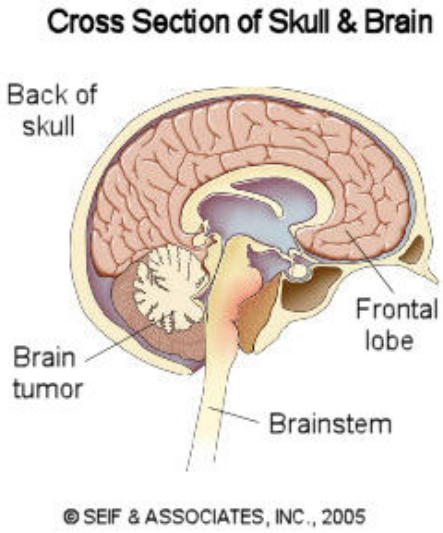
Brain Tumors, General Information

Brain tumors are diseases, in which cancer (*malignant*) cells begin to grow in the tissues of the brain. Brain tumors account for 85% to 90% of all primary central nervous system (CNS) tumors. A "primary" brain tumor is one that starts in the brain, rather than spreading to the brain from a cancer in a different part of the body.



The brain controls memory, learning, senses (hearing, sight, smell, taste, touch), and emotion. It also controls other parts of the body, including muscles, organs, and blood vessels.

Most brain tumors occur in people age 45 or above. However, a couple rare tumors occur almost only in children.

Primary brain tumors are much less common than secondary brain tumors. A secondary brain tumor starts in a different part of the body and spreads to the brain.

CAUSES

Most primary brain tumors begin when normal cells somehow develop errors in their genetics. In most cases, it is not known how this process starts. These genetic errors allow cells to grow and divide at increased rates and to continue living when normal, healthy cells would die. The result is a clump of abnormal cells, which forms a tumor.

There are many different types of brain cells. In many cases, one type of brain cell develops the error that leads to a tumor being formed. The tumor is named according to the type of cell that developed the problem.

Environmental factors and infection, which may cause brain cancer, include:

- Exposure to chemicals and solvents. This could happen on the job or through hobbies. Examples include:
  - Vinyl chloride.
  - Pesticides.
  - A variety of industrial chemicals.

Research is ongoing, because it is not known whether there is a true relationship between these chemicals and the development of primary brain tumors.

- Exposure of the head to radiation, such as during a nuclear accident.
- Epstein-Barr virus infection. This can cause a rare brain tumor.
- Being a transplant recipient or patient with AIDS (*acquired immunodeficiency syndrome*).

SYMPTOMS

Symptoms of brain tumors are related to the part of the brain that is affected. For example, a brain tumor that affects the part of the brain controlling vision will affect that sense.

General signs and symptoms include:

- Headache. Changes in pattern, higher frequency, or more severe.
- Stomach or intestinal problems, such as:
  - Nausea.
  - Loss of appetite.
  - Vomiting.
- Changes in:
  - Personality.
  - Mood.

- Mental capacity.
- Concentration.
- Balance problems.
- Confusion with everyday activities.
- Speech problems.
- Seizure in someone who has never had a seizure before. These may occur in up to 20% of patients with a tumor in the upper part of the brain. Seizures may be present for months before a clear diagnosis is made.

DIAGNOSIS

The diagnosis is based on:

- Patient history.
- Neurological examination (*nervous system function test*).
- Diagnostic procedures, including:
  - CT scan (*computed tomography*) and MRI (*magnetic resonance imaging*).
  - After therapy, SPECT (*single photon emission computed tomography*) and PET (*positron emission tomography*) may be useful, to see if there is new tumor growth. Both of these tests are ways of making images of the brain. These tests are usually only available at large hospitals.

Once a brain tumor is found, more tests may be done to determine the type of tumor. Your caregiver will also need to know how different the tumor cells are from the cells that are near it. This is called the histologic grade of the tumor. To plan treatment, it is important to know the type and grade of brain tumor.

TREATMENT

Four kinds of direct treatment are available. The types selected depend on the type and location of the tumor.

- **Surgery** is the most common treatment. To take out the cancer from the brain, a surgeon will cut a part of bone from the skull to get to the brain. This operation is called a craniotomy. After the cancer is removed, the bone will be put back in place, or a piece of metal or fabric will be used to cover the opening in the skull.
- **Radiation therapy** and **radiosurgery** use X-rays to kill cancer cells from the outside and to shrink tumors. Radiation therapy may also be used by putting materials that produce radiation (*radioisotopes*) through thin plastic tubes, into the tumor, to kill cancer cells from the inside.
- **Chemotherapy** uses drugs to kill cancer cells. Chemotherapy is called a systemic treatment because the drug enters the bloodstream, travels through the body, and can kill cancer cells throughout the body. Chemotherapy may be:
  - Taken by pill.
  - Put into the body by a needle in a vein or muscle.
- **Biological therapy** uses the body's immune system to fight cancer. It is being studied in clinical trials for use in the treatment of brain cancer. It uses materials made by the body, or made in a lab, to help the body's natural defenses against disease.

Rehabilitation After Treatment

Because brain tumors can develop in parts of the brain that control motor skills, speech, vision and thinking, rehabilitation may be a necessary part of recovery. The brain can sometimes heal itself after treatment or trauma from a brain tumor, but this can take time and patience.

- **Cognitive rehabilitation** can help you cope with problems of thinking and awareness.
- **Physical therapy** can help you regain lost motor skills or muscle strength.
- **Vocational therapy** can help you get back to work after a brain tumor.
- **Specialists in speech difficulties** (*speech pathologists*) are just one of many types of therapists who can help you recover.

School-age children with brain tumors may especially benefit from tutoring, as a part of their overall treatment plan. A brain tumor can cause changes in the brain that affect thinking and learning. The earlier these problems are identified, the earlier they can be addressed with strategies that provide the most benefits to the child.

SEEK MEDICAL CARE IF:

- You feel there are side effects from medicines prescribed.
- You feel that medicines for pain are not being effective.
- You develop any new symptoms that you did not have previously.

SEEK IMMEDIATE MEDICAL CARE IF:

- You develop a high fever, neck stiffness, or confusion.
- You have a headache that becomes severe or does not respond to pain medication.
- You have a fainting episode.
- You have a seizure.
- You develop a rash.
- You develop severe vomiting or are unable to tolerate food or fluids.

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