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Inner nuclear layer thickness, a biomarker of metamorphopsia in epiretinal membrane, correlates with tangential retinal displacement

Yoshikazu Ichikawa, Yutaka Imamura, Masahiro Ishida

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Abstract

Purpose: To examine correlations of inner nuclear layer (INL) thickness with metamorphosia and tangential retinal displacement in epiretinal membrane (ERM).

Design: Retrospective, consecutive, interventional case series.

Methods:

Setting: Institutional study

Patient Population: Fifty eyes of 50 patients undergoing epiretinal membrane surgery

Observation Procedures: M-CHARTS were used to measure metamorphopsia. Inner nuclear layer (INL) thickness and outer retinal layer (ORL) thickness in the macula and distances between the intersections of 2 sets of retinal vessels situated vertically or horizontally were measured in Spectralis OCT and infrared images.

Main Outcome Measures: Correlations of INL and ORL thicknesses with M-CHARTS scores and distances of retinal displacement

Results: Preoperative INL thickness significantly correlated with pre- and postoperative metamorphopsia scores at 3 months (Spearman's correlation coefficient: P=.036 and P= .003, respectively). The baseline INL thickness and its change at 3 months significantly correlated with the postoperative vertical retinal displacements at 3 months (P< .001 for both). Pre- and postoperative ORL thicknesses were not correlated with pre- and postoperative metamorphopsia scores at any periods.

Conclusions: INL thickness is a useful biomarker to evaluate metamorphopsia and appears to be determined by tangential retinal displacement in ERM. Structural changes of inner retinal layer, which cause Müller cells distorted, play a more important role for generation of metamorphosia than outer retina. Our results provide evidence for the theory that Müller cell functions as an optic fiber in humans.