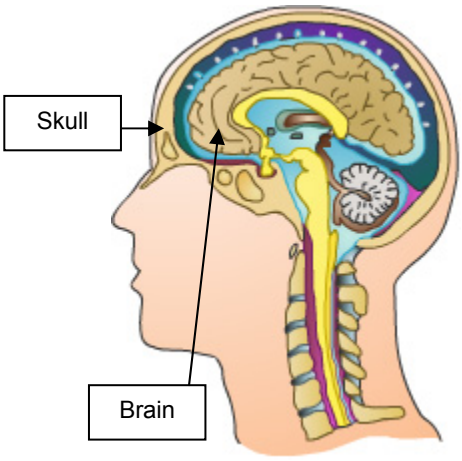
Brain Cancer

Introduction

Brain tumors are not rare. Thousands of people are diagnosed every year with tumors of the brain and the rest of the nervous system. The diagnosis and treatment of brain tumors depends on the type of tumor, tumor grade and where it started.

This reference summary will help you understand how brain tumors are diagnosed and what options are available to treat them.

The Brain



The brain is the most important organ in the body. It controls the 5 senses, as well as the ability to speak and move.

The right side of the brain controls the left side of the body. The left side of the brain controls the right side of the body.

The brain is a soft, spongy mass of tissue. It is protected by the bones of the skull and three thin membranes called meninges. Watery fluid called cerebrospinal fluid (CSF) cushions the brain.

A network of nerves carries messages back and forth between the brain and the rest of the body.

The three major parts of the brain control different activities:

- Cerebrum - The largest part of the brain. It controls reading, thinking, learning, speech, and emotions.
- Cerebellum - Controls balance and complex actions like walking.
- Brain Stem - The brain stem connects the brain with the spinal cord. It controls hunger, thirst, breathing, body temperature, and blood pressure.

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There are many different types of cells in the brain. The thinking cells, the cells responsible for brain activity, are known as “neurons.” The other cells in the brain help take care of the neurons; they are known as “glial cells.”

Cancer and its Causes

The body is made up of very small cells. Normal cells in the body grow and die in a controlled way. Sometimes cells keep dividing and growing without normal controls, causing an abnormal growth called a tumor.

If the tumor does not invade nearby tissues and body parts, it is called a benign tumor, or non-cancerous growth. Benign tumors are rarely life threatening.

If the tumor invades and destroys nearby cells, it is called a malignant tumor, or cancer. Cancer can sometimes be life threatening. Cancerous cells may also spread to different parts of the body through blood vessels and lymph channels.

Cancer treatments are used to kill or control abnormally growing cancerous cells.

Cancers in the body are given names, depending on where the cancer started. Cancer that begins in the breast will always be called a breast cancer, even if it has spread to another place such as the liver, bones, or lungs.

Cancer that starts in the brain, rarely, if ever, spreads outside the brain. It is likely to grow rapidly and crowd out or invade the surrounding healthy brain tissue and cause disability and death. Although doctors can locate where a cancer started, the cause of a cancer in a patient cannot usually be identified.

Cells contain hereditary or genetic materials called chromosomes. This genetic material controls the growth of the cell. Cancer always arises from changes that occur in this genetic material. When the genetic material in a cell becomes abnormal, it can lose its ability to control its growth.

The sudden changes in genetic material can occur for a variety of reasons. These changes may be inherited from parents.

Changes in genetic materials may also occur because of exposure to infections, drugs, tobacco, chemicals, or other factors.

However, to date, the only known causes for brain tumors or cancers are:

1. Previous radiation therapy to the head area.
2. Exposure to some chemicals. These chemicals are formaldehyde used by pathologists and embalmers. Vinyl chloride used in the manufacturing of plastics and acrylonitrile used in the manufacturing of textile and plastics.

