

Brain Tumors: Radiation Therapy



What is radiation therapy?

Radiation therapy uses strong beams of energy to kill cancer cells. It helps control the growth of some types of brain tumors. In some cases, it can shrink the tumor or destroy it. It's often used along with surgery or chemotherapy to treat brain tumors. This type of treatment is done by a healthcare provider called a radiation oncologist.

When might radiation therapy be used?

Radiation therapy may be used to treat a brain tumor:

- After surgery (sometimes with chemotherapy) to try to kill tumor cells left in the brain
- As the main (primary) treatment if surgery can't be done
- To help relieve symptoms caused by the tumor

Types of radiation therapy

There are 2 main types of therapy. You may get both types. They include:

- **External beam radiation therapy (EBRT).** For this type, a machine sends the rays of energy to the tumor from outside the body. This treatment is usually done every weekday over several weeks.
- **Internal radiation (brachytherapy).** This is also called interstitial therapy when the radiation is placed inside the tumor with seeds or pellets.

External beam radiation therapy (EBRT)

There are several types of EBRT. The goal is to target the tumor and limit damage to nearby healthy brain cells. To limit the harm, your healthcare provider may use special types of EBRT, such as:

- **3-D conformal therapy (3D-CRT).** For this treatment, a computer uses imaging scans to match the radiation beams to the shape of the tumor from different angles. These may be CT or MRI scans.
- **Intensity modulated radiation therapy (IMRT).** This is a lot like 3D-CRT. It lets the healthcare provider control the intensity or strength of the radiation beams pointed at different parts of the tumor. The strength and intensity of the beams are carefully shaped. This allows accurate treatment of the cancer while helping to protect nearby tissues.
- **Conformal proton beam therapy.** This is like IMRT. But instead of an X-ray, it uses another type of beam that has charged particles (protons) to damage the cancer cells. Protons stop more quickly than X-rays after hitting a target. This may lead to less damage to the tissues the beams pass through to reach the tumor.
- **Stereotactic radiosurgery (SRS).** This method can be used on some tumors. Though it's called surgery, there's no cutting. A high-energy dose of radiation is sent to the tumor from many angles. It may be given as a single day treatment. Or it may be given as several doses over a 3 to 5 days. There are 2 main types of SRS:
 - **Gamma knife radiation.** This uses radiation beams called gamma rays. The rays are sent from a radioactive source (cobalt) and focused at the tumor from hundreds of angles at the same time. Treatment is usually done in 1 session.

- **Linear accelerator based.** Instead of using a radioactive source, the X-rays are created by a machine. This machine moves around the head to send radiation to the tumor from different angles. Treatment is usually done in 1 to 5 sessions.

Brachytherapy

For this treatment, the radiation is placed very close to or inside the tumor. This is done during surgery. The radiation the implants give off travels a very short distance. This helps limit the effect on nearby healthy tissue. Brachytherapy may be done along with EBRT. It can be given in different ways. Radioactive pellets may be placed inside the surgical cavity. Sometimes a machine in the operating room delivers radiation directly to the surgical cavity during surgery. Or a balloon containing radioactive liquid or pellets can be inserted into the brain. The balloon is removed later.

Possible side effects

Radiation treatment affects normal cells as well as cancer cells. It may cause side effects. These depend on how much radiation you get and how it's given. It also depends on where and how big the tumor is. Possible side effects include:

- Headache
- Brain swelling (edema)
- Skin irritation and hair loss at the treated area
- Intolerance of cold
- Nausea and vomiting
- Tiredness
- Trouble thinking and remembering
- Problems with your thyroid, hypothalamus, or pituitary glands, which can affect hormone levels in your body

Radiation necrosis

Sometimes dead brain tissue forms at the site of the radiation. This is called radiation necrosis. The mass of dead brain tissue comes from both cancer cells and healthy cells. Radiation necrosis can take anywhere from months to years to develop.

Radiation necrosis may need to be removed with surgery if it causes problems like headaches and seizures.

Radiation necrosis is less common these days. This is because detailed imaging tests and newer ways to precisely aim radiation at a tumor are now used.

Risk of future cancer

Radiation can damage the DNA in healthy cells. As a result, you have a small risk of a second brain cancer after brain radiation. This second cancer usually occurs many years later. Talk to your radiation oncologist about the risks and benefits of radiation therapy.

© 2000-2027 The StayWell Company, LLC. All rights reserved. This information is not intended as a substitute for professional medical care. Always follow your healthcare professional's instructions
This information is not intended as a substitute for professional medical care. Always follow your Healthcare professional's instructions. Copyright Krames LLC.