

Comparison of magnetization transfer methods for assessing macromolecular bound water in the brain and cervical spinal cord

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APPENDIX D

Propositions

Comparison of magnetization transfer methods for assessing macromolecular bound water in the brain and cervical spinal cord

Alfonso Lema Dopico

Maastricht, 26th of June, 2017

1. MTsat and MTR measures both differentiate disability levels in brain and spinal cord for people with multiple sclerosis
2. MTsat may be more sensitive to microstructural changes associated with pathology in the normal appearing white matter
3. MTsat also could be a more sensitive parameter than MTR in the cervical spinal cord and can differentiate people with MS who suffer mild disability
4. No significant correlations were found between MT parameters in the brain and cervical spinal cord for people with MS, even though mixed models reflected a minor relationship
5. Potentially more specific chemical exchange saturation transfer (CEST) methods could be applied to characterise molecules in myelin associating with water
6. Correlative *post mortem* studies could further contribute to validation of MTsat as a measure related to demyelination and axonal loss

7. Longitudinal studies combining multiple current MRI (and new PET) measures of axon and myelin integrity will help to define those measures most sensitive to change over time and their clinical correlates
8. MTsat enhances the sensitivity of current methods to detecting pathology, is able to be implemented on standard platforms and may provide a useful secondary outcome measure for clinical trials with development of harmonisation and quality control methods. Validation, software and methods for this provide opportunities for commercial development.