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## Chapter 2      Radiation Therapy

THIS chapter is developed to help you and your family understand radiation therapy. It covers topics such as:

How is radiation therapy given?

External and internal therapy

How to manage side effects

### **WHAT IS RADIATION THERAPY?**

Radiation is a special kind of energy carried by waves or a stream of particles. It can come from special machines or from radioactive substances. High levels of the same kind of energy can be used to treat cancer. Radiation deposits energy that destroys the fastest-growing cells (usually those are the cancer cells) in that area by damaging their genetic material. Even though radiation destroys both cancer cells and normal cells, normal cells can repair themselves and grow back. The use of high-energy rays or particles to treat disease is called radiation therapy.

### **HOW IS RADIATION THERAPY GIVEN?**

Radiation therapy can be either external or internal. Most people who receive radiation therapy for cancer have the external type, but some patients have both.

#### **EXTERNAL therapy is given**

- By a machine that directs the high-energy rays or particles at the cancer site.
- During outpatient visits to a hospital or treatment center.

#### **INTERNAL therapy is given**

- By inserting a radioactive substance sealed in a small container, called an implant, directly into a tumor.
- By placing an implant in the area where a tumor has been removed to kill any tumor cells that may remain.
- Or, by taking an unsealed radioactive source by mouth.
- By injecting an unsealed source into the body.

If you take unsealed radiation by mouth or injection, you probably will need to stay in the hospital for several days.

## **EXTERNAL RADIATION THERAPY:**

### **WHAT TO EXPECT**

External Radiation is the most widely used therapy because it allows large areas of the body to be treated at the same time. The doctor's choice of radiation source and strength depends on the type of cancer and how deep into the body the radiation must penetrate to reach it.

Simulation - To Pinpoint the Treatment Area

A therapist will use a special x-ray machine to define your "treatment port," and mark it with semi-permanent colored ink. You may have more than one treatment area.

Simulation takes a half hour to two hours.

You can help by:

- Lying very still on the table during simulation
- Being careful not to wash off the ink marks
- Letting medical staff know if your marks are fading

### **What Happens During Treatment?**

- You sit in a special chair or lie down on a treatment table.
  - You must remain very still so the radiation goes where it is needed and goes to the same area each time.
- You cannot see the radiation, and most likely will feel nothing.

### **How Long Does It Take?**

Treatment usually is given

- 5 days a week for 6 or 7 weeks.
- Each session lasts 15-30 minutes, but the actual time it takes to give the dose of radiation is only 1-5 minutes.
- If you feel ill or uncomfortable, tell the therapist. The machine can be stopped at any time.

## Points to Remember

- Don't worry; your body does not become radioactive.
- There is no need to avoid other people.
- Expect side effects in the area being treated (for example, redness and scaliness of the skin in the area through which the radiation was delivered). Most can be controlled with medicine or diet.
- Most side effects go away after treatment ends.
- Tell your doctor if you have coughing, sweating, fever, or unusual pain.

And, don't forget

- The doctor should see you at least once a week.
- The treatment plan may be revised.
- It's important to complete all scheduled treatments to get the most benefit from your therapy.

## INTERNAL RADIATION THERAPY:

### WHAT TO EXPECT

Internal radiation therapy places the high-energy radiation as close to the cancer cells as possible, so that fewer normal cells are exposed to radiation. This means the doctor can give a higher total dose in a smaller area and in a shorter time. Radioactive materials can be placed internally using small implants or by direct injection into the bloodstream or body cavity.

Radioactive substances used include:

Radium, cesium, iridium, iodine, phosphorus

### How is the Implant Placed in the Body?

- The procedure is done in the hospital and with anesthesia. Under the guidance of imaging procedures, such as X-rays, ultrasound, or CT, a physician will place the implant in the target area.

### How Long is the Implant Kept in the Body?

- They can be temporary (1-7 days) or permanent. The permanent implants are small and cause little discomfort. Therefore, they are simply left in place after their radioactive material is used up.

## Does the Implant Spread Radiation to Other People?

- It may transmit some rays outside the body, so you may need a private room. Visitors may be limited, and they should sit at least 6 feet from your bed, and stay no longer than 30 minutes each day. Most hospitals do not let children under 18 or pregnant women visit a patient receiving implant treatment.

## What Happens After the Implant is Removed?

- There is no more radioactivity in your body.
- You may need extra rest, but can do as much as you feel like doing.
- The treated area may be sore or sensitive for a while.

## Are There Side Effects?

If general anesthesia is used, the anesthetic may make you feel drowsy, weak, or nauseated. From the implant itself:

- Pain and illness are rare.
- The applicator holding the implant in place may be uncomfortable.

