

Title of Abstract: Neurodegeneration difference between the Non-lesioned and Lesioned hemisphere in stroke patients

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Background: Stroke is the 4th leading cause of death in Hispanics. It has generally been suggested that neurodegeneration is isolated to the lesioned hemisphere. However, recent evidence has suggested that the non-lesioned side of the brain may also undergo neurodegeneration. Here, we sought to evaluate the amount of neurodegeneration in the lesioned and non-lesioned hemisphere in chronic stroke patients and identify the impact of stroke size and location.

Methods: T1-weighted magnetic resonance imaging and diffusion weighted imaging (DWI) of the brain was collected in 23 patients with chronic stroke and 14 healthy controls. We quantified the amount of neurodegeneration in the lesioned and non-lesioned hemisphere in the cerebral peduncles (CP), posterior limb of the internal capsule (PLIC), pons, and motor cortex. The size and the white matter integrity in the region of interest were determined. The amount of neurodegeneration between groups was statistically compared, a $p < 0.05$ was considered statistically significant.

Results: We observed that CPs in the lesioned hemisphere were smaller compared to the non-lesioned hemisphere and healthy controls (304 mm^3 vs 488 mm^3 vs 374 mm^3). In addition, patients with stroke had reduced white matter integrity in both the lesioned (255.99 ± 35.43) and non-lesioned (257.36 ± 39.21) hemispheres compared to controls (329.98 ± 23.45).

Conclusion: Our results indicate that neurodegeneration occurred in both hemispheres of the brain after a stroke. However, the damage or amount of neurodegeneration was significantly higher in the lesioned hemisphere. Therefore, our work suggests that therapists should consider targeting both sides of the body rather than the more affected limb.