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Accelerated tumor progression after COVID-19 infection in patients with glioblastoma: A retrospective case-control study

Timothy A Gregory^{1 2}, Stephanie R Knight¹, Ashley E Aaroe¹, Kaitlin N Highsmith³, Zachary C Janatpour², Barbara J O'Brien¹, Nazanin K Majd¹, Monica E Loghin¹, Chirag B Patel¹, Shiao-Pei Weathers¹, Vinay K Puduvalli¹, Carlos Kamiya-Matsuoka¹

Affiliations

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Abstract

Background: We observed rapid tumor progression following COVID-19 infection among patients with glioblastoma and sought to systematically characterize their disease course in a retrospective case-control study.

Methods: Using an institutional database, we retrospectively identified a series of COVID-19-positive glioblastoma cases and matched them by age and sex 1:2 to glioblastoma controls who had a negative COVID-19 test during their disease course. Demographic and clinical data were analyzed. Hyperprogression was defined using modified response evaluation criteria in solid tumors criteria. Time to progression and overall survival were estimated using the Kaplan-Meier method.

Results: Thirty-two glioblastoma cases with positive COVID-19 testing were matched to 64 glioblastoma controls with negative testing; age, sex, and molecular profiles did not differ between groups. Progression events occurred in 27 cases (84%) and 46 controls (72%). Of these, 14 cases (52%) presented with multifocal disease or leptomeningeal disease at progression compared with 10 controls (22%; $P = .0082$). Hyperprogression was identified in 13 cases (48%) but only 4 controls (9%; $P = .0001$). Cases had disease progression at a median of 35 days following COVID-19 testing, compared with 164 days for controls ($P = .0001$). Median survival from COVID-19 testing until death was 8.3 months for cases but 17 months for controls ($P = .0016$). Median overall survival from glioblastoma diagnosis was 20.7 months for cases and 24.6 months for controls ($P = .672$).

Conclusions: Patients with glioblastoma may have accelerated disease progression in the first 2 months after COVID-19 infection. Infected patients should be monitored vigilantly. Future investigations should explore tumor-immune microenvironment changes linking tumor progression and COVID-19.

Keywords: COVID-19; SARS-CoV-2; glioblastoma; glioma; progression.