

Radiation Therapy

Introduction

Radiation therapy is the use of high-energy rays to treat cancer. A beam of radiation is directed to the tumor site from a treatment machine. The beam passes through the body and destroys cancer cells in its path. This booklet:

- Explains how treatment is planned and given.
- Describes the possible side effects of treatment.
- Tells you how to care for yourself during and after treatment.

Simulation

Before you begin treatment, you will go through simulation and treatment planning. These are done to ensure that:

- The treatment site is mapped out,
- You get the correct dose of radiation, and
- The dose to nearby tissue is minimized.

During simulation, you will have x-rays and your skin will be marked. These marks define the area to be treated. Simulation may take two to four hours.

Preparation for Simulation

Depending on the area being treated, special preparation may be needed for the simulation. Your nurse will review this with you. If you do not need any preparation, eat and drink as you normally would on the day of the procedure. Wear comfortable clothes. Make sure not to wear earrings or necklaces. You will be lying in one position for a long time. If you think this will be hard for you, take Tylenol® or your usual pain medication one hour before your appointment. If you think you may get anxious during the procedure, speak with your doctor about medicine that may be helpful.

Simulation Day

When you arrive for your appointment, the radiation therapist will greet you and take a photograph of your face. This picture will be used to identify you throughout your treatment. It is a standard safety measure. The therapist will explain the simulation to you. If you have not already signed a consent form, your doctor will review everything with you. You will then sign the consent.

For the simulation procedure, you will get undressed and change into a gown. Keep your shoes on. The therapists will then help you lie on a table. Although the simulation table will have a sheet on it, the table is hard and has no cushion. If you have not taken pain medicine and think you may need it, tell the therapists before the simulation begins. The temperature in the room is usually cool. Throughout simulation, you will feel the table move to different positions. The lights in the room will be turned on and off and you will see red laser lights on each wall. **Do not look directly into the red beam as this may hurt your eyes.** The therapists use these laser lights as a guide when they position you on the table. If you feel uncomfortable at any time during the procedure, let the therapists know.

The therapists will walk in and out of the room during the procedure. There will always be someone who can see and hear you. During the simulation, you will hear the therapists speak to each other as they work. They will explain what they are doing. Try not to speak once they begin, as it may change your position. However, tell them if you are uncomfortable or need assistance. To help pass the time, music can be played. If you would like, ask the radiation therapist to play a tape or CD for you. You may bring one of your own from home.

Positioning

Depending on the area of the body we are treating, you may be lying on your stomach or back. Your arms may be raised above your head or at your sides. A mold of your body may be made to help you stay in position. Making the mold takes about 15 minutes. If you need a mold, you will lie in it during the simulation and every day of your treatment.

X-ray Images

While you are lying in position, x-rays will be taken of the area to be treated. These may be done with a specialized machine called a simulator or on a CT scan machine. These x-rays are **not** used for diagnosis or to detect tumors. They are used to map your treatment plan.

You will hear the machine as it is turned on and off. Even if the noise seems loud, the therapists will be able to hear you if you need to speak with them. The x-ray images take about 45 minutes.

Skin Markings (Tattoos)

The therapists will draw on your skin in the area being treated with a felt marker. Then they will make some permanent skin markings, called tattoos, with a small needle and a drop of ink. This feels like a pinprick. The tattoo marks are no bigger than the head of a pin. After the tattoos are made, the therapists will take several photographs of you in the simulation position. The photographs and tattoo marks will be used to position you correctly on the table each day for treatment. The felt marking can be washed off after simulation. **The tattoos are permanent and will not wash off.**

Scheduling

Please know that we will do our best to give you a daily appointment time that you would like but it is not always possible.

At the end of simulation, we will give you an appointment for your initial set-up. This is the final appointment before your treatment begins.

Treatment Planning

During the time between your simulation and initial set-up, your radiation oncologist will work with a team to plan your treatment. They will use your simulation x-rays and/or CT or PET scan to plan the angles and shapes of the radiation beams for you. They will also compute the dose that your body will receive. The details are carefully planned and checked. This takes between five days and two weeks.

Initial Set-up or Beam Films

Treatment generally begins within one week of simulation. Before your first treatment, you will be scheduled for a set-up. This takes about one hour. If pain medicine was helpful during simulation, you may want to take it before this visit.

