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Advancement in Cancer Treatment and Radiation Oncology

Abhinaya.N*

Department of Pharmacology, JNTU Hyderabad, Andhra Pradesh, India

Commentary

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*For Correspondence

Abhinaya.N, Department of Pharmacology, Tel: 7396006373; E-mail: nabhinaya07@gmail.com

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INTRODUCTION

Radiation oncology is therapy used to treat cancer with radiation. It uses carefully targeted and high energy radiation to kill cancer cells. It treats most effectively that causes cancer cells to die immediately. Radiation causes damages to chromosomes and DNA. Hence the cells cannot divide and tumor cannot grow. Radiation can be given either alone or in combination with surgery or chemotherapy. It is also used treat some benign and malignant tumors [1-5].

It was treated by Radiation Oncologist. In some countries single Oncologists handle radiotherapy and Chemotherapy there are named as "clinical oncologists" [6-9].

It is introduced by great German Scientist Wilhelam Roentgen in 1895. He received Nobel Prize for this invention. Later Radio therapy was upgraded by various eminent scientists.

TREATMENT

Radiation oncologists oversee radiation therapy. Main aim of radiation oncology is to destroy the cancer cells without harming the healthy tissue [10-13].

X-rays, gamma rays and charged particles are types of radiation used in treatment.

TYPES OF RADIATION THERAPY

There are various types of treatments some are as follows.

1) External-beam radiation therapy:

Source of radiation can passed through external source through a machine associated with a computer with special software programmed to adjust the size and shape of the rays. It gets directly aim to tumor and destroys it [14-17].

It includes 3 Dimensional conformal radiation therapies [3D-CRT].

Intensity modulated radiation therapy [IMRT].

Proton beam Therapy [PBT] and

Stereotactic radiation Therapy.[SRT]

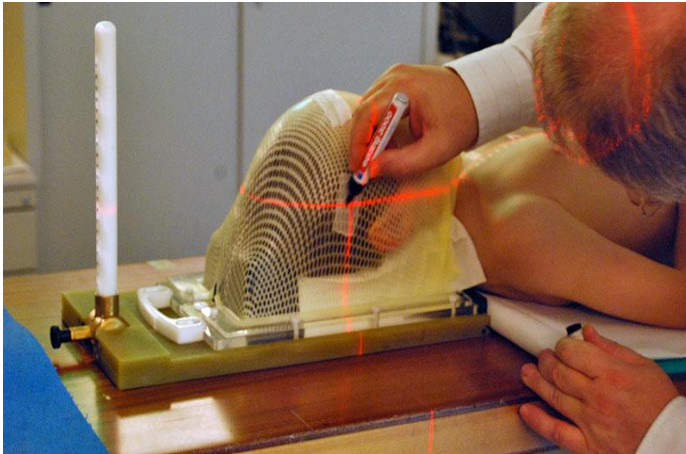


Figure 1: External beam radiation therapy. (Image courtesy: http://www.strahlentherapie-schwabing.de/files/element/text_pic/598540981.jpg)

2) Internal Radiation:

It is also known as brachytherapy. In this tiny particles of radioactive materials are placed near the tumor or with in the tumor. It may destroy the cancer cells within the body [18-21].

- 3) Other treatment options:**
- a. Intraoperative radiation Therapy (IORT)
 - b. systemic Radiation Therapy
 - c. Radio immuno therapy
 - d. Radio Sensitizers and Radio protectors.

a. Intraoperative radiation Therapy: It is mostly used for breast cancer. It can be performed with the x-rays and beam rays. The major drawback in IORT is the rays will shield during exposure. Advanced IORT is planning to reduce the shielding effect and high precise delivery of rays in the tumor. This may reduce the multiplication of tumors [14, 15].

b. Systemic Radiation Therapy: Systemic Radiation Therapy can be applied by using radioactive drugs. These are called radio pharmaceuticals. These drugs are put in vein or mouth; they may passes into systemic circulation and bound to the specific antibodies and cancer cells. Directly target to the cancer cell and kills the cell. Mostly it may use in bone cancers, thyroid and prostate cancer [21- 23].

c. Radioimmuno therapy: Radionuclide labeled with antibody is used to deliver cytotoxic radiation to a target cell. Antibody associated with antigen is used to deliver a lethal dose of radiation to the tumor cells. It is mostly used to treat prostate cancer, ovarian cancer, and colorectal cancer [24].

d. Radio Sensitizers and Radio protectors: Any specific drug which makes the tumor cell more sensitive then it termed as a radio sensitizers. Specifically targeted therapies and chemotherapies can act as radio sensitizers [25].

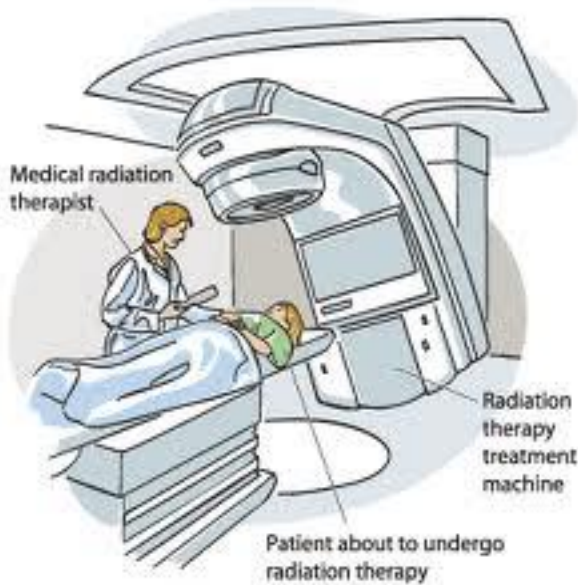


Figure 2: Radiation oncology treatment. (Image courtesy: <http://www.trip2medi.com/images/treatment/radition%20therapy.jpeg>)

ADVERSE EFFECTS

1. Common side effects: various skin problems such as dryness, itching, peeling.
2. Fatigue
3. Shortness of breath
4. Nausea, vomiting or diarrhea
5. Sexual problems
6. Hair loss and weight loss
7. Developing second cancer
8. Dental health problems like Dry mouth, Mouth sores, Difficulty swallowing, chewing, infection.
9. Weakening of bones.
10. Various psychological problems may see [26-28].

CONCLUSION

Mostly protons, electrons and x rays are commonly used radiations in the treatment of radiation oncology. I concluded that using carbon rays is an ideal choice in the treatment of cancer. Trails I, II and III are succeeded and achieved the effort. Carbon ions transfer high energy of radiation; this may cause death of the cell. Treatment days will be reduced and 100% achievement in curing the cancer. It may reduce side effects. Various targeted sites includes skull base tumors, malignant nerve sheath tumor, sarcomas, head and neck, lung, liver, prostate and recurrent compared to other radiations. There may chances to applicable of carbon ions radiation in radiation oncology treatment.

Radiation treatment is also used to kill the other tumors. In secondary hyperparathyroidism especially in HD patients clinically been treated with radio therapy and achieved the progress. Localized the parathyroid gland with the planar and SPECT imaging and intraoperative gamma probe detection at surgery. Most of the primary hyperthyroidism patients are benefited with the treatment.

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