AUTOMATED QUANTIFICATION OF WHITE MATTER HYPERINTENSITIES TO SUPPORT DEMENTIA DIAGNOSIS

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White matter hyperintensities (WMH) are present in various dementia types, but are particularly associated with vascular dementia (VaD). A WMH load 25% total white matter is used as a diagnostic criterion. The load and location of WMH provide useful information for dementia diagnosis, and differentiation between dementia types. We present an automated tool that provides a summary report based on quantitative assessment of global and regional WMH. This tool is incorporated in the Assessa\textsuperscript{®} CE-marked medical device. Automated WMH quantification is performed using T1W-MRI and FLAIR images, based on our implementation of the “LST: Lesion Segmentation Tool” (http://www.applied-statistics.de/lst.html). We performed validation of the method in 43 subjects with clinically diagnosed dementia. The report indicates that a patient meets clinical imaging criteria for VaD if 25% total white matter constitutes WMH. From data where Fazekas scores were available, we determined that 5-25% WMH indicates a likely micro-vascular component of symptoms, and 5% WMH that symptoms are unlikely to be caused by micro-vascular disease. Validation tests revealed good agreement between manual and automated segmentations, comparable with other state-of-the-art automated methods. We also found good correlation between manual and automated segmentations; $R^2=0.81$ for total WMH, $R^2=0.86$ for juxtaventricular WMH, $R^2=0.84$ for periventricular WMH, $R^2=0.78$ for deep WMH, and $R^2=0.81$ for juxtacortical WMH. WMH measurements are an effective marker of potential VaD. The use of WMH volume is a feature of diagnostic criteria at specialist centres. These results show that our approach can provide an appropriate measurement to support dementia diagnosis at non-specialist centres.