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# Radiotherapeutic advances in the management of glioblastoma

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## Abstract

Glioblastoma remains a fatal diagnosis despite continuous efforts to improve upon the current standard backbone management paradigm of surgery, radiation therapy, systemic therapy and Tumor Treating Fields. Radiation therapy (RT) plays a pivotal role, with progress recently achieved in multiple key areas of research. The evolving landscape of dose and fractionation schedules and dose escalation options for different patient populations is explored, offering opportunities to better tailor treatment to a patient's overall status and preferences; novel efforts to modify treatment volumes are presented, such as utilizing state-of-the-art MRI-based linear accelerators to deliver adaptive therapy, hoping to reduce normal tissue exposure and treatment-related toxicity; specialized MR techniques and functional imaging using novel PET agents are described, providing improved treatment accuracy and the opportunity to target areas at risk of disease relapse; finally, the role of particle therapy and new altered dose-rate photon and proton therapy techniques in the treatment paradigm of glioblastoma is detailed, aiming to improve tumor control and patient outcome by exploiting novel radiobiological pathways. Improvements in each of these aforementioned areas are needed to make the critical necessary progress and allow for new approaches combining different advanced treatment modalities. This plethora of multiple new treatment options currently under investigation provides hope for a new outlook for patients with glioblastoma in the near future.

**Keywords:** Glioblastoma; Radiation therapy; Radiotherapeutic advances; Review.

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