

Topic: 20. Imaging

**Title: Volume estimation of subcortical grey matter structures in multiple sclerosis: comparison between NeuroQuant® and FIRST**

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**Background:** Volume estimation of subcortical grey matter structures is becoming a field of interest in multiple sclerosis (MS). The goal of this study was to compare volume estimations for subcortical structures obtained with the NeuroQuant® and FIRST in a cohort of clinically isolated syndrome (CIS) patients.

**Material and methods:** 115 CIS patients were analyzed. Structural images were acquired on a 3.0 T system using a sagittal 3D T1-weighted gradient-echo (MPRAGE) sequence (TR=2300 ms, TE=3000 ms, voxel size=1.0x1.0x1.2mm<sup>3</sup>). Volumes for subcortical structures were obtained with NeuroQuant® and FIRST -following the described methodology; total intracranial volumes were also obtained. The Intraclass Correlation Coefficient (ICC) between the two estimated volumes (NeuroQuant® and FIRST) was calculated for each of the following structures: (right and left) thalamus, caudate, putamen, pallidum, hippocampus and amygdala. The total intracranial volume was also considered. For each structure, the percentage difference of the volume calculated with FIRST in relation to the volume estimated by NeuroQuant® was also calculated.

**Results:** The ICC was below 0.45 for the following structures: pallidum (ICC left=0.25, ICC right=0.27), amygdala (ICC left=0.29, ICC right=0.35) and total intracranial volume (ICC=0.44). The ICC ranged between 0.45 and 0.65 for the caudate (ICC left=0.46, ICC right=0.61) and thalamus (ICC left=0.55, ICC right=0.64); and it was higher than 0.65 for the hippocampus (ICC left=0.67, ICC right=0.76) and putamen (ICC right=0.79, ICC left=0.83). FIRST estimated volumes were systematically lower than the volumes obtained with NeuroQuant®, except for the pallidum (both right and left), where FIRST volumes were on average 70% higher than NeuroQuant® volumes. FIRST underestimations ranged between 1% and 12% for (both right and left) thalamus, caudate, putamen, hippocampus and total intracranial volume; and between 20% and 28% for right and left amygdala.

**Conclusions:** Structures showing largest disagreement between the two methods were the smallest ones (pallidum and amygdala). For the other subcortical grey matter regions, the agreement on the estimated volumes was moderate to strong.

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