Brain Tumors

Symptoms and Treatments Guidebook

AdventHealth

Learn About Brain Tumors.

Understand your options.

Each year, more than 43,000 adults in the United States are diagnosed with a brain tumor. There are more than 100 different types of these tumors, which are caused by the uncontrolled growth of cells that form a mass in the brain. Brain tumors can be benign (noncancerous) or malignant (cancerous). A benign brain tumor has non cancerous cells and does not invade adjacent tissue. However, its size and location may cause some symptoms as it presses on vital areas. Malignant brain tumors, which contain cancer cells, invade tissue that surrounds them, usually growing quickly. Sometimes, malignant tumors will recur following treatment, but they seldom spread throughout the body.

A brain tumor may be a new growth or a congenital condition (present at birth). If a tumor forms in the brain, it is called a primary brain tumor. Tumors that spread to the brain from other parts of the body are referred to as secondary brain tumors or metastatic brain tumors.

At AdventHealth, we're known for providing better outcomes to patients suffering from brain tumors for two important reasons: advanced technology in minimally invasive brain surgery and a dedicated and highly skilled multidisciplinary team. Our smarter treatment options include Gamma Knife® radiosurgery, endoscopic brain surgery, endoscopic endonasal skull-base surgery, and MRI-guided laser interstitial thermal therapy. In fact, AdventHealth Orlando is recognized by *U.S. News & World Report* as the highest-ranked hospital in Florida for neurology and neurosurgery.

This guidebook will answer some of the most common questions asked by patients who are newly diagnosed with a brain tumor. It will also cover select treatment options and areas of expertise at AdventHealth Orlando. We want you to feel confident in all aspects of your treatment – and that starts with being well-informed. Because our team isn't just here to treat your brain tumor – we're here to help you heal in body, mind *and* spirit.

Brain Tumor Types and Conditions

At AdventHealth, you're surrounded by the strength and technology of the region's most advanced neuroscience institute for neurology and neurosurgery. We treat some of the most complex conditions, including those listed below.

ACOUSTIC NEUROMAS

Acoustic neuromas are noncancerous tumors that form on the acoustic nerve when normal nerve cells reproduce uncontrollably. The growth usually begins on the lining of the nerve where it runs through the internal auditory canal – a short, bony canal at the base of the brain. These tumors can affect hearing, balance and facial muscles. Minimally invasive treatments to address acoustic neuromas employ laser technology to remove tumors or reduce their size while preserving hearing and facial nerve function and minimizing damage to surrounding brain tissue.

GLIOBLASTOMAS

Glioblastomas are the most common type of tumor found in the central nervous system. They are also the most likely to be malignant out of the brain tumors classified as astrocytomas. These tumors generally occur in people older than 50 and are rare in anyone younger than 30. Minimally invasive surgery may be an effective option for some patients with glioblastomas that are unresponsive to traditional therapies or surgery.

MENINGIOMAS

Meningiomas are typically noncancerous tumors that form on the protective linings of the brain and spinal cord (the meninges). Because they are slow growing, small tumors, they may only require monitoring with an annual MRI. However, large meningiomas often call for surgical removal since they can interfere with normal body function and produce serious side effects, including seizures, difficulty speaking, paralysis of eye movement and hearing loss. Using laser technology, endoscopes and 3-D brain mapping, our surgeons isolate these tumors and preserve the adjacent healthy tissue that lines the brain and spine, as this area is critical to all essential body functions, from breathing to walking.

INTRAVENTRICULAR TUMORS

Intraventricular tumors appear in the brain's ventricles, or hollow spaces, which are filled with a protective liquid called cerebrospinal fluid. These tumors can develop anywhere in the brain where ventricles exist. They frequently obstruct the flow of cerebrospinal fluid, placing pressure on surrounding brain tissue. This can lead to headaches, nausea, deterioration in mental health, visual disturbances and death. Located deep within the center of the brain, intraventricular tumors are difficult to reach using traditional surgical approaches, but minimally invasive techniques can pinpoint affected tissue with millimeter-specific accuracy.

