Primary Progressive Multiple Sclerosis: A Clinical and MR Imaging Cross-Sectional Study Using T2-Lesion Load Total Brain Parenchymal Fraction and Spinal Cord Cross-Sectional Area

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Purpose
There is little data on correlations between clinical and MR parameters in primary progressive multiple sclerosis (PPMS) patients. The purpose of this study was to establish correlations between MR parameters (T2-lesion load, total brain parenchymal fraction (BPF) and cord area) and several clinical parameters in a cohort of PPMS patients.

Materials & Methods
Forty-eight PPMS patients underwent clinical assessment and brain MR imaging using T1- and T2-weighted 3 mm contiguous transverse sections of the whole brain and cervical MR imaging with a sagittal magnetization-prepared rapid-acquisition gradient echo sequence. T2-lesion load and BPF were calculated with semi or completely automated segmentation techniques. Spinal cord cross-sectional area (SCCA) was calculated with use of a semiautomated segmentation technique from a series of five contiguous 3 mm axial slices centred at the C2-C3 disk obtained from the original data set.

Results
There was a significant correlation between T2-lesion load and BPF (r = −0.552; p < 0.001), but not between these MR parameters and EDSS or disease duration. Significant differences were found in T2-lesion load and BPF between patients with predominant spinal cord symptoms, and those without (p < 0.001). SCCA was reduced significantly in patients as compared to the controls (p < 0.001), but no significant differences were observed between clinical subgroups. There was a weak but significant correlation between SCCA and EDSS (r = −0.294; p = 0.012), although this correlation did not strengthen when clinical subgroups were analyzed separately.

Conclusion
Striking discrepancies were found between brain MR results and clinical data in this cohort of PPMS patients. Significant differences in the brain, but not in the cervical cord MR data were found between patients whose predominant clinical syndrome was progressive spastic paraparesis and those who had a predominantly nonspinal progressive syndrome. SCCA was the only MR parameter that showed a significant correlation with EDSS.

References