

ABSTRACT

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Role of Laser Interstitial Thermal Therapy in the Management of Primary and Metastatic Brain Tumors.

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Laser interstitial thermal therapy (LITT) is a minimally invasive treatment option for brain tumors including glioblastoma, other primary central nervous system (CNS) neoplasms, metastases, and radiation necrosis. LITT employs a fiber optic coupled laser delivery probe stabilized via stereotaxis to deliver thermal energy that induces coagulative necrosis in tumors to achieve effective cytoreduction. LITT complements surgical resection, radiation treatment, tumor treating fields, and systemic therapy, especially in patients who are high risk for surgical resection due to tumor location in eloquent regions or poor functional status. These factors must be balanced with the increased rate of cerebral edema post LITT compared to surgical resection. LITT has also been shown to induce transient disruption of the blood-brain barrier (BBB), especially in the peritumoral region, which allows for enhanced CNS delivery of anti-neoplastic agents, thus greatly expanding the armamentarium against brain tumors to include highly effective anti-neoplastic agents that have poor BBB penetration. In addition, hyperthermia-induced immunogenic cell death is another secondary side effect of LITT that opens up immunotherapy as an attractive adjuvant treatment for brain tumors. Numerous large studies have demonstrated the safety and efficacy of LITT against various CNS tumors and as the literature continues to grow on this novel technique so will its indications.

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