Modelling new enhancing MRI lesion counts in multiple sclerosis.

Abstract

Magnetic resonance imaging (MRI) has been established as the most relevant paraclinical tool for diagnosing and monitoring multiple sclerosis (MS). In this context, counting the number of new enhancing lesions on monthly MRI scans is widely used as a surrogate marker of MS activity when evaluating the effect of treatments. In this study, we investigated whether parametric models based on mixed Poisson distributions (the Negative Binomial (NB) and the Poisson-Inverse Gaussian (P-IG) distributions) were able to provide adequate fitting of new enhancing lesion counts in MS. We found that the NB model gave good approximations in relapsing-remitting and secondary progressive MS patients not selected for baseline MRI activity, whereas the P-IG distribution modelled better new enhancing lesion counts in relapsing-remitting MS patients selected for baseline activity. This study shows that parametric modelling for MS new enhancing lesion counts is feasible. This approach should provide more targeted tools for the design and the analysis of MRI monitored clinical trials in MS.