ABSTRACT

J Neurooncol. 2022 Jan 17. doi: 10.1007/s11060-021-03927-z. Online ahead of print.

The epidemiology of primary and metastatic brain tumors in infancy through childhood.

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PURPOSE: To evaluate the epidemiology of primary and metastatic pediatric brain tumors in the United States according to the WHO CNS 4th and 5th editions classifications.

METHODS: Pediatric patients (age ≤ 14) presenting between 2004 and 2017 with a brain tumor were identified in the National Cancer Database and categorized by NICHD age stages. Patients' age, sex, race/ethnicity, overall survival, and tumor characteristics were evaluated according to WHO CNS 4th and 5th editions.

RESULTS: 23,978 pediatric brain tumor patients were identified. Overall, other (i.e. circumscribed) astrocytic gliomas (21%), diffuse astrocytic/oligodendroglial gliomas (21%; 64% of which were midline), and embryonal tumors (16%) predominated. A minority of brain tumors were of ependymal (6%), glioneuronal & neuronal (6%), germ cell tumor (GCT; 4%), mesenchymal non-meningothelial (2%), cranial nerve (2%), choroid plexus (2%), meningioma (2%), pineal (1%), and hematolymphoid (0.4%) types. GCTs were more likely in patients of Asian/Pacific Islander race/ethnicity. Brain metastases were exceedingly rare, accounting for 1.4% overall, with the most common primary tumor being neuroblastoma (61%) and non-CNS sarcoma (16%). Brain metastatic, choroid plexus, and embryonal tumors peaked during infancy and toddlerhood; whereas diffuse gliomas peaked in middle-late childhood. GCTs and glioneuronal & neuronal tumors uniquely displayed bimodal distributions, with elevated prevalence in both infancy and middle-to-late childhood.

CONCLUSION: We systematically described the epidemiology of pediatric brain tumors in the context of contemporary classification schema, thereby validating our current understanding and providing key insights.

DOI: 10.1007/s11060-021-03927-z
PMID: 35037155