

Short Note on Brain Tumors in Children: Treatment Strategies and Future Approaches

Laura Gray*

Department of Pediatrics, University of Liège, Wallonia, Belgium

DESCRIPTION

Pediatric brain tumors are a significant health concern, accounting for the majority of childhood cancer deaths. While treatment options have improved over the years, there is still a need for more effective therapies to improve outcomes for children with brain tumors.

Current treatment strategies

The current treatment strategies for pediatric brain tumors depend on several factors, including the type and location of the tumor, as well as the age and overall health of the child. The primary treatment options include surgery, radiation therapy, and chemotherapy. Surgery is often the first step in treating a pediatric brain tumor, and it is used to remove as much of the tumor as possible. In some cases, the entire tumor may be removed, while in others, only a portion can be safely removed.

Radiation therapy is another treatment option for pediatric brain tumors. It uses high-energy radiation to destroy cancer cells and shrink tumors. Radiation therapy may be used in combination with surgery or chemotherapy, depending on the specific type of tumor and the child's overall health.

Chemotherapy involves the use of drugs to kill cancer cells. It may be given orally or intravenously, and it is often used in combination with surgery and radiation therapy. Chemotherapy can have significant side effects, including nausea, vomiting, and hair loss.

Future therapeutic approaches

While current treatment strategies for pediatric brain tumors have improved outcomes for children, there is still a need for more effective therapies. Researchers are currently exploring several new therapeutic approaches, including immunotherapy, targeted therapy, and gene therapy.

Immunotherapy involves using the body's own immune system to fight cancer. One approach is to use checkpoint inhibitors, which are drugs that block certain proteins on cancer cells that

prevent the immune system from attacking them. Another approach is to use Chimeric Antigen Receptor (CAR) T-cell therapy, which involves modifying a patient's T-cells to target and kill cancer cells.

Targeted therapy involves using drugs that target specific proteins or pathways involved in the growth and survival of cancer cells. This approach can be more effective than chemotherapy, which can damage healthy cells as well as cancer cells. Targeted therapy is already being used to treat some types of pediatric brain tumors, such as medulloblastoma.

Gene therapy involves modifying a patient's genes to treat or prevent disease. In the case of brain tumors, researchers are exploring the use of gene therapy to target specific mutations that are involved in tumor growth. One approach is to use viral vectors to deliver therapeutic genes to the tumor cells, which can then inhibit tumor growth or trigger cell death.

Combination therapies are another area of focus for researchers. By combining different treatment approaches, such as immunotherapy and targeted therapy, researchers hope to improve outcomes for children with brain tumors.

Challenges in developing new therapies

Developing new therapies for pediatric brain tumors is challenging for several reasons. One challenge is the heterogeneity of brain tumors, which means that there are many different types of tumors with different genetic mutations and growth patterns. This makes it difficult to develop therapies that will work for all types of tumors.

Another challenge is the blood-brain barrier, which is a protective barrier that prevents many drugs from entering the brain. This makes it difficult to deliver drugs directly to brain tumors, which can limit the effectiveness of some therapies. Finally, clinical trials for pediatric brain tumors can be challenging to conduct due to the rarity of the disease and the ethical considerations involved in conducting research on children. This can make it difficult to gather enough data to determine the safety and efficacy of new therapies.

Correspondence to: Laura Gray, Department of Pediatrics, University of Liège, Wallonia, Belgium, E-mail: drgraylaura@med.uoa.gr

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