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Central Nervous System Tumors - Childhood - Treatment Options [1]

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ON THIS PAGE: You will learn about the different ways doctors use to treat children with a CNS tumor. To see other pages, use the menu on the side of your screen.

In general, tumors in children are uncommon, so it can be hard for doctors to plan treatments unless they know what has been most effective in other children. That's why more than 60% of children are treated as part of a clinical trial. [Clinical trials \[3\]](#) are research studies that compare standard treatments (the best proven treatments available) with newer approaches to treatments that may be more effective. Clinical trials may test such approaches as a new drug, a new combination of standard treatments, or new doses of current therapies. Studying new treatments involves careful monitoring using scientific methods, and all participants are followed closely to track their health and progress.

To take advantage of these newer treatments, all children with a CNS tumor should be treated at a specialized cancer center. Doctors at these centers have extensive experience in treating children and have access to the latest research. A doctor who specializes in treating children with a tumor is called a pediatric oncologist. In many cases, a team of doctors works with a child and the family to provide care; this is called a [multidisciplinary team \[4\]](#). Pediatric cancer centers often have extra support services for children and their families, such as child life specialists, nutritionists, physical and occupational therapists, social workers, and counselors. Special activities and programs to help your child and family cope may also be available.

Treatment overview

Descriptions of the most common treatment options for a CNS tumor are listed below. Treatment options and recommendations depend on several factors, including the type of CNS tumor, whether it is cancerous, the stage and/or grade of the tumor, possible side effects, the family's preferences, and the child's age and overall health. For instance, radiation therapy is often limited in children younger than three years old, because extensive radiation therapy can cause learning and memory problems in the future. Your child's care plan may also include treatment for symptoms and side effects, an important part of medical care. Take time to learn about all of

your child's treatment options and be sure to ask questions about things that are unclear. Also, talk about the goals of each treatment with your child's doctor and what you can expect during the treatment.

Type of CNS Tumor	Treatment Commonly Used
Astrocytoma [5]	<p>Low-grade astrocytoma: Surgery alone, or surgery plus radiation therapy, or radiation therapy alone for older children; surgery plus chemotherapy or limited radiation therapy for younger children</p> <p>High-grade astrocytoma: Surgery plus radiation therapy and chemotherapy</p>
Brain stem glioma [6]	Radiation therapy, with or without chemotherapy
Ependymoma [7]	Surgery and radiation therapy; possibly chemotherapy
Germ cell tumor [8]	Surgery and radiation therapy, with or without chemotherapy
Medulloblastoma [9]	Surgery, radiation therapy, and chemotherapy

Learn more about [making treatment decisions](#) [10].

Surgery

Surgery is the removal of the tumor and surrounding tissue during an operation. It is almost always used to find out the type of tumor, either through a biopsy or during treatment when the tumor can be removed without significant damage to the brain. A neurosurgeon is a doctor who specializes in treating a tumor in the brain or spine with surgery. Sometimes, a tumor spreads and grows between normal nerve cells, making surgery difficult. In certain situations, surgery can damage parts of the brain near the tumor, affecting arm and leg movement, breathing, swallowing, eye movement, or consciousness. Learn more about [surgery](#) [11]. Some tumors cannot be removed by surgery because of their location. These tumors are called inoperable or unresectable. In these instances, the doctor will recommend other treatment options.

Radiation therapy

Radiation therapy is the use of high-energy x-rays or other particles to destroy tumor cells. A doctor who specializes in giving radiation therapy to treat a tumor is called a radiation oncologist. The most common type of radiation treatment is called external-beam radiation therapy, which is radiation given from a machine outside the body. When radiation treatment is given using implants, it is called internal radiation therapy or brachytherapy. A radiation therapy regimen (schedule) usually consists of a specific number of treatments given over a set period of time.

