

Side Effect From Radiation Therapy

== Advantages ==

Ionizing radiation Ionizing radiation, also spelled ionising radiation, consists of subatomic particles or electromagnetic waves that have enough energy per individual photon

Adjuvant therapy The term "adjuvant therapy," derived from the Latin Adjuvant therapy, also known as adjunct therapy, adjuvant care, or augmentation therapy, is a therapy that is given in addition to the primary or initial therapy to maximize its effectiveness. improves the effect of a vaccine. If known disease is left behind following surgery, then further treatment is not technically adjuvant. The surgeries and complex treatment regimens used in cancer therapy have led the term to be used mainly to describe adjuvant cancer treatments. Medications used to help primary medications are known as add-ons. An example of such adjuvant therapy is the additional treatment usually given after surgery where all detectable disease has been removed, but where there remains a statistical risk of relapse due to the presence of undetected disease

Brachytherapy contrasts with unsealed source radiotherapy, in which a therapeutic radionuclide (radioisotope) is injected into the body to chemically localize to the tissue requiring destruction. It also contrasts to External Beam Radiation Therapy (EBRT), in which high-energy x-rays (or occasionally gamma-rays from a radioisotope like cobalt-60) are directed at the tumour from outside...

Image-guided radiation therapy Immediately prior to, or during, a treatment fraction, the patient is localized in the treatment room in the same position as planned from the reference imaging dataset. An example of IGRT would include comparison of a cone beam computed tomography (CBCT) dataset, acquired on the treatment machine, with the computed tomography (CT) dataset from planning. Image-guided radiation therapy (IGRT) is the process of frequent imaging, during a course of radiation treatment, used to direct the treatment, position Image-guided radiation therapy (IGRT) is the process of frequent imaging, during a course of radiation treatment, used to direct the treatment, position the patient, and compare to the pre-therapy imaging from the treatment plan. IGRT would also include matching planar kilovoltage (kV) radiographs or megavoltage

(MV) images with digital reconstructed radiographs (DRRs) from the planning CT 733e0dce5c

Radiation therapy It may also be used as part of adjuvant therapy, to prevent tumor recurrence after surgery to remove a primary malignant tumor (for example, early stages of breast cancer). A physician who practices in this subspecialty is a radiation oncologist and practicing radiographer are therapeutic radiographer. It is normally delivered by a linear particle accelerator. Radiation therapy or radiotherapy (RT, RTx, or XRT) is a treatment using ionizing radiation, generally provided as part of cancer therapy to either kill Radiation therapy or radiotherapy (RT, RTx, or XRT) is a treatment using ionizing radiation, generally provided as part of cancer therapy to either kill or control the growth of malignant cells. Radiation therapy is synergistic with chemotherapy, and has been used before, during, and after chemotherapy in susceptible cancers. The subspecialty of oncology concerned with radiotherapy is called radiation oncology. Radiation therapy may be curative in a number of types of cancer if they are localized to one area of the body, and have not spread to other parts 733e0dce5c

History of radiation therapy Influenced by electrotherapy and escharotics—the medical application of caustic substances—doctors began using radiation to treat growths and lesions produced by diseases such as lupus, basal cell carcinoma, and epithelioma. Radiation was generally believed to have bactericidal properties, so when radium was discovered, in addition to treatments similar to those used with x-rays, it was also used as an additive to medical treatments for diseases such as tuberculosis where there were resistant bacilli. The history of radiation therapy or radiotherapy can be traced back to experiments made soon after the discovery of X-rays (1895), when it was shown that The history of radiation therapy or radiotherapy can be traced back to experiments made soon after the discovery of X-rays (1895), when it was shown that exposure to radiation produced cutaneous burns 733e0dce5c

== History == 733e0dce5c

Fast neutron therapy Radiation therapy kills cancer cells in two ways depending on the effective energy of Fast neutron therapy utilizes high energy neutrons typically between 50 and 70 MeV to treat cancer. In the United States, one treatment center is operational, in Seattle, Washington. Neutron therapy is currently available in Germany, Russia, South Africa and the United States. Most fast neutron therapy beams are produced by reactors, cyclotrons (d+Be) and linear accelerators. The Seattle center uses a cyclotron which produces a proton beam impinging upon a beryllium target. cyclotron which produces a proton beam impinging upon a beryllium

target 733e0dce5c

Due to their low kinetic energy, emitted Auger electrons travel over a very short range: much less than the size of a single cell, on the order of less than a few-hundred nanometers. This very short-range delivery of energy permits highly targeted therapies, since the radiation-emitting nuclide will be close to the delivery site (e.g., a DNA strand) to cause cytotoxicity. However, this is a technical challenge; Auger therapeutics must... 733e0dce5c This process is distinct from the use of imaging to delineate targets and organs in the planning process of radiation therapy. However, there is a connection between the imaging processes as IGRT relies directly on the imaging modalities from planning as the reference coordinates for localizing the patient. The variety of medical imaging technologies used in planning includes x-ray computed tomography (CT), magnetic resonance imaging (MRI), and positron... 733e0dce5c Additionally, because radiation was found to exist in hot spring waters which were reputed for their curative powers, it was marketed as a wonder cure for all sorts of ailments in patent medicine and quack cures. It was believed by medical science that small doses of radiation would cause no harm and the harmful effects of large doses were temporary. 733e0dce5c

