomizados se han obtenido unas DOS medias, lineales y de área posvitrectomía significativamente mayores respecto a los ojos no vitrectomizados ($p < 0,001$). La DOS pico no resultó significativamente mayor con respecto a los ojos no vitrectomizados ($p = 0,59$).

Palabras clave:

Cristalino
Vitrectomía
Densitometría
Scheimpflug
Cataratas

[☆] Please cite this article as: Ibáñez-Ruiz MA, Beneyto-Martin P, Pérez-Martínez MT. Densidad cristaliniana medida con cámara de Scheimpflug en ojos vitrectomizados. Arch Soc Esp Oftalmol. 2016;91:385–390.

* Corresponding author.

E-mail address: oftalmologia.mariba@gmail.com (M.A. Ibáñez-Ruiz).

Conclusiones: En ojos vitrectomizados encontramos mayor DOS cristaliniana que en ojos no vitrectomizados. El gel vítreo resultaría importante en el mantenimiento de la transparencia del cristalino.

© 2016 Sociedad Española de Oftalmología. Publicado por Elsevier España, S.L.U. Todos los derechos reservados.

Introduction

Despite the technical developments in retina and vitreous surgery, cataracts remain as the most frequent post-surgery complication. Apparently, up to 80–90% of patients would require post-vitrectomy cataract surgery within 2 years after surgery.^{1,2}

The most frequently described lens changes in relation to vitrectomy consist in a generally temporary posterior subcapsular opacification followed by a progressive and permanent nuclear sclerosis. As in senile cataracts, lens proteins become insoluble or folded, but this occurs at a higher rate than in senile cataracts.²

Cataracts have been studied with predominantly subjective methods, among which the most widely utilized is the LOCS III classification.⁶ Said method is based on the interpretation of slit lamp photographs or images, although the reproducibility of this method could be compromised.^{3,4} Objective methods are based on obtaining various lens parameters such as light dispersion, fluorescence and phosphorus metabolites, without said parameters being subject to observer interpretation, consequently enabling greater reproducibility.^{5,6}

The Pentacam device (Oculus-Pentacam, Wetzlar, Germany) consists of 2 cameras: a central camera that controls fixation and automatically corrects ocular movements, and a second camera assembled on a wheel that turns 360° around the central axis of the eye, obtaining 50 sections with 25,000 elevation points (500 per section) in 2 s utilizing blue LED monochromatic light (475 nm wavelength free of UV light) in the form of a slit and applying the Scheimpflug principle. Saved images, corrected in relation to a reference point (central point of the cornea) are processed jointly to create a 3-D model of the anterior segment.^{5,7-9}

In what concerns lens density, Bouguer and Lambert describe it as loss of radiation or light when passing through a medium. Beer found that this lost radiation could be proportional to the molarity or concentration of the substances in said medium. Accordingly, optical density would be proportional to molarity. On the basis of this premise, optical density increase could be correlated to the development of cataract.¹⁰ The amount of reflected light captured by the camera would be proportional to optical density and could be quantified in a continuous grayscale, with zero being a totally transparent lens and 100 an opaque lens.¹⁰

In a transversal study with 21 eyes, Kirkwood et al.¹¹ registered 3 types of densitometric values:

1. Peak: registering the highest densitometry value.
2. Linear: registering density values on a line drawn in the area of the visual axis.
3. 3-D: registering the density of a 3 mm circular area.

It appears that the last of said 3 measures is more representative of lens opacity.⁷ Most authors select a region or area of interest, calculating mean density, standard deviation and highest density peak^{3,11,12} for said area.

Postvitrectomy cataracts has been studied mainly with subjective methods, for which reason the application of an objective method such as Pentacam would be of interest due to its higher sensitivity and ability to detect changes at earlier stages. The hypothesis of this study is that, as cataracts is the most frequent complication in vitrectomy, higher lens density could be expected in vitrectomised eyes as compared with non-vitrectomised eyes.

Subjects, material and method

An observational, transversal, ambispective case and control study was carried out in which the dependent variable was the Scheimpflug optical density (DOS) lens measurement in vitrectomised eyes, and the independent variable was the lens DOS in non-vitrectomised eyes.

The population of reference were phakic eyes vitrectomised due to various vitreo-retinal diseases in the Retina Department of the Virgen de la Salud Hospital of Toledo, Spain, from January 1, 2010 up to July 1, 2014.

The study included eyes with lens in vitrectomy without corneal disease and sufficient cooperation to obtain quality images with the Pentacam device. Pseudophakic or aphakic eyes in vitrectomy were excluded, together with those who required silicone oil as postvitrectomy tamponade agent.

A previous study¹³ was used as basis to assess sample size. Accordingly, for an estimated DOS increase of 1.5, a confidence level of 95% and a statistical power ($1 - \beta$) of 80%, the calculated sample size was 70 cases for comparison groups. Even so, the highest possible number of cases was selected.

Overall, the study included 121 vitrectomised phakic eyes, which were divided into groups: 81 that preserved the lens and 40 who were operated for postvitrectomy cataracts. The control group comprised 88 contralateral non-vitrectomised eyes. The number of cases and controls is not identical because in some patients the control eye was pseudophakic, aphakic or anophthalmic.

The lens DOS was obtained utilizing the Scheimpflug camera of the Oculus-Pentacam device. Measures were taken after dilating both eyes with tropicamide in a darkened room. Overall, 3–4 measurements were taken to obtain an image with a quality factor (QS section of the initial Pentacam screen) greater than 95%. The 270–290° section of the Scheimpflug image screen was used. Three types of DOS measurements were taken: peak, linear and area. In the first, the highest density point of the central area of the lens nucleus was

Download English Version:

<https://daneshyari.com/en/article/4007936>

Download Persian Version:

<https://daneshyari.com/article/4007936>

[Daneshyari.com](https://daneshyari.com)