Adult Brain Tumor, General Information

Adult brain tumor is a disease in which cancer (*malignant*) cells begin to grow in the tissues of the brain. The brain controls memory and learning, senses (hearing, sight, smell, taste, and touch) and emotion. It also controls other parts of the body. These include muscles, organs, and blood vessels. This summary covers tumors that start in the brain (primary brain tumors). Often cancer found in the brain has started somewhere else in the body. It then has spread (metastasized) to the brain. This is called brain metastasis.

SYMPTOMS

You should see your caregiver if the following symptoms appear:

- Frequent headaches.
- Vomiting.
- Difficulty walking or speaking.

If there are problems, your caregiver may order a CT (*computed tomographic*) scan. This is a special x-ray that uses a computer to make a picture of the brain. An MRI (*magnetic resonance imaging*) scan may also be done. This test uses magnetic waves to make a picture of the brain. Surgery may be required to determine if there is a brain tumor and to see what type of tumor it is.

PROGNOSIS

The chance of recovery (*prognosis*) and choice of treatment depend on:

- The type of brain tumor.
- The patient's general state of health.

There are many types of brain tumors and the treatments are varied. Your caregivers will help you decide what treatment is best for you and what treatment will give you the best outcome. Your caregivers can help answer your questions.

STAGE EXPLANATION

Types of adult brain tumor

Once a brain tumor is found, more tests will be done to determine the type of tumor. A doctor 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, the doctor needs to know the type and grade of brain tumor. The following types of tumors are used to group adult brain tumors.

ASTROCYTOMAS

These are tumors that start in brain cells called astrocytes. There are different kinds of astrocytomas, which are defined by how the cancer cells look under a microscope.

- Non-infiltrating astrocytoma
  - Grow slowly and usually do not grow into the tissues around them.
- Well-differentiated mildly and moderately anaplastic astrocytoma
  - Are slow growing, but grow more quickly than non-infiltrating astrocytomas. They start to grow into other tissues around them.
- Anaplastic astrocytomas
  - Have cells that look very different from normal cells and that grow more rapidly. This tumor is more malignant and more difficult to treat.

GLIOBLASTOMA MULTIFORME (GRADE IV ASTROCYTOMA)

These are tumors that grow very quickly. They have cells that look very different from normal cells.

BRAIN STEM GLIOMAS

These are tumors located in the bottom part of the brain that connects to the spinal cord (the brain stem).

CEREBELLAR ASTROCYTOMA

This occurs in the area of the brain called the cerebellum. It is just above the back of the neck. These tumors usually grow slowly. They do not usually spread from where they began to other parts of the brain or body.

EPENDYMAL TUMORS

These are tumors that begin in the ependyma. The cells line the passageways in the brain where special fluid that protects the brain and spinal cord (*cerebrospinal fluid*) is made and stored. There are different kinds of ependymal tumors, which are defined by how the cells look under a microscope.

- Well-differentiated ependymoma
  - Have cells that look very much like normal cells and grow quite slowly.
- Anaplastic ependymoma
  - Are ependymal tumors that do not look like normal cells and grow more quickly than well-differentiated ependymal tumors.

EPENDYMOBLASTOMA

- Rare cancers that usually occur in children. They may grow very quickly.

OLIGODENDROGLIAL TUMORS

These begin in the brain cells called oligodendrocytes. They provide support and nourishment for the cells that transmit nerve impulses. Different types of oligodendroglial tumors are defined by how the cells look under a microscope.

WELL-DIFFERENTIATED OLIGODENDROGLIOMA

- Slow-growing tumors that look very much like normal cells.

ANAPLASTIC OLIGODENDROGLIOMA

- Grow more quickly, and the cancer cells look very different from normal cells.

OTHER BRAIN TUMORS

MIXED GLIOMAS

- Brain tumors that occur in more than one type of brain cell, including:
  - Cells of astrocytes.
  - Ependymal cells.
  - Oligodendrocytes.

MEDULLOBLASTOMA

- Brain tumors that begin in the lower part of the brain. They are almost always found in children or young adults. This type of cancer may spread from the brain to the spine.

PINEAL PARENCHYMAL TUMORS

- Tumors found in or around a tiny organ located near the center of the brain (*the pineal gland*). The tumors can be slow growing (*pineocytomas*) or fast growing (*pineoblastomas*). Astrocytomas may also start here.

GERM CELL TUMORS

- Tumors arise from the sex cells. There are different kinds of germ cells including:
  - Germinomas.
  - Embryonal carcinomas.
  - Choriocarcinomas.
  - Teratomas.

