



ORIGINAL ARTICLE

Symmetry of peripheral retinal nonperfusion in diabetic retinopathy by ischemic index

Ashley M. Speilburg^{a,*}, Bruce Teitelbaum^a, Yi Pang^a, Shaun Ittiara^b

^a Illinois College of Optometry/Illinois Eye Institute, 3241 S. Michigan Ave, Chicago, IL 60616, USA

^b Retinal Vitreal Consultants Ltd, Chicago, Illinois, 2626 S. Michigan Ave, Chicago, IL 60616, USA

Received 15 September 2017; accepted 27 November 2017

KEYWORDS

Retinopathy;
Diabetes;
Ultra-widefield
fluorescein
angiography;
Ischemic index

Abstract

Purpose: Diabetic retinopathy is the leading cause of blindness among working-age adults in most developed countries. It affects eyes bilaterally and is generally believed to be symmetrical, yet there are few studies evaluating the symmetry of diabetic retinopathy. The purpose of the present study was to evaluate the symmetry of the amount of peripheral retinal ischemia in patients with diabetic retinopathy.

Methods: Ultra-widefield fluorescein angiography images were obtained on both eyes of 54 subjects, mean age 56.4 years, from an urban eye clinic. A single, high quality image from the arteriovenous phase of the angiogram of each eye was selected for analysis. The total area of gradable fundus and area of nonperfusion seen in the arteriovenous phase of the ultra-widefield fluorescein angiogram were determined. An ischemic index (ISI) was calculated by dividing the non-perfused retinal area by the total retinal area and multiplying by 100.

Results: The mean ISI OD was 11.27, mean ISI OS was 11.64. The mean absolute value (\pm SD) of ISI difference between OD and OS was 4.46 ± 6.09 . A difference in ISI of 10% or less was found in 92.6% of subjects. A statistically significant correlation was found in the ISI between right and left eyes ($r_s = 0.80$, $p < 0.0001$) and there was no statistically significant difference in ISI between the right and left eyes ($p = 0.85$).

Conclusion: Asymmetrical retinopathy in diabetic patients is uncommon and additional pathological processes should be considered in the presence of asymmetric DR.

© 2017 Spanish General Council of Optometry. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

* Corresponding author at: Illinois College of Optometry/Illinois Eye Institute, 3241 S. Michigan Ave, Chicago, IL 60616, USA.
E-mail address: ascheurer@ico.edu (A.M. Speilburg).

<https://doi.org/10.1016/j.optom.2017.11.005>

1888-4296/© 2017 Spanish General Council of Optometry. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

PALABRAS CLAVE

Retinopatía;
Diabetes;
Angiografía
fluoresceínica de
campo ultra-amplio;
Índice isquémico

Simetría de la no perfusión de la retina periférica evaluada mediante el índice isquémico

Resumen

Objetivo: La retinopatía diabética constituye la causa principal de ceguera entre los adultos en edad productiva en muchos países desarrollados. Afecta a los ojos bilateralmente, y por lo general se piensa que es simétrica, aunque existen pocos estudios que evalúen la simetría en esta situación. El objetivo del presente estudio fue evaluar la simetría de la cantidad de isquemia en la retina periférica en pacientes con retinopatía diabética.

Métodos: Se obtuvieron imágenes de ambos ojos mediante angiografía fluoresceínica de campo ultra-amplio, en 54 sujetos, con edad media de 56,4 años, en una clínica ocular urbana. Se seleccionó para análisis una única imagen de gran calidad de la fase arteriovenosa del angiograma de cada ojo. Se determinaron el área total de fondo graduable y el área de no perfusión observados en la fase arteriovenosa de la angiografía fluoresceínica de campo ultra-amplio. Se calculó el índice isquémico (ISI) dividiendo el área de la retina no perfundida entre el área total de la retina, multiplicado por 100.

Resultados: El ISI OD medio fue de 11,27, el ISI OS medio fue de 11,64. El valor absoluto medio (\pm SD) de la diferencia de ISI entre OD y OS fue de $4,46 \pm 6,09$. Se encontró una diferencia de ISI del 10% o menos en el 92,6% de los sujetos. Se encontró una correlación estadísticamente significativa de ISI entre los ojos derecho e izquierdo ($r_s = 0,8$, $p < 0,0001$), y no se encontró diferencia estadísticamente significativa de ISI entre los ojos derecho e izquierdos ($p = 0,85$).

Conclusión: La retinopatía asimétrica en pacientes diabéticos es infrecuente, por lo que deberán considerarse procesos patológicos adicionales en presencia de RD asimétrica.

© 2017 Spanish General Council of Optometry. Publicado por Elsevier España, S.L.U. Este es un artículo Open Access bajo la licencia CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

Diabetes mellitus affects approximately 422 million individuals worldwide and the global prevalence has nearly doubled since 1980.¹ Diabetic retinopathy (DR) is the leading cause of blindness among working-aged adults and affects about 92 million people globally.² Owing to the systemic nature of the disease, DR affects eyes bilaterally and usually develops in a relatively symmetric pattern over time, although few studies have looked at this directly. Laron et al. investigated the spatial correspondence of abnormal multifocal electroretinogram responses in adolescents with type 1 diabetes and no retinopathy. Their results showed high agreement (68–94%) of inter-ocular correspondence of locations of abnormal multifocal electroretinogram implicit times, suggesting a symmetrical disease process even before the presence of clinically visible DR.³ Iino et al. prospectively followed a cohort of diabetic patients with and without symmetrical DR for the development of brain infarction. While not the main outcome of their study, they reported that only 12 of 142 (8.4%) patients had asymmetric retinopathy.⁴ Other studies have reported asymmetric DR in 5–10% of patients with proliferative disease.⁵

There has been increasing interest in peripheral retinal involvement in DR. Predominantly peripheral lesions have been associated with an increased risk of progression of both non-proliferative diabetic retinopathy and of conversion to proliferative disease. Predominantly peripheral lesions are identified by more than 50% of the lesion being located outside the seven standard fields of the

Early Treatment Diabetic Retinopathy Study (ETDRS).⁶ These peripheral lesions are hypothesized to come from underlying capillary non-perfusion.⁷ Recent technological advances have greatly improved the evaluation of capillary function in the peripheral retina. Compared to standard fluorescein angiography which covers 15% of the retinal surface with the 45 degree images, ultra-widefield fluorescein angiography (UWFA) provides extended peripheral retinal views and covers 82% of the retina with the 200 degree field of view, captured in a single frame.⁸

The purpose of this study was to evaluate the symmetry of the amount of peripheral retinal nonperfusion in patients with diabetic retinopathy. In this article, we define symmetry as the likeness of the total value of peripheral non-perfusion as measured by ischemic index (ISI) in the right eye compared to the left eye. To our knowledge, no prior studies have reported on this.

Methods

The study protocol and informed consent were approved by the Illinois College of Optometry Institutional Review Board and followed the tenets of the Declaration of Helsinki. Informed consent was obtained from all subjects and 58 individuals with DR were enrolled from the Illinois Eye Institute, an urban primary eye clinic in this cross-sectional, prospective study. Patients with prior panretinal photocoagulation treatment or a history of significant retinal vascular pathology (vein occlusion, artery occlusion or retinal macroaneurysm) were excluded. UWFA images were

Download English Version:

<https://daneshyari.com/en/article/10211490>

Download Persian Version:

<https://daneshyari.com/article/10211490>

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