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Brain Tumors in Adolescents and Young Adults: A Review

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Abstract

Brain tumors account for the majority of cancer-related deaths in adolescents and young adults (AYAs), defined as individuals aged 15 to 39. AYAs constitute a distinct population in which both pediatric- and adult-type central nervous system (CNS) tumors can be observed. Clinical manifestations vary depending on tumor location and often include headaches, seizures, focal neurological deficits, and signs of increased intracranial pressure. With the publication of the updated World Health Organization CNS tumor classification in 2021, diagnoses have been redefined to emphasize key molecular alterations. Gliomas represent the majority of malignant brain tumors in this age group. Glioneuronal and neuronal tumors are associated with longstanding refractory epilepsy. The classification of ependymomas and medulloblastomas has been refined, enabling better identification of low-risk tumors that could benefit from treatment de-escalation strategies. Owing to their midline location, germ cell tumors often present with oculomotor and visual alterations as well as endocrinopathies. The management of CNS tumors in AYA is often extrapolated from pediatric and adult guidelines, and generally consists of a combination of surgical resection, radiation therapy, and systemic therapy. Ongoing research is investigating multiple agents targeting molecular alterations, including isocitrate dehydrogenase inhibitors, SHH pathway inhibitors, and BRAF inhibitors. AYA patients with CNS tumors should be managed by multidisciplinary teams and counselled regarding fertility preservation, psychosocial comorbidities, and risks of long-term comorbidities. There is a need for further efforts to design clinical trials targeting CNS tumors in the AYA population.