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**Q1: Describe a correlation between therapeutic radiology and oncology?**

**Ans:** The therapeutic radiology is also called radiation oncology, it is a treatment of cancer and other disease with radiation, oncology is a branch of medicine that focuses on diagnosing and treats cancer. Radiation in many form is use to kill the cancer and prevent them from metastasis

Therapeutic radiology may be used to cure or control cancer. Or it may be used to ease some of the symptoms linked to cancer.

Healthcare providers who treat diseases with therapeutic radiology are called radiation oncologists.

Therapeutic radiology was developed just a few years after X-rays were discovered in 1895 and radium in 1898. The first cure of cancer by radiation was reported in 1899. It involved a case of skin cancer. Radiation oncology became a medical specialty in 1922.

Therapeutic radiology treatment may be used alone, or along with other types of treatment. These include surgery, chemotherapy, and other treatments.

Your radiation oncologist will decide on the amount and type of radiation to use based on the type of cancer, location of the tumor, and sensitivity of the surrounding tissue.

Although each treatment facility may have specific practices in place, radiation oncology procedures often include the following steps

A doctor may recommend radiation therapy to kill cancerous cells.

Radiation therapy can help shrink tumors and kill cancerous cells in the early stages.

This kind of treatment, in combination with other appropriate therapies, can cause cancer to go into remission. In many cases, it does not come back again.

Radiation therapy can also help treat symptoms when cancer has spread widely. At this point, the radiation is part of palliative care, which aims to relieve a person’s symptoms and improve their quality of life. It may also extend a person’s life, in some cases.

Palliative radiation treatment usually involves lower doses and fewer treatment sessions than curative treatment.

In some people with bone cancer, for example, palliative radiation treatment can help stop painful tumors from developing.

Other ways that palliative radiation treatment can help [include](http://www.cancerresearchuk.org/about-cancer/cancers-in-general/treatment/radiotherapy/symptoms/):

* relieving pressure or a blockage by reducing tumor size
* treating symptoms of brain cancer, such as headaches, nausea, and dizziness
* reducing symptoms of lung cancer, such as chest pain and breathlessness
* controlling ulcerating tumors, bleeding, and infections

In people with head and neck cancers, an obstruction in the superior vena cava can affect the return of blood to the heart. Radiation therapy can help relieve this.

Cancer is metastatic when it has spread to other parts of the body. Here, learn about metastatic breast cancer.

* **Types**

There are two forms of radiation therapy.

* **External beam radiation therapy**

This is the most common type. It involves an external machine emitting a beam of radiation that targets the treatment area.

Different forms are available, depending on the need. High-energy beams, for example, can target cancer that is deeper within the body.

* **Internal radiation therapy**

There are different types of internal radiation therapy. Both involve implanting or introducing a radioactive substance into the body.

Brachytherapy involves inserting a radioactive implant in or close to the cancerous tissue. The implant may be temporary or permanent. Another type of internal radiation therapy involves drinking or receiving an injection of radioactive liquid.

The goal is to limit the extent to which healthy tissue around the cancer is exposed to the radiation. Doctors may recommend this treatment for prostate or ovarian cancer, for example.

A doctor may recommend undergoing both main types of radiation therapy. The decision will depend on:

* the type of cancer
* the size of the tumor
* the tumor’s location, including the types of tissue nearby
* the person’s age and overall health
* other treatments

**Q2: Elaborate the duties of therapeutic radio technologist in department?**

**Ans:** Radiation Therapy Technologists perform a wide variety of technical therapeutic procedures by the application of ionizing radiation from radioactive materials or generators to treat benign or malignant diseases of the body; and perform other related duties as assigned.

Radiation Therapy Technologists typically confer with Radiation Oncologists and work closely with Dosimetrists to discuss the treatment plan and the type of simulator films that will be necessary; place reference markings on the patients' body; review treatment procedures with the patient to reinforce the therapist's comments on reactions to therapy, to ensure that communication and emergency procedures are understood, and to advise on appropriate dietary and skin care procedures; position patients for single portal, multiple portal, rotation or cross beam therapy, providing immobilization devices as required; set up equipment according to the treatment plan verifying the placement of bars, wedges and similar devices; closely monitor the

Patient for unexpected reactions and report these deviations to the Therapist; and record delivered dosage values on the chart, verifying these values against the prescribed treatment plan.

Incumbents may also calculate prescribed dosages of ionizing radiation to be delivered to the patient; assist in preparing applicators for interstitial and intracavitary implants; operate simulation, radiographic and automated or manual film processing equipment; evaluate

The technical quality of localization and verification port films; perform minor equipment adjustments; order equipment and supplies; and evaluate equipment for modification and replacement.

