

Radiation Therapy 101



The National Cancer Institute defines radiation therapy as the use of a certain type of energy, called ionizing radiation, to kill cancer cells and shrink tumors. Radiation therapy injures or destroys cancer cells in the area being treated by damaging their genetic material, which prevents the cells from either growing or replicating. The goal of radiation therapy is to damage as many cancer cells as possible without harming the healthy tissue that surrounds them.

About half of all cancer patients receive some type of radiation therapy, and it can be used for almost any kind of tumor. In some cases, patients may only receive radiation therapy to treat their cancer. In others, it may be used in combination with surgery or chemotherapy. And for some types of cancers, patients may receive radiation therapy as a preventive measure, with radiation targeted to areas that do not have evidence of cancer in order to prevent new cancer cells from growing. Radiation can also be used as a method to treat pain in some cancers.

Radiation has been used to treat cancer since the early 1900s. Therapeutic techniques have advanced continuously over the years, including the development of higher energy X-ray equipment, and treatments that minimize exposure to the surrounding healthy tissue and skin. Eisenhower BIGHORN Radiation Oncology, located in the Eisenhower Lucy Curci Cancer Center, offers patients the most advanced equipment and radiation treatment techniques available today.

TYPES OF RADIATION THERAPY

The principal types of radiation therapy are external beam radiation therapy and internal radiation therapy (also called brachytherapy or implant radiation therapy).

The majority of cancer patients who receive radiation therapy receive *external beam therapy*, usually as an outpatient. Patients are given carefully calculated doses of radiation designed to treat their specific type of cancer. The total prescribed dose of radiation is usually broken up into smaller doses, with treatments spread out over an extended period of time in order to minimize damage to healthy tissue. An example of radiation therapy treatment for breast cancer might involve treatments five days per week, for a total of six and one-half weeks.

Different types of radiation can be used in external beam radiation therapy. However, the principal types of radiation therapy clinically used are photons and electrons.

There have been significant technological advances in external beam radiation therapy over the past decade, expanding the options open to patients at Eisenhower. Three-dimensional (3-D) conformal radiation therapy uses computer technology to allow physicians to precisely target a tumor with radiation beams that actually conform to the shape of the tumor. Because this technique minimizes radiation to surrounding cells, higher doses of radiation can be used to treat the cancer. According to the National Cancer Institute, improved outcomes with 3-D conformal radiation therapy have been reported for nasopharyngeal, prostate, lung, liver, and brain cancers.

Intensity-modulated radiation therapy (IMRT) is the next generation of radiation therapy providing far greater beam shaping capability than traditional 3-D conformal radiation therapy. CT (computed tomography) scans are linked with sophisticated software programs, creating a 3-D simulation, and the radiation beam direction and intensity are selected. The technology delivers higher doses of radiation directly to the tumor, and lower doses to nearby healthy tissue. This technique can potentially lead to fewer side effects. The technology has been used effectively to treat cancers in the brain, head and neck, nasopharynx, breast, liver, lung, prostate, and uterus.

Eisenhower Medical Center has recently purchased Varian's newest linear accelerator, the NovalisTx™ (please see box for details). Beginning this summer, physicians at Eisenhower will be able to deliver IMRT radiation up to eight times faster than was previously possible. The new technology will significantly shorten treatment times for patients, making them more comfortable and reducing the chance of movements that might affect the IMRT's accuracy.

Internal radiation therapy (also called *brachytherapy*) uses radiation that is placed directly into the tissue itself. Because they are placed directly in or very close to the tumor, internal radiation implants make it possible to deliver a high dose of radiation to a smaller, more focused area.

Brachytherapy is utilized to treat prostate cancer with permanent radioactive seed implants. In addition, brachytherapy has been used to treat breast cancer delivering high-dose radiation therapy to a focused area in the breast via a specialized catheter (MammoSite™ Radiation Therapy System).

POSSIBLE SIDE EFFECTS

Radiation treatments themselves are painless. However, given the nature of radiation, there can be varying degrees of side effects from the treatment. Yet, since radiation treatments are localized, the side effects are usually confined to the area being treated. Depending on the treatment, they may begin a few days or weeks after the patient begins radiation, and may continue several weeks after the treatment is completed. Radiation oncologists work to keep side effects to a minimum, and to help patients prepare for and deal with those side effects that are unavoidable.

Side effects vary from patient to patient, and depend on the type and dose of radiation and the type of cancer being treated. Some patients experience no side effects, while others may have many. A patient's overall health is also a determining factor, so physicians encourage radiation therapy patients to maintain a healthy diet and get plenty of rest before, during and after their course of therapy.

Most side effects of radiation therapy are temporary, and can be mitigated with appropriate care. The most common are fatigue and skin changes in the area being treated (the skin becomes sensitive and may appear to be sunburned). Patients should check with the treatment specialist before using soaps, lotions or perfumes that may irritate the skin, and they should keep the treated area out of the sun. In addition to fatigue, internal radiation therapy patients may experience soreness and sensitivity in the implant area.

For more information about radiation therapy at Eisenhower Medical Center, please visit www.emc.org or call 760-674-3600.