Oral Presentations

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is not yet clear how early this phenomenon begins, its impact on clinical disability or which cortical areas are primarily affected.

Methods: 100 consecutive patients (10 Clinically Isolated Syndrome (CIS), 32 possible MS (p-MS), 42 Relapsing Remitting MS (RR-MS), 16 Secondary Progressive MS (SP-MS)), and 40 age/gender-matched healthy volunteers (HV) underwent a neurological examination (Expanded disability status scale, EDSS) and a 1.5T MRI scan. Global and regional Cortical Thickness (CTh) measurements, brain parenchyma fraction and T2 lesion load were analysed. Results: We found a significant global cortical thinning in p-MS (2.22 ± 0.09 mm), RR-MS (2.16 ± 0.10 mm) and SP-MS (2.11 ± 0.12 mm) compared to CIS (2.51 ± 0.11 mm) and HV (2.48 ± 0.08 mm). The correlations between mean CTh and white matter (WM) lesion load was only moderate in MS (r = −0.393, p = 0.03) and absent in p-MS (r = −0.147, p = 0.422). Analysis of regional CTh revealed that the majority of cortical areas were involved not only in MS, but also in p-MS. Cortical pathology of the primary motor and visual area strongly correlated with motor and visual disability as evaluated by means of the corresponding Neuro-status Functional Systems. Discussion: Cortical thinning is a diffuse and very early phenomenon in MS, correlates with clinical disability, and is largely independent from WM inflammatory pathology.

P616 Effects of mid sagittal plane selection on corpus callosal area O. Ishaq, G. Hamarneh, R. Tam, A. Traboulsee, D. Li; Simon Fraser University (Vancouver, CAN); UBC MS/MRI Research Group (Vancouver, CAN)

Background: Atrophy of the corpus callosum (CC) can occur in multiple sclerosis (MS) patients at a faster rate (~4.5% versus ~1%) than loss in whole brain volume. It could be useful as another measure of neuro-degeneration. However, reliable identification of the mid sagittal plane (MSP) is difficult due to interhemispheric asymmetry, lack of landmarks and imprecise repositioning. These sources of error may confound the interpretation of changes in CC area. Objectives: To determine the effects of shifting (perturbation) the MSP selection on CC cross sectional area for MS patients. Methods: MR brain volumes of 5 MS patients with 3 scans each were acquired using a 3-D inversion-prepared spoiled gradient echo (SPGR) MRI sequence. Each sagittal slice was a 1.22 mm interval using a 3-D inversion-prepared spoiled gradient echo (SPGR) sequence and a 1.5T MRI scanner. Methods: We determined whether a plane embedded in a given volume is not located on the discrete position grid of the volume. The cross sectional CC areas in the altered planes were measured and compared against the CC area in the reference MSP. Results: The mean CC area was 569 mm² (SD 38 mm²). The maximum change in CC area was 17.14%. Conclusions: Precise selection of the MSP on follow-up MRI scans can occur because of patient repositioning and cerebral asymmetry. Shifts in the MSP between serial MRI studies may falsely increase or decrease the cross sectional CC area. This potential source of error should be taken into consideration when using CC area to monitor disease progression or treatment effects in multiple sclerosis.

P617 Biplanar whole cord MRI using parallel imaging in multiple sclerosis: a 1-year follow-up study K. Weier, Y. Nadjm, A. Thonen, J. Hirsch, L. Kappos, D. Leppert; E.W. Raduce, A. Gass; University Hospital Basel (Basel, CH)

Introduction: Despite its functional importance and its common involvement in MS, few studies have evaluated the spinal cord (SC) in MS patients serially. In a combined brain and whole SC MRI protocol we were following MS patients. The SC protocol part included assessment in the sagittal and transverse plane of the whole SC by using multi-array coils and parallel imaging. We were interested in the evolution of SC pathology as it may occur in MS, which has also been considered an additional measure of treatment effects. Methods: A cohort of 256 MS patients from the outpatient clinic (178 women, 78 men, 24–74 years old, EDSS 0–7.0) with different MS subtypes (CIS, RRMS, SPMS and PPMS) treated with best individual selected standard treatments were investigated. Examinations were performed on a Siemens I.5T Avanto MRI system which offers multi-array-coils and parallel imaging techniques. SC pathology was assessed on both sagittal and transverse images. Results: Abnormal SC MRI was noted in 75% MS patients, in more than half of them only focal lesions were identified. Focal lesions were primarily located in the cervical SC (39%) and about 2/3 showed more than 2 lesions. Diffuse cord abnormalities were found in 21% and in almost one third of these diffuse abnormalities in all levels. On f/u, new brain lesions were demonstrated in 16% of patients, while SC changes were noted in 8% of patients. In half of these patients this was easy to interpret new pathology, while more subtle changes were seen in the other half. New pathology consisted of focal lesions and/or new or increasing diffuse abnormalities. Transverse MRI was useful to confirm or suspect changes compared to the previous examination, particularly as exact repositioning and identical slice positioning on sagittal images is extremely difficult. Conclusion/Discussion: Follow-up examinations of the SC to assess disease activity in MS are still challenging. Exact repositioning and identical slice positioning on sagittal images is very demanding. Unless high contrast new lesions are visible the assessment of disease activity on cord MRI suffers from the lack of strong contrast. Our cohort included a relatively low percentage of patients with inflammatory disease activity and the rate of SC abnormality may therefore be lower than that of untreated cohorts.

P618 High-resolution MRI of the hypothalamus in multiple sclerosis R.J. Mills, C.A. Young, T. Smith; Walton Centre for Neurology and Neurosurgery (Liverpool, UK)

Background: Autonomic dysfunction in MS is common yet overt involvement of the hypothalamus in MS is not often seen on magnetic resonance imaging (MRI). Indeed, by routine, diagnostic MRI at 1.5T, only 4% of patients have plaques in the hypothalamic region, however by light microscopy at post mortem, 94% of patients have evidence of hypothalamic disease. One reason for this apparently wide discrepancy is the suboptimal scan geometry of routine MRI which often uses slice thickness of 5 mm with or without interslice gap. The use of thin, contiguous slices and higher field strength, which improves signal to noise ratio (SNR), may yield greater detection of abnormalities. Objective: To determine the prevalence of disease in the hypothalamus using high resolution MRI at 3T. Method: 50 patients with clinically definite MS, chosen at random from an MS database, and 10 healthy controls underwent MRI on a Siemens 3T Trio machine. Three, 3D sequences of T2 TSE (Turbo spin echo), T2 FLAIR (fluid attenuated inversion recovery) and T1 IR (Inversion recovery) were acquired in the coronal plane. The sequences were of contiguous 1 mm slices with in–plane resolution of up to 0.5 by 0.5 mm. Images were read by both a neurologist and a

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