RADIATION THERAPY

Radiation therapy, sometimes called radiotherapy, involves the use of radiation to treat cancer and other diseases. Specially trained doctors called radiation oncologists use radiation to cure cancer, to stop a tumor from growing or to relieve symptoms such as pain. Radiation has been used to treat cancer and other diseases for more than 100 years. External beam radiation therapy is the most common method for giving radiation therapy. Similar to an X-ray, external beam radiation therapy is delivered from a machine that doesn't touch your skin. Your doctor directs the radiation beams to the tumor inside your body to destroy it. This works because tumor cells, unlike normal cells, cannot repair themselves after being damaged by radiation. Typically, external beam radiation is given daily for several weeks. This allows doctors to deliver enough radiation to the cancer cells in your body, while allowing healthy cells time to recover.

STEREOTACTIC RADIATION THERAPY

A specialized type of external beam radiation therapy called stereotactic radiation uses focused radiation beams targeting a well-defined tumor. It relies on detailed imaging, computerized three-dimensional treatment planning and precise treatment set-up to deliver the radiation dose with extreme accuracy. There are two types of stereotactic radiation:

1. Stereotactic radiosurgery (SRS) delivers one to five stereotactic radiation treatments to the brain or spine. SRS is delivered by a team involving a radiation oncologist and a neurosurgeon. This treatment does not involve surgery. An incision is not made and tissue is not surgically removed.
2. Stereotactic body radiation therapy (SBRT) or stereotactic ablative radiotherapy (SABR) delivers one to five stereotactic radiation treatments to tumors within the body, excluding the brain or spine.

SRS/SBRT/SABR is generally best for very small tumors. Doctors use specialized scans to pinpoint exactly where the tumor target is located. A customized holder may be used to keep the body perfectly still during treatment. Some treatment machines have the ability to adjust for patient motion, such as breathing.

These techniques allow doctors to give a high dose of radiation to the tumor in a short amount of time. SRS/SBRT/SABR is a type of external beam radiation therapy that can be completed in one to five treatments.

The advantage of SRS/SBRT/SABR is it delivers the right amount of radiation to the cancer in a shorter amount of time than traditional treatments. Plus, the treatment is delivered with extreme accuracy, minimizing the effect on other nearby organs.

A disadvantage of SRS/SBRT/SABR is that this technique is suitable only for small, well-defined tumors that can be seen on imaging, such as CT or MRI scans. This approach is not suitable for all situations. Also, the amount of radiation that may be safely delivered may be limited if the cancer is located close to a sensitive normal structure, such as the spinal cord or bowel.

OTHER NAMES FOR STEREOTACTIC RADIATION

There is sometimes confusion about the branding of equipment separate from the terminology of SRS or SBRT/SABR. Stereotactic radiation may be delivered by a number of different devices; brand name stereotactic treatment machines you may hear mentioned include Axesse, CyberKnife, Gamma Knife, Edge, Halcyon, Novalis Tx, TomoTherapy, Truebeam, Unity, Versa HD or ViewRay. It is important not to confuse these brand names with the actual type of stereotactic radiation under consideration.

HOW ARE THESE TREATMENT SYSTEMS ALIKE?

- Use multiple narrow radiation beams.
- Target small, well-defined areas with precision.
- Use immobilization devices or techniques that limit or monitor and adjust for any movement during treatment.
- Give high doses of radiation safely and accurately over just a few treatments (usually one to five sessions overall).

HOW ARE THESE TREATMENT SYSTEMS DIFFERENT?

- Different capabilities: Some stereotactic systems can treat tumors only in the head, others only in the head and neck, and others anywhere in the body.
- Different schedules: Some stereotactic treatments may be best given in a single session. Others may be given in a few treatments over several days.
- Different ways to achieve accuracy: Different systems use different ways to keep patients in the correct position. Some use customized holders that keep the patient immobile, and others have the machine track any movement of the patient.

