

Multiple Sclerosis: From Pathology to Patient Monitoring

The Role of MR in MS Management (Jack H Simon)

This fourth talk in the session is concerned with the role of MR imaging in MS management.

Optimal utilization of MR imaging in individual patients with MS is of course important to clinical imagers and clinicians. Researchers interested in improving this approach will also benefit from understanding the technical limitations of the clinical approach, its information content, and why and where we need the more advanced approaches, or not.

There are several relatively simple and practical approaches to monitoring disease in the patient, predominantly those based on focal lesion counts, by T2-weighted imaging or contrast enhancement, usually within the white matter compartment of the brain. Although developed in the 1980's, based on clinical practice and experience in clinical trials and natural history studies, the lesion count methodology has re-emerged recently due to intriguing hints of relevance to the important question of treatment success or failure.

Several validation series show fairly consistent results for count methodology in monitoring disease with specific therapies. The validation studies are based on how effectively early lesion counts and other laboratory data (eg CSF measures) predict late outcome based on clinical disease activity, disability and/or MR measures of tissue damage. Count methodology will likely be a component in assessing "active disease-free status", as therapy continues to improve.

Building on this, advanced imaging and pathology correlation studies indicate that the considerable relevant focal pathology in the gray matter is also informative, potentially in individuals. There is as yet the unfulfilled but exciting promise of measuring atrophy in individual patients, in the clinic.

Optimal white and gray matter measures for clinical practice require strong MR acquisition technique, and uniform interpretation approaches, which will be discussed.

Based on this discussion of MR in MS management, the target audience should have a clear understanding of the current state-of-the-art in monitoring individual patients with MS by MR imaging, and hopefully some insight into where this field needs to go in the future---narrowing the gap between MR in the individual patient and MR techniques most appropriate for patient population studies.