

ABOUT BRAIN TUMORS

The brain is the center of thought, memory, emotion, speech, sensation and motor function. The spinal cord and special nerves in the head called cranial nerves carry and receive messages between the brain and the rest of the body.

- There are two types of brain tumors:
 - **Primary** – a tumor that starts in the brain. Primary brain tumors can be benign (noncancerous) or malignant.
 - **Metastatic** – a tumor caused by cancer elsewhere in the body that spreads to the brain. Metastatic brain tumors are always cancerous.
- Primary tumors in the brain or spinal cord rarely spread to distant organs.
- Brain tumors cause damage because as they grow they can interfere with surrounding cells that serve vital roles in our everyday life.

GENERAL RISK FACTORS FOR BRAIN TUMORS

Most brain and spinal cord tumors have no known risk factors and occur for no apparent reason. There are no known proven ways to prevent these tumors.

FACTS ABOUT BRAIN TUMORS

- The Central Brain Tumor Registry of the United States estimates that more than 40,000 Americans will be diagnosed with a primary brain tumor this year.
- This year, an estimated 170,000 Americans will be diagnosed with a brain or spinal cord tumor that has spread from another part of the body.



HELPFUL WEB SITES ON BRAIN TUMORS

- American Cancer Society**
www.cancer.org
- American Brain Tumor Association**
www.abta.org
- National Brain Tumor Foundation**
www.braintumor.org
- The Brain Tumor Society**
www.tbts.org
- National Cancer Institute**
www.cancer.gov



LEARNING ABOUT CLINICAL TRIALS

The radiation oncology team is constantly exploring new ways to treat people with brain tumors through studies called clinical trials. Today's standard radiation therapy treatments are a result of clinical trials completed many years ago. For more information, please contact the following organizations:

- National Cancer Institute**
www.cancer.gov/clinicaltrials
- Radiation Therapy Oncology Group**
www.rtog.org

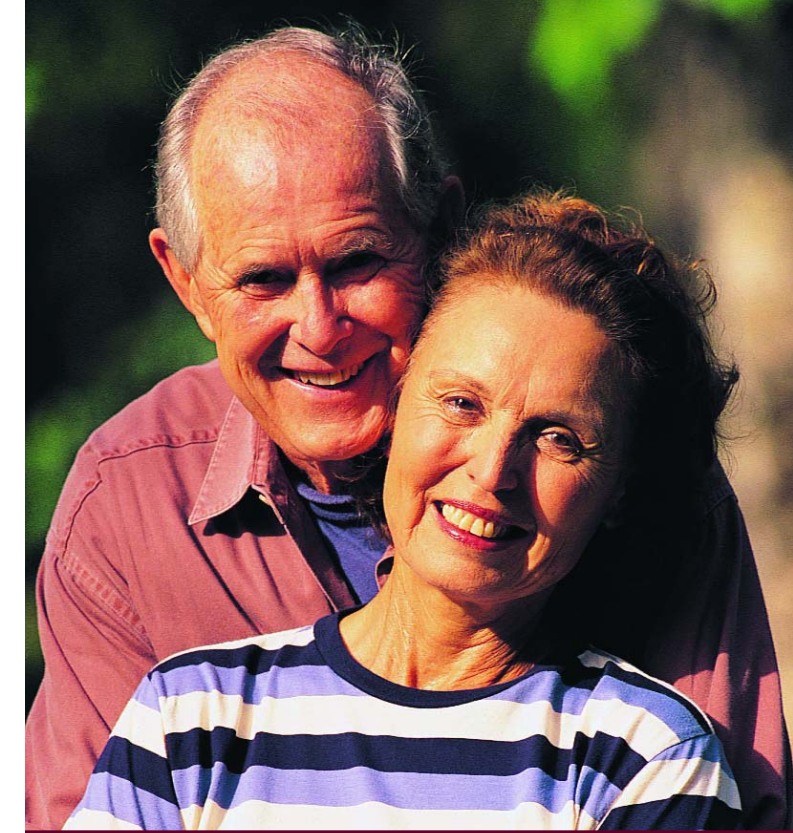
ABOUT THE RADIATION ONCOLOGY TEAM

Radiation oncologists are the doctors who oversee the care of each patient undergoing radiation treatment. Other members of the radiation oncology team include radiation therapists, radiation oncology nurses, medical physicists, dosimetrists, social workers and nutritionists. To locate a radiation oncologist in your area, visit www.astro.org/patient.



ABOUT ASTRO

The American Society for Therapeutic Radiology and Oncology is the largest radiation oncology society in the world. The Society's mission is to advance the practice of radiation oncology by promoting excellence in patient care, promoting research and disseminating research results.



