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Medulloblastoma: tumorigenesis, current clinical paradigm, and efforts to improve risk stratification.

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Abstract

Medulloblastoma is the most common brain malignancy in children and tremendous advances have recently been made in understanding the pathogenesis of this tumor. The Hedgehog and Wnt signaling pathways are implicated in medulloblastoma development, and both pathways were discovered as a result of analyses of genetic syndromes associated with the tumor. Over the past 80 years, considerable progress has been made in the treatment of what was once a fatal disease. The first survival reports followed the introduction of craniospinal irradiation, and yet the success of this modality, which continues to be a central component of treatment regimens for patients older than 3 years, comes at a significant cost. The present challenge in medulloblastoma treatment is to improve upon existing survival rates and to minimize the side effects of treatment. The current tools of clinical risk assessment fail to adequately identify patients older than 3 years who require less radiation and those who require more radiation. Significant effort has been made to improve clinical risk stratification and titration of treatment by analyzing properties of the tumor cells themselves for prognostic significance. These efforts include identifying histopathologic, cytogenetic, and molecular features that may correlate with prognosis.

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