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Association between macular ganglion cell layer- inner plexiform layer and diabetic retinopathy

Background/Objectives

This study aimed to evaluate the association between the thickness of the macular ganglion cell layer-inner plexiform layer (GCL-IPL), a marker of retinal neurodegeneration, and diabetic retinopathy (DR), in type 2 diabetic patients (T2DM), and to determine the related risk factors.

Methods

This cross-sectional study included 50 eyes of 25 T2DM patients. Complete ophthalmological examination was performed, including color fundus photography and optical coherence tomography (OCT) of the macula. Data were analyzed using the software package Statistica™ 14.0.1.25 (TIBCO Inc., USA).

Results

Fifty eyes were divided into two groups: no DR (n = 34) and non-proliferative DR (NPDR) (n = 16). The NPDR group had longer diabetes duration (p = 0.042), higher HbA1c (p = 0.002), lower HDL cholesterol (p = 0.036), and also lower macular GC-IPL thickness (p = 0.027) than those without DR. The correlation between DR and GC-IPL was significantly negative (R = -0.319, p = 0.024). DR was positively related to diabetes duration (p = 0.047) and HbA1c (p = 0.003), while the relation between GC-IPL and diabetes duration (p = 0.042) and HbA1c (p = 0.043) was negative. Binary logistic regression analysis showed that HbA1c (OR = 2.77, p = 0.007) and HDL cholesterol (OR = 0.08, p = 0.031) were the main predictors for DR, whereas the best model for predicting the GC-IPL thickness (R² = 0.223) obtained from stepwise regression analysis included HDL cholesterol, triglycerides, estimated glomerular filtration rate, and albumin/creatinine ratio.



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Conclusions

The negative correlation between macular GCL-IPL and DR indicates the coexistence of neurodegenerative and microvascular changes, linked by the well-known risk factors: diabetes duration and HbA1c.

Keywords: diabetic retinopathy; ganglion cell layer-inner plexiform layer; risk factors; type 2 diabetes.

Biography

Dr. Romano Vrabec is a medical specialist at Merkur University Hospital in Croatia with extensive experience in internal medicine and clinical care. He is dedicated to delivering evidence-based treatment and advancing patient-centered healthcare practices. Dr. Vrabec actively contributes to multidisciplinary clinical management, integrating modern diagnostic approaches with effective therapeutic strategies. In addition to his hospital responsibilities, he engages in professional development and academic collaboration, supporting continuous medical education and research initiatives. His commitment to clinical excellence and innovation reflects his dedication to improving patient outcomes and strengthening healthcare standards within Croatia and internationally.