NEURO-ONCOLOGY

Abstracts

NI-43. GROWTH KINETICS OF CONTRAST ENHANCING GLIOMAS ASSOCIATE INVASIVE GROWTH WITH SEIZURE PRESENTATION
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PURPOSE: Epileptic seizure is a common presentation for patients with malignant glioma. Although the biological mechanisms which produce tumor-associated seizures are unclear, seizures are more prevalent in grade II gliomas. We hypothesized that an invasive growth kinetic would be associated with seizure incidence at presentation, and this association may explain why non-grade IV gliomas are more likely to present with seizures. METHODS: A total of 354 patients with contrast enhancing gliomas WHO grade II (N = 13), III (N = 28), and IV (N = 313) were studied. We incorporated diagnostic T1 + contrast and T2/FLAIR MRIs into a mathematical growth model to calculate a ratio of migration (D, mm²/yr) and proliferation (P, 1/yr) rates of tumor growth. We examined the association between the relative invasiveness ratio (D/P, mm²) and seizure presentation. RESULTS: When stratifying patients by histologic grade, grade III seizure presenting (SP) patients exhibited higher average D/P (p = 0.012, t-test) than non-seizure presenting (NSP) patients. Within grade III patients, SP patients with little to no mass effect similarly exhibited higher average D/P than NSP patients (p = 0.035 t-test). Broadening our scope, we observed that among all grade II-IV contrast enhancing gliomas, SP patients had higher D/P (p = 0.025, Mann-Whitney) than NSP patients. CONCLUSIONS: The association of high D/P with SP suggests that patients with an invasive growth pattern (high D/P) may be more likely to present with seizures than nodular tumors (low D/P). We interpret this association to imply that more infiltrative tumor growth is more likely to produce a seizure due to tumor cell invasion along white matter tracts, disrupting functional connectivity. In contrast, nodular growth may predominately push against, rather than invade along white matter tracts, leading to less disruption of functional connectivity and decreased seizure incidence.