High dose rate (HDR) brachytherapy is a type of internal radiation therapy often used in treating prostate cancer. It uses needles containing radioactive material that travel to the tumor. They can be left in place for less than a day.

## MANAGING SIDE EFFECTS

### Fatigue

The body uses a lot of energy when healing itself. Stress, daily trips for treatment, and the effects of radiation on normal cells all may contribute to fatigue. Most people begin to feel unusually tired after a few weeks of radiation therapy. This will gradually go away after the treatment is finished.

You can help by:

- Not trying to do too much
- Limiting activities when you feel tired
- Resting or sleeping in your free time
- Trying to get more sleep at night, and rest during the day
- Learn relaxation techniques such as deep breathing, meditation, visual imagery, etc

## **Skin Problems**

Skin in the treatment area may look reddened, irritated, sunburned, or tanned. After a few weeks of therapy, skin may be very dry. With some kinds of therapy, treated skin may develop a "moist reaction," especially in areas where there are skin folds. When this happens, the skin may become very sore. You should tell your doctor or nurse right away. Most skin reactions go away a few weeks after treatment is finished, but in some cases, treated skin remains darker than it was before.

You should:

- Be very gentle with the skin in the treatment area
- Wash only with lukewarm water and mild soap
- Don't wear tight clothing
- Don't rub, scrub, or scratch
- Don't put heating pads or ice packs on treated skin
- Don't use powders, creams, perfumes, deodorants, body oils, ointments, lotions, or home remedies in the treatment area for several weeks afterward. Many skin products leave a coating on the skin that can interfere with radiation therapy or healing
- Avoid exposing the area to the sun during treatment and for at least 1 year afterwards. Wear protective clothing. Ask the doctor about sun blocking lotions

## **Hair Loss**

Radiation therapy causes hair loss only in the area being treated. So, if it's the hip that's being treated, you will not lose hair from your head. Most patients find the hair grows back again after treatment. But loss of hair, from head, face, or body, can be hard to adjust to.

You may want to:

- Wear a hat, turban, scarf, or a wig with a soft lining
- Select a wig early so you can match color and style

## **Side Effects of Radiation on the Blood**

Sometimes radiation therapy can cause low white blood cells counts or low levels of platelets. These blood cells help your body fight infection and repair wounds. If your blood tests show low levels of these cells, your treatment might be delayed for a week or so to allow your blood counts to come back up.

Bleeding gums or prolonged bleeding from a cut, for example, should be reported to the doctor right away.

## Side Effects of Radiation to the Head & Neck

Some people experience:

- Redness and irritation in the mouth
- Dry mouth
- Changes in taste or loss of sense of taste
- Cavities
- Earaches (earwax hardens)
- Difficulty swallowing
- Swelling or drooping of skin under the chin
- Mouth Care
  - Avoid spices and coarse foods such as raw vegetables, dry crackers, and nuts
  - Don't smoke, chew tobacco, or drink alcohol
  - Stay away from sugary snacks that promote tooth decay
  - Do not use commercial mouthwash, as alcohol dries the mouth
  - Have a complete dental checkup before starting therapy
  - Clean teeth and gums thoroughly with a soft brush, after meals, and at least once more daily
  - Use a fluoride toothpaste, without abrasives
  - Floss gently between teeth daily
  - Follow doctor's or nurse's direction to rinse mouth frequently with warm water or saline solutions
- You may need to stop wearing your dentures until treatment is over

### Tips on eating

Soreness or dryness in the mouth or throat can make it hard to eat.

- Choose foods that taste good and are easy to eat
- Prescription pain medications may help
- If it hurts to chew or swallow, try to have more liquid and semi-solid meals

### Side Effects of radiation to the Breast & Chest

- Difficulty or pain in swallowing
- Radiation after lumpectomy may cause changes in the skin texture, increased/decreased sensitivity, or changes in breast size
- Cough
- Breast soreness or swelling from fluid build-up

You should:

- Wear a soft cotton bra, without wires
- Go bra-less when possible
- Ask about exercises to keep your arm from getting stiff

### **Other concerns**

If your therapy includes implants of radioactive material after external radiation is completed, you may have breast tenderness or a feeling of tightness while the implants are in your breast. After they are removed, you may notice some of the side effects of the external treatment. After 10 or 12 months, no further changes are likely to be caused by the radiation therapy.

If you see new changes in your breast, tell your doctor at once.

