CONSORTIUM OF MULTIPLE SCLEROSIS CENTERS (CMSC) GUIDELINES FOR A STANDARDIZED MRI PROTOCOL FOR THE DIAGNOSIS AND FOLLOWUP OF MULTIPLE SCLEROSIS: UPDATE AND IMPLEMENTATION

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Purpose: MRI is widely used to aid in the diagnosis of multiple sclerosis (MS) and increasingly in follow-up. Guidelines for a standardized brain and spinal cord MRI protocol had been previously proposed and a follow-up consensus meeting was convened to i) review and update the guidelines and ii) develop implementation strategies

Methods and Materials: Sponsored by the Consortium of MS Centers, an international group of neurologists and radiologists (including representatives from the American Academy of Neurology, American Society of Neroradiology and Radiological Society of North America) initially met in Vancouver, BC, November 3-4, 2001. Guidelines and indications for standardized brain and spinal cord MRI for MS were developed and subsequently presented and discussed at local and regional academic and community meetings and 8 international neurology and radiology conferences (including the ISMRM). A follow-up consensus meeting reconvened on February 28-March 2, 2003 revised and updated these guidelines with strategies to make them universally useable, useful and used.

Results: The following consensus recommendations were made: (1) When available, standardized brain MRI [1.0 Tesla and higher, 3mm(preferred)-5mm thick, non-gapped, sagittal fluid attenuating inversion recovery (FLAIR), axial FLAIR/T2 weighted (T2)] should be performed in the initial evaluation of suspected MS and baseline evaluation in established MS. (2) Brain and spinal cord [sagittal T1-weighted (T1), proton density (PD)/T2W with axial fast (or turbo) spin echo (FSE) T2 through suspicious lesions] MRI are indicated if the presenting symptoms are unresolved and at the level of the spinal cord and also when the brain MRI is equivocal. (3) In suspected MS, follow-up MRI to establish diagnosis by identifying disease disseminated in time and/or space is indicated. (4) In established MS, routine follow-up MRI scans at predefined intervals are not recommended, in the absence of clinical indications, which include unexpected clinical worsening, reassessment for initiation or modification of treatment and suspicion of secondary diagnosis. (5) Use of gadolinium (0.1 mmol/kg with minimum 5 minute delay) is recommended in suspected MS to identify disease disseminated in time but otherwise optional. (6) The indication (diagnosis, baseline or follow-up evaluation) for the study should always be provided. (7) The radiology report should include a description of findings, comparison with previous studies and interpretation. (8) MRI studies should be permanently retained and available.

A number of implementation strategies, including presentations at national and international meetings, publications, endorsement and support from MRI technologists, neurological and radiological professional societies, web-based instructions and CME were discussed.

Conclusion: Implementation (www.mscare.org) of these useful and useable guidelines for standardized MRI protocol in MS will benefit patients and be helpful to neurologists and radiologists.

Table 1: Brain MRI Protocol

Sequences	Suspected MS Diagnosis	Established MS Baseline or Follow-up
Sagittal FLAIR	Recommended	Optional
Axial PD/T2	Recommended	Recommended
Axial FLAIR	Recommended	Recommended
Gadolinium-enhanced T1	Recommended	Optional

Table 2: Spinal Cord Protocol

Sequences	
Sagittal PD/T2	Recommended
Sagittal pre-Gad T1	Recommended
Sagittal post-Gad T1	For suspicious lesions
Axial post-Gad T1	Through suspicious lesions
Axial T2	Helpful to confirm suspicious lesions