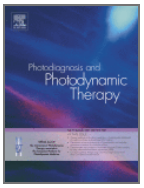
Photodiagnosis and Photodynamic Therapy
Available online 28 September 2021, 102558
In Press, Journal Pre-proof



# Correlation between Optical Coherence Tomography Angiography and Multifocal Electroretinogram Findings in Patients with Diabetes Mellitus

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https://doi.org/10.1016/j.pdpdt.2021.102558



## Highlights

- Juxtafoveal and parafoveal vessel density decreases in diabetic retinopathy.
- In the early stages of diabetic retinopathy, neurodegeneration and microvascular degeneration begin separately from each other at the same time.
- Vascular and neuronal degeneration can be followed by non-invasive tests with OCTA and mfERG.

## Abstract

## Background

**:** Diabetic retinopathy is characterized by microvascular, neural and glial cell damage. Optical coherence tomography angiography (OCTA) can detect subclinical microvasculopathy while multifocal electroretinography (mfERG) can detect subclinical local retinal dysfunction before onset of clinically observable retinopathy. Here, we investigated the relationship between retinal dysfunction in multifocal electroretinography and vascular changes in optical coherence tomography angiography.

## Methods

: The study included 63 eyes of 63 diabetic patients without retinopathy (DM+DR-) and 68 eyes of 68 patients with non-proliferative diabetic retinopathy (NPDR). In addition, 64 eyes of 64 age and sex-matched subjects were included as the control group (CG). All subjects were evaluated using OCTA and mfERG.

## Results

: The vascular density in the superficial and deep capillary plexus was significantly decreased in the DM+DR-group and the NPDR group compared with the CG group (except for the superficial foveal area, NPDR group vs. CG group) ($p<0.05$). The vascular density of the superficial and deep parafoveal region was significantly decreased in the NPDR group compared to the DM+DR- group ($p<0.05$). In circles of 2-, 5- and 10-degree, the amplitudes of the N1 and P1 waves were statistically significantly decreased in both the DM+DR- group and the NPDR group compared with the CG ($p<0.05$). When the NPDR group was compared with the DM+DR- group, there was a statistically significant decrease in the amplitude of the N1 and P1 waves in the circles of 2- and 5-degree ($p<0.05$). According to the correlation analysis, the amplitude and implicit times of the N1 and P1 waves showed weak-to-moderate correlation with vascular density ($p<0.05$).

## Conclusions

: The decreased peaks of mfERG wave provides evidence regarding neurodegenerative effect of DM-associated hyperglycemia. The decreased vascular density caused by hyperglycemia was topographically associated with the retinal dysfunction and neurodegeneration.

## Keywords

Diabetic retinopathyoptical coherence tomography angiographymultifocal electroretinographyretinal neurodegenerationretinal microvascular degenereation

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