

J Neurooncol. 2023 Sep 5. doi: 10.1007/s11060-023-04431-2. Online ahead of print.

Neuropsychological impairment in primary malignant brain tumor patients with awake craniotomy: a hospital-based registration study

Yah-Yuan Wu^{1 2}, Ko-Ting Chen^{3 4 5}, Yi-Chuan Chu^{1 2}, Chun-Chang Yeh^{1 2},
Wei-Chia Chen^{1 2}, Pin-Yuan Chen^{4 5 6}, Wei-Han Chang^{7 8}, Kuo-Chen Wei^{3 4 5},
Yi-Chun Chen^{9 10}

Affiliations

PMID: 37668943 DOI: [10.1007/s11060-023-04431-2](https://doi.org/10.1007/s11060-023-04431-2)

Abstract

Purpose: Neuroplasticity is an ability to maintain neural circuit function when facing damages. It is one of the reasons that making brain tumors notorious. Therefore, we evaluated the characteristics of patients with primary brain tumors, compared neuropsychological deficits between patients who had awake craniotomy with left- or right-sided tumors, and analyzed the association between white matter tracts and neuropsychological deficits in patients with right-sided tumors.

Methods: Using the registration dataset of Chang Gung Memory Hospital between 2014 and 2020, this study included a total of 698 adult patients who received craniotomy for primary brain tumors (538 of conventional craniotomy; 160 of awake craniotomy). Neuropsychological assessments were arranged in patients as preoperative evaluation for awake craniotomies.

Results: A lower proportion of right-sided tumors was noted in patient who had awake craniotomy than those who had conventional craniotomy (33.8% and 51.5%, $p < 0.001$). In awake craniotomy, 88.7% of patients with left-sided tumors and 77.8% of patients with right-sided tumors had neuropsychological impairment. Patients with left-sided tumors had worse preoperative performance compared to those with right-sided tumors in global function (36.2% and 8.0%, $p < 0.001$), language domain (57.6% and 22.2%, $p < 0.001$), and attention (36.0% and 18.5%, $p = 0.02$). Furthermore, in those with right-sided low-grade gliomas, patients involving pathway of superior longitudinal fasciculus (SLF) I had a higher risk of deficits than those without involvement in verbal memory ($p = 0.001$, Odd ratio = 11.2, 95% CI = 1.8 ~ 71.4) and visual memory ($p = 0.048$, Odd ratio = 10.5, 95% CI = 1.0 ~ 111).

Conclusion: In awake craniotomy, patients with left-sided brain tumors had worse cognitive function than those with right-sided tumors in terms of global function, language, and attention. 77% of patients with right-sided tumors had neuropsychological impairment. Therefore, a comprehensive neuropsychological evaluation and awake craniotomy are necessary for patients with brain tumors.

Keywords: Awake craniotomy; Neuropsychological assessment; Right-sided brain tumor.

© 2023. The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature.