



Brain and Spinal Cord Tumors

Brain and spinal cord tumors feature abnormal tissue growth inside the skull or the bony spinal column. Tumors are classified as benign (noncancerous) if the cells that make up the growth are similar to normal cells, grow slowly, and are confined to one location. Tumors are malignant (cancerous) when the cells are different from normal cells, grow quickly, and can spread easily to other locations.

Because the central nervous system (CNS) is housed within rigid, bony quarters (the skull and spinal column), any abnormal growth can place pressure on sensitive nerve tissues and impair function. While malignant cells elsewhere in the body can easily seed tumors inside the brain and spinal cord, malignant CNS tumors rarely spread out to other body parts.

Most spinal cord cancers are metastatic, meaning that they arise from a wide variety of primary cancers. These include lung, breast, prostate, head and neck, gynecologic, gastrointestinal, thyroid, melanoma, and renal cell carcinoma.

When new tumors begin within the brain or spinal cord, they are called primary tumors. Primary CNS tumors rarely grow from neurons—nerve cells that perform the nervous system's important functions – because once neurons are mature they no longer divide and multiply. Instead, most tumors are caused by out-of-control growth among cells that surround and support neurons. Primary CNS tumors—such as gliomas and meningiomas—are named by the types of cells comprising them, their location, or both.

The cause of most primary brain and spinal cord tumors remains a mystery. Scientists don't know exactly why and how cells in the nervous system or elsewhere in the body lose their normal identity and grow uncontrollably. Some of the possible causes under investigation include viruses, defective genes, and chemicals. Brain and spinal cord tumors are not contagious or, at this time, preventable.

Spinal cord tumors are less common than brain tumors. About 10,000 Americans develop primary or metastatic spinal cord tumors each year. Although spinal cord tumors affect people of all ages, they are most common in young and middle-aged adults.

Brain tumors affect about 40,000 Americans each year. About half of these tumors are primary and the remainder are metastatic.

Brain and spinal cord tumors cause many diverse symptoms, which generally develop slowly and worsen over time. Some of the more common symptoms of a brain tumor include headaches; seizures (a disruption of the normal flow of brain cell electricity that can lead to convulsions, loss of consciousness, or loss of bladder control); nausea and vomiting; and vision or hearing problems. Increased intracranial pressure can also decrease blood flow in the eye and trigger swelling of the optic nerve, which in turn causes blurred vision, double vision, or partial visual loss. Other symptoms of a CNS tumor may include the following: behavioral and cognitive symptoms, motor or balance problems, pain, sensory changes such as numbness, and decreased skin sensitivity to temperature.

Diagnosis: Special imaging techniques, especially computed tomography (CT) and magnetic resonance imaging (MRI), have greatly improved the diagnosis of CNS tumors. In many cases, these scans can detect the presence of a tumor even if it is less than half an inch across.

Treatment: The three most commonly used treatments are surgery, radiation, and chemotherapy. When a tumor compresses the spinal cord or its surrounding structures, corticosteroids may be given to reduce the swelling and preserve nerve function until the tumor can be removed.

Surgery to remove as much tumor as possible is usually the first step in treating an accessible tumor—as long as there is little risk of neurological damage. Fortunately, neurosurgical advances now make it possible for doctors to reach tumors that were previously considered inaccessible.

Doctors treat most malignant, inaccessible, or inoperable CNS tumors with radiation and/or chemotherapy. Radiation therapy bombards tumor cells with lethal beams of energy. Chemotherapy uses tumor-killing drugs that are given orally or injected into the bloodstream. Because not all tumors are vulnerable to the same anticancer drugs, doctors often use a combination of drugs for chemotherapy.

The overall outcome of radiation therapy is not always good. Radiation can damage spinal cord myelin, which can lead to paralysis. Researchers are looking for better ways to target radiation or enhance its effectiveness, perhaps by making tumor tissue more vulnerable. Researchers are studying brachytherapy (small radioactive pellets

implanted directly into the tumor) as the optimum way to deliver radiotherapy to the tumor while sparing surrounding normal tissues.

Some cells within tumors are quite resistant to radiation. Using a gene therapy approach, scientists hope to kill these cells by inserting a “suicide” gene that could make the tumor cells sensitive to certain drugs or program the cancerous cells to self-destruct.

Blocking the formation of blood vessels (angiogenesis) is a very promising tool for the treatment of various cancers. Since brain tumors are the most angiogenic of all cancers, blocking their blood supply might prove to be especially effective

The gamma knife is a newer tool that provides a precisely focused beam of radiation energy that delivers a single dose of radiation on target. The gamma knife does not require a surgical incision; doctors have found it can help them reach and treat some small tumors that are not accessible through surgery.

Although most primary tumors of the spinal cord are not life threatening, they can cause significant disability. Goals of rehabilitation include functional improvement in mobility, self-care, and pain management.

Source: National Institute of Neurological Disorders and Stroke, American Brain Tumor Association, National Cancer Institute. Paralysis Resource Guide, 2013.

Websites

American Association of Neurological Surgeons: Spinal Tumors

<https://www.aans.org/patients/conditions-treatments/spinal-tumors/>

American Cancer Society: Brain and Spinal Cord Tumors in Adults

<https://www.cancer.org/cancer/brain-spinal-cord-tumors-adults.html>

American Cancer Society: About Brain and Spinal Cord Tumors in Children

<https://www.cancer.org/cancer/types/brain-spinal-cord-tumors-children/about.html>

American Cancer Society: Brain Tumors in Children

<https://www.cancer.org/cancer/types/brain-spinal-cord-tumors-children.html>

American Childhood Cancer Organization: Types of Childhood Cancer

<https://www.acco.org/types-of-childhood-cancer/>

Click on either Spinal Cord Tumors or Brain Cancers

Mayo Clinic: Spinal Cord Tumors

www.mayoclinic.com

<http://www.mayoclinic.org/diseases-conditions/spinal-cord-tumor/home/ovc-20117315>

National Cancer Institute: Childhood Brain and Spinal Cord Tumors Treatment Overview

<http://www.cancer.gov/cancertopics/pdq/treatment/childbrain/patient/>

National Institute of Neurological Disorders and Stroke (NINDS): Brain and Spinal Tumors Information Page

<https://www.ninds.nih.gov/Disorders/All-Disorders/Brain-and-Spinal-Tumors-Information-Page>

National Institute of Neurological Disorders and Stroke (NINDS): Brain and Spinal Tumors: Hope Through Research

<https://www.ninds.nih.gov/Disorders/Patient-Caregiver-Education/Hope-Through-Research/Brain-and-Spinal-Tumors-Hope-Through>

Sharecare: Spinal Cord Tumors

<http://www.sharecare.com/health/spinal-cord-tumors>

Sharecare is a health and wellness social media platform that connects people with top-ranking experts ranging from doctors and specialists to hospitals, healthcare companies and health-conscious consumers. The power behind the site's unique Q&A format is its collective wisdom, providing health-seeking consumers with answers reflecting multiple expert perspectives—greatly simplifying the search for quality information. Created by Jeff Arnold and Dr. Mehmet Oz in partnership with Harpo Studios, Sony Pictures Television and Discovery Communications, Sharecare allows people to ask, learn and act upon questions of health and wellness, creating an active community where knowledge is shared and put into practice. Launched in 2010, Sharecare is based in Atlanta, Georgia.

Associations

American Brain Tumor Association

<http://www.abta.org>

8550 W. Bryn Mawr Ave., Suite 550

Chicago, IL 60631

Email: info@abta.org

Phone: 773-577-8750 or Toll-free: 800-886-2282 (CareLine)

Founded in 1973, the American Brain Tumor Association (ABTA) was the first national nonprofit organization dedicated solely to brain tumors. For 40 years, the ABTA has been providing comprehensive resources that support the complex needs of brain tumor patients and caregivers, as well as the critical funding of research in the pursuit of breakthroughs in brain tumor diagnosis, treatment and care.

Childhood Brain Tumor Foundation (CBTF)

<http://www.childhoodbraintumor.org/>

20312 Watkins Meadow Drive

Germantown, MD 20876

Phone: 301-515-2900

Toll-free: 877-217-4166

Email: cbtf@childhoodbraintumor.org

CBTF is an all-volunteer organization founded in 1994 by families, friends and physicians of children with brain tumors. Their mission is to raise funds for scientific research and heighten public awareness of this disease and to improve prognosis and quality of life for those that are affected. CBTF is specific to funding pediatric brain tumor research.

Children's Brain Tumor Foundation

www.cbtf.org

1460 Broadway

New York, NY 10036

Phone: 212-448-9494

Email: info@cbtf.org

Children's Brain Tumor Foundation, a non-profit organization, was founded in 1988 by dedicated parents, physicians and friends. Their mission is to improve the treatment,

quality of life and the long term outlook for children with brain and spinal cord tumors through research, support, education, and advocacy to families and survivors.

Making Headway Foundation

<http://makingheadway.org>

115 King Street

Chappaqua, NY 10514-3460

Phone: 914-238-8384

Email: info@makingheadway.org

MHF offers services and funds research for children with brain or spinal cord tumors.

Musella Foundation for Brain Tumor Research and Information: Clinical Trials and Noteworthy Treatments for Brain Tumors

<https://virtualtrials.org/>

1100 Peninsula Blvd.

Hewlett, NY 11557

Email: musella@virtualtrials.org

Toll-free: 888-295-4740

The Musella Foundation is a 501(c)3 non-profit organization dedicated to speeding up the search for the cure of brain tumors and to help families deal with a brain tumor diagnosis. They create and distribute educational materials, provide help matching patients to clinical trials, give emotional and financial support to brain tumor patients, awareness and advocacy for brain tumor issues and gives grants for brain tumor research. They maintain the "Clinical Trials and Noteworthy Treatments For Brain Tumors" website at <http://virtualtrials.com>, as well as the "Brain Tumor Copayment Assistance Program" website at <http://braintumorcopays.org>, the "National Walk To End Brain Tumors" website at <http://walktoendbraintumors.org> and we are co-founders of the "Grey Ribbon Crusade" website, at <http://greyribboncrusade.org>.

Brain Tumor Copayment Assistance Program

<http://braintumorcopays.org>

Phone: 1-855-426-2672 (toll free)

The Brain Tumor Drug Copayment Assistance Program, a program of the Musella Foundation For Brain Tumor Research & Information, Inc., provides financial assistance to families who need help covering the cost of certain drugs used to treat a specific type of brain tumor called a glioblastoma multiforme as well as other types of Primary Malignant Brain Tumors, such as: Anaplastic Astrocytoma, Gliosarcoma, High Grade Oligodendroglioma. They CANNOT help people with other tumor types with this program. There is no fee for this assistance.

National Brain Tumor Society

www.braintumor.org

55 Chapel Street, Suite 006

Newton, MA 02458

Phone: 617-924-9997

The National Brain Tumor Society's mission is to find better treatments, and ultimately a cure, for people living with a brain tumor today and anyone who will be diagnosed with a

brain tumor tomorrow. As a part of that mission, it is their goal to ensure that everyone in the brain tumor community has access to helpful information including patients, family members, caregivers, and advocates.

Pediatric Brain Tumor Foundation (PBTF)

<http://www.curethekids.org/>

380 Knollwood St., Suite H #125

Winston Salem, NC 27103

Email: info@curethekids.org

Toll-free: 800-253-6530

PBTF is a nonprofit organization dedicated to eradicating childhood brain tumors and providing support to families.

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This publication is supported by the Administration for Community Living (ACL), U.S. Department of Health and Human Services (HHS) as part of a financial assistance award totaling \$10,000,000 with 100 percent funding by ACL/HHS. The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement, by ACL/HHS, or the U.S. Government.