When you come for the set-up, you will be shown the dressing room and asked to change into a gown. The therapists will bring you to the room where you will receive your treatment each day. They will position you on the table. You will lie exactly as you were the day of your simulation. X-rays of each of the radiation beams (beam films) will be taken to make sure that your position is correct and that the area being treated is exactly what your radiation oncologist wants. The beam films will be repeated throughout your treatment. They are used to make sure you are in the right position and are being treated in the right place. They are **not** used to see how your tumor responds to the treatment. You will be scheduled to begin treatment within several days after your set-up.

Treatment Administration

Radiation treatments are given daily, Monday through Friday, four or five days a week. For some patients, the treatment is given in just one day. For other patients the treatment is given over a number of weeks. Your treatment will be given for about _____ weeks. You must come in every day you are scheduled for treatment. Treatment may not be as effective if you skip or miss treatment days. However, you may have one or two scheduled days off to allow the machines to be maintained. If you need to change your schedule for any reason, please speak with your radiation therapist.

After you check in at the reception desk, have a seat in the waiting room. When they are almost ready for you, the therapists will tell you to change. When they bring you into the treatment room, the therapists will help you lie on the table. Once you are properly positioned, the therapists will leave the room, close the door, and begin the treatment. You will not see or feel the radiation, although you may hear the machine as it moves around you and is turned on and off. You will be in the treatment room for about 20 minutes. Most of this time will be spent positioning you correctly. The actual treatment only takes a few minutes.

Although you are alone during the treatment, the therapists can see you on a monitor and hear you through an intercom at all times. Breathe normally during the treatment, but do not move. If you are very uncomfortable and need help, speak to the therapists. They can turn off the machine and come in to see you at any time, if necessary.

Weekly Visits During Treatment (“Status Checks”)

Your radiation oncologist oversees your entire treatment. He or she will see you each week with your nurse to evaluate your response to treatment. This visit will be before or after your treatment each _____. Expect to be here about one extra hour that day. This visit is a good time to ask questions and discuss any concerns you have. If you need to speak with your doctor or nurse any time between these weekly visits, ask the support staff or therapists to contact them when you come in for treatment.

Pain Management and Safety

If you are having radiation therapy to relieve pain, it is hard to know when your pain will go away. Some people notice less pain the first week of treatment. Others may not have pain relief until a few weeks after the treatments are all done. Throughout your treatment you should:

- Take your pain medicine as prescribed. If you are having problems controlling your pain, speak to your doctor or nurse.
- Use pillows or blankets to pad and support the area being treated.
- Avoid things that involve using bone(s) that are being treated.
 - Do not lift, push, pull, or carry heavy objects.
 - Do not do heavy household chores.
 - Do not sit or stand for long periods if this puts pressure on the area receiving radiation.

- Ask your nurse to give you the card, “Preventing Falls: What You Can Do.”
- If your nurse has given you a yellow Falls Precaution bracelet, please be sure that you are wearing it for each visit to the department.

Side Effects

Some people develop side effects from treatment. The type and how severe they are depend on many factors. These include the area being treated, the dose of radiation, the number of treatments, and your general state of health. Side effects may be worse if you are also having chemotherapy.

Many patients ask about vitamins. You may take a daily multivitamin if you wish. Do not take more than the recommended daily allowance of any vitamin. Do not take any supplements unless your doctor approves them. This includes both nutritional and herbal.

You are being treated to the _____.

Below are listed a number of side effects people may have from radiation therapy. The nurse will check those that you may have.

Skin Reaction

During the course of radiation therapy, the skin and hair in the area being treated may change. This is normal and expected. After two or three weeks, your skin may become pink or tanned. As treatment continues, it may become bright red or very dark. It may also feel dry and itchy, and it may look flaky. Sometimes the skin in sensitive areas may blister, open, and peel. If this occurs, tell your doctor or nurse. Your nurse will teach you how to care for your skin.

The skin reaction sometimes becomes more severe during the week after treatment is completed. You may notice a rash, especially in any area where you have had previous sun exposure. Although this may be a side effect of treatment, a rash could be a sign of infection. If you develop a rash at any time during your treatment, tell your doctor or nurse so that you can be evaluated. The skin gradually heals after treatment is completed, but generally takes three or four weeks.

You may also lose some or all of the hair in the area being treated. The hair will usually grow back two to four months after treatment is completed.

Below are guidelines to care for your skin while you are receiving radiation. Continue these until the skin reaction resolves. These refer to the skin **only in the area being treated**.

