Optical coherence tomography indicates disease activity prior to clinical onset of central nervous system demyelination.

Abstract: Establishing biomarkers for predicting disease activity in demyelinating disease of the central nervous system is crucial for designing appropriate disease modifying treatment strategies. To investigate retinal findings and disease activity in patients with radiologically isolated and clinically isolated syndromes. We performed retinal optical coherence tomography and cerebral magnetic resonance imaging in healthy control individuals (n=19), in individuals with non-specific white matter lesions (n=18), and in patients with clinically isolated syndromes (n=18) and radiologically isolated syndromes (n=20). Reduced volume of retinal nerve fibre layer and increased volume of inner nuclear layer at baseline correlated with subsequent disease activity as measured by an increase in cerebral T2 lesion load in patients with radiologically isolated syndromes. Reduced volume of retinal nerve fibre layer and increased volumes of inner and outer nuclear layer were associated with progression into multiple sclerosis in patients with clinically isolated syndromes. Patients with radiologically and clinically isolated syndromes behave similarly concerning paraclinical disease activity in cerebral magnetic resonance imaging. In both conditions, reduction of retinal nerve fibre layer and increased inner nuclear layer and outer nuclear layer volumes
predict disease activity and are associated with progression into multiple sclerosis.