ABSTRACT

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Assessment and prediction of glioblastoma therapy response: challenges and opportunities.

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Glioblastoma is the most aggressive type of primary adult brain tumor. The median survival of patients with glioblastoma remains approximately 15 months, and the 5-year survival rate is less than 10%. Current treatment options are limited, and the standard of care has remained relatively constant since 2011. Over the last decade, a range of different treatment regimens have been investigated with very limited success. Tumor recurrence is almost inevitable with the current treatment strategies, as glioblastoma tumors are highly heterogeneous and invasive. Additionally, another challenging issue facing patients with glioblastoma is how to distinguish between tumor progression and treatment effects, especially when relying on routine diagnostic imaging techniques in the clinic. The specificity of routine imaging for identifying tumor progression early or in a timely manner is poor due to the appearance similarity of posttreatment effects. Here, we concisely describe the current status and challenges in the assessment and early prediction of therapy response and the early detection of tumor progression or recurrence. We also summarize and discuss studies of advanced approaches such as quantitative imaging, liquid biomarker discovery and machine intelligence that hold exceptional potential to aid in the therapy monitoring of this malignancy and early prediction of therapy response, which may decisively transform the conventional detection methods in the era of precision medicine.

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