Keep Your Skin Clean

- Bathe or shower daily using warm water and a mild unscented soap. Examples of soaps you may use include Dove®, Basis®, and Cetaphil®. Rinse the skin well, and pat dry with a soft towel.
- When washing, be gentle with your skin in the area being treated. Do not use a washcloth or a scrubbing cloth or brush.
- The tattoo marks are permanent and will not wash off. You may get other markings during treatment, for example a purple felt-tipped marker outline of your treatment area. Use mineral oil to remove these lines when the therapists tell you they can be washed off. Do not use alcohol or alcohol pads on the skin in the area being treated.

Moisturize Your Skin

- Your nurse may suggest that you start using a moisturizer the first day of treatment. If you are not likely to develop a skin reaction, you don't need to use a moisturizer unless your skin becomes dry or itchy. Your nurse will instruct you.

- There are a few moisturizers you can use. There is no evidence that one is better than another. Over-the-counter moisturizers you may use are Aquaphor®, Eucerin®, or a pure aloe vera gel. There are many other products that are also good to use, and your nurse may recommend one of these to you. Your nurse will give you some suggestions if you would like. Use only one at a time unless your nurse tells you to use more. Using aloe vera from the plant is more likely to cause an allergic reaction than using a pure aloe vera gel. We recommend that you do not use it.
- If you are using a moisturizer, apply it two times a day. Your nurse will tell you if you need to do it more or less often.
 - **If you are treated in the morning, apply it:**
 - After your treatment.
 - Before you go to bed.
 - **If you are treated in the afternoon, apply it:**
 - In the morning, at least 4 hours before your treatment.
 - Before you go to bed.
 - **On weekends, apply it:**
 - In the morning.
 - Before you go to bed.
- Do not wash off the moisturizer before your treatment. It could irritate your skin.

Avoid Irritating the Skin in the Area Being Treated

- Wear loose-fitting cotton clothing in the area being treated. Avoid tight clothing that may rub against the skin.
- Use **only** the moisturizers, creams, or lotions your doctor or nurse recommend.
- Do not use any deodorants in the area being treated other than Toms of Maine®, cornstarch, or crystals from a health food store. Stop these if the skin becomes irritated.
- Do not use make-up, perfumes, powders, or after-shave in the area being treated.
- If your skin is itchy, don't scratch it. Apply moisturizer. Tell your nurse so he or she can recommend ways to relieve the itching.
- Don't shave the treated skin. If you must shave, use only an electric razor. Stop this if the skin becomes irritated.
- Do not use any tape on treated skin.
- Avoid applying extreme heat or cold to the treated skin. This includes hot tubs, water bottles, heating pads, and ice packs.
- If you have no skin reaction, you may swim in a chlorinated pool. However, be sure to rinse off the chlorine immediately after leaving the pool.
- Avoid tanning or burning your skin during treatment and for the rest of your life. If you are going to be in the sun, use a PABA-free sunblock with an SPF of 30 or higher. Wear clothing that covers you as much as possible.

Fatigue

Most people develop fatigue after two or three weeks of treatment. People commonly describe their fatigue as:

- Tiredness.
- Weariness.
- Lack of energy.
- Weakness.

- Being unable to concentrate.

This gradually goes away after your treatment is done, but it may last several months.

There are a number of reasons people develop fatigue during treatment:

- The effects of radiation on the tissues.
- Making trips for treatment each day.
- Not having enough restful sleep each night.
- Not eating enough protein and calories.
- Having pain or other symptoms.
- Feeling anxious or depressed.

Some people find that their fatigue is worse at certain times of the day and that they have more energy at other times. Below are suggestions to help you manage your fatigue.

- If you are working and are feeling well, we encourage you to keep working during treatment if possible. However, you may find that working shorter hours will help you feel less tired.
- Plan your daily activities. Pick those things that are necessary and most important to you and do them when you have the most energy.
- Plan time to rest or nap for short periods during the day, especially when you feel more tired. You may also find it helpful to go to sleep earlier at night and get up later in the morning.
- Ask family and friends to help you with things such as shopping, cooking, and cleaning.
- Some people find exercise increases their energy level. Ask your doctor if you can do light exercise, such as walking.
- Eat foods high in protein and calories.
- Some people have symptoms such as pain, nausea, diarrhea, difficulty sleeping, or feeling depressed or anxious. These can all increase your fatigue. Ask your doctor or nurse for help with any other symptoms you may have.