Proton therapy photon radiation therapy, proton therapy is often used in conjunction with surgery and/or chemotherapy to most effectively treat cancer. Its chief advantage over other types of external beam radiotherapy is that the dose of protons is deposited over a narrow range of depth; hence in minimal entry, exit, or scattered radiation dose to healthy nearby tissues. Proton therapy is In medicine, proton therapy, or proton radiotherapy, is a type of particle therapy that uses a beam of protons to irradiate diseased tissue, most often to treat cancer 733e0dce5c

== Description == 733e0dce5c Radiation therapy is commonly applied to the cancerous tumor because of its ability to control cell growth. Ionizing radiation works by damaging the DNA of cancerous tissue leading to cellular death. To spare normal tissues (such as skin or organs which radiation must pass through... 733e0dce5c When evaluating whether to treat a tumor with photon or proton therapy, physicians may choose proton therapy if it is important to deliver a higher radiation dose to targeted tissues while significantly decreasing radiation to nearby organs at risk. The American Society for Radiation Oncology Model Policy for Proton Beam therapy says proton therapy is considered reasonable if sparing the surrounding normal tissue "cannot be adequately achieved with photon-based radiotherapy" and can benefit the patient. Like photon radiation therapy, proton therapy is often used in conjunction with surgery

and/or chemotherapy to most effectively treat cancer. The widespread use of radium in medicine ended when it was discovered that physical tolerance was lower than expected and exposure caused long...

External beam radiotherapy Each radiotherapy beam consists of one type of particle intended for use in treatment, though most beams contain some contamination by other particle types. External beam radiation therapy (EBRT) is a form of radiotherapy that utilizes a high-energy collimated beam of ionizing radiation, from a source outside the body, to target and kill cancer cells. The radiotherapy beam is composed of particles, which are focussed in a particular direction of travel using collimators

Radiation therapy kills cancer cells in two ways depending on the effective energy of the radiative source. The amount of energy deposited as the particles traverse a section of tissue is referred to as the linear energy transfer (LET). X-rays produce low LET radiation, and protons and neutrons produce high LET radiation. Low LET radiation damages cells predominantly through the generation of reactive oxygen species (free radicals). The neutron is uncharged and damages cells by direct effect on nuclear structures. Malignant tumors tend to have low oxygen levels and thus can be resistant to low LET radiation. This gives an advantage to neutrons in certain situations. One advantage is a generally... An adjuvant used on its own specifically refers to an agent that improves the effect of a vaccine. Medications used to help primary medications are known as add-ons.

Brachytherapy Brachytherapy is commonly used as an effective treatment for cervical, prostate, breast, esophageal and skin cancer and can also be used to treat tumours in many other body sites. The word "brachytherapy" comes from the Greek word βραχύς, brachys, meaning "short-distance" or "short". Brachytherapy is a form of radiation therapy where a sealed radiation source is placed inside or next to the area requiring treatment. Treatment results have demonstrated that the cancer-cure rates of brachytherapy are either comparable to surgery and external beam radiotherapy (EBRT) or are improved when used in combination with these techniques. The word "brachytherapy" comes from the Greek word βραχύς, brachys, meaning "short-distance" or "short". of radiation therapy where a sealed radiation source is placed inside or next to the area requiring treatment. Brachytherapy can be used alone such as in early prostate cancer or in combination with other therapies such as surgery, EBRT and chemotherapy such as in advanced cervical

cancer 733e0dce5c

The term "adjuvant therapy," derived from the Latin term *adjuvāre*, meaning "to help," was first coined by Paul Carbone and his team at the National Cancer Institute in 1963. In 1968, the National Surgical Adjuvant Breast and Bowel Project (NSABP) published its B-01 trial results for the first randomized trial that evaluated the effect of an adjuvant... 733e0dce5c

Auger therapy In contrast to traditional α - and β -particle emitters, Auger electron emitters exhibit low cellular toxicity during transit in blood or bone marrow. Similar to other forms of radiation therapy, Auger therapy relies on radiation-induced damage to cancer cells (particularly DNA damage) to arrest cell division, stop tumor growth and metastasis and kill cancerous cells. It differs from other types of radiation therapy in that electrons emitted via the Auger effect (Auger electrons) are released with low kinetic energy. Auger therapy is a form of radiation therapy for the treatment of cancer which relies on low-energy electrons (emitted by the Auger effect) to damage cancer Auger therapy is a form of radiation therapy for the treatment of cancer which relies on low-energy electrons (emitted by the Auger effect) to damage cancer cells, rather than the high-energy radiation used in traditional radiation therapy 733e0dce5c

Radiotherapy beams are classified by the particle they are intended to deliver, such as photons (as x-rays or gamma rays), electrons, and heavy ions; x-rays and electron beams are by far the most widely used sources for external beam radiotherapy. Orthovoltage ("superficial") X-rays are used for treating skin cancer and superficial structures. Megavoltage X-rays are used to treat deep-seated tumors (e.g. bladder, bowel, prostate, lung, or brain), whereas megavoltage electron beams are typically used to treat superficial lesions extending to a depth of approximately 5 cm. A small number of centers operate experimental and pilot programs employing beams of heavier particles, particularly protons, owing to the rapid decrease... 733e0dce5c

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