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How to evaluate extent of resection in diffuse gliomas: from standards to new methods

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Abstract

Purpose of review: Maximal safe tumor resection represents the current standard of care for patients with newly diagnosed diffuse gliomas. Recent efforts have highlighted the prognostic value of extent of resection measured as residual tumor volume in patients with isocitrate dehydrogenase (IDH)-wildtype and -mutant gliomas. Accurate assessment of such information therefore appears essential in the context of clinical trials as well as patient management.

Recent findings: Current recommendations for evaluation of extent of resection rest upon standardized postoperative MRI including contrast-enhanced T1-weighted sequences, T2-weighted/fluid-attenuated-inversion-recovery sequences, and diffusion-weighted imaging to differentiate postoperative tumor volumes from ischemia and nonspecific imaging findings. In this context, correct timing of postoperative imaging within the postoperative period is of utmost importance. Advanced MRI techniques including perfusion-weighted MRI and MR-spectroscopy may add further insight when evaluating residual tumor remnants. Positron emission tomography (PET) using amino acid tracers proves beneficial in identifying metabolically active tumor beyond anatomical findings on conventional MRI.

Summary: Future efforts will have to refine recommendations on postoperative assessment of residual tumor burden in respect to differences between IDH-wildtype and -mutant gliomas, and incorporate the emerging role of advanced imaging modalities like amino acid PET.

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