* **Chief Radiation Therapy Technologist**

Under general direction, incumbents direct and coordinate all technical therapeutic and related work in the Radiation Oncology

Department/Section of a campus medical center.

Incumbents select, train, make assignments to, and review the work of subordinate therapy technicians and related ancillary medical personnel; answer difficult questions on procedures and techniques; and may coordinate all business/clerical functions of the organization.

Incumbents may also assist investigators on research projects and special programs; perform work of an innovative nature to develop new techniques or complex therapeutic procedures; direct or coordinate student technologist training programs; and may teach formal courses in anatomy, physiology, ethics and treatment techniques.

* **Associate Chief Radiation Therapy Technologist**

Under general direction, incumbents serve as the Principal assistant to the Chief Radiation Therapy Technologist in a campus medical center facility.

 Incumbents may in addition perform the range of duties outlined for Chief Radiation Therapy Technologist during their absence or as delegated by the Chief during the performance of normal work assignments.

* **Senior Radiation Therapy Technologist**

Under general supervision, incumbents are assigned continuing

Responsibility for leading a therapeutic team composed of at least one Radiation Therapy Technologist. Incumbents advise and direct therapeutic team members and are assigned technical responsibility for the work performed.

Incumbents may also advise and direct other Technologists in new or difficult procedures; investigate unsatisfactory procedures or problems and make recommendations for solutions; provide clinical instruction for student technologists; and ensure that equipment repairs are satisfactorily executed.

Incumbents may be assigned unit-wide supervisory duties in the absence of the Chief Technologist.

* **Radiation Therapy Technologist**

Under supervision, Radiation Therapy Technologists perform the range of typical duties outlined in the series concept. Incumbents function as a member of a team with the Senior Radiation Therapy Technologist in patient treatment on super voltage equipment and act independently in the operation of orthovoltage equipment and in taking radiographic films for simulation purposes.

**Q3: What medical problems (diseases) could be treated under the field of therapeutic radiology? Explain with examples**

**Ans:** Radiation therapy is used to treat many conditions, including:

* **Acoustic neuroma**

A non-cancerous tumor that may develop from an overproduction of Schwann cells that press on the hearing and balance nerves in the inner ear.

* **Arteriovenous malformations**

An abnormal set of connections between arteries and veins usually occurring in the brain and spine causing neurologic symptoms or bleeding

* **Bone cancer**

An abnormal growth of cells within a bone that may be cancerous or benign

* **Brain tumor**

An abnormal growth of tissue (tumor) in the brain that may be cancerous or non-cancerous

* **Breast cancer**

A disease in which malignant (cancer) cells form in the tissues of the breast

* **Cancer**

The uncontrolled growth of abnormal cells in the body

* **Chondrosarcoma**

A malignant type of bone cancer that primarily affects the cartilage cells of the femur (thighbone), arm, pelvis, knee, and spine. Although less frequent, other areas (such as the ribs) may be affected

* **Chordoma**

A rare type of slow-growing cancerous tumor that can occur anywhere along the spine, from the base of the skull to the tailbone

* **Colon cancer (colorectal cancer)**

A disease that is indicated by malignant cells in the colon or rectum

* **Esophageal cancer**

A disease in which cancerous cells form in the tissues of the esophagus

* **Ewing's sarcoma**

A type of cancer that occurs primarily in the bone or soft tissue, most often found in the extremities and can involve muscle and the soft tissues around the tumor site as well as spread to other areas of the body.

* **Head and neck cancers**

Benign and malignant tumors that originate in the head and neck region, including sarcomas and nerve or lymph node conditions

* **Leukemia**

Cancer of the blood that develops in the bone marrow, which produces the three major blood cells: white blood cells, red blood cells, and platelets.

* **Liver cancer**

A type of cancer that starts in the cells of the liver, viral hepatitis and liver damage from alcohol or fatty liver are risk factors for liver cancer.

* **Lung cancer**

Cancer that usually starts in the lining of lungs, but can also begin in other areas of the respiratory system

* **Lymphoma**

Cancer that starts in cells called lymphocytes, which are part of the body's immune system.

* **Metastatic brain cancer**

An abnormal growth of tissue (tumor) in the brain that travels from another part of the body to the brain (metastasize).

* **Meningioma**

A type of tumor that grows from the protective membranes, called meninges, which surround the brain and spinal cord, and is often benign and slow-growing.

* **Non-Hodgkin's lymphoma**

A type of cancer of the lymphatic system which can begin in almost any part of the body, causing cells to abnormally reproduce and tumors to eventually grow.

* **Osteosarcoma**

A type of bone cancer, most often occurring in children, adolescents, and young adults, that develops in the osteoblast cells that form the outer covering of bone.