Stereotactic radiosurgery is a way to deliver high doses of radiation therapy directly to a tumor and not to healthy tissue. This technique makes detailed, three-dimensional maps of the brain and tumor, so doctors can pinpoint where to direct the radiation treatment. It works best for certain noncancerous tumors and a tumor that is only in one part of the brain.

Another type of radiation therapy used for a CNS tumor is proton therapy. Proton therapy is a type of external-beam radiation therapy that uses protons rather than x-rays. At high energy, protons can destroy tumor cells. Proton therapy is becoming more widely used in the United States.

Learn more about [radiation therapy](#) [12]. Side effects from radiation therapy may include fatigue, mild skin reactions, upset stomach, headaches, and loose bowel movements. Most side effects go away soon after treatment is finished. However, in the long term, radiation therapy can sometimes cause problems with the growth and development of the child's brain. Therefore, the doctor may choose to treat the tumor in another way.

Chemotherapy

Chemotherapy is the use of drugs to destroy tumor cells, usually by stopping the tumor cells' ability to grow and divide. Chemotherapy is given by a medical oncologist, a doctor who specializes in treating a tumor with medication.

Systemic chemotherapy is delivered through the bloodstream to reach tumor cells throughout the body. Common ways to give chemotherapy include an intravenous (IV) tube placed into a vein using a needle or in a pill or capsule that is swallowed (orally). A chemotherapy regimen usually consists of a specific number of cycles given over a set period time. A patient may receive one drug at a time or combinations of different drugs at the same time.

Chemotherapy is effective for many cancerous types of brain tumors. Depending on the tumor type, chemotherapy may be given immediately after a biopsy or surgery or after radiation therapy. In some instances, chemotherapy is used at the same time as radiation therapy.

Chemotherapy may also be given directly into the spinal canal, in a procedure called intrathecal chemotherapy, to treat tumor cells on the surface of the brain and spine. This procedure is still being researched in clinical trials and may not be available everywhere.

The side effects of chemotherapy depend on the individual and the dose used, but they can include fatigue, risk of infection, nausea and vomiting, hair loss, loss of appetite, and diarrhea. These side effects usually go away once treatment is finished.

Learn more about [chemotherapy](#) [13] and [preparing for treatment](#) [14]. The medications used to treat a tumor are continually being evaluated. Talking with your child's doctor is often the best way to learn about the medications prescribed for your child, their purpose, and their potential side effects or interactions with other medications. Learn more about your child's prescriptions by using [searchable drug databases](#) [15].

Getting care for symptoms and side effects

A CNS tumor and its treatment often cause side effects. In addition to treatment to slow, stop, or eliminate the disease, an important part of care is relieving a child's symptoms and side effects. This approach is called palliative or supportive care, and it includes supporting the child with his or her physical, emotional, and social needs.

Palliative care can help a child at any stage of illness. Children often receive treatment for the tumor and treatment to ease side effects at the same time. In fact, patients who receive both often have less severe symptoms, better quality of life, and families report that they are more satisfied with treatment.

Palliative treatments vary widely and often include medication, nutritional changes, relaxation techniques, and other therapies. Your child may also receive palliative treatments similar to those meant to eliminate the tumor, such as chemotherapy, surgery, and radiation therapy. Talk with your child's doctor about the goals of each treatment in the treatment plan.

Before treatment begins, talk with your child's health care team about the possible side effects of your child's specific treatment plan and supportive care options. And during and after treatment, be sure to tell your doctor or another health care team member if your child is experiencing a problem so it is addressed as quickly as possible. Learn more about [palliative care](#) [16].

Remission and the chance of recurrence

A remission is when the tumor cannot be detected in the body and there are no symptoms. This may also be called "no evidence of disease" or NED.

A remission can be temporary or permanent. This uncertainty leads to many survivors feeling worried or anxious that the tumor will come back. While many remissions are permanent, it's important to talk with the doctor about the possibility of the tumor returning. Understanding the risk of recurrence and the treatment options may help you feel more prepared if the tumor does return. Learn more about [coping with the fear of recurrence](#) [17].

