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"Navigating the complexities of low-Grade glioma treatment: insights into SBT I-125 and novel assessment tools"

Sarah Shaheen ¹, Ume Aiman ², Zahra Ali Haque ², Zainab Azad ²

Affiliations

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Abstract

Central nervous system tumors, classified by the WHO into four grades based on their aggressiveness, present significant challenges in treatment, particularly low-grade gliomas (LGGs) which, despite their slower growth, can progress to high-grade gliomas. Lucca B. Palavani and colleagues evaluated the efficacy and safety of SBT I-125 brachytherapy for LGMs in a systematic review and meta-analysis of 20 studies involving 988 patients. The analysis revealed an overall complication rate of 10%, with headaches and cyst formation being the most frequent issues. The five-year progression-free survival (PFS) rate was 66%, while the ten-year PFS rate was 30%, and the rate of malignant transformation was 26%. The mortality rate was 33%. Despite these findings, significant limitations were noted, including data insufficiencies, study heterogeneity, lack of randomized controlled trials, and potential publication bias. Inconsistencies in follow-up durations further hindered the evaluation of long-term efficacy and safety. Recent advancements in automated tumor assessment, such as Cheng et al.'s deep learning-based pipeline, are revolutionizing glioma management by enhancing the accuracy and consistency of tumor volume and RANO measurements. These innovations facilitate improved glioma grading, genetic mutation prediction, surgical planning, real-time intraoperative guidance, and histopathological analysis. Integrating such advanced tools into clinical practice can significantly enhance the precision and efficiency of glioma management. In conclusion, while SBT I-125 brachytherapy shows promise, concerns regarding safety and efficacy underscore the need for further research with standardized methodologies. Incorporating advanced automated assessment tools could improve treatment evaluation and patient outcomes.

Keywords: Automated Tumor Assessment; Deep learning-based Pipeline; Low-Grade Gliomas; Progression-free survival (PFS); SBT I-125 brachytherapy.

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