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Evaluation of Standard Response Assessment in Neuro-Oncology, Modified Response Assessment in Neuro-Oncology, and Immunotherapy Response Assessment in Neuro-Oncology in Newly Diagnosed and Recurrent Glioblastoma

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Abstract

Purpose: The Response Assessment in Neuro-Oncology (RANO) criteria are widely used in high-grade glioma clinical trials. We compared the RANO criteria with updated modifications (modified RANO [mRANO] and immunotherapy RANO [iRANO] criteria) in patients with newly diagnosed glioblastoma (nGBM) and recurrent GBM (rGBM) to evaluate the performance of each set of criteria and inform the development of the planned RANO 2.0 update.

Materials and methods: Evaluation of tumor measurements and fluid-attenuated inversion recovery (FLAIR) sequences were performed by blinded readers to determine disease progression using RANO, mRANO, iRANO, and other response assessment criteria. Spearman's correlations between progression-free survival (PFS) and overall survival (OS) were calculated.

Results: Five hundred twenty-six nGBM and 580 rGBM cases were included. Spearman's correlations were similar between RANO and mRANO (0.69 [95% CI, 0.62 to 0.75] v 0.67 [95% CI, 0.60 to 0.73]) in nGBM and rGBM (0.48 [95% CI, 0.40 to 0.55] v 0.50 [95% CI, 0.42 to 0.57]). In nGBM, requirement of a confirmation scan within 12 weeks of completion of radiotherapy to determine progression was associated with improved correlations. Use of the postradiation magnetic resonance imaging (MRI) as baseline scan was associated with improved correlation compared with use of the pre-radiation MRI (0.67 [95% CI, 0.60 to 0.73] v 0.53 [95% CI, 0.42 to 0.62]). Evaluation of FLAIR sequences did not improve the correlation. Among patients who received immunotherapy, Spearman's correlations were similar among RANO, mRANO, and iRANO.

Conclusion: RANO and mRANO demonstrated similar correlations between PFS and OS. Confirmation scans were only beneficial in nGBM within 12 weeks of completion of radiotherapy, and there was a trend in favor of the use of postradiation MRI as the baseline scan in nGBM. Evaluation of FLAIR can be omitted. The iRANO criteria did not add significant benefit in patients who received immune

checkpoint inhibitors.