

When Your Child Has a Brain Tumor

The brain is part of the body's nervous system. Your child's ability to think, learn, speak, feel emotion, and reason are all controlled by the brain. The brain also controls essential body functions, such as movement, sensation, breathing, and heartbeat. A brain tumor can affect your child's brain function and threaten their overall health. Tell your child's health care provider about any changes in personality, mood, or behavior. For younger children, any loss of developmental milestones will need to be addressed. These include crawling, standing, and walking.

There are many kinds of brain tumors. Your child's provider will talk with you about the type of brain tumor, treatment choices, and likely outcomes for your child.



What is a brain tumor?

A brain tumor is a mass of abnormal cells in the brain.

- A tumor can be primary. This means it started in cells in the brain. Or a tumor can be metastatic. This tumor is made up of cancer cells that traveled to the brain from another part of the body. In children, primary tumors are much more common than metastatic tumors.
- A tumor can be noncancer (benign) or cancer (malignant). Most benign tumors are made up of slow-growing cells that rarely spread. Most malignant tumors are made up of fast-growing cells that grow into nearby tissue. They are more likely to spread to other parts of the brain. Both benign and malignant tumors can be life-threatening and need to be treated.

Who is at risk for a brain tumor?

Brain tumors can occur randomly in children of all ethnic backgrounds and ages. In most cases, there's no clear cause of the tumor. But there are a few risk factors that can make a child more likely to have a brain tumor:

- Children with certain genetic conditions are more likely to have brain tumors. This includes children who have neurofibromatosis type 1, or more rarely, tuberous

sclerosis, or Li-Fraumeni syndrome.

- High-dose radiation to the head, such as treatment for another cancer, can cause brain tumors.

What are the symptoms of a brain tumor?

A brain tumor can affect each child differently. It depends on where the tumor is, how big it is, and how fast it's growing. Common symptoms of a brain tumor include:

- Repeated headaches.
- Developmental delay or regression.
- Trouble learning at school.
- Loss of balance.
- Trouble walking.
- Seizures or convulsions.
- Problems with vision, speech, concentration, balance, or movement.
- Nausea or vomiting.
- Paralysis, weakness, or numbness in one part or side of the body.
- Changes in personality, mood, or behavior.
- Fast increase in head size in infants.
- Unusual sleepiness or change in activity level.

How is a brain tumor diagnosed?

Your child will likely see a pediatric neurologist or a pediatric neurosurgeon for diagnosis and treatment. These are health care providers who treat problems of the brain. Your child may also see other kinds of healthcare providers.

To diagnose a tumor, a provider will ask you about your child's health history. You will need to describe your child's symptoms and other health problems. Your child may also have tests, such as:

- **Neurologic exam.** This is done to check how well your child's nervous system is working. During the exam, the provider checks your child's muscle strength, balance, coordination, and reflexes. They may also check skills, such as thinking and memory, vision, hearing, and talking.
- **MRI scan or CT scan.** One or both of these may be done to take detailed pictures of the brain. These help the provider find out the tumor size and exactly where it is. With either test, a contrast material may be injected into the blood through a vein. This makes a tumor easier to see.
- **Stereotactic biopsy.** This is done to learn more about the tumor type and find out if it is benign or malignant. During this procedure, a small piece (sample) of the tumor is taken out using a needle and sent to a lab. There, the sample is tested and given a

grade. The grade is based on how different the tumor cells look from normal cells. It gives clues about how fast the tumor cells are growing and spreading into nearby tissue.

- **Brain surgery.** This may be done to do the biopsy. Or it may be done to take out as much of the tumor as can be removed safely. The tumor is then tested to find out the type and grade of the tumor.
- **Cerebrospinal fluid (CSF) exam.** This is also called a lumbar puncture or spinal tap. It's done to find out if there are tumor cells or blood in the CSF. Testing is also done to look for tumor markers that may be in the spinal fluid. (Tumor markers are proteins made by some kinds of tumors.)

How is a brain tumor treated?

Treatment for a brain tumor varies for every child. Each treatment has its own possible risks and complications. Your child's health care provider will discuss treatment choices with you. Many children get more than one type of treatment. Treatments may include:

- **Surgery.** This may be done to take a sample of the tumor for testing or to remove as much of the tumor as possible.
- **Chemotherapy.** This treatment uses strong medicine to kill tumor cells. Your child may be given one or more medicines. They can be taken by mouth (orally) or put into a blood vessel intravenously (IV). In some cases, they can be injected into the fluid that surrounds the brain and spinal cord (the CSF). Chemotherapy is often used along with other treatments. It's given in cycles to allow the body to rest and build new healthy cells between treatments.
- **Targeted therapy.** This treatment uses medicines to target specific proteins, enzymes, or other molecules affecting cancer growth.
- **Radiation therapy.** Tumor cells are killed with strong X-ray beams. If your child needs radiation therapy, they will be referred to a specialist called a radiation oncologist. This type of health care provider will tell you about the different types of radiation treatments and which may be best for your child.
- **Other medicines.** These may be given to your child to help with symptoms or other problems from the tumor or treatment. For instance, your child may be given steroids to reduce swelling in the brain. Or anticonvulsants may be used to help prevent or control seizures. They may take antibiotics to treat infections and may be given anti-nausea medicines to help during radiation or chemo treatments. Other medicines may be given as needed.
- **Clinical trials.** A clinical trial is a research study that tests new medical treatments or new ways of giving care. Ask your child's provider if a clinical trial is an option for your child.

What are the long-term concerns?

More brain tumors in children are now treatable. Your child's health care providers will work closely with you to make sure your child gets the best care. Your child's long-term outcomes depend on many factors. These include:

- Your child's age and overall health.

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- The tumor type and size.
 - If the tumor is growing in one place or has spread.
 - Where the tumor is in the brain.
 - The types of treatment needed, such as radiation therapy.

Coping with your child's condition

If your child has been diagnosed with a brain tumor, know that your family doesn't have to go through this alone. You will need support and might want to consider getting counseling. This can help all of you deal with any fears and concerns. Get help and comfort from your friends, community resources, and support groups. The more you learn about your child's condition and its treatments, the more in control you may feel. For more information about brain tumors, contact the following organizations:

- [Children's Brain Tumor Foundation at www.cbtf.org](http://www.cbtf.org)
- [Pediatric Brain Tumor Foundation at www.curethekids.org](http://www.curethekids.org)
- [American Cancer Society at www.cancer.org](http://www.cancer.org)
- [Children's Oncology Group \(COG\) at www.childrensoncologygroup.org](http://www.childrensoncologygroup.org)