PITUITARY TUMORS

Pituitary tumors are generally noncancerous and do not spread beyond the pituitary glands. They can, however, produce significant side effects including vision loss, hormonal changes, sexual dysfunction, weight loss or gain, nausea and vomiting, watery nasal drainage, headaches, constipation, low blood pressure and body hair loss. Using laser technology, endoscopes and 3-D brain mapping, our surgeons can isolate pituitary tumors and preserve the adjacent healthy brain tissue, nerves and blood vessels. This minimizes the possibility of brain damage, stroke and blindness.

SKULL BASE TUMORS

These tumors are located near the brain stem and cerebellum and therefore pose a serious threat due to the cerebellum's role in controlling body movement. A skull base tumor can also partially or completely block the flow of spinal fluid, increasing pressure on the brain and spinal cord. Using laser technology, endoscopes and 3-D brain mapping, our surgeons can isolate skull-base tumors and preserve adjacent healthy tissue that is critical to key body functions.

RECURRENT BRAIN TUMORS

A recurrent brain tumor is a tumor that has come back after treatment. This can sometimes happen years after the tumor has gone into remission (or been stabilized or shrunk) following treatment. The tumor can recur in the same place in the brain (called a local recurrence), nearby (regional recurrence) or somewhere else in the central nervous system (distant recurrence). Tumor remissions can either be permanent or temporary, and it's important for you to talk to your doctor about the chances of recurrence and receive regular follow-up tests to see if a tumor has returned. If a recurrent brain tumor is detected, doctors will perform a new cycle of diagnostic tests to analyze the tumor and help determine treatment options. These may include surgery, chemotherapy, radiation therapy and targeted therapy.

TRIGEMINAL NEURALGIA

Trigeminal neuralgia is not a type of brain tumor but a condition that may occur due to a brain tumor that is pressing on the trigeminal nerve – a cranial nerve that extends into parts of the face. This pressure can cause the nerve to misfire, resulting in often-excruciating jaw and facial pain that is usually confined to one side. This pain has been described as feeling like an electric shock. When treatment with medications fails to bring needed relief, other treatment options may include microvascular decompression or non-invasive stereotactic radiosurgery using Gamma Knife® technology.

OTHER TYPES OF BRAIN TUMORS

There are more than 100 different types of brain tumors. AdventHealth's neuroscience team is equipped to diagnose, evaluate, treat and manage the various forms of this disease with the expertise, skill and compassion you expect from a world-class program such as ours. Some of the other types of brain tumors and brain masses that we treat are listed below.

- Brain stem tumors
- Central nervous system (CNS) lymphoma
- Ganglioglioma
- Giant cell astrocytoma
- Gliosarcoma
- Hemangioblastoma
- Metastatic brain tumors
- Neurofibroma
- Orbital tumors
- Pineal region tumors
- Schwannoma
- Teratoma

Brain Tumor Risk Factors

The cause of most brain tumors is unknown. However, there are certain things that can increase your risk of developing a brain tumor, including exposure to certain chemicals or medical treatments, or having a personal or family history of certain diseases. These risk factors don't mean that you'll certainly develop a brain tumor — they only put you at an increased risk, no matter how slight that risk may be. Some potential risk factors for developing a brain tumor are listed below.

- Age (risk increases the older you are)
- Occupational exposure to certain chemicals
- Race (higher overall risk for Caucasians; higher risk of meningiomas for African Americans)
- Smoking
- Family history of genetic disorders such as:
  - Neurofibromatosis type 1 and 2
  - Tuberous sclerosis
  - Von Hippel-Lindau disease
  - Li-Fraumeni syndrome
- Radiation exposure
- Weakened immune system

Researchers are studying whether using cell phones or having a head injury are important risk factors. To date, studies have not shown consistent links between these possible risk factors and brain tumors, but additional research is needed.