* **Pancreatic cancer**

Cancers that begin in the pancreas

* **Para nasal sinus cancer**

A type of malignant cancer in the tissues of the Para nasal sinuses or nasal cavity

* **Prostate cancer**

A type of cancer that occurs when cells grow abnormally in the prostate gland and form tumors

* **Soft tissue sarcomas**

A rare cancer in one of the soft tissues there are many different kinds of soft tissue sarcoma. In general, soft tissue sarcomas are rare.

* **Spinal cord tumors, spine tumors**

A tumor that forms on the spinal cord or in the area around it Even if benign, the tumor may cause pain, weakness, numbness, or tingling from pushing on the spinal cord or nerves.

* **Trigeminal neuralgia**

A nerve disorder that causes a stabbing or electric-shock-like pain in parts of the face

**Q4 what are the complications and side effects that a person could face during his /her treatment in therapeutic radiology department?**

**Ans:** Radiation can affect healthy cells as well as cancerous ones. When this happens, a person experiences side effects.

Specific side effects depend on factors such as:

* the area receiving treatment
* the person’s overall health
* the type and doses of radiation

### Short term side effects

Short term side effects radiation therapy includes fatigue, skin changes, and nausea.

Short term side effects vary, depending on the part of the body receiving radiation.

They can include:

* **fatigue**

Fatigue describes feeling tired or exhausted almost all the time. Your level of fatigue often depends on your treatment plan. For example, radiation therapy combined with chemotherapy may result in more fatigue. Learn more about

* **hair loss**
* **diarrhea**
* **skin changes**

Some people who receive radiation therapy experience dryness, itching, blistering, or peeling. These side effects depend on which part of the body received radiation therapy. Skin problems usually go away a few weeks after treatment ends. If skin damage becomes a serious problem, your doctor may change your treatment plan

* **nausea and vomiting**

### Long term side effects

Radiation therapy is a local treatment. This means that it only affects the area of the body where the tumor is located. For example, people do not usually lose their hair from having radiation therapy. But radiation therapy to the scalp may cause hair loss.

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Most side effects go away after treatment. But some continue, come back, or develop later. These are called late effects. One example is the development of a second cancer. This is a new type of cancer that develops because of the original cancer treatment. The risk of this late effect is low. And the risk is often smaller than the benefit of treating the primary, existing cancer.

### Site-specific side effects of radiation therapy

Some side effects depend on the type and location of radiation therapy.

* **Head and neck**

 Radiation therapy aimed at a person’s head or neck may cause these side effects:

* Dry mouth
* Mouth and gum sores
* Difficulty swallowing
* Stiffness in the jaw
* Nausea
* Hair loss
* A type of swelling called lymphedema
* Tooth decay
* **Chest**

Radiation therapy aimed at the chest may cause these side effects:

* Difficulty swallowing
* Shortness of breath
* Breast or nipple soreness
* Shoulder stiffness
* Cough, fever, and fullness of the chest, known as radiation pneumonitis. This happens between 2 weeks and 6 months after radiation therapy.
* Radiation fibrosis, which causes permanent lung scars from untreated radiation pneumonitis. The radiation oncologist knows how to lower the risk of fibrosis.
* **Stomach and abdomen**

Radiation therapy aimed at the stomach or abdomen may cause these side effects:

* Nausea and vomiting
* Diarrhea

These symptoms will likely disappear after treatment. And your doctor can prescribe drugs to manage these side effects. Making changes to your diet may also reduce your discomfort.

* **Pelvis**

Radiation therapy aimed at the pelvis may cause these side effects:

* Diarrhea
* Rectal bleeding
* Incontinence, which is when a person is not able to control his or her bladder
* Bladder irritation

Additionally, men and woman may have different symptoms.

* **Potential side effects for men include:**
* Sexual problems, such as erectile dysfunction, which is the inability to get or maintain an erection
* Lowered sperm counts and reduced sperm activity. This can occur from radiation therapy to the testes or prostate. And it may affect a man's ability to father a child.
* **For women**
* Changes in menstruation, such as having menstruation stop
* Symptoms of menopause, such as vaginal itching, burning, and dryness
* Infertility, which is the inability to conceive a child or maintain a pregnancy. This may occur if both ovaries receive radiation therapy

Long term side effects also depend on the treatment site.

They include:

* heart or lung problems, if radiation affects the chest
* thyroid problems, leading to hormonal changes, if radiation affects the neck area
* lymphedema, which involves lymph fluid building up and causing pain
* hormonal changes, including a possibility of early menopause, from radiation in the pelvic area

There is a slight chance that high doses of radiation in certain areas can increase the risk of another form of cancer developing. A doctor will provide more specific information and help with weighing the risks and benefits.

Not everyone who has radiation therapy experiences long term side effects. The risk depends on the doses, the area of treatment, and other individual factors.

 **the end**