Imaging biomarkers of disease progression in multiple sclerosis

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Summary

Clinical course descriptions of multiple sclerosis (MS) have long played a vital role in understanding the disease and in guiding treatment decisions. Traditional definitions of these courses entail most MS patients being diagnosed with relapsing-remitting (RR) MS initially, and then transitioning to a secondary progressive (SP). However, many different criteria have been proposed to distinguish between these courses, and a clear consensus remains elusive. Recent clarifications of the standard classifications by the International Advisory Committee on Clinical Trials of MS acknowledged the need for change based on improved understanding of MS and its pathology, but also emphasized that imaging and biological markers that might provide objective criteria for separating clinical phenotypes are lacking. Based on our research and clinical experience, we hypothesize that these difficulties are driven by the fact that there is in reality a third “transitional” phase between RR and SP MS. Concretely defining this transitional MS course is presently elusive, but could be greatly facilitated by the combined analysis of clinical, cognitive, and imaging data in very large datasets with many subjects and multiple timepoints. This presentation will discuss the value of different magnetic resonance imaging (MRI) and optical coherence tomography (OCT), serum neurofilament light chain (sNfL), clinical, and cognitive outcomes in defining and predicting transitional MS, using a large cohort of MS patients collected over a period of 10 years, with an average follow-up of 5 years. Based on the findings of individual and composite biomarkers employed in the study, we will concretely estimate the onset and end of transitional MS, and determine the best clinically applicable predictors and diagnostic markers.