MULTIPLE SCLEROSIS

Characterization of lesion evolution in relapsing–remitting and secondary progressive multiple sclerosis

Multiple sclerosis (MS) is a chronic, inflammatory, demyelinating disease, in which certain areas of the brain are known to be particularly susceptible to development of white matter lesions. How the spatiotemporal distribution of lesions alters over the disease course is unclear, and formed the focus of a recent study by Kerstin Bendfeldt and colleagues.

The study involved 217 patients with MS from two centres, of whom 209 had relapsing–remitting MS (RRMS) and 62 had secondary progressive MS (SPMS). All patients underwent an MRI scan at baseline and at follow-up (median follow-up time of 25 months), with both T1-weighted images and T2-weighted images being obtained.

Lesions observed on T2 imaging are nonspecific regarding histopathology, and may represent areas of inflammation or oedema. Persistence of lesions on T1 imaging can represent areas of severe damage. The authors hypothesized that

the regional distribution of T1 and T2 lesions would differ between the RRMS and SPMS groups, and may change over time.

“...lesion burden on T1-weighted MRI was higher in patients with SPMS than in those with RRMS”

Using lesion probability maps based on consistent imaging changes observed within the groups of patients, the researchers found both RRMS and SPMS groups had a high probability of developing lesions in the callosal body, the corticospinal tract and the occipital horns of the lateral ventricles. At these sites, lesion burden on T1-weighted MRI was higher in patients with SPMS than in those with RRMS. This finding highlights key brain regions that might be particularly vulnerable to damage as MS progresses.

In contrast to the T1 lesion maps, no significant differences were observed between RRMS and SPMS in lesion maps of T2-weighted images. T2 lesions could, therefore, be more stable than T1 lesions in advanced stages of MS.

In a longitudinal analysis comparing baseline and follow-up scans, regional T1 or T2 lesion probability did not change in either RRMS or SPMS groups. This finding could reflect the limited capacity of MRI to detect progression of neuronal damage in the short-term.

“Future studies that we intend to perform might lead to better prediction of MS progression at a single-subject level,” says Benfeldt.

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