

Brain Tumors: Diagnosis



How are brain tumors diagnosed?

If your healthcare provider thinks you might have a brain tumor, you will need exams, imaging scans, and tests to know for sure. Diagnosing a brain tumor starts with your healthcare provider asking you questions. You'll be asked about your health history, your symptoms, risk factors, and family history of disease.

A physical exam will also be done. You will likely be checked for possible signs of brain or spinal cord problems. So the exam will test things like your reflexes, muscle strength, sensation, eye and mouth movement, vision, coordination, and alertness.

What tests might I need?

You may need 1 or more of these imaging tests:

- Magnetic resonance imaging (MRI)
- Magnetic resonance spectroscopy
- Magnetic resonance angiography and magnetic resonance venography
- Diffusion tensor imaging
- Functional MRI
- CT scan or CT angiogram
- Positron emission tomography scan
- Angiogram

And other tests may be done, too, such as:

- Lumbar puncture (spinal tap)
- Electroencephalogram
- Vision and hearing tests
- Brain tumor biopsy

Types of imaging tests

- **Magnetic resonance imaging (MRI).** An MRI scanner uses magnets and strong radio waves to make pictures of the brain. MRIs are very useful in diagnosing brain tumors. A special dye might be put into your vein during the MRI. The dye helps get clearer pictures of the brain. It also makes it easier to see the difference between a tumor and normal brain tissue.

An MRI can show images of the brain from many different angles. It can show smaller details better than other scans. An MRI is especially helpful in finding tumors in the back part of the brain called the posterior fossa. It's also better at finding tumors in the spinal cord.

- **Magnetic resonance spectroscopy (MRS).** An MRS scan can be done as part of an MRI. It can measure the metabolites (chemical changes) inside the tumor. Sometimes, this test is used to figure out if a growth is an active tumor or a mass of scar tissue.

- **Magnetic resonance angiography and magnetic resonance venography.** These are special types of MRI tests that can show blood vessels in and around the brain. They might be used to plan surgery.
- **Diffusion tensor imaging or diffusion weighted imaging.** This test is a type of MRI. It lets the healthcare provider see the cellular structure of your brain. Surgeons use it to help plan tumor removal.
- **Functional MRI.** This MRI test can help map which parts of the brain handle important functions, such as movement or speech. You do certain tasks while the MRI is done. The results help your healthcare provider better plan surgery to take out the tumor.
- **CT scan.** A CT scan is a type of X-ray that creates detailed pictures of the brain. Many images of the brain are taken as the X-ray scanner moves around your head. A computer combines these many images into a useful picture. Sometimes a special dye is put into a vein before a CT scan. This test is not used as often as MRI to look for brain tumors, but it can be helpful in some cases.

A special form of CT scan, known as **CT angiography**, may be used to look at the blood vessels around a tumor to help plan surgery.

- **Positron emission tomography (PET) scan.** For a PET scan, a small amount of a radioactive substance is put into your blood through a vein. It's usually glucose, a type of sugar. Fast-growing tissue, such as a tumor, absorbs this substance quickly and can then be seen by a special type of scanner.

A PET scan can help your healthcare provider tell the difference between an active, growing tumor and damage from radiation therapy or a scar from surgery. Tumors take up the sugar while scar tissue doesn't.

- **Angiogram.** An angiogram is a series of X-rays taken after a special dye is put into your blood. It may also be called **arteriogram** or **venogram**, depending on which type of blood vessel the dye is put into.

A soft catheter is put into a large blood vessel, usually in your groin. The catheter is slid through the vessel into one of the main vessels in your head. It's positioned with the help of an X-ray. The dye is then put into the catheter. After injection, it flows through the blood vessels in your brain and can be seen on X-rays. These X-rays show the tumor and the blood vessels that lead to it, which helps healthcare providers plan surgery.

This test isn't used much today. CT angiography and magnetic resonance angiography are used more often to look at blood vessels in the brain.

Other tests

- **Lumbar puncture (spinal tap).** For this test, a thin, hollow needle is put between the bones of your lower back and into the spinal canal. This is the area around the spinal cord. It carries cerebrospinal fluid (CSF), which supports and cushions your brain and spinal cord. The fluid pressure in the spinal canal and brain can be measured during this test. A small amount of CSF can also be removed and sent for testing to see if there are cancer cells in it. Other tests may be done on this fluid as well.
- **Electroencephalogram (EEG).** An electroencephalogram is a simple test that measures your brain waves, or the electrical activity in your brain. Small round discs with wires (electrodes) are stuck to your scalp. An EEG can be used to check for seizures.
- **Vision and hearing tests.** Testing of your vision and hearing can help your healthcare providers understand how the tumor is affecting these brain functions.
- **Brain tumor biopsy.** If any of these tests suggest that a tumor might be present, a neurosurgeon will probably take a biopsy of the tumor. In most cases, this is the only way to know for sure if a tumor is or isn't cancer. It's also the only way to know exactly what type of tumor it is. But in some cases, healthcare providers can get enough information from just the imaging tests to make a diagnosis.
- **A craniotomy** might be done to do a brain tumor biopsy. During this surgery, a healthcare provider opens the skull to take out as much of the tumor as possible. This tissue is then sent to a lab and tested to see if it's cancer. If the tumor is in a place that makes it hard to remove, another type of biopsy, called a **stereotactic biopsy**, might be done. For this biopsy, the neurosurgeon drills a small hole in the skull and puts a hollow needle into the brain to take out a small piece of the tumor. The needle is carefully guided to the tumor with the help of an imaging test, like an MRI or CT scan.

Getting your test results

When your healthcare provider has the results of your tests, they will contact you. Your provider will talk with you about other tests you may need if a brain tumor is found. Make sure you understand the results and what your next steps should be.

© 2000-2027 The StayWell Company, LLC. All rights reserved. This information is not intended as a substitute for professional medical care. Always follow your healthcare professional's instructions
This information is not intended as a substitute for professional medical care. Always follow your Healthcare professional's instructions. Copyright Krames LLC.