NC-15. RELATIONSHIPS BETWEEN NEUROCOGNITIVE FUNCTIONING AND IDH1 GENETIC MUTATION STATUS IN MALIGNANT ASTROCYTOMA
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BACKGROUND: Patients with malignant astrocytoma in similar brain regions present with variation in neurocognitive function (NCF). One potential contributor to this variation is the rate at which the tumor progresses or “lesion momentum”. IDH1-wild type (IDH1-WT) tumors are more rapidly progressive than IDH1-mutant (IDH1-M) tumors. We hypothesized that patients with IDH1-WT tumors would exhibit worse NCF than patients with IDH1-M tumors. METHODS: The IDH1 status of 119 patients with malignant astrocytoma was determined with immunohistochemistry and genetic sequencing. Patients completed NCF testing prior to surgical resection [WAIS-III: Block Design, Similarities, Digit Span (DS), Digit Symbol; Hopkins Verbal Learning Test-Revised; Confrontation Naming; Controlled Oral Word Association (COWA); Token Test; Trail Making Test (TMT); Grooved Pegboard]. Raw NCF test scores were converted to age-adjusted z-scores. Lesion volume was calculated from preoperative T2/FLAIR MRI.

RESULTS: Patients with IDH1-WT tumors (n = 66; mean age = 54.40) were significantly older than those with IDH1-M tumors (n = 53; mean age = 37.74; p < .001). No between group differences were found in years of education, gender, race, lesion location, or lesion volume. IDH1-WT patients performed worse than IDH1-M patients on all NCF tests with statistically significantly lower (p = .025 to .001) performances on HVLT-R Total Recall, HVLT-R Delayed Recall, TMTA, TMTB, COWA, Digit Symbol, Token, and Grooved Pegboard. For IDH1-WT patients, FLAIR volume was significantly associated with 12 of 14 NCF tests (r = -0.33 to -0.51, p < .009 for all). For IDH1-M patients, FLAIR volume was only significantly associated with Naming [r = -0.48, p = .001]. CONCLUSION: Patients with IDH1-WT malignant astrocytoma exhibit worse NCF than those with IDH1-M tumors. FLAIR lesion volume is inversely associated with NCF for patients with IDH1-WT but not IDH1-M tumors. These findings are consistent with the hypothesis that patients with IDH1-WT tumors present with greater NCF dysfunction secondary to greater lesion momentum that may preclude compensatory neuroplasticity and brain reorganization.