

2449 INVESTIGATING STRUCTURAL CONNECTIVITY AND COGNITION IN MULTIPLE SCLEROSIS (MS) OVER TWO YEARS

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Objectives Structural connectivity and graph theory analysis may elucidate substrates for cognitive impairment in MS, providing additional biomarkers for disease progression in addition to conventional MRI analysis. We investigated the association between global network metrics and cognitive impairment cross-sectionally and longitudinally over 24 months.

Methods 48 patients with relapsing-remitting MS were recruited for an observational study over 24 months. Processing speed, learning/memory, executive function and language were assessed with the Minimal Assessment of Cognitive Function in MS (MACFIMS) battery. Patients were divided into cognitively-impaired (Z score <-1SD for ≥ 2 tests) versus cognitively-preserved at baseline. Structural connectomes were reconstructed using diffusion-weighted imaging and probabilistic tractography.

Network metrics and cognitive scores were analysed at baseline, and network metric changes were correlated with cognitive changes over 24 months.

Results Mean age was 30 years, 63% female, median disease duration 1.88 years, median EDSS 2.0. At baseline, network metrics were not correlated with any cognitive outcomes after adjusting for age, gender and T2 lesion volume. Between cognitively impaired (n=25) and preserved patients (n=23), there was no difference in lesion volume, normalised gray matter volume, or network metrics. Baseline EDSS was not significantly correlated with any graph measures. Over two years, change in executive function was negatively correlated with change in mean local efficiency, clustering coefficient and assortativity ($p < 0.05$).

Conclusion Global network metrics were not correlated with cognitive outcomes or EDSS scores, and did not differentiate between cognitively impaired vs preserved patients. Longitudinal changes in global network metrics are associated with cognitive decline.

2241 EARLY PREDICTORS OF DISABILITY IN PAEDIATRIC MULTIPLE SCLEROSIS: EVIDENCE FROM A NATIONAL REGISTRY

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Objective Early recognition of markers of faster disability worsening in paediatric-onset multiple sclerosis (POMS) is a key requisite of personalised therapy for children with MS at the earliest possible time after symptoms onset. We sought to

identify early predictors of rapid disability accrual in patients with POMS, considering the potential for commencing higher-efficacy disease-modifying therapies (DMTs).

Methods Using the global MSBase registry, we identified patients who were <18 years at the onset of MS symptoms. The clinico-demographic characteristics examined as predictors of future MS Severity Score (MSSS) included: sex, age at symptoms onset, absence of disability at the initial assessment, and maximum Expanded Disability Status Scale (EDSS) score, relapse frequency, and presence of brainstem, pyramidal, visual, or cerebellar symptoms during the first 12 months. The Bayesian log-normal mixed models were adjusted for cumulative proportion of time on higher-efficacy DMTs.

Results 672 patients (70% female) contributing 9357 visits were included. Older age at symptoms onset ($\exp(\beta) = 1.10$ [95% Credible Interval: 1.04, 1.17]), higher EDSS score (1.22 [1.12, 1.34]), and pyramidal (1.31 [1.11, 1.55]), visual (1.25 [1.10, 1.44]), or cerebellar (1.18 [1.01, 1.38]) symptoms during the first 12 months were associated with higher MSSS. MSSS was reduced by 4% for every 24% increase in the proportion of time on higher-efficacy DMTs (0.96 [0.93, 0.99]).

Conclusions MS symptoms presented later in the childhood, higher disability, and pyramidal, visual, or cerebellar symptoms during the first year predicted more rapid accrual of disability in patients with POMS. Persistent treatment with higher-efficacy DMTs was associated with a reduced rate of disability worsening.

2259 A 20-YEAR MULTICENTRE RETROSPECTIVE REVIEW OF OPTIC NERVE SHEATH FENESTRATION OUTCOMES

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Objective To determine the efficacy and safety of optic nerve sheath fenestration (ONSF) for idiopathic intracranial hypertension (IIH), and other indications from a major tertiary hospital and specialty eye referral hospital in Melbourne, Australia from July 2000 to December 2020.

Method All patients undergoing optic nerve sheath fenestrations (ONSF) were retrospectively reviewed with patient demographics, surgery indications, visual acuity, visual fields, fundus photos of optic discs, retinal nerve fiber layers (RNFL), average thickness of optic discs on optical coherence tomography (OCT), treatments, and complications recorded. Non-parametric tests were used to compare the treatment groups pre- and post-operatively.

Results A total of 127 eyes from 75 patients underwent ONSF, in which 92 eyes from 55 cases with IIH, 9 eyes from 5 cases with cerebral venous sinus thrombosis (CVST), and 26 eyes from 15 cases with other etiologies (Other). IIH cases post ONSF had a best corrected visual acuity (BCVA) improvement of 92% and 'Other' group BVCA of 80% at last follow up, both demonstrating a statistically significant improvement. All 8 CVST eyes demonstrated improvement of BCVA at last follow up. All groups demonstrated non-significant stabilisation/improvements in visual fields, OCT, and papilloedema grading. Common complications included transient diplopia (n=19, 15%) and worsening of visual function