Advanced MRI of Adult Brain Tumors

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This article is intended to provide clinical neurologists with an overview of the major techniques of advanced MRI of brain tumor: diffusion-weighted imaging, perfusion-weighted imaging, dynamic contrast-enhanced T1 permeability imaging, diffusion-tensor imaging, and magnetic resonance spectroscopy. These techniques represent a significant addition to conventional anatomic MRI T2-weighted images, fluid attenuated inversion recovery (FLAIR) T2-weighted images, and gadolinium-enhanced T1-weighted images for assessing tumor cellularity, white matter invasion, metabolic derangement including hypoxia and necrosis, neovascular capillary blood volume, and permeability. Although a brief introduction and more extensive references to the technical literature is provided, the major focus is to provide a summary of recent clinical experience in application of these major advanced MRI techniques to differential diagnosis, grading, surgical planning, and monitoring of therapeutic response of tumors.

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