### **Side Effects of Radiation to the Stomach & Abdomen**

You may have to deal with an upset stomach, nausea, or diarrhea. Localized damage to the lining of the esophagus, stomach, and intestines, and accumulation of toxic waste products of cell destruction are the probable causes. Your doctor can prescribe medicines for relief. Do not take any home remedies without checking with the doctor or nurse.

#### **Nausea**

- To manage nausea, pay attention to when it occurs, and
- If you feel queasy a few hours right after therapy, do not eat for several hours before your treatment time. You may handle the treatment better on an empty stomach.
- If your stomach feels upset just before treatment, try a bland snack such as toast or crackers and apple juice just before the appointment.
- Try to unwind before your treatment. In the waiting room, read, write letters, or work on a crossword puzzle to relax.
- Stick to any special diet given to you.
- Eat small meals.
- Eat often and try to eat and drink slowly.
- Avoid foods that are fried or high in fat.
- Drink cool liquids between meals.
- Choose foods with a mild aroma, and those served cool or at room temperature.
- For severe upsets, try a clear liquid diet or bland foods that are easy to digest, such as dry toast and gelatin.

## Diarrhea

Diarrhea most often begins in the third or fourth week of external therapy. Your doctor can prescribe medicine or give you special instructions to help. Tell the doctor or nurse if the medicine is not controlling the diarrhea.

- Making these changes in your diet may help
- Try a clear liquid diet (water, weak tea, clear broth, plain gelatin) as soon as diarrhea starts or when you feel that it's going to start.
- Ask your doctor or nurse which liquids won't make the diarrhea worse. (weak tea, clear broth, drinks that are low in sugar)
- Avoid foods high in fiber or that can cause cramps or a gassy feeling (raw fruits and vegetables, coffee, beans, cabbage, whole grain products, sweets and spicy foods).
- Eat frequent small meals.
- Avoid milk and milk products if they irritate your bowels.
- When diarrhea starts to improve, try eating small amounts of low-fiber foods such as rice, bananas, applesauce, mashed potatoes, low-fat cottage cheese, and dry toast.
- Be sure to eat foods high in potassium (bananas, potatoes, apricots) and other minerals you may lose through diarrhea.

Try to pack the highest possible food value into even small meals so that you will have enough calories and vital nutrients.

## Side Effects of Radiation to the Pelvis

Radiation therapy to any part of the pelvis (the area between the hips) may cause one or more of the digestive problems already described. The bladder also may be irritated, causing discomfort or frequent urination. Your doctor can prescribe medicines to help.

## Side Effects of Radiation to Sexual and Reproductive Organs

Other side effects occur only in the sexual and reproductive organs, depending upon which organs are treated. Some of the more common side effects do not last long after treatment. Others are long-term or permanent. Before your treatment begins, ask your doctor about these side effects.

## Fertility

- Discuss birth control measures with your doctor. It is not a good idea to become pregnant during therapy.

## **Radiation may hurt the fetus**

- If you are pregnant before beginning therapy, special steps should be taken to protect the fetus.
- Women may stop menstruating or have other menopause symptoms.
- Vaginal itching, burning, or dryness may occur.

Radiation therapy to an area that includes the testes can reduce both the number of sperm and their ability to fertilize. This does not mean that you will be infertile. If you want to father a child and are concerned about future fertility, look into the option of banking your sperm before treatment.

## **Sexual Relations**

Some women are advised not have intercourse during treatment to the pelvic area. Others may find intercourse painful. You most likely will be able to resume having sex a few weeks after treatment ends.

Some shrinking of vaginal tissues occurs during therapy. After the therapy is finished, your doctor may suggest using a dilator, a device that gently stretches the tissue of the vagina.

Most types of radiation therapy do not cause a change in the ability to enjoy sex; however, both men and women may notice a decrease in their levels of desire. This is more likely caused by the stress of having cancer than by the radiation therapy and should go away when the treatment ends. It should not be a major concern.

## **Does Radiation Therapy Affect the Emotions?**

Nearly all patients who receive treatment for cancer feel some degree of emotional distress. It's not unusual to feel

- Depressed
- Angry
- Frustrated
- Afraid
- Lonely
- Helpless

Radiation therapy may affect the emotions indirectly through fatigue or changes in hormone balance, but the treatment itself is not the direct cause of mental distress.

Many patients help themselves by talking about their feelings with a close friend, family member, chaplain, nurse, social worker, or psychologist.

- You may want to ask your doctor or nurse about meditation, relaxation exercises, or cancer support groups to help you unwind and feel better.

Adapted by the American Cancer Society, Chinese Community Health Education Council and the Chinese Community Health Resource Center from "Radiation Therapy and You" published by the National Institutes of Health, 1990. Revised 2004.