Possible Symptoms of a Brain Tumor

The signs and symptoms of brain tumors vary greatly depending on the size and location of the tumor in each case. Symptoms may arise when a tumor presses on a nerve or damages a certain area of the brain. They may also occur when the brain swells or fluid builds up within the skull.

The most commonly identified symptoms of brain tumors include:

- Confusion
- Headaches
- Seizures
- Swallowing problems
- Mental and/or personality changes
- Nausea and vomiting
- Vision problems
- Drowsiness
- Hearing loss
- Buzzing or ringing in the ears
- Problems with muscle coordination
- Balance issues
- Distorted gait or speech

If you or a loved one experience these symptoms, discuss the possibility of a brain tumor with your physician. The symptoms are more often attributed to other illnesses but should be reviewed by a doctor without delay. Our care coordinator is available to answer any questions you might have by calling 407-543-4673.

How Brain Tumors are Diagnosed

As with most diseases, successful treatment of brain tumors begins with early detection and an accurate diagnosis. Based on your symptoms, the specialists at the AdventHealth Neuroscience Institute may recommend a variety of tests ranging from a simple physical exam to state-of-the-art medical imaging that can identify even the smallest tumor in the brain.

Following are some of the tests that our doctors may use to determine the presence and stage of a brain tumor.

- Physical exam and medical history
- Neurological exam
- Visual field exam
- Tumor markers test (may require a blood, urine, spinal fluid or tissue sample)
- Gene testing
- Lumbar puncture and cytologic analysis (microscopic analysis of spinal fluid)
- Medical imaging including CT (computed tomography), MRI (magnetic resonance imaging) or SPECT (single proton emission computed tomography) scans

If your doctors believe that a brain tumor is present, they may recommend that a biopsy be performed. This requires the creation of a small window in the skull so that a special needle can remove a tissue sample. This tissue is viewed by a pathologist under a microscope in order to determine if a tumor is present, whether it is cancerous, and additional information that will inform your treatment plan.

Know Your Treatment Options

The AdventHealth Neuroscience Institute is a state-of-the art facility for adults and children affected by all types of brain tumors. We specialize in minimally invasive treatments, including those using laser technology, to remove tumors or reduce their size. These advanced techniques often minimize damage to surrounding tissue and result in less scarring and pain. Patients also generally recover quicker than with more traditional procedures.

Our renowned neurologists, oncologists and neurosurgeons recommend personalized treatment plans based on the size of the tumor, growth pattern, patient health and other contributing factors. See below for details on select brain tumor treatment options offered by our expert team.

BRAIN PORT SURGERY

This minimally invasive procedure accurately targets tumors within the substance or fluid-filled spaces of the brain. Through a tiny incision in the skull, your surgeon places a small tube and employs a GPS-like neuro-navigation system to thread an endoscope with a lighted camera through the tube and to the tumor without damaging surrounding tissue. The surgeon can then operate on the tumor using specialized tools that fit through the tube; afterward, the tools and tube are carefully removed and the skull is closed. With its to-the-millimeter accuracy, brain port surgery minimizes trauma to the brain and reduces pain and recovery time. It is most frequently used to address metastatic tumors, colloid cysts and ventricle tumors.

ENDOSCOPIC ENDONASAL SKULL BASE SURGERY

This minimally invasive surgical technique is performed through the natural orifice of the nose, reducing scarring and recovery time. Advanced technology allows the surgeon to reach the deep structure of the skull base with improved visualization and minimal disturbance to other parts of the brain. Endoscopic endonasal surgery may be used to address brain tumors, including metastatic and skull-base tumors, meningiomas, pituitary tumors and more.

