



Correlations between retinal and choroidal microvascular changes and disease duration, severity and cognitive impairment in episodic migraine patients

Lígia Barros Oliveira, Mauro Eduardo Jurno, Leonardo Proveti Cunha, Thiago Cunha Vale

Hospital Foundation of the State of Minas Gerais, Belo Horizonte, Minas Gerais, Brazil

Introduction

Migraine is recognized as a neurovascular disorder resulting from dysfunction of hypothalamic and brain stem nuclei, with consequent changes in cortical excitability. The retina can be considered an extension of the central nervous system. Retinal and choroidal thickness, measured by optical coherence tomography (OCT), may reflect neurovascular changes in migraine.

Objective

To evaluate the relationship between the changes identified in OCT and optical coherence tomography angiography (OCTA) in patients with migraine with aura (MA) and migraine without aura (MWA) and the duration and severity of the disease using the Headache Impact Test-6 (HIT-6) questionnaire and cognitive assessment through the Montreal Cognitive Assessment (MoCA).

Methods

In this cross-sectional study, 32 eyes of 16 patients with MA and 30 eyes of 15 patients with MWA were compared with 32 eyes of 16 healthy age-matched controls. Measurements of the thickness of the peripapillary retinal nerve fiber layer (pRNFL), total macula, ganglion cell complex (GCC), and choroidal thickness were evaluated by OCT as well as the superficial vascular density of the macula by OCTA.

Results

Statistically significant differences between the groups in relation to the layers analyzed by OCT and OCTA of the macula were not found. Lower choroidal thickness values in the fovea and in the superior internal, superior external, external temporal and average thickness regions were found in individuals with migraine when compared to the control group ($p < 0.05$). The cognitive assessment of patients in relation to controls did not determine statistically significant differences. Statistically significant negative correlations were found between disease duration and total macular thickness ($p = 0.037$; in the average thickness of the MWA group), ganglion cell complex (GCC) thickness ($p = 0.017$; in the average thickness of the MWA group) and choroidal thickness ($p = 0.039$; in the average thickness of the MWA group), as well as the HIT-6 score and the peripapillary retinal nerve fiber layer (pRNFL) thickness ($p = 0.027$; in the average thickness of the MWA group).

Conclusion

Compared with controls, individuals with migraine showed a significant reduction in choroidal thickness. Our results showed that the longer the disease duration was, the thinner the total macula, GCC and choroidal thickness were. Additionally, the thickness of the pRNFL layer showed an inverse correlation with the disability caused by migraine. The results of this study contribute to the understanding of the vascular changes in migraine.