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Features associated with retinal thickness extension in diabetic macular oedema☆

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Diabetic retinopathy;
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Abstract
Background: Clinically significant macular oedema has features that are associated with a major risk of visual loss, with thickening that involves the centre of the macula, field 7 or visual deficiency, although it is unknown if these features are related to retinal thickness extension.
Material and methods: An observational, analytical, prospective, cross-sectional and open study was conducted. The sample was divided into initial visual acuity ≥0.5, central field thickness, centre point thickness, field 7 and macular volume more than the reported 2 standard deviation mean value in eyes without retinopathy. The extension was determined by the number of the central field area equivalent thickening and these features were compared by Student's *t* test for independent samples.
Results: A total of 199 eyes were included. In eyes with visual acuity of ≥0.5, the mean extension was 2.88 ± 1.68 and 3.2 ± 1.63 in area equivalent in eyes with visual acuity <0.5 ($p = 0.12$). The mean extension in eyes with less than 2 standard deviation of central field thickness, centre point thickness, field 7 and macular volume was significantly lower than in eyes with more than 2 standard deviations (1.9 ± 0.93 vs. 4.07 ± 1.49, 2.44 ± 1.47 vs. 3.94 ± 1.52, 1.79 ± 1.07 vs. 3.61 ± 1.57 and 1.6 ± 0.9 vs. 3.9 ± 1.4, respectively, $p < 0.001$).
Conclusions: The extension of retinal thickness is related with the anatomical features reported with a greater risk of visual loss, but is not related to initial visual deficiency.

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PALABRAS CLAVE
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Oedema macular;
Pérdida visual

Características relacionadas con la extensión del engrosamiento retiniano en edema macular diabético

Resumen
Antecedentes: El edema macular clínicamente significativo presenta características asociadas con mayor riesgo de pérdida visual: engrosamiento que involucra el centro de la mácula, el campo 7 o baja visual inicial; sin embargo, se desconoce la relación entre estas características y la extensión del engrosamiento retiniano.
Material y métodos: Estudio observacional, analítico, prospectivo, transversal y abierto. La muestra se dividió en función de la capacidad visual inicial $\geq$ o < 0.5, grosor del campo central, del punto central, campo 7 y volumen macular > 2 desviaciones estándar del promedio reportado en ojos sin retinopatía. La extensión se determinó mediante el número de equivalentes de área del campo central engrosados, y se comparó con las características mediante la t de Student para medias independientes.
Resultados: Ciento noventa y nueve ojos incluidos. En ojos con capacidad visual $\geq$ 0.5 el promedio de extensión fue 2.88 ± 1.68 y 3.2 ± 1.63 equivalentes de área en ojos con < 0.5 ($p = 0.12$). El promedio de extensión, en ojos con menos de 2 desviaciones estándar del grosor del campo central, punto central, campo 7 y volumen macular fue significativamente menor a los ojos con más de 2 desviaciones estándar (1.9 ± 0.93 vs. 4.07 ± 1.49, 2.44 ± 1.47 vs. 3.94 ± 1.52, 1.79 ± 1.07 vs. 3.61 ± 1.57 y 1.6 ± 0.9 vs. 3.9 ± 1.4, respectivamente, $p < 0.001$).
Conclusión: La extensión del engrosamiento retiniano se relaciona con las características anatómicas reportadas con mayor riesgo de pérdida visual, pero no se relaciona con la baja visual inicial.

Background

The diagnosis of clinically significant macular oedema is based on characteristics related to a greater risk of developing moderate vision loss, regardless of the degree of retinopathy at the time of diagnosis.[1] The prevalence of clinically significant macular oedema amounts to approximately 23% in the Mexican population.[2]

The characteristics described by the Early Treatment Diabetic Retinopathy Study (ETDRS) are the following: retinal thickening in the centre of the macula or within 500 microns of the adjacent retina; presence of exudate in the centre of the macula or within 500 microns of the adjacent retina, if associated with the thickening of the adjoining retina; or the presence of retinal thickening in an area (or areas) larger than a disc area, located at a distance amounting to the diameter of a disc or less in relation to the centre of the macula.[3]

Another characteristic not included by the ETDRS, but which has been reported as associated with a greater risk of vision loss, is the thickening involving or surrounding the centre of the fovea[4] and affecting the temporal perifoveal field.[5]

Several studies have reported on the relation between anatomical characteristics, such as the central point thickness or the macular volume, and functional characteristics, such as visual capacity, and have determined that the correlation between these is highly variable.[6–9] However, studies have not taken into account the extension of the oedema present in these patients. The use of optical coherence tomography has allowed for the objective assessment of the oedema pattern (focal or diffuse)[10] and for the determination of the amount of fields affected by the thickening.[11]

The optical coherence tomography and the macular volume allowed for the determination of the affected area before photocoagulation and its relation to the characteristics associated with the risk of vision loss, so as to assess if result variability is related to the extension of the oedema and not only to its characteristics.

Material and methods

An observational, analytical, prospective, cross-sectional and open study was conducted in type 2 diabetic patients with clinically significant macular oedema in Mexico City and its metropolitan area. The sample was obtained from patients who attended Hospital Juárez de México, from 1 May 2008 to 31 July 2014. The study began on 1 January and ended on 31 August 2014. It was authorised by the research and research ethics committees of the hospital in which it was conducted. All patients agreed to participate in the study by giving their written consent.

The study included type 2 diabetic patients from 40 to 80 years old, of either gender, with any degree of diabetic retinopathy and focal clinically significant macular oedema, with a fast macular map and record of the best-corrected visual acuity on the day of the treatment.

The following subjects were excluded from the study: subjects with opacity of mean limiting visual function per