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Commentary

Strategies of Radiation Therapy for Leukemia

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DESCRIPTION

Radiation Therapy is used for Cancer Treatment and the Radiation therapy either kills or slows the growth of cancer cells by damaging their DNA. Radiation therapy (also referred as radiotherapy) is a type of cancer treatment wherein high doses of radiation are used to kill cancer cells and shrink tumors. Along with chemotherapy and surgery, radiation therapy is one of the most efficient cancer treatments. The most common types of radiation therapy are External Beam Radiation Therapy (EBRT) and internal radiation therapy. The radiation oncologist can recommend radiotherapy that is tailored to the patient's condition and kind of cancer. Radiation therapy, also known as radiotherapy, is a common cancer treatment that uses radiation (usually high-powered X-rays) to kill cancer cells. Radiation therapy can be used independently or in conjunction with other therapies such as surgery or chemotherapy.

Radiation oncologists are doctors that specialize in radiation therapy. The radiation oncologist will suggest and benefit form radiation therapy. If that's the case, they will determine the best type of radiation therapy based on the type of cancer. They also create the radiation therapy plan, including the radiation dosage that will kill cancer cells while leaving healthy tissue alone. Radiation therapy, also referred as radiotherapy, is a type of cancer treatment that uses ionizing radiation to control or kill malignant cells. It is typically delivered *via* a linear accelerator. Various types of the radiation therapy are the two main types of radiation therapy External Beam Radiation Therapy (EBRT) and internal radiation both types work by destroying the DNA of cancer cells. Cancer cells die and tumors shrink when their DNA instructions to grow and multiply are not present.

External beam radiation therapy

Radiation therapy using an external beam (EBRT) The most common type of radiotherapy is External Beam Radiation Therapy (EBRT). A machine directs high-energy radiation beams toward the tumor in EBRT. X-rays, electrons, or protons are the most common types of energy. Precision is important in EBRT.

The radiation oncologist will design a treatment plan that use radiation to target the tumor while avoiding healthy tissue. There are various types of EBRT are as follows:

- CT images and computer software are used in 3D conformal radiation therapy to produce a 3D model of the tumor. The machine directs radiation beams that target the cancer site while sparing healthy tissue, using the model as a guide.
- A more advanced form of radiation therapy is Intensity-Modulated Radiation Therapy (IMRT). IMRT employs a large number of radiation beams with varying dosage levels. IMT delivers a higher dose to radiation to the tumor while delivering lower doses to healthy tissue.
- IMRT involves arc-based radiotherapy. It directs varying intensity energy beams in a rotational arc-like pattern. This method of radiation delivery is faster than traditional IMRT. Tomotherapy and Volumetric Modulated Arc Therapy (VMAT) are 2 types of arc-based radiotherapy.
- Image-Guided Radiotherapy (IGRT) is a form of EBRT in which the radiation machine performs a low-dose X-ray or mini CT scan before to each treatment. This image helps in treatment site alignment, resulting in more precise radiation delivery.
- Particle therapy is a form of radiation therapy that uses protons instead of photons (X-rays). Protons can deliver the same radiation dose to the tumor and reducing radiation dose to healthy tissues in some people.
- Stereotactic radiosurgery, also known as Gamma Knife radiosurgery, uses high doses of focused radiation to physically destroy small brain lesions. It doesn't require a cutting, unlike surgery. This treatment typically takes one to five days.
- SBRT is a type of radiation which uses high doses of focused radiation to destroy tumors outside of the brain. It, like stereotactic radiosurgery, eliminates tumors with surgical precision but without actual surgery.
- Intraoperative Radiotherapy (IORT) is used to deliver radiation during surgery. After a tumor has been surgically removed, IORT destroys any remaining cancer cells that aren't safe to remove surgically.

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Internal radiation treatment

Internal radiation therapy provides radiation to cancer cells inside the body. It is employed to treat tiny tumors in the head, neck, breast, cervix, uterus, or prostate. Internal radiation can be supplied by a solid or liquid source.

Brachytherapy involves the placement of a solid radioactive source, or "seed," inside or near a tumor. The source emits radiation into a small area, killing cancer cells. Some implants release low doses for long periods of time (weeks). Others may give high doses for shorter periods of time (minutes). Some brachytherapy implants are only temporary. Others stay in the body forever. They eventually stop releasing radiation. Systemic therapy involves the injection of liquid radioactive material through the blood in order to identify and destroy cancer cells. Some forms are swallowed. Others will be given by Vein Injection (IV). Radionuclide therapy is one treatment option (radioimmunotherapy). A radioactive protein recognizes specific cancer cells, attaches to them, and then releases radiation to kill them in radioimmunotherapy.

Before receiving internal radiation therapy, some may need a physical exam and imaging. The radiation oncologist will explain how you can prepare for the procedure based on how the radiation will be supplied. External beam radiation therapy starts with a planning session called as a simulation. Simulation is a treatment planning step that allows modifying treatment. Getting in position is half of the simulation. Patient seated on a table, exactly as they will be during treatment. The radiation therapy team may employ a mold or mask to keep the body in place. They'll double-check patient alignment. They may receive temporary or permanent markings (tiny dots) showing which body parts should be exposed to radiation.

Getting scans a CT scan or an MRI will be done to identify the tumor. This information will assist team doctor in tailoring X-rays to target a tumor while sparing healthy tissue. The radiation oncologist can use simulation to calculate radiation dosage and how the patients receive it.