



Differences In Tumor Size, Clinical, Demographic, And Socioeconomic Profiles of Central Nervous System

Tumors Among a Racially Diverse Cohort: Retrospective Case-Control Study

Kyung Moo Kim^{1,2}, Rachel Jane Lew, Tate Justin Higashihara, Shaina Yamashita, Michelle Pang, Michelle Stafford, Connor Goo, Kimberly Bergenholtz Teehera, Kayti Luu, Richard Ho, Enrique Carrazana, Jason Viereck, Kore Kai Liow, Arash Ghaffari-Rafi

Background: One avenue to improve outcomes among brain tumor patients involves the mitigation of healthcare disparities. Investigating clinical differences among brain tumors across socioeconomic and demographic strata, such can aid in healthcare disparity identification and, by extension, outcome improvement.

Methods: Utilizing a racially diverse population from Hawaii, 323 cases of brain tumors (meningiomas, gliomas, schwannomas, pituitary adenomas, and metastases) were matched by age, sex, and race to 651 controls to investigate the associations between tumor type and various demographic, socioeconomic, and medical comorbidities. Tumor size at the time of diagnosis was also compared across demographic groups.

Results: At the time of diagnosis for benign meningiomas, Native Hawaiians and Pacific Islanders (NHPI; $P < 0.05$), Asians, and Hispanics exhibited nearly two-fold larger tumor volumes than Whites. For gliomas, NHPI similarly presented with larger tumor volumes relative to Whites ($P = 0.04$) and Asians ($P = 0.02$), while for vestibular schwannomas, NHPI had larger tumor sizes compared to Asians ($P < 0.05$). Benign meningiomas demonstrated greater odds of diagnosis ($P < 0.05$) among Native American or Alaskan Natives, patients comorbid with obesity class I, hypertension, or with a positive Alcohol Use Disorders Identification Test-Consumption (AUDIT-C). Malignant meningiomas demonstrated greater odds ($P < 0.05$) among patients from higher median household income and urban geography. Gliomas overall exhibited increased odds ($P < 0.05$) of diagnosis among Whites and reduced odds among Asians, with greater comorbidity with obesity class III; for glioblastoma specifically, there were reduced odds of asthma diagnosis. Patients with vestibular schwannomas were at increased odds ($P < 0.05$) of being from the highest income quartile and having a positive AUDIT-C, yet reduced odds of psychiatric disorders. Pituitary adenomas exhibited reduced odds of diagnosis among Whites, yet greater odds among NHPI, military personnel, obesity class I, and psychiatric disorders. Intracranial metastases were more common in patients with pre-obesity, asthma, a positive AUDIT-C, and living in more affluent regions. Benign meningiomas are most often presented with seizures, while malignant meningiomas have the addition of cognitive difficulty. Gliomas often present with seizures, cognitive difficulty, dizziness/nausea/vomiting (DNV), vestibular schwannomas with DNV, and metastases with seizures.

Conclusion: Brain tumors exhibit unique sociodemographic disparities and clinical comorbidities, which may have implications for diagnosis, treatment, and healthcare policy.