Curr Probl Cancer. 2023 Jun 4;100965. doi: 10.1016/j.currproblcancer.2023.100965. Online ahead of print.

Imaging Cancer in Neuroradiology

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Affiliations PMID: 37349190 DOI: 10.1016/j.currproblcancer.2023.100965

Abstract

Neuroimaging plays a pivotal role in the diagnosis, management, and prognostication of brain tumors. Recently, the World Health Organization published the fifth edition of the WHO Classification of Tumors of the Central Nervous System (CNS5), which places greater emphasis on tumor genetics and molecular markers to complement the existing histological and immunohistochemical approaches. Recent advances in computational power allowed modern neuro-oncological imaging to move from a strictly morphology-based discipline to advanced neuroimaging techniques with quantifiable tissue characteristics such as tumor cellularity, microstructural organization, hemodynamic, functional, and metabolic features, providing more precise tumor diagnosis and management. The aim of this review is to highlight the key imaging features of the recently published CNS5, outlining the current imaging standards and summarizing the latest advances in neurooncological imaging techniques and their role in complementing traditional brain tumor imaging and management.

Keywords: Artificial intelligence; Brain tumor; CEST; CT Perfusion; Central Nervous System; Diffusionweighted imaging; FDG PET; Imaging; MR perfusion; Machine learning; Neuroimaging; Neurooncological; WHO CNS5; WHO Classification; diffusion-tensor imaging (DTI); fMRI.

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