

Radiation Therapy to the Brain

This information will help you prepare for radiation therapy to your brain, including what to expect before, during, and after your treatment. You will also learn about side effects and how to care for yourself during your treatment.

Radiation can be given to part of the brain to treat primary tumors. It can also be given to the whole brain to treat tumors that have spread there from another part of the body (metastasized).

You will be getting external beam radiation. A beam of radiation will be directed to the tumor site from a treatment machine. The beam passes through the head and destroys cancer cells in its path.

Simulation

Before you begin treatment you will have a treatment planning procedure called a simulation. This is done to make sure that:

- Your treatment site is mapped out
- You get the right dose of radiation
- The dose to nearby tissue is as small as possible

During your simulation, you will have x-rays or a computed tomography (CT) scan. Your skin may be marked with small tattoos. These marks help identify the area to be treated. If you're concerned about receiving tattoos as part of your radiation treatment, talk with your doctor.

Your simulation will take about 1 hour.

Preparing for your simulation

No special preparation is needed before your simulation. You may eat and drink as you normally would on the day of your procedure.

If you think you will be uncomfortable while lying still for a long time, bring acetaminophen (Tylenol®) or your usual pain