

PERFUSION WEIGHTED IMAGING IN THE STUDY OF BRAIN GLIOMAS: REPRODUCIBILITY AND COMPARISON OF DATA OBTAINED BY USING TWO DIFFERENT SOFTWARE PLATFORMS

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The aim of this study was to evaluate the effect of using different softwares on reproducibility of perfusion parameters in a group of gliomas. We evaluated intra and interobserver reproducibility (intra-software reproducibility) and inter-software reproducibility.

We retrospectively evaluated DCE (Dynamic Contrast-enhanced MRI) and DSC (Dynamic Susceptibility Contrast MRI) data sets of 20 patients with gliomas (8 WHO II, 4 WHO III and 8 WHO IV) using a 3.0 Tesla magnet. Perfusion data were postprocessed with two software: NordicIce (NordicNeuroLab, Bergen, Norway) and Olea Sphere (Olea Sphere, Olea Medical Solutions, La Ciotat, France); in Olea Sphere both automatic and manual detection of vascular input function (VIF) was used. Parametric maps of K_{trans} and V_p were obtained from DCE data sets; parametric map of CBV from DSC data sets. For each parameter we evaluated the maximal abnormality through hotspots method. All patients were analyzed by two independent observers blinded to the histological grade using both softwares. Each observer repeated the analysis after one month to evaluate intraobserver reproducibility. Additionally, in each patient we compared DCE and DSC parameters obtained selecting the same ROIs with the two softwares. To assess reproducibility of data we used ICC (intraclass correlation coefficient) and Bland-Altman analysis.

ICC for intra and interobserver reproducibility was higher than 0.8 in almost all cases for each parameter and each software suggesting almost perfect agreement. ICC for intersoftware reproducibility ranged from 0.3 to 0.6 suggesting poor to moderate agreement; we obtained similar results selecting same ROIs with the two softwares.

Our results show that each software guarantees almost perfect intra and interobserver reproducibility. Best reproducibility is obtained when automatic detecting of VIF is selected in Olea Sphere. The finding of low inter-software reproducibility suggests that caution should be made when comparing results obtained with different softwares.