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Advanced MRI of Adult Brain Tumors

Geoffrey S. Young, MD

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.

[< previous](#) 7 of 19 [next >](#)

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^a Department of Radiology, Brigham and Women's Hospital, 75 Francis Street, Boston, MA 02115, USA

^b Harvard Medical School, Boston, MA 02115, USA

Department of Radiology, Brigham and Women's Hospital, 75 Francis St., Boston, MA 02115.

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