Loss of Appetite

Some people find that their appetite decreases during treatment. Your body needs protein and calories. They help repair the normal cells injured from radiation. Try not to lose weight during your treatment. Also, if you have a mold to position you for treatment, it may not fit correctly if your weight changes. Below are suggestions to help you maintain your weight.

- Be selective about what you eat to be sure you increase your calories and protein. Ask for the booklet *Eating Well During and After Cancer Treatment*. It contains many suggestions. Try the different foods that are recommended.
- Try to eat small meals often throughout the day. If you never seem to feel hungry, set up a schedule to ensure you eat regularly, for example every two hours.
- Eat your meals in a calm place and take your time. Eat with family or friends whenever possible.
- Vary the color and texture of foods to make them more appealing.
- Bring snacks and drinks with you when you come for treatment. You can have these while you are waiting or while you are coming to and from the department each day.
- Liquid nutritional supplements can be taken if you are not eating enough food. There are many products available, and they come in many flavors. Ask your doctor or nurse which product is best for you.

- If you wish, you may take a daily multivitamin of ordinary strength. Do not take more than that unless it is okay with your doctor.

☐ Bone Marrow Suppression

Bone marrow is the substance inside bone that produces blood cells. There are three main types of blood cells. White blood cells fight off infection, platelets help your blood to clot, and red blood cells carry oxygen needed for energy. When large areas of bone marrow are in the area being irradiated, it can affect the production of blood cells. Your blood cell counts may go down. We will monitor you throughout treatment with a blood test called a CBC (complete blood count). If your counts drop, we may stop your treatment until they return to higher levels. We will tell you what precautions to take. If you develop a fever of 100.4° F (38° C) or greater, shaking chills, flu-like symptoms, or bleeding, tell your doctor or nurse immediately. You may need to be evaluated to see if you have an infection.

Other Side Effects You May Have

Sexual Issues

- **There is nothing radioactive inside your body. You do not need to avoid close contact with other people.**
- You do not have to change your sexual activity unless your doctor gives you specific advice. If you or your partner could become pregnant, be sure to use a contraceptive.
- You may have concerns about the effects of cancer and your treatment on your sexuality. An excellent resource is the booklet *Sexuality and Cancer*. There are two versions, one for men, and another for women. You can get a copy from the American Cancer Society. Call 1-800-ACS-2345.
- MSKCC has a *Sexual Health Program* to help patients address the sexual impact of their disease and treatment. You can meet with a specialist before, during, or after your treatment.
 - Female Sexual Health Program. Call 646-888-5076 for an appointment.
 - Male Sexual Health Program. Call 646-422-4359 for an appointment.

Emotional Concerns

Having cancer is likely to cause you and the people who care about you to react in many ways. You may feel:

- Anxious.
- Depressed.
- Alone.
- Angry.
- Nervous.
- Worried.
- Numb.
- Down.
- Afraid.
- Ambivalent.

All these feelings are expected if you or someone you love has a serious illness. You may also worry about telling your employer that you have cancer or about paying your medical bills. You may worry about how your family relationships may change, about the effect of cancer or treatment on your body, and if you will continue to be sexually attractive. You may worry that the cancer will come back. When people try to protect each other by hiding

their feelings, they can feel very alone. It might help to talk about your feelings. Talking can help the people around you know what you are thinking. It can bring you closer at a time when support is so needed.

Each of us has our own way of responding to difficult situations. Generally, we use whatever has worked for us in the past. However, sometimes this is not enough. We encourage you to speak with your doctor, nurse, and social worker about your concerns.

After You Complete Treatment

After your treatment is done, it is important to have regular follow-up appointments with your oncologists. You may need blood tests, x-rays, and scans. You will see members of your medical team at various times.

Before coming for your visits, write down any questions and concerns you have. Bring this and a list of all your medicines. If you are running low on any medicine, let your doctor know before you run out. You can also call your doctor or nurse at any time between follow-up visits if you have any questions or develop any problems.

Conclusion

We hope this booklet has been helpful in giving you an idea of what to expect during your treatment. If you have any questions, please speak with your radiation oncologist or nurse. Below are telephone numbers you might need.

Monday to Friday 9AM to 5PM

Radiation Oncologist _____

Telephone _____

Radiation Nurse _____

If you have any problems that must be addressed in the evenings or over the weekend, please call _____ and ask for the radiation oncologist on call.



Memorial Sloan-Kettering
Cancer Center

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