



Understanding Medulloblastoma: A Common Pediatric Brain Tumor

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INTRODUCTION

Medulloblastoma is a type of brain tumor that originates in the cerebellum or posterior fossa, a region at the base of the brain. It is the most common malignant brain tumor in children, but it can also occur in adults. This article explores the causes, symptoms, diagnosis, treatment, and ongoing research related to medulloblastoma. The exact cause of medulloblastoma is not well understood, but several factors have been implicated. Changes in specific genes such as MYC, SHH, and TP53 have been associated with the development of medulloblastoma. A small percentage of cases are linked to hereditary syndromes like Li-Fraumeni syndrome, Turcot syndrome, and Gorlin syndrome. While not definitively proven, some studies suggest a link between environmental exposures and the development of brain tumors. Symptoms of medulloblastoma vary depending on the tumor's size, location, and the extent of its spread. Common symptoms include headaches often more severe in the morning, nausea and vomiting frequently occurring in the morning, linked to increased intracranial pressure. Balance and Coordination Problems due to the tumor's impact on the cerebellum. Changes in Behavior and School Performance particularly in children, who may exhibit a decline in academic abilities or behavioral changes. Vision Problems such as double vision or uncontrolled eye movements. Seizures although less common, seizures can occur.

DESCRIPTION

Diagnosing medulloblastoma involves several steps include neurological Examination to assess balance, coordination, and other brain functions. Imaging tests like Magnetic Resonance Imaging (MRI) is the primary tool for visualizing brain tumors. A contrast dye may be used to enhance the images. To check for the presence of cancer cells in the cerebrospinal fluid, indicating the spread of the tumor. A sample of the tumor is examined microscopically to confirm the diagnosis and identify the tumor subtype. Treatment for medulloblastoma typically involves a combination of therapies The primary goal is to

remove as much of the tumor as possible. Complete resection can improve prognosis but may not always be feasible. Often follows surgery, especially in patients older than 3 years. Proton therapy, a type of radiation that targets tumors more precisely, may be used to minimize damage to surrounding brain tissue. Used to kill remaining cancer cells and prevent recurrence. Chemotherapy can be administered orally, intravenously, or directly into the cerebrospinal fluid. Newer treatments that specifically target cancer cells while sparing normal cells. These therapies are still under investigation in clinical trials but hold promise for more effective and less toxic treatment options. The prognosis for medulloblastoma depends on several factors younger children generally have a more challenging prognosis due to the potential side effects of radiation therapy on their developing brains. Extent of Surgical Removal of complete resection improves outcomes. Medulloblastoma is classified into four main molecular subtypes: WNT, SHH, Group 3, and Group 4. WNT tumors have the best prognosis, while Group 3 tumors are more aggressive.

CONCLUSION

Medulloblastoma, while a serious and challenging diagnosis, has seen significant advancements in treatment and understanding over the years. Early detection, precise surgical techniques, and innovative therapies continue to improve outcomes for patients. Ongoing research holds the promise of even more effective and less harmful treatments, offering hope to those affected by this aggressive pediatric brain tumor. Research on medulloblastoma is ongoing, with several promising areas of study understanding the genetic and molecular basis of medulloblastoma can lead to more personalized and effective treatments. Leveraging the body's immune system to target cancer cells. Early trials are exploring the use of immune checkpoint inhibitors and CAR-T cell therapy. Finding ways to reduce the long-term side effects of treatment, especially in children, is a major focus. This includes refining radiation techniques and developing targeted therapies.

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