

Appendix S1. Current resources promoting use of the International 2020 MAGNIMS-CMSC-NAIMS Consensus Guidelines on the Use of MRI in Multiple Sclerosis (International 2020 Guidelines)—updated standardized MRI guidelines for diagnosis and follow-up of patients with multiple sclerosis

Posters

- “Updated recommendations for a standardized MRI protocol for multiple sclerosis.” This poster (LB310) was presented at the ACTRIMS meeting (February 27-29, 2020, in West Palm Beach, Florida). The poster abstract appears in the ACTRIMS Forum 2020, poster session 2.¹
- “Updated CMSC magnetic resonance imaging (MRI) protocol for MS.” This poster and platform presentation from the CMSC working group was presented at the CMSC 2020 Virtual Annual Meeting which took place in May and June 2020.² The virtual poster session featured an interview with Anthony Traboulsee, MD (June 1-14, 2020). The poster and interview can be viewed at:
http://delmedgroup.com/Daily_2020/PosterTour/index.html

Publications

- “The Importance of a Globally Aligned, Standardized MRI Protocol for MS.” This editorial discusses the international effort to harmonize the guidelines into one international standard of care for patients with MS.³
(<https://www.neurologylive.com/journals/neurologylive/2020/february-2020/the-importance-of-a-globally-aligned-standardized-mri-protocol-for-ms>)
- “CMSC MRI guidelines evolve into international consensus protocol” This article discusses the update planned for the 2020 International Guidelines and the process involving the October 2019 consensus conference.⁴
(https://www.medscape.com/viewarticle/932431?src=WNL_confprev_200619_MSCPED_IT&uac=114681DZ&impID=2424365&faf=1)

Online Video Presentations

- “Updates to the MRI Protocol and Clinical Guidelines for MS.” At the ACTRIMS 2020 conference, the CMSC premiered a videotaped roundtable discussion, produced in conjunction with NeurologyLive®.⁵ This program presented details of the October 2019 landmark consensus conference organized by the CMSC. June Halper moderated the discussion between four experts from the 2019 consensus meeting: Drs. Anthony Traboulsee, David Li, Scott Newsome, and Frederik Barkhof. The 1-hour program was broken down into 11 segments (Table A below). The group discussed the updated MRI protocol and clinical guidelines for MS, and strategies for implementation of the protocol. The series can be viewed at: <https://www.neurologylive.com/peer-exchange/mri-protocol-clinical-guidelines-ms/evolution-of-ms-mri-guidelines-and-alignment-with-magnims>.
- “ACTRIMS 2020 News Network, Episode 9: Updated Recommendations for Standardized MRI Protocol in MS.” This additional programming was released in

conjunction with the ACTRIMS 2020 meeting and includes an update about the standardized MRI protocol in MS with Dr. Patricia Coyle.⁶
(<https://www.neurologylive.com/view/actrims-2020?seriesVid=9>)

Table A. Topics in the video series covering Updates to the MRI Protocol and Clinical Guidelines for MS: CMSC Working Group⁵

1. Evolution of MS MRI Guidelines and Alignment with MAGNIMS
2. Role of Gadolinium and Central Vein Sign in MS Imaging
3. MS Diagnosis: McDonald Criteria and Gadolinium
4. Treatment Modifications Based on Inflammatory Activity
5. Maintaining a Consistent Protocol and Scanner for MS
6. PML Monitoring and Educating Technicians
7. Developing International Protocols and Standardized Scanners
8. Barriers in Use of CMSC Protocol
9. Impact of Insurance on Scanning and Patient Care
10. Payer and Patient Education of the Standardized Examination
11. Final Thoughts on MRI Guidelines and Protocols

References:

1. Traboulsee A, Barkhof F, Oh J, et al. Updated recommendations for a standardized MRI protocol for multiple sclerosis (LB310). *Mult Scler*. 2020;26(Issue 1_suppl):155-156.
2. Traboulsee A, Li D, Banwell B, et al. Updated recommendations for a standardized magnetic resonance imaging (MRI) protocol for multiple sclerosis. *Int J MS Care*. 2020;22(supplement 2):3.
3. Traboulsee A, Li D. The importance of a globally aligned, standardized MRI protocol for MS. *NeurologyLive*. Published online February 28, 2020.
<https://www.neurologylive.com/journals/neurologylive/2020/february-2020/the-importance-of-a-globally-aligned-standardized-mri-protocol-for-ms>. Accessed April 15, 2020.
4. Melville NA. CMSC MRI guidelines evolve into international consensus protocol. *Medscape.com*; published online June 16, 2020.
https://www.medscape.com/viewarticle/932431?src=WNL_confprev_200619_MSCPEDIT&uac=114681DZ&impID=2424365&faf=1. Accessed June 20, 2020.
5. Halper J, Traboulsee A, Li D, Barkhof F, Newsome S. Current Series: Updates to the MRI Protocol and Clinical Guidelines for MS: CMSC Working Group. Published online February 23, 2020.
<https://www.neurologylive.com/peer-exchange/mri-protocol-clinical-guidelines-ms/evolution-of-ms-mri-guidelines-and-alignment-with-magnims>. Accessed June 6, 2020.
6. Coyle PK. ACTRIMS 2020 News Network, Episode 9: Updated Recommendations for Standardized MRI Protocol in MS. Published online April 4, 2020. <https://www.neurologylive.com/view/actrims-2020?seriesVid=9>. Accessed October 5, 2020.