CRANIOPHARYNGIOMA

- Tumors that occur near the pituitary gland. The pituitary gland is a small organ about the size of a pea. This gland is located just above the back of the nose. It controls many of the body's functions.

MENINGIOMA

- Tumors that occur in the membranes that cover and protect the brain and spinal cord (the meninges). They usually grow slowly.

MALIGNANT MENINGIOMA

- A rare tumor that grows more quickly than other meningiomas.

CHOROID PLEXUS TUMORS

The choroid plexus is tissue located in the spaces inside the brain called ventricles. The choroid plexus makes the fluid that fills the ventricles and surrounds the brain and spinal cord. These tumors can grow slowly (*choroid plexus papilloma*) or grow more rapidly (*anaplastic choroid plexus papilloma*). The rapidly growing tumors are more likely to spread to other places in the brain and to the spinal cord.

RECURRENT

Recurrent disease means that the cancer has come back (*recurred*) after it has been treated. It may come back in the brain or in another part of the body.

TREATMENT OPTION OVERVIEW

HOW ADULT BRAIN TUMORS ARE TREATED

There are treatments for all patients with an adult brain tumor. Three kinds of treatment are used:

- **Surgery**
  - The most common treatment of adult brain tumors.
  - To take out the cancer from the brain, a doctor will cut a part of the bone from the skull to get to the brain. This operation is called a craniotomy. After the doctor removes the cancer, the bone will be put back. Or a piece of metal or fabric will be used to cover the opening in the skull.
- **Radiation therapy**
  - Uses x-rays produced by a machine called a linear accelerator or a cobalt machine to kill cancer cells from the outside and shrink tumors (*external-beam 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 (*internal radiation therapy*).
- **Chemotherapy**
  - Uses drugs to kill cancer cells.
  - May be taken by pill. Or it may be put into the body by a needle in the vein or muscle.
  - Is called a systemic treatment because the drug enters the bloodstream, travels through the body, and can kill cancer cells throughout the body.
- **Biological therapy**
  - Uses the body's immune system to fight cancer.
  - Is also being studied in clinical trials.
  - Tries to get the body to fight cancer.
  - Uses materials made by the body or made in a laboratory to:

1. Boost.
2. Direct.
3. Restore the body's natural defenses against disease.
   - Is sometimes called biological response modifier therapy or immunotherapy.

TREATMENT BY TYPE

- Treatment of adult brain tumor depends on:
  - The type and stage of the disease.

- The patient's age and overall health.

- Standard treatment may be considered because of its effectiveness in past studies. Or participation in a clinical trial may be considered. Not all patients are cured with standard therapy. Some standard treatments may have more side effects than are desired. For these reasons, clinical trials are designed to find better ways to treat cancer patients. They are based on the most up-to-date information. Clinical trials are ongoing in most parts of the country for most types of adult brain tumor. To learn more about clinical trials, call the Cancer Information Service at 1-800-4-CANCER (1-800-422-6237); TTY at 1-800-332-8615.

ADULT NONINFILTRATING ASTROCYTOMA

Treatment may be one of the following:

- Surgery to remove the cancer.
- Surgery followed by external-beam radiation therapy.
- If anaplastic astrocytoma comes back (*recurs*) after surgery, treatment may be radiation therapy if it was not given before. If it was given before, clinical trials of chemotherapy or biological therapy should be considered.

ADULT WELL-DIFFERENTIATED MILDLY AND MODERATELY ANAPLASTIC ASTROCYTOMA

Treatment may be one of the following:

- Surgery followed by external-beam radiation therapy.
- Surgery alone.
- A clinical trial of surgery followed by radiation therapy and chemotherapy.

ADULT ANAPLASTIC ASTROCYTOMA

Treatment may be one of the following:

- Surgery followed by external-beam radiation therapy.
- Surgery followed by external-beam radiation therapy and chemotherapy.
- A clinical trial of new forms of radiation therapy such as:
  - Internal radiation.
  - Radiation given during surgery.
  - Radiation given with drugs to make the cancer cells more sensitive to radiation.
- A clinical trial of chemotherapy or biological therapy following radiation therapy.
- A clinical trial of chemotherapy drugs. These are placed in the body during surgery.

