Longitudinal study of vision and retinal nerve fiber layer thickness in multiple sclerosis.

OBJECTIVE: Cross-sectional studies of optical coherence tomography (OCT) show that retinal nerve fiber layer (RNFL) thickness is reduced in multiple sclerosis (MS) and correlates with visual function. We determined how longitudinal changes in RNFL thickness relate to visual loss. We also examined patterns of RNFL thinning over time in MS eyes with and without a prior history of acute optic neuritis (ON).

METHODS: Patients underwent OCT measurement of RNFL thickness at baseline and at 6-month intervals during a mean follow-up of 18 months at 3 centers. Low-contrast letter acuity (2.5%, 1.25% contrast) and visual acuity (VA) were assessed.

RESULTS: Among 299 patients (593 eyes) with >or=6 months follow-up, eyes with visual loss showed greater RNFL thinning compared to eyes with stable vision (low-contrast acuity, 2.5%: p < 0.001; VA: p = 0.005). RNFL thinning increased over time, with average losses of 2.9microm at 2 to 3 years and 6.1microm at 3 to 4.5 years (p < 0.001 vs 0.5-1-year follow-up interval). These patterns were observed for eyes with or without prior history of ON. Proportions of eyes with RNFL loss greater than test-retest variability (>or=6.6microm) increased from 11% at 0 to 1 year to 44% at 3 to 4.5 years (p < 0.001).
**INTERPRETATION:** Progressive RNFL thinning occurs as a function of time in some patients with MS, even in the absence of ON, and is associated with clinically significant visual loss. These findings are consistent with subclinical axonal loss in the anterior visual pathway in MS, and support the use of OCT and low-contrast acuity as methods to evaluate the effectiveness of putative neuroprotection protocols.

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