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The Impact of Extent of Ablation on Survival of Patients With Newly Diagnosed Glioblastoma Treated With Laser Interstitial Thermal Therapy: A Large Single-Institutional Cohort

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Abstract

Background: Upfront laser interstitial thermal therapy (LITT) can be used as part of the treatment paradigm in difficult-to-access newly diagnosed glioblastoma multiforme (ndGBM) cases. The extent of ablation, though, is not routinely quantified; thus, its specific effect on patients' oncological outcomes is unclear.

Objective: To methodically measure the extent of ablation in the cohort of patients with ndGBM and its effect, and other treatment-related parameters, on patients' progression-free survival (PFS) and overall survival (OS).

Methods: A retrospective study was conducted on 56 isocitrate dehydrogenase 1/2 wild-type patients with ndGBM treated with upfront LITT between 2011 and 2021. Patient data including demographics, oncological course, and LITT-associated parameters were analyzed.

Results: Patient median age was 62.3 years (31-84), and the median follow-up duration was 11.4 months. As expected, the subgroup of patients receiving full chemoradiation was found to have the most beneficial PFS and OS (n = 34). Further analysis showed that 10 of them underwent near-total ablation and had a significantly improved PFS (10.3 months) and OS (22.7 months). Notably, 84% excess ablation was detected which was not related to a higher rate of neurological deficits. Tumor volume was also found to influence PFS and OS, but it was not possible to further corroborate this finding because of low numbers.

Conclusion: This study presents data analysis of the largest series of ndGBM treated with upfront LITT. Near-total ablation was shown to significantly benefit patients' PFS and OS. Importantly, it was shown to be safe, even in cases of excess ablation and therefore could be considered when using this

modality to treat ndGBM.

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