CONDITIONS TREATED WITH STEREOTACTIC RADIATION

Stereotactic radiosurgery (SRS) is used to treat conditions involving the brain or spine including:

- Cancers that recur in the brain (gliomas and other primary brain tumors).
- Cancers that spread to the brain (brain metastases).
- Benign tumors arising from the membranes covering the brain (meningiomas).
- Benign tumors of the pituitary (pituitary adenoma).
- Benign tumors of the inner ear (acoustic neuromas/vestibular schwannomas).
- Benign conditions of the cranial nerves (trigeminal neuralgia).
- Abnormal blood vessels in the brain (arteriovenous malformations).

Stereotactic body radiation therapy (SBRT) is used to treat small tumors in the chest, abdomen or pelvis that cannot be removed surgically or treated with conventional radiation therapy, including:

- Lung cancers (small size).
- Lung metastases (cancers that started elsewhere and spread to the lungs).
- Cancers that start in or spread to the liver (liver metastases).
- Prostate cancer (low and some intermediate risk).
- Pancreatic cancer.
- Cancers of the adrenal glands.
- Kidney cancer.
- Cancers that start elsewhere and spread to the lymph nodes.
- Movement disorders (Parkinson's Disease, Essential Tremors).
- Cancers that start elsewhere and spread to the bone (bone metastases).

These lists cover commonly treated conditions but do not include every possibility. Stereotactic radiation may be useful for other cancers not readily addressed with surgery or conventional radiation therapy. Patients with tumors that are small and few in number are the best candidates for stereotactic techniques. Not all patients can benefit from this type of treatment.

Your radiation oncologist can tell you whether this approach is an option for your specific condition as new research continues to broaden the use of this technology.

WHO IS QUALIFIED TO PROVIDE RADIATION THERAPY?

Radiation oncologists are highly trained, board-certified and licensed physicians who use radiation therapy in its various forms to care for patients with cancer and other conditions and who oversee the care of each person undergoing stereotactic radiation. Radiation oncologists team up with neurosurgeons for stereotactic radiosurgery of the brain or spine.

Other members of the radiation therapy treatment team include medical physicists, dosimetrists, radiation therapists and radiation oncology nurses.

To find a radiation oncologist go to **www.rtanswers.org**.

WHERE SHOULD I BE TREATED?

Modern radiation therapy facilities are widely available across the country. Not all of them offer every type of radiation treatment. You should choose a center that offers the most appropriate treatments for your particular condition. Possibilities include:

- Academic medical centers located at major universities across the country.
- Community hospital cancer centers.
- Freestanding radiation therapy or cancer centers.

The suitability of a given treatment center will depend on the specific treatment you require, the technical capabilities of the center, the experience of the physicians and the center's location. Your health insurance plan may limit your choices to certain preferred centers.

HOW DO I CHOOSE THE BEST TREATMENT FOR ME?

Choosing between treatments is confusing, and sometimes there is no simple answer. For many patients, there are several reasonable options. Factors to consider:

- What are the side effects?
- Is it covered by insurance?
- Is travel required to get to the treatment?
- Have you had the opportunity to ask questions?
- Have your questions been answered to your satisfaction?
- Do you feel comfortable with the radiation oncologist?

THINGS YOU SHOULD KNOW

- Your physician should discuss all of the appropriate, medically approved treatments related to your condition. You should be concerned if your doctor refuses to talk about other treatments.
- Question heavily advertised treatments not backed by scientific evidence.
- You can always seek a second opinion. No doctor should discourage you from getting one.

Where can I get **more information**?

RT Answers
www.rtanswers.org

National Comprehensive Cancer Network
www.nccn.org

National Cancer Institute
www.cancer.gov

ABOUT ASTRO

The American Society for Radiation Oncology is the largest radiation oncology society in the world with more than 10,000 members who specialize in treating patients with radiation therapies. ASTRO is dedicated to improving patient care through education, clinical practice, advancement of science and advocacy. Visit www.astro.org for more information.

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ASTRO
TARGETING CANCER CARE

Stereotactic **Radiation** (SRS, SBRT, SABR)

Stereotactic radiation is a type of external beam radiation therapy that delivers very high doses of radiation to precisely target a tumor. Your radiation oncologist can tell you if this is an option for your specific condition.

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