Visual pathway involvement in progressive multiple sclerosis: demyelination and neurodegeneration are more prominent in secondary progressive than primary progressive patients.

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Introduction: the pathophysiologic distinction between primary progressive (PP) and secondary progressive (SP) multiple sclerosis (MS) is still debated. We aimed at using visual evoked potentials-VEPs and optical coherence tomography-OCT to compare respectively the extent of demyelination and neurodegeneration in the visual pathway of PP and SP MS.
Methods: One hundred progressive MS patients (55 SP: disease duration-DD 20.1±7.6 years, progression duration-PD 7.44±4.7 years, median EDSS 6.0; 45 PP: DD 8.4±4.7 years, median EDSS 6.0) and 42 healthy controls (HC) underwent testing with high-contrast visual acuity (VA), low contrast letter acuity (LCLA) full-field pattern-reversal VEPs and peripapillary RNFL measurement with OCT. Patients with ophthalmological comorbidities were not enrolled in the study.
Results: After excluding eyes with previous optic neuritis-ON (unilateral in 18 SP and 2 PP, bilateral in 7 SP), VA did not significantly differ between SP and PP (HCVA 0.88±0.2 vs 0.94±0.2 decimal, p=0.424) and was significantly reduced than in HC (1.03±0.2, p<0.001 for SP and p=0.035 for PP). SP had significantly lower LCLA (0.19±0.1) *vs* PP (0.29±0.2, p=0.015) and *vs* HC (0.31±0.1, p<0.001). Mean binocular RNFL was significantly thinner in SP (81.1±12.03 µm) *vs* PP (88.7±9.9 µm, p=0.002), and in both subgroups *vs* HC (96.9±5.7 µm, p<0.001). RNFL was abnormally reduced in 58.9% (46/78) SP eyes *vs* 26.1% (23/88) PP eyes (p<0.001). VEPs were significantly delayed in SP (145.0±19.3 msec) *vs* PP (132.9±19.3 msec, p=0.003), and in both *vs* HC (116.2±5.2 msec, p<0.001). VEPs were abnormal in 76.9% (60/78) SP eyes *vs* 61.3% (54/88) PP eyes (p=0.020). RNFL and VEP latency group differences lost significance after correcting for DD (partial correlation: p=0.629 for RNFL, p=0.259 for VEPs latency), with persistence of statistical significance when correcting for PD (partial correlation: p=0.001 for RNFL thickness, p=0.003 for VEP latency).
Conclusions: despite similar global disability, SP patients have greater visual impairment, demyelination and neurodegeneration along the visual pathway compared with PP. These aspects seem partly ascribable to a longer disease duration and to a higher likelihood of subclinical episodes during the relapsing phase in SP patients, but may reflect distinct pathophysiologic processes between the two courses of the disease.

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