MINI-SYMPOSIUM : RECENT ADVANCES IN NEUROIMAGING IN MULTIPLE SCLEROSIS, AND THEIR NEUROPATHLOGICAL SIGNIFICANCE

Multiple sclerosis pathology and its reflection by imaging technologies: introduction

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magnetic resonance imaging, multiple sclerosis, neuropathology, positron emission tomography

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Multiple sclerosis (MS) was originally defined by neuropathology as a chronic inflammatory disease of the central nervous system, which leads to focal lesions in the white matter, characterized by selective primary demyelination with partial preservation of axons and reactive astrocytic gliosis (1). On the basis of this concept, numerous studies focused on the pathology of active white matter lesions. They provided fundamental insights into the nature of the inflammatory response and the neurobiological mechanisms of demyelination, remyelination, and axonal injury (3,4). Magnetic resonance imaging is currently a very useful in clinical studies and in particular in trials focused on anti-inflammatory or immunomodulatory treatment strategies in early MS, but much less is known about how neuroimaging reflects the much more complex neuropathological changes seen in the progressive stage of the disease.

The aim of the current mini-symposium is to summarize the current view of the neuropathology of progressive MS and to provide information as to how this knowledge can already be translated into clinical practice with new MRI and PET technologies. Cornelia Laule and Wayne Moore focus on new MRI technologies, which specifically allow imaging of myelin in the process of demyelination and remyelination (5). Roberta Magliozzi and coworkers discuss the clinical importance of cortical lesions, how they can be detected by MRI and how their immunopathology is reflected in the cerebrospinal fluid (6). Klaus Schmierer focuses on new approaches to spinal cord imaging and how diffuse neurodegeneration in the spinal cord is related to axonal degeneration in focal lesions (8). Bruno Stankoff and co-workers review the progress of myelin and microglial imaging by positron emission tomography, which provides dynamic *in vivo* information on changes documented in neuropathological studies (9). Finally, Simon Hametner and coworkers concentrate of changes in iron metabolism in the multiple sclerosis brain and their visualization in patients by high-field (7T) magnetic resonance imaging (2). All these data show that with newly developed technologies fill the gap between neuropathology and neuroimaging in multiple sclerosis and this progress will become instrumental in monitoring disease progression in the patients.

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