If the tumor does return after the original treatment, it is called a recurrent tumor. It may come back in the same place (called a local recurrence), nearby (regional recurrence), or in another place (distant recurrence).

When this occurs, a cycle of testing will begin again to learn as much as possible about the recurrence, including whether the tumor's grade has changed. After testing is done, you and your child's doctor will talk about the treatment options. Often the treatment plan will include the therapies described above such as surgery, chemotherapy, and radiation therapy, but they may

be used in a different combination or given at a different pace. Your child's doctor may also suggest clinical trials that are studying new ways to treat this type of recurrent tumor.

For a recurrent CNS tumor, the next phase of treatment depends on three factors:

- The type of tumor
- Whether the tumor recurred where it originally began or in another part of the brain or body
- The type of treatment given for the original tumor

Depending on your child's situation, the doctor may recommend surgery, radiation therapy, chemotherapy, and/or [stem cell/bone marrow transplantation](#) [18].

A recurrent tumor may bring up emotions such as disbelief or fear. You and your family are encouraged to talk with the health care team about these feelings and ask about support services to help you cope. Learn more about [dealing with a tumor recurrence](#) [19].

If treatment fails

Although treatment is successful for the majority of children with a tumor, sometimes it is not. If a child's tumor cannot be cured or controlled, this is called an advanced or terminal tumor. This diagnosis is stressful, and it may be difficult to discuss. However, it is important to have open and honest conversations with your child's doctor and health care team to express your family's feelings, preferences, and concerns. The health care team is there to help, and many team members have special skills, experience, and knowledge to support patients and their families.

Parents or guardians are encouraged to think about where the child would be most comfortable: at home, in a home-like setting elsewhere, in the hospital, or in a hospice environment. Hospice care is a type of palliative care for people who are expected to live less than six months. It is designed to provide the best possible quality of life for people who are near the end of life. Nursing care and special equipment can make staying at home a workable alternative for many families. Some children may be happier if they can arrange to attend school part-time or keep up other activities and social connections. The child's health care team can help parents or guardians decide on an appropriate level of activity. Making sure a child is physically comfortable and free from pain is extremely important as part of end-of-life care. Learn more about [caring for a terminally ill child](#) [20] and [advanced care planning](#) [21].

The death of a child is an enormous tragedy, and families may need support to help them cope with the loss. Pediatric cancer centers often have professional staff and support groups to help with the process of grieving. Learn more on [grieving the loss of a child](#) [22].

The next section helps explain clinical trials, which are research studies. Use the menu on the side of your screen to select About Clinical Trials, or you can select another section, to continue reading this guide.

Links:

[1] <http://www.cancer.net/cancer-types/central-nervous-system-tumors-childhood/treatment-options>

[2] <http://www.cancer.net/about-us>

[3] <http://www.cancer.net/node/18668>

- [4] <http://www.cancer.net/node/24957>
- [5] <http://www.cancer.net/node/18488>
- [6] <http://www.cancer.net/node/18548>
- [7] <http://www.cancer.net/node/18769>
- [8] <http://www.cancer.net/node/18883>
- [9] <http://www.cancer.net/node/19237>
- [10] <http://www.cancer.net/node/24582>
- [11] <http://www.cancer.net/node/24720>
- [12] <http://www.cancer.net/node/24728>
- [13] <http://www.cancer.net/node/24723>
- [14] <http://www.cancer.net/node/24473>
- [15] <http://www.cancer.net/node/25369>
- [16] <http://www.cancer.net/node/25282>
- [17] <http://www.cancer.net/node/25241>
- [18] <http://www.cancer.net/node/24717>
- [19] <http://www.cancer.net/node/25042>
- [20] <http://www.cancer.net/node/25280>
- [21] <http://www.cancer.net/node/25113>
- [22] <http://www.cancer.net/node/25288>