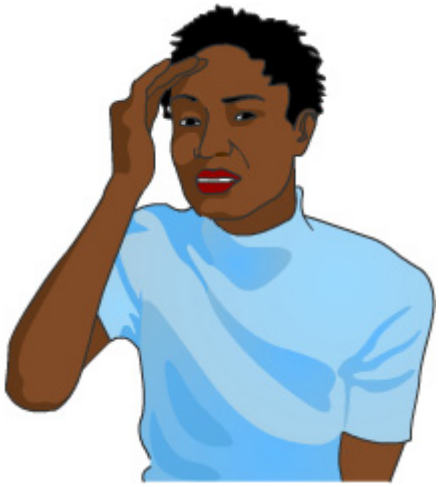
Exposure to the textiles and plastics themselves does not increase the risk of developing brain cancer. A family history of brain cancers increases slightly the chance of developing brain cancer

The use of cell phones has NOT been linked to an increased incidence of brain cancers.

Symptoms

The symptoms of brain tumors depend on the tumor size, type, and location. Symptoms may be caused when a tumor presses on a nerve or damages a certain area of the brain.

The most common symptom of brain tumors is headaches, usually because of the pressure that the tumor places on the surrounding brain.



Seizures or convulsions can also occur because the tumor may irritate the brain.

Other possible signs of brain tumors include:

- Speech problems
- Impaired vision
- Weakness in parts of the body
- Problems with understanding
- Nausea or vomiting
- Problems balancing or walking
- Numbness or tingling in the arms or legs

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Primary Brain Tumors

There are two main types of brain tumors: primary and metastatic. Primary tumors start in the brain. Metastatic tumors start somewhere else in the body and move to the brain.

There are two kinds of primary tumors: benign and malignant. Benign tumors do not contain cancer cells. Malignant tumors do contain cancer cells.

The most common benign primary brain tumors are called “meningiomas.” They begin in the covering of the brain called the dura. They are more common in women than in men. In older patients, small meningiomas should be watched if significant symptoms are not occurring. Meningiomas that are bigger or show a tendency to get bigger may need to be removed surgically. If the whole tumor is taken out, it is not likely that the meningioma will come back.

Rarely, meningiomas can be malignant. In such a case, a second operation may be necessary, and possibly radiation therapy.

The most common primary malignant brain tumor is called a "glioma" because it originates from the glial cells.

Gliomas can be classified using a grading system. The system uses 4 grades, from low grade (grade 1) to high grade (grade 4). The grade of a tumor refers to the way the cells look under a microscope. Cells from high grade tumors look more abnormal and generally grow faster than cells from low grade tumors.

Grade 1 tumors are the least malignant and the slowest to grow. If they are totally removed surgically they can be associated with long-term remission.

Grade 2 tumors have more malignant cells in them than Grade 1. They grow somewhat faster and have a tendency to recur, often more cancerous than the first time.

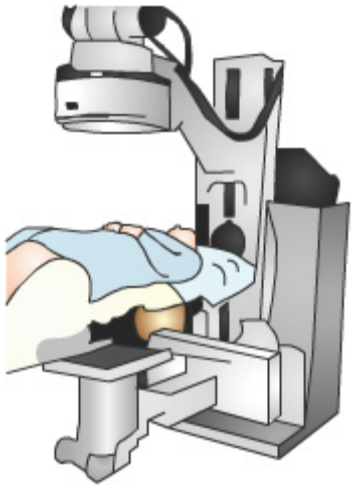
Grade 3 and 4 tumors are very malignant and are often difficult to treat. Grade 4 tumors are also known as glioblastoma multiforme. These tumors usually require an

operation to take as much of the tumor as possible, followed by radiation therapy and chemotherapy.

Even the most malignant gliomas tend to stay in the brain; they rarely grow outside the brain.

Metastatic Brain Tumors

Metastatic brain tumors start somewhere else in the body and move to the brain. Cancers that commonly affect the brain are lung cancers, breast cancers, and skin cancers.



Metastatic brain tumors are usually found AFTER the original cancer has been diagnosed.Metastatic brain tumors are usually treated with radiation therapy and possibly chemotherapy.