RADIATION THERAPY for BRAIN TUMORS

Understanding Your Treatment Options



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SIGNS OF BRAIN TUMORS

No blood test or other screening exam can detect brain tumors, but there are often some outward signs. While tumors in different parts of the central nervous system disrupt different functions, some symptoms include:

- Headaches.
- Nausea/vomiting.
- Seizures.
- Weakness or numbness on one side of the body.
- Changes in vision, hearing or sensation.
- Difficulty with speech.
- Lack of coordination.
- A change in mood or personality.
- Memory loss.

DIAGNOSING BRAIN TUMORS

If you suffer from any of the initial signs of a brain tumor, your doctor will likely conduct some or all of the following tests:

- A physical exam to determine your overall health.
- A neurologic exam to evaluate brain and spinal cord function.
- Imaging studies, such as CT, MRI or PET scans, to look for signs of a brain tumor.
- If studies or scans indicate you might have a brain tumor, some tissue may be taken from the tumor to make an exact diagnosis. This test is called a biopsy.
- A spinal tap may also be performed to look for tumor cells. During this test, a needle is placed in the lower back to obtain a sample of cerebrospinal fluid. This fluid is then examined to see if tumor cells are present.

TREATING BRAIN TUMORS

If doctors determine that you have a tumor, the treatment options and prognosis are based on the following factors:

- Tumor type.
- Location and size of tumor.
- Tumor grade (how abnormal the cells are).
- Your age, medical history and general health.

UNDERSTANDING RADIATION THERAPY

Radiation therapy, sometimes called radiotherapy, is the careful use of radiation to safely and effectively treat many different kinds of tumors.

- Doctors called radiation oncologists use radiation therapy to try to kill tumors, to control tumor growth or to relieve symptoms.
- Radiation therapy works within tumor cells by damaging their ability to multiply. When these cells die, the body naturally eliminates them.
- Healthy cells near the tumor may be affected by radiation, but they are able to repair themselves in a way tumor cells cannot.

RADIATION THERAPY OPTIONS FOR BRAIN TUMORS

People with brain tumors should discuss treatment options with several cancer specialists, including a radiation oncologist. A radiation oncologist is a doctor who will help you understand the types of radiation therapy available to treat your tumor. Conventional radiation therapy treatment options for brain tumors include:

- External beam radiation therapy.
- Brachytherapy or internal radiation therapy.

EXTERNAL BEAM RADIOTHERAPY

External beam radiotherapy involves a series of daily outpatient treatments over several weeks to accurately deliver radiation to the brain. Radiation is often given after surgery, and sometimes it is used instead of surgery.

- **3-dimensional conformal radiotherapy** or 3D-CRT combines multiple radiation treatment fields to deliver precise doses of radiation to the brain. Tailoring each of the radiation beams to the patient's tumor allows coverage of the brain tumor while keeping radiation away from nearby organs, such as the eyes.
- **Intensity modulated radiation therapy** or IMRT is the most recent advance in the delivery of radiation. IMRT differs from 3D-CRT by modifying the intensity of the radiation within each of the radiation beams.
- **Stereotactic radiotherapy**, sometimes called radiosurgery, is a type of external beam radiation therapy that pinpoints high doses directly on the tumor, in some cases in only one treatment.
- **Proton therapy** is given much the same way as external beam therapy, but it uses proton particles rather than X-rays to kill brain tumor cells. This treatment is only available in a few regions of the country.

INTERNAL RADIATION THERAPY

Internal radiation therapy or brachytherapy works by placing radioactive sources in or just next to a tumor.

- During brachytherapy, a tube or balloon called a catheter will be inserted into the brain. The radiation will then be carried to the tumor using this catheter.
- The radioactive source will then be left in place from several hours to several days to kill the tumor cells.
- In some cases, the radiation is permanently placed directly into the tumor or the area where the tumor was before surgery.

NEWER TECHNIQUES

Doctors are constantly exploring newer and better ways to treat primary brain tumors.

- Drugs that make tumor cells more sensitive to radiation are called radiosensitizers. Combining radiation with radiosensitizers may allow doctors to kill more tumor cells.
- Chemotherapy is used with radiation to treat some brain tumors. Your doctor may recommend that you consult with a medical oncologist (chemotherapy doctor) before starting radiation.

POTENTIAL SIDE EFFECTS

The effects of brain radiation can vary depending on your tumor and the technique used to treat it.

- Before treatment, your radiation oncologist will discuss any side effects – however rare – you may experience.
- Possible side effects can include fatigue, change in appetite, headaches, visual changes, hair loss, skin irritation, nausea, vomiting and/or unsteadiness.
- Some side effects can be treated with steroids or other medications. Talk to your doctor about any problems you experience.