Appendix S2. Strategies for dissemination and implementation of the International 2020 MAGNIMS-CMSC-NAIMS Consensus Guidelines on the Use of MRI in Multiple Sclerosis (International 2020 Guidelines)

- Once the International 2020 Guidelines are published, implementation will follow. Neurologists, radiologists, and MRI facilities had a preview of the protocol at the 8th joint ACTRIMS/ECTRIMS meeting which was held online (MSVirtual2020) September 11-13, 2020. An educational session highlighting the International 2020 Guidelines was presented by three of the author/experts – Drs. Alex Rovira, Mike Wattjes and Jiwon Oh – and included discussion of the details about the protocol and recommended sequences. This helped to raise awareness about the ease of using the standardized MRI protocol for MS. In addition to the MAGNIMS-CMSC-NAIMS teaching session, the CMSC MRI Guidelines Working Group presented a poster at the 8th Joint ACTRIMS-ECTRIMS meeting highlighting advocacy and implementation strategies planned for the MS MRI protocol.
- Neurologists, radiologists, and MR technologists: In the coming months, the CMSC and other groups will roll out educational programming for health care professionals about the ease and adaptability of a standardized MRI protocol. Implementation can only take place if and when neurologists, radiologists, and MRI technologists are ready to adopt the protocol. The soon-to-be-published International 2020 Guidelines represents a globally-aligned protocol that will provide high-quality care for patients with MS. A “meet the expert” event where radiology colleagues can assemble and interact directly with the authors of the International 2020 Guidelines will encourage and educate the radiology community on the details of the protocol. The CMSC will post links to articles and one-page summaries. The CMSC also plans to reach out to neurology and radiology societies to explore their endorsement of the standardized MRI protocol.
- Examination cards for dissemination: Examination cards to be disseminated will help encourage implementation. These cards will provide a visual reminder for neurologists, radiologists, and MRI technologists to use the International 2020 Guidelines. CMSC dissemination strategies will include making these examination cards available for downloading from the CMSC website and direct mailing cards to MR facilities in the United States. These cards will allow radiologists and MR technologists to load the information onto scanners to make the process of accessing and using the standardized MRI protocol easier.
- For Patients: The CMSC, NMSS, and MSAA will develop educational programs and webinars for patients to advocate for the updated International 2020 Guidelines. Programming will be accessible through the association websites.
- Abstracts submitted to international medical meetings: The CMSC MRI Guidelines working group has submitted abstracts to various medical meetings this year including the 2020 Virtual Annual Meeting of the CMSC, the 8th Joint ACTRIMS-ECTRIMS

meeting, the RSNA, and the ISMRM & SMRT Joint conference. Due to concerns about the coronavirus, these 2020 meetings were presented in a virtual, online format.

- **CMSC and MSAA collaboration efforts:** Working with the MSAA, the CMSC will share the International 2020 Guidelines with a network of imaging centers through the MSAA's MRI Access Fund. The MSAA's fund assists qualified patients with MS who have no medical insurance or cannot afford their insurance costs, with payments for brain and spinal MRI scans. The CMSC will provide examination cards and print materials to the MSAA partner organizations and MRI facilities. The MSAA will share the guidelines with their Healthcare Advisory Council and other health care professionals. In addition to webinars, the CMSC plans to organize "meet the expert" teleconferences for MSAA partner organizations and facilities so that the authors of the International 2020 Guidelines can speak directly with neurologists, radiologists, and MR technologists about the protocol.
- **CMSC and the US Department of Veterans Affairs (VA) MS Centers of Excellence collaboration efforts:** The CMSC and the VA will collaborate on strategies including online presentations and prerecorded webinars to be presented at MS clinical and research meetings. This will involve direct communication with neurologists and radiologists who select sequences for scanning patients with MS. Following the anticipated publication of the International 2020 Guidelines, the VA will prepare a one-page summary of the "International MS protocol" for future VA newsletters to be shared with Radiology and Neurology Chiefs throughout the United States. In addition, the VA will inform all VA-affiliated neurology residency program directors to share the protocol with residents who typically order patient scans. Finally, the VA will summarize the value of the protocol in a newsletter for patients that will be sent to 25,000 veterans who are patients with MS.
- **Studying the use of MRI as part of a quality improvement project is an area under consideration.** Quality improvement projects (QIP) would involve ways to improve overall quality by making health care more patient-centric, trustworthy, easy to access, and safe. Simultaneously, the goal is to reduce the cost of quality care for individuals, families, employers, and government while improving general health with proven interventions. Further study in this area is needed to show that standardized MRI protocols can be effective in improving quality and care of patients while remaining cognizant of escalating costs and implementing cost-saving measures. Examples of QIP projects: proportion of MRIs satisfying Standardized MRI criteria; frequency of repeat MRI studies before and after adoption of standardized MRI protocol; time required to review standardized MRI compared to nonstandardized studies.