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Radiotherapy and Its Uses in the Treatment of Cancer

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Commentary

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DESCRIPTION

Radiation therapy, often known as radiotherapy, is a treatment that uses ionising radiation to control or destroy cancerous cells. It is typically administered as part of cancer treatment and is typically delivered through a linear accelerator. If a cancer is restricted to a single part of the body, radiation therapy may be curative. After surgery to remove a primary malignant tumour, it may also be used as adjuvant therapy to prevent tumour recurrence. In tumours that are susceptible to chemotherapy, radiation treatment has been utilised before, during, and after the chemotherapy. Radiation oncology refers to the branch of oncology that deals with radiotherapy. As a result of its capacity to regulate cell proliferation, radiation treatment is frequently administered to malignant tumours.

Ionizing radiation kills cells by destroying the DNA of malignant tissue. Shaped radiation beams are directed from many angles of exposure to intersect at the tumour, producing a considerably higher absorbed dose there than in the surrounding healthy tissue, in order to protect normal. If the draining lymph nodes are clinically or radiologically associated with the tumour, or if there is a possibility of latent malignant dissemination, the radiation fields may additionally include those nodes in addition to the tumour itself.

In contrast to radiology, which uses radiation for imaging and diagnosis in medicine, radiation oncology is the branch of medicine that deals with prescribing radiation. It can also be applied as a therapeutic or palliative measure. Combining radiation therapy with surgery, chemotherapy, hormone therapy,

immunotherapy, or some combination of the four is also rather frequent. Radiation therapy can be used in some capacity to treat the majority of prevalent cancer forms.

A cancer's radio sensitivity describes how it reacts to radiation. Modest radiation dosages quickly kill cancer cells that are highly radiosensitive. Leukemias, the majority of lymphomas, and germ cell cancers are among these. Most epithelial tumours are only moderately radiosensitive, need a much greater radiation dose to obtain a dramatic cure. Some cancers are especially radioresistant, meaning that considerably greater doses than are definitely safe in clinical practise are needed to provide a drastic cure. Radiation therapy is still a palliative option for many patients with metastatic melanoma despite the fact that radiation therapy is typically thought to be radio resistant for renal cell carcinoma and melanoma. Research into combining radiation therapy with immunotherapy is ongoing, and it has some potential for melanoma and other types of cancers.

A CT scan is used in modern radiation therapy to locate the tumour and nearby healthy areas as well as to calculate doses for the development of an intricate radiation treatment plan. Small skin marks are applied to the patient to direct the positioning of the treatment fields. At this point, patient placement is essential since the patient must be positioned consistently throughout each treatment. For this reason, a variety of patient positioning tools have been created, including cushions and masks that can be moulded to the patient. The technique known as Image Guided Radiation Therapy (IGRT) makes use of imaging to correct for positioning mistakes made during each treatment session.

A tumor's response to radiation therapy is also influenced by its size. Very large tumours react to radiation less effectively than smaller tumours or microscopic illness because of complex radiobiology. To counteract this effect, several measures are employed. The most popular method is surgical resection followed with radiation treatment. The treatment of breast cancer with a mastectomy or broad local excision followed by adjuvant radiation therapy is where this is most frequently observed. Another approach is to use neoadjuvant chemotherapy to reduce the tumour before using radical radiation therapy. A third method involves providing specific medications to the malignancy throughout a course of radiation therapy in order to increase its radiosensitivity. Cisplatin, nimorazole, and cetuximab are a few examples of radiosensitizing medications.