Writer's cramp primary dystonia shows brain gray and white matter alterations: a multimodal imaging study.

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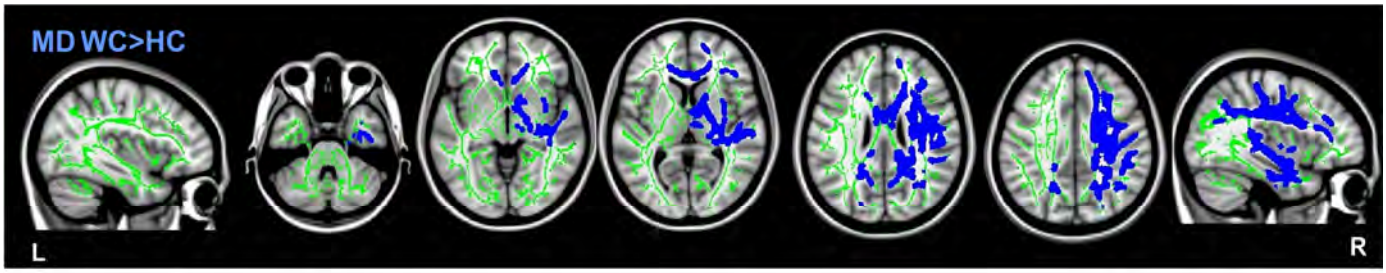
Target audience. Neurologists and neuroradiologists.

Purpose. To investigate the cortical and WM patterns of alterations characterizing Writer's Cramp (WC) primary dystonia in comparison with healthy controls.

Methods. 1.5 Tesla T1-weighted and diffusion tensor (DT) MRI scans were obtained from 19 right hand-affected patients with WC, and 30 matched healthy controls. Cortical thickness, surface area and volume measures were analyzed using both a 'vertex wise' and a 'region-wise' comparison with Freesurfer. Tract-based spatial statistics (TBSS) was used to perform a brain voxel-wise analysis of fractional anisotropy and mean (MD), axial (axD) and radial (radD) diffusivity metrics. The effects of disease severity were examined by correlating cortical metrics and DT MRI with disease duration and WC severity scales (p value <0.05).

Results. Increases in cortical surface area and volume metrics were found bilaterally in paracentral gyrus, postcentral gyrus, as well as supramarginal gyrus and temporo-occipital gyrus in WC patients compared with controls. Compared to controls, WC showed increased MD, axD and radD in the corpus callosum and thalamic radiations bilaterally, and in the right corticospinal tracts and right major associative tracts. Cortical measures did not correlated with clinical data. WCRS score correlated with increased radD in the corpus callosum and left cingulum bundle.

Figure 1. TBSS results in WC patients vs healthy controls. Mean diffusivity (MD) voxelwise group differences are shown in blue. p<0.05, Family-wise error corrected for multiple comparisons.



Discussion and conclusions. This study shows the presence of widespread structural brain alterations in WC patients that were not restricted to the basal ganglia and motor cortices. Structural abnormalities were observed in the sensory parietal regions as well as in areas of the visual system. These findings corroborate the hypothesis that WC dystonia is the a complex disturbance which results from the involvement of several neural circuits.[1] Advanced MRI techniques may give insight in the pathophysiology of this multifaceted disease.

References. 1.Ramdhani RA, Kumar V, Velickovic M, et al. Mov Disord 2014;29:1141-50.