Impact of Disease-Modifying Therapies on MRI Outcomes in Patients with Relapsing -Remitting Multiple Sclerosis: A Systematic Review and Network Meta-Analysis

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March 07, 2024

Abstract

Background Multiple sclerosis is a chronic autoimmune inflammatory demyelinating disorder of the central nervous system. The clinical presentation supported by characteristic findings on MRI forms the backbone of the current diagnostic criteria. This study was aimed to investigate the efficacy based on MRI outcomes of FDA approved disease-modifying therapies (DMTs) for relapsing-remitting MS (RRMS). Materials and Methods We searched PubMed, Embase, and the Cochrane Central Register of Controlled Trials for randomised controlled trials (RCTs) of DMTs. The outcome measures were the change from baseline in the number of T2, T1 and/or gadolinium-enhancing (Gd+) lesions in brain MRI performed at 12 months to 24 months. We performed a network meta-analysis using the frequentist approach in STATA version 16.0. Results We identified 26 RCTs for final analysis. Interferon β-1a and placebo were the most common comparison treatment. Dimethyl fumarate (DMF) 480 mg was more effective in reducing the Gd+ lesions and T1 lesions. Pegylated interferon β1a 250 mcg was relatively better in reducing T2 lesions. The treatment ranking showed that DMF 480 mg/720 mg and interferon β1b 250 mcg were more efficacious (0.9, 0.8 and 0.8 in SUCRA, respectively) for Gd+ lesions; pegylated interferon β1b 250 mcg and DMF 480 mg/720 mg were more efficacious (1.0, 0.9 and 0.9 in SUCRA, respectively) for T2 lesions and dimethyl fumarate 480 mg/720 mg were more effective (0.9 in SUCRA both, respectively) for T1 lesions. Conclusion Dimethyl fumarate 480 mg and pegylated interferon β1a 250 mcg demonstrated favourable MRI outcomes in patients with the RRMS

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