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## Original article

# Oct parameters as predictive factors for the visual outcome after ranibizumab therapy in neovascular age related macular degeneration<sup>☆</sup>



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## ABSTRACT

**Objective:** To evaluate macular morphological parameters measured by spectral domain optical coherence tomography (SD-OCT) as predictive factors of visual outcome in patients with exudative age-related macular degeneration (AMD) treated with ranibizumab.

**Methods:** A retrospective study was conducted on 47 patients diagnosed with exudative AMD and treated with intravitreal ranibizumab for 12 months. Central retinal thickness (CRT), extension and thickness of modifications secondary to neovascular process, and status of the bands corresponding to the external limiting membrane (ELM) and to the ellipsoid region of the photoreceptors (ISe) were evaluated by means of SD-OCT. The relationship between these variables and visual acuity was analyzed by statistical methods.

**Results:** At the time of the diagnosis, preservation of ELM and ISe bands, and CRT were correlated with initial visual acuity. Twelve months later, CRT and visual acuity were independent parameters. Bivariate relationship analysis showed a correlation between final visual acuity and the following parameters: initial CRT, initial ISe and ELM status, and ISe and ELM integrity after loading dose. Multiple regression analysis indicated that initial visual acuity and ISe band status after loading dose have a predictive value for final visual acuity.

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*Conclusions:* The status of ISe and ELM bands after 12 months of treatment with ranibizumab was associated with visual outcome. Initial visual acuity and status of the ISe band after loading dose are prognostic factors of final visual acuity.

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## Parámetros tomográficos como factores pronóstico del resultado visual tras terapia con ranibizumab en degeneración macular neovascular asociada a la edad

### R E S U M E N

#### Palabras clave:

Degeneración macular asociada a la edad  
Tratamiento antiangiogénico  
Tomografía de coherencia óptica de dominio espectral  
Fotorreceptores  
Elipsoides  
Membrana limitante externa

*Objetivo:* Evaluar parámetros morfológicos maculares determinados mediante tomografía de coherencia óptica de dominio espectral (SD-OCT) como factores predictivos de la respuesta funcional en pacientes con degeneración macular asociada a la edad (DMAE) de tipo exudativo tratados con ranibizumab.

*Métodos:* Estudio retrospectivo de 47 pacientes diagnosticados de DMAE exudativa y tratados con ranibizumab intravítreo durante 12 meses. Mediante SD-OCT se evaluaron el grosor retiniano central (CRT), la extensión y el grosor de las alteraciones secundarias al proceso neovascular, y el estado de las bandas correspondientes a la membrana limitante externa (MLE) y a la región elipsoide de los fotorreceptores (ISe), analizándose por métodos estadísticos la relación entre estas variables y la agudeza visual.

*Resultados:* Al diagnóstico, la conservación de las bandas MLE e ISe y el CRT se correlaciona con la visión inicial. Doce meses después, el CRT y la visión final son parámetros independientes. Los análisis bivariante mostraron correlación entre la agudeza visual final y los siguientes parámetros: CRT inicial, estado inicial de las bandas ISe y MLE, y estado de estas tras la dosis de carga. El análisis de regresión lineal múltiple indica que la visión inicial y el estado de la banda ISe tras la fase de carga tienen valor predictivo de la visión final.

*Conclusiones:* El estado de conservación de las bandas ISe y MLE tras 12 meses de tratamiento con ranibizumab se correlaciona con el resultado visual. La agudeza visual inicial y el estado de la banda ISe tras la fase de carga son factores pronóstico de la agudeza visual final.

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## Introduction

Age-related macular degeneration (AMD) is the main cause of vision loss and legal blindness in patients over 50 years of age in developed countries, with growing incidence due to population aging.<sup>1</sup> For precise diagnostic and follow-up of neovascular AMD, in addition to funduscopy fluorescein angiography is required as well as optic coherence tomography (OCT). The latter technology, developed by Huang et al.<sup>2</sup> in 1991, is a fast and noninvasive imaging device that provides high-resolution tomographic images of biological tissue. In the last decade, OCT has revolutionized clinical practice in ophthalmology. The technological breakthroughs included in devices and software have provided detailed display of the retinal microstructure. Nowadays, OCT constitutes a fundamental tool for diagnosing and following up patients with choroidal neovascularization, to the extent that several multicenter studies for evaluating treatment protocols with antiangiogenics drugs has been designed including tomographic parameters obtained with OCT as the main or exclusive criterion for retreatment, above clinical and retinographic parameters.<sup>3-6</sup> However, the relationship between

baseline tomographic parameters and visual results obtained with antiangiogenics treatment for exudative ARMD has not been studied in depth. The excellent resolution of spectral domain OCT (SD-OCT) has facilitated visualization and interpretation of retinal structures. Accordingly, the conservation of photoreceptor reflectancy strips in the inner segment ellipsoid (ISe) and external limiting membrane (ELM) are deemed to reflect the grade of integrity of photoreceptors in a number of retinal pathologies.<sup>7-9</sup> Therefore, the evaluation of said parameters in neovascular ARMD can be useful to assess patient management in clinical practice. The objective of the present research is to identify by means of SD-OCT baseline tomographic parameters in exudative AMD with prognostic value for the visual results obtained after 1 year of treatment with intravitreal ranibizumab.

## Subjects, material and methods

### Subjects

All the procedures were carried out in accordance with the principles of the Helsinki declaration and the study was

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