Moving toward molecular classification of diffuse gliomas in adults.

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Abstract

Diffuse gliomas are a heterogenous group of neoplasms traditionally classified as grades II to IV based on histologic features, and with prognosis determined mainly by histologic grade and pretreatment clinical factors. Our understanding of the molecular basis of glioma initiation, tumor progression, and treatment failure is rapidly evolving. A molecular profile of diffuse gliomas is emerging. Studies evaluating gene expression and DNA methylation profile have found multiple glioma subtypes and an association between subtype and survival. The recent discovery of isocitrate dehydrogenase 1 and 2 (IDH1 and IDH2) mutations in glioma has provided reproducible prognostic biomarkers and novel therapeutic targets. Glioblastomas that exhibit CpG island hypermethylator phenotype, proneural gene expression, or IDH1 mutation identify a subset of patients with markedly improved prognosis. Accumulated evidence supports the stratification of both low-grade and anaplastic diffuse gliomas into prognostic groups using 1p/19q codeletion and IDH mutation status. A classification scheme incorporating clinical, pathologic, and molecular information may facilitate improved prognostication for patients treated in the clinic, the development of more effective clinical trials, and rational testing of targeted therapeutics.

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