Title: Initial cross-sectional MR spectroscopy analysis of a cohort of secondary progressive MS patients enrolled in the MS-SMART trial

Author(s): D. Plantone1, B. Solanky1, D. Miller1, S. Pavitt2, G. Giovannoni3, C. Gandini Wheeler-Kingshott1,4,5, F. De Angelis1, A. Doshi1, C. Weir6, R. Parker6, N. Stallard7, C. Hawkins8, B. Sharrack9, G. Cranswick10, S. Chandran11, J. Chataway1, for the MS-SMART trialists

Affiliation(s): 1Queen Square Multiple Sclerosis Centre, NMR Research Unit, Department of Neuroinflammation, UCL Institute of Neurology, University College London, London, 2Leeds Institute of Health Sciences, University of Leeds, Leeds, 3Department of Neurology, Barts and The London NHS Trust, The Royal London Hospital, London, United Kingdom, 4Brain MRI 3T Research Center, C. Mondino National Neurological Institute, 5Department of Brain and Behavioural Sciences, University of Pavia, Pavia, Italy, 6Edinburgh Clinical Trials Unit, Usher Institute of Population Health Sciences and Informatics, University of Edinburgh, Edinburgh, 7Statistics and Epidemiology, Division of Health Sciences, Warwick Medical School, University of Warwick, Warwick, 8Keele University Medical School, Royal Stoke University Hospital, Stoke-on-Trent, 9Department of Neurology, Royal Hallamshire Hospital, Sheffield, 10Edinburgh Clinical Trials Unit, University of Edinburgh, 11Centre for Clinical Brain Sciences, University of Edinburgh, Edinburgh, United Kingdom

Abstract

Background: Proton MR spectroscopy (MRS) is able to detect and quantify different metabolites in the central nervous system, and has been widely studied in multiple sclerosis (MS). These include: N-acetyl aspartate (NAA) and N-acetylaspartylglutamate (NAAG) (both markers of neuronal integrity); myoinositol (mI, a marker of glial proliferation); glutamate and glutamine (Glx, representing a mixture of aminoacids acting as excitatory and inhibitory neurotransmitters); creatine and phosphocreatinine (Cr+PCr, suggested marker of gliosis); and glycerophosphocholine+phosphocholine (GPC+PCh, markers of membrane phospholipids, highly suggestive of ongoing inflammation when elevated). Normalization of metabolite levels to Cr+PCr has several advantages, including the reduced influence of inhomogeneities and relaxation parameters.

Aim: To examine metabolite concentrations using MRS, in 120 secondary progressive MS (SPMS) patients, and to correlate them with clinical and demographic measures.
Method: 120 SPMS patients, enrolled in the MS-SMART trial (NCT01910259) were studied at baseline by 1H-MRS. The mean values of GPC+PCh/Cr+PCr; NAA+NAAG/Cr+PCr; Glx /Cr+PCr; ml/Cr were calculating by considering one single voxel of normal appearing white matter (NAWM) in each hemisphere. Kendall's tau-b coefficients were used to test the correlations between the variables. Two sample t-tests were performed to test for differences between gender groups and EDSS band.

Results: There were no significant associations between any of the metabolites studied and: age, EDSS, total disease duration, SPMS duration and time since diagnosis. NAA+NAAG/Cr+PCr was significantly higher in females (p = 0.02) and ml/Cr was significantly higher in males (p < 0.01).

Conclusion: Our initial cross-sectional results show that the metabolic processes underlying the progression of the disease may differ between males and females, and ultimately could affect clinical course.

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