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ORIGINAL ARTICLE

Comparison between the preferential hyperacuity perimeter and the Amsler grid to detect age-related macular degeneration and Stargardt's disease

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Abstract

Purpose: To evaluate the ability of the preferential hyperacuity perimeter (PHP) and the Amsler grid to detect central scotomas in Stargardt's disease and age macular degeneration.

Methods: Prospective, comparative, cross-section study in which 16 patients affected with AMD and Stargardt's disease were evaluated. All patients had an optometric evaluation including refraction, best corrected visual acuity, evaluation with PHP Foresee and with the Amsler grid. The sensitivity of the macular evaluation tests (The Amsler grid and PHP) for each maculopathy was calculated.

Results: To detect scotomas in both macular pathologies, the PHP sensitivity is 60-70%, while the Amsler grid sensitivity is 85-100%. As screening methods for maculopathies, the PHP sensitivity is 83%, while the Amsler grid sensitivity is 93%.

Conclusions: The Amsler grid and the PHP are both useful to detect scotomas in Stargardt's disease and AMD. As a disease screening method, the Amsler grid is useful in both conditions; however, the PHP is only useful in AMD, not in Stargardt's.

Comparación entre el perímetro de hiperagudeza preferencial y la rejilla de Amsler para detectar la degeneración macular asociada con la edad y la enfermedad de Stargardt

Resumen

Objetivo: Evaluar la capacidad del perímetro de hiperagudeza preferencial (PHP) y la rejilla de Amsler para detectar escotomas centrales en la enfermedad de Stargardt y DMAE.

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Enfermedad
de Stargardt;
Degeneración macular
asociada con la edad

Métodos: Estudio prospectivo, comparativo y de corte transversal en el que se ha evaluado a 16 pacientes afectos de DMAE y enfermedad de Stargardt. Todos los pacientes han sido sometidos a una evaluación optométrica que incluyó refracción, agudeza visual con la mejor compensación óptica, evaluación con PHP Foresee y evaluación con la rejilla de Amsler. Se calculó la sensibilidad de los test de evaluación macular (rejilla de Amsler y PHP) para cada maculopatía.

Resultados: El PHP presenta una sensibilidad del 60-70 % para detectar escotomas en ambas afecciones maculares y la rejilla de Amsler, del 85-100 %. Como método de cribado de maculopatía, la sensibilidad del PHP fue del 81 %, mientras que la de la rejilla de Amsler fue del 93 %.

Conclusiones: Tanto la rejilla de Amsler como el PHP son útiles para la detección de escotomas en enfermedad de Stargardt y en DMAE. Como método de cribado de enfermedad, la rejilla de Amsler es útil en ambas, pero no el PHP, que se muestra útil en DMAE pero no para Stargardt.

Introduction

The Stargardt's disease was described for the first time in 1909 by Karl Stargardt. It is currently the most frequent macular dystrophy, and the second most frequent retinal inherited condition after retinitis pigmentosa.[1] Its prevalence is estimated to be 1/10,000 people.[2] The patients report a progressive bilateral vision loss which begins when they are between 6 and 20 years old, with no previous ocular alteration symptoms.[3] To keep a visual acuity (VA) over 0.5 on the decimal scale in at least one eye is a 52 % at the age of 19; a 32 % at the age of 29; and a 22 % at the age of 39.[4] After decreasing to this level, the VA usually falls down quickly, and keeps stable in approx. 0.1, associated with a central scotoma.[3]

Age-related macular degeneration (AMD) constitutes the greatest cause of legal blindness in the Western world, in people older than 65 years of age. It is estimated 15 million American people are currently affected with AMD.[5] There are two main types of AMD: the atrophic AMD, which evolves slowly along the years, causing a gradual vision loss that may lead to a central scotoma; and the neovascular AMD, characterised by the growth of choroidal neovascularization, where the most common initial symptom is the crooked and wavy appearance of the straight lines, quickly advancing up to a significant vision loss.

The Amsler grid was presented in 1947 as a technique to evaluate the central visual field in patients with macular conditions.[6] It consists in a grid with a central fixation spot, on which the patient must mark scotoma areas or metamorphopsia. Its simplicity allows it to be used as a self-control, warning the patient to visit his/her ophthalmologist as soon as a change in the scotoma size and depth, or in the metamorphopsia is detected. However, this test reliability is doubtful, given a possible fixation loss, and the brain adaptation to complete scotoma areas.[7-9]

The preferential hyperacuity perimeter (PHP) is a technique designed to avoid the Amsler grid problems. It is a visual field test to qualitatively measure the macular distortion areas in a non-invasive way, on the basis of the hyperacuity characteristic, i.e., the visual system ability to detect alignment errors when locating an object with regards to others in the space (Figure 1).

So far, this technology has been used to assist in the AMD monitoring, to detect changes in the visual function.[10,11] Some other studies have showed that the PHP is more sensitive than the Amsler grid to detect lesions due to AMD.

The PHP research group[12] studied 185 patients to evaluate the PHP ability at detecting choroidal neovascularization due to macular degeneration, and its ability to differentiate it from an average AMD stage. The results showed that the
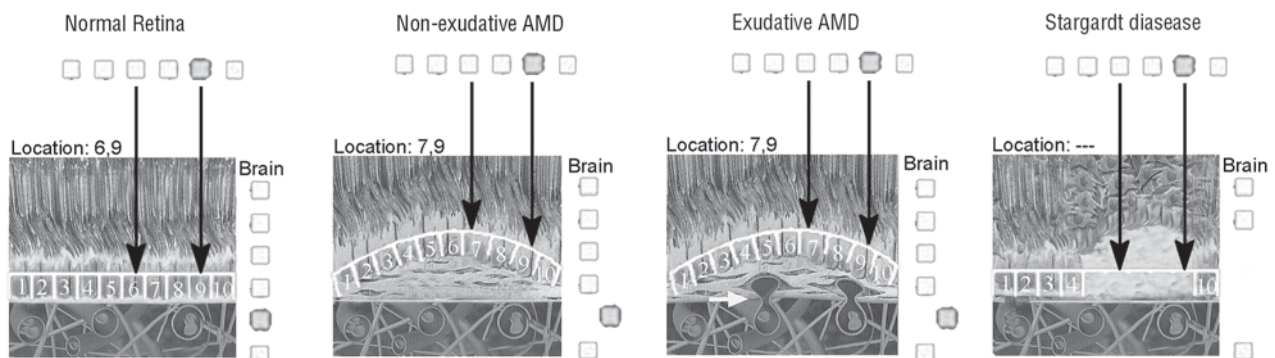

Figure 1 Scheme of a normal Retina vs photoreceptor rising due to AMD vs photoreceptor absence in Stargardt's disease.