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Glioma

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Abstract

Gliomas are primary brain tumours that are thought to develop from neural stem or progenitor cells that carry tumour-initiating genetic alterations. Based on microscopic appearance and molecular characteristics, they are classified according to the WHO classification of central nervous system (CNS) tumours and graded into CNS WHO grades 1-4 from a low to high grade of malignancy. Diffusely infiltrating gliomas in adults comprise three tumour types with distinct natural course of disease, response to treatment and outcome: isocitrate dehydrogenase (IDH)-mutant and 1p/19q-codeleted oligodendrogliomas with the best prognosis; IDH-mutant astrocytomas with intermediate outcome; and IDH-wild-type glioblastomas with poor prognosis. Pilocytic astrocytoma is the most common glioma in children and is characterized by circumscribed growth, frequent BRAF alterations and favourable prognosis. Diffuse gliomas in children are divided into clinically indolent low-grade tumours and high-grade tumours with aggressive behaviour, with histone 3 K27-altered diffuse midline glioma being the leading cause of glioma-related death in children. Ependymal tumours are subdivided into biologically and prognostically distinct types on the basis of histology, molecular biomarkers and location. Although surgery, radiotherapy and alkylating agent chemotherapy are the mainstay of glioma treatment, individually tailored strategies based on tumour-intrinsic dominant signalling pathways have improved outcome in subsets of patients.