Patients with metastatic tumors usually only have surgery if:

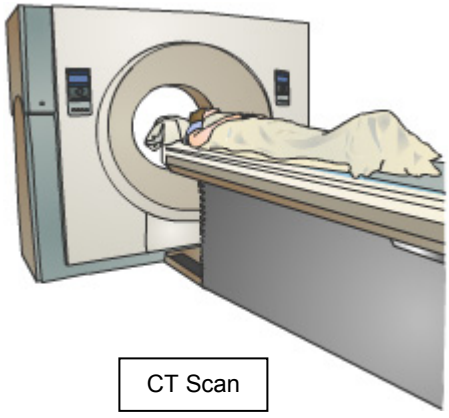
- The original cancer is under control
- There are only a few brain tumors, usually not more than two close to each other
- The brain tumors can be accessed through surgery.

Sometimes a brain tumor may have to be taken out as a life-saving procedure.

The outcome of patients with metastatic brain tumors usually depends on the stage of the original cancer.

Diagnosis

The diagnosis of a brain tumor is usually made after a careful history and physical examination are done, in addition to radiological tests.



CT Scan

CAT scans and MRI scans of the brain are very important in diagnosing brain tumors.

The appearance of the tumor on the CAT scan or MRI may help the doctor determine what kind of tumor the patient has.

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Sometimes the CAT scan or MRI does not show the exact type of tumor. More radiological tests and sometimes surgery may be needed to make an exact diagnosis.

Surgery

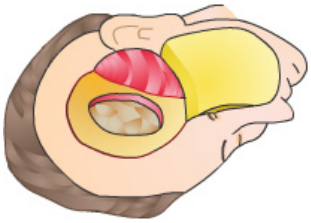
Surgery is usually done on primary brain tumors to help pinpoint the diagnosis and to take as much of the tumor as possible.

Stereotactic

There are two main types of surgery commonly used on brain tumors: open and stereotactic. If the tumor is accessible and the patient is in good health, an open operation is done to take as much of the tumor as possible.

If the tumor is deep or the patient's health does not allow an open operation, a stereotactic biopsy can be performed. Using a small needle under CAT scan or MRI guidance, a small piece of the tumor can be taken out.

In an open operation, a piece of the skull is taken out, the brain is entered and the tumor is taken out. The piece of the skull is then replaced and the skin is closed.



Open Surgery

Sometimes it is impossible to take the whole tumor out, especially with malignant gliomas. In some cases, if the whole tumor is removed, the surrounding brain can become damaged or deficiencies in the brain can result.

Depending on the location of the tumor, the neurosurgeon may have to decide during the operation exactly how much of the tumor can be safely removed.

Surgery on metastatic brain tumors may be done to help diagnose the disease and may be needed to save the life of a patient. If the original tumor is under control, removal of a metastatic tumor may help to extend the patient's life.

Therapy

Radiation therapy and chemotherapy are two additional treatments that may be used to control or eliminate brain tumors.

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Your doctor may recommend one or both of these therapies in addition to surgery or as an alternative to surgery.

In the case of a malignant brain tumor, radiation therapy is needed to control the tumor and possibly achieve long-term remission.

There are some possible side effects of radiation therapy; these include the possibility of strokes and dementia. The severity, as well as the chance that they happen, worsen with higher doses of therapy. The radiation therapy is usually very well tolerated.

Chemotherapy is a way of treating different kinds of cancer with anti-cancer drugs. Some kinds of chemotherapy are given through an IV directly into the bloodstream and others are given orally. Various kinds of chemotherapy can be used to help treat malignant brain tumors.

The side effects of chemotherapy depend mainly on the drugs that are used. The most common side effects include fever and chills, nausea and vomiting, loss of appetite, and weakness. Some side effects may be relieved with medicine. Patients will be monitored for signs of infection.

Sometimes special wafers loaded with chemotherapy products are placed directly in the tumor cavity during surgery.

Patients who receive an implant (a wafer) that contains a drug are monitored by the health care team for signs of infection after surgery.

Summary

Brain tumors are not rare.

The treatment and future expectations for patients with brain tumors mostly depends on the type and grade of the tumor as well as the health of the patient.

Medical and technical advances have greatly improved the chances of remission for brain tumor patients.

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