ENDOSCOPIC MICROVASCULAR DECOMPRESSION

The AdventHealth Neuroscience Institute is one of the few centers in the country to offer this minimally invasive surgical technique. Here, the neurosurgeon operates through a tiny opening behind the ear with the help of optical technology and special surgical instrumentation. The object is to relieve abnormal compression on the cranial nerve. Patients can experience faster healing and improved outcomes with this procedure versus more invasive options. Conditions treated with this technique may include trigeminal neuralgia, glossopharyngeal neuralgia, medically intractable vertigo and various neurovascular compression syndromes.

GAMMA KNIFE® PERFEXION™

AdventHealth Orlando is currently the only facility in Central Florida employing the Leksell Gamma Knife Perfexion system to treat brain lesions and tumors. The Gamma Knife isn't really a knife at all, but an instrument for conducting radiosurgery. Considered the gold standard for non-invasive brain tumor treatment, it employs powerful doses of radiation to precisely target diseased brain tissue while leaving surrounding tissue intact. This advanced technology allows our surgeons to eradicate brain lesions that were previously considered inoperable, offering new hope for many patients.

MRI-GUIDED LASER INTERSTITIAL THERMAL THERAPY

The AdventHealth Neuroscience Institute is one of only a handful of centers nationwide to offer this minimally invasive surgical technique for treating brain tumors that prove unresponsive to radiation therapy, chemotherapy and other treatments. With the help of an intraoperative MRI, the designated tissue is heated via a laser probe's light energy. This thermal therapy may be used to address brain metastasis, astrocytomas, gliomas and epilepsy.

RADIATION THERAPY

Radiation therapy uses high-energy X-rays or other types of radiation to kill tumor cells or keep them from growing. There are two types of radiation therapy: external and internal. External radiation therapy uses a source that is outside the body to deliver radiation to the tumor's location. Internal radiation therapy uses a radioactive substance that is sealed inside a needle, wire, catheter or "seeds" and placed directly into or near the brain tumor. The type of radiation therapy used depends largely on the type of tumor and its location in the brain.

CHEMOTHERAPY

Chemotherapy is a type of cancer treatment that uses drugs to destroy cancer cells. The chemicals in chemotherapy destroy cancer cells by interfering with cell division and stopping or slowing the growth of cancer cells. Depending on the type, location and size of your brain tumor, chemotherapy can:

- Destroy cancer cells to the point that your doctor can no longer detect them in your body and they will not grow back
- Keep cancer from spreading or slow its growth
- Ease cancer symptoms by shrinking tumors that are causing pain or pressure

Sometimes, chemotherapy is the only cancer treatment used. But more often, you would receive chemotherapy along with surgery, radiation therapy or biological therapy.

We're designed to help patients like you.

The AdventHealth Neuroscience Institute offers you the benefits of the most advanced technology for the diagnosis and treatment of brain tumors. Here, top neurosurgeons – including some of the country's leading specialists – are experts in some of the most current procedures including minimally invasive surgery, noninvasive treatments and radiation therapy.

Our board-certified physicians and surgeons are experts in diagnosing and treating brain tumors, and our team includes one of the few neuro-oncologists in Florida. Patients choose us because our comprehensive, coordinated care program is focused on whole-patient healing – starting with early detection and continuing through post-tumor rehabilitation and counseling.

We also offer some of the most advanced, minimally invasive brain surgeries and technologies such as the Gamma Knife, which allows us to precisely target tumors with radiation while leaving nearby, healthy brain tissue intact. And we continually participate in cutting-edge clinical trials, which offer treatments and medications that aren't yet available at other institutions.

Just as important, through your entire treatment, your designated care coordinator will be there to help you plan for and navigate each step of your journey. We even have a dedicated minimally invasive brain surgery and Gamma Knife care coordinator who can answer your questions about these procedures. This commitment to patient-centered excellence has made ours one of the top brain tumor programs in the country.

We're here to talk.

For more information, or for a physician referral, call our care coordinator at 407-543-4673.

This guide is provided to the general public to disseminate health-related information. The information is not intended to be used for diagnosing or prescribing. Please consult your physician before undertaking any form of medical treatment and/or adopting any exercise program or dietary guidelines.