Pretreatment Evaluation of Glioma

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INTRODUCTION
Glioma, the most common primary brain tumor, refers to all the tumors originating from glial cells.1 Gliomas constitute approximately 27% of all primary central nervous system (CNS) tumors and 80% of malignant tumors.2 Glioma includes all the neoplasms arising from astrocytic, ependymal, and oligodendroglial cells or choroid plexus. Astrocytomas (originating from astrocytes) can be either circumscribed or diffuse. Circumscribed astrocytomas include pilocytic astrocytoma, pleomorphic xanthoastrocytoma, and subependymal giant cell astrocytoma. Diffuse astrocytomas consist of low-grade fibrillary astrocytoma, anaplastic astrocytoma, gliomatosis cerebri, and glioblastoma multiforme (GBM).1,3 Based on the World Health Organization (WHO) guidelines, gliomas are classified into 4 grades3,4 (Table 1). Mortality increases in higher-grade tumors but, depending on the anatomic location, and the tendency for local infiltration and later malignant transformation, even grade I tumors can be fatal.5

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KEY POINTS
- Despite their limited role, conventional computed tomography and magnetic resonance (MR) imaging are traditionally considered the primary techniques for characterization of central nervous system (CNS) glioma; however, advanced imaging methods have evolved the imaging of glioma.
- Various modern imaging techniques, such as diffusion-weighted imaging, perfusion imaging, MR spectroscopy, and susceptibility-weighted imaging, might be used to assess presurgical grading, prognosis, and biopsy planning of CNS gliomas.
- The use of functional MR imaging and diffusion tensor imaging to delineate the relation of the tumor to important anatomic and functional areas has been promising. These techniques are shown to be useful in decreasing postoperative disability and allowing maximum tumor resection. Both techniques are subject to various limitations and need further technical improvements.
- PET is valuable for evaluation of the various aspects of the cellular metabolism of gliomas, which can potentially aid in surgical planning of gliomas and predicting their prognosis.