Hypofractionated Radiation: Understanding the Modality and Impact on Patient Outcomes

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The evolving field of radiation oncology has revolutionized treatment options for several malignancies. Advances in technology allow radiation oncologists to maximize the dose of radiation while minimizing damage to surrounding healthy tissue. Hypofractionated radiation, which reduces the frequency and number of treatments, is being studied in multiple tumor types. This modality often shortens a course of therapy by days or even weeks. Staying informed on emerging treatment modalities allows oncology nurses to educate patients on treatment plans and potential toxicities. This article explains the differences in radiation therapy modalities and focuses on hypofractionation and its benefits to patients.

AT A GLANCE

- Advancements in radiation technology have led to decreased toxicities and improved patient outcomes.
- Hypofractionated therapy maximizes the dose of radiation and minimizes toxicity to organs at risk.
- Oncology nurses must focus on the area being treated with radiation therapy when educating patients on possible side effects.

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Radiation therapy has been used as a method to treat cancer since the early 1900s (Gianfaldoni et al., 2017). As of 2020, radiation continues to be a common treatment modality received by 50%–70% of patients with cancer at some point during the course of treatment (Peng et al., 2020). Numerous advances in radiation technology have occurred since its initial discovery, yet the goal of radiation remains the same. While chemotherapy is a systemic treatment, radiation therapy is designed to locally treat a malignancy. Unlike chemotherapy, radiation uses high-energy photon beams (x-ray or gamma rays), or charged particles (electrons or protons), to target specific locations of the body (Gianfaldoni et al., 2017). The damage to the DNA of the cells in the targeted region leads to eventual cell death, while allowing healthy cells outside of the targeted field to remain unaffected. Although toxicities occur, patients often experience fewer side effects during radiation therapy compared to chemotherapy because of its targeted approach. Advances in technology have led to better opportunities for targeting smaller areas of the body, reducing the potential for side effects (Garibaldi et al., 2017). In addition, radiation can be divided into larger doses to be given once a day, or less often, and is sometimes used as a shorter course of treatment. This is known as hypofractionated radiation. This article will explain the differences in radiation therapy modalities, focusing on hypofractionation and its benefits to patients.

Types of Radiation

There are two kinds of radiation: non-ionizing and ionizing (U.S. Environmental Protection Agency, 2021). Non-ionizing radiation is a low-frequency radiation, such as radio waves, and can be used for communication devices like mobile phones. In contrast, ionizing radiation is high frequency, is commonly used in health care, and affects the atoms of living things. Ionizing radiation includes alpha, beta, and gamma rays, as well as x-rays. Radiation therapy uses high-energy gamma rays, which can pass through the human body, to damage and destroy cancer cells (U.S. Nuclear Regulatory Commission, 2020). Of the three types of radiation therapy (i.e., standard therapy, hyperfractionated therapy, and hypofractionated therapy), standard therapy remains the most common treatment option and has been since radiation therapy was introduced as a treatment modality for cancer (Zeman, 2018). Hyperfractionated therapy