ADULT GLIOBLASTOMA MULTIFORME

Treatment may be one of the following:

- Surgery followed by external-beam radiation therapy and chemotherapy.
- Surgery followed by external-beam radiation therapy.
- A clinical trial of new forms of radiation therapy, such as:
  - Internal radiation.
  - Radiation given during surgery.
  - Radiation given with drugs to make the cancer cells more sensitive to radiation.
- A clinical trial of chemotherapy or biological therapy following radiation therapy.
- A clinical trial of chemotherapy drugs. These are placed in the body during surgery.

ADULT BRAIN STEM GLIOMA

Treatment may be one of the following:

- External-beam radiation therapy.
- A clinical trial of:
  - Chemotherapy.
  - Biological therapy.

ADULT WELL-DIFFERENTIATED EPENDYMOMA

Treatment may be one of the following:

- Surgery to remove the cancer.
- Surgery to remove the cancer followed by external-beam radiation therapy.
- A clinical trial of:
  - Chemotherapy.
  - Biological therapy.

ADULT MALIGNANT EPENDYMOMA

Treatment may be one of the following:

- Surgery to remove the cancer followed by external-beam radiation therapy.
- A clinical trial of external-beam radiation therapy with chemotherapy.
- A clinical trial of;
  - Chemotherapy.
  - Biological therapy.

ADULT WELL-DIFFERENTIATED OLIGODENDROGLIOMA

Treatment may be one of the following:

- Surgery to remove the cancer followed by external-beam radiation therapy.
- Surgery to remove the cancer.
- A clinical trial of radiation therapy plus chemotherapy.

ADULT ANAPLASTIC OLIGODENDROGLIOMA

Treatment may be one of the following:

- Surgery to remove the cancer followed by external-beam radiation therapy.
- Surgery followed by external-beam radiation therapy and chemotherapy.
- A clinical trial of new forms of radiation therapy such as:
  - Internal radiation.
  - Radiation given during surgery.
  - Radiation given with drugs to make the cancer cells more sensitive to radiation.
- A clinical trial of:
  - Chemotherapy.
  - Biological therapy following radiation therapy.

MIXED GLIOMAS

Treatment may be one of the following:

- Surgery followed by:
  - External-beam radiation therapy.
  - External-beam radiation therapy and chemotherapy.
- A clinical trial of new forms of radiation therapy, such as:
  - Internal radiation.
  - Radiation given during surgery.
  - Radiation given with drugs to make the cancer cells more sensitive to radiation.
- A clinical trial of:
  - Chemotherapy.
  - Biological therapy following radiation therapy.

ADULT MEDULLOBLASTOMA

Treatment may be one of the following:

- Surgery to remove the cancer plus external-beam radiation therapy.
- A clinical trial of surgery plus external-beam radiation therapy and chemotherapy.
- (See the PDQ patient information summary on childhood brain tumor for more information.)

ADULT PINEAL PARENCHYMAL TUMOR

Treatment may be one of the following:

- Surgery plus external-beam radiation therapy.
- Surgery plus external-beam radiation therapy and chemotherapy.
- A clinical trial of new forms of radiation therapy, such as:
  - Internal radiation.
  - Radiation given during surgery.
  - Radiation given with drugs to make the cancer cells more sensitive to radiation.
- A clinical trial of:
  - Chemotherapy.
  - Biological therapy following radiation therapy.

ADULT CENTRAL NERVOUS SYSTEM GERM CELL TUMOR

Treatment depends on:

- Whether the cancer can be removed in an operation.
- The kind of cells.
- The location of the tumor.
- Other factors.

ADULT CRANIOPHARYNGIOMA

Treatment may be one of the following:

- Surgery to remove the cancer.
- Surgery to remove the cancer followed by radiation therapy.

ADULT MENINGIOMA

Treatment usually consists of surgery to remove the tumor. If all of the tumor cannot be removed in an operation, a patient may also receive external-beam radiation therapy after surgery.

ADULT MALIGNANT MENINGIOMA

Treatment may be one of the following:

- Surgery followed by external-beam radiation therapy.
- A clinical trial of new forms of radiation therapy, such as:
  - Internal radiation.
  - Radiation given during surgery.
  - Radiation given with drugs to make the cancer cells more sensitive to radiation.
- A clinical trial of:
  - Chemotherapy.
  - Biological therapy following radiation therapy.

RECURRENT ADULT BRAIN TUMOR

Treatment may be one of the following:

- Surgery alone.
- Surgery followed by chemotherapy.
- External-beam radiation therapy alone, if not used during previous treatment, with or without chemotherapy.
- Internal radiation therapy.
- A clinical trial of:
  - Chemotherapy.
  - Chemotherapy drugs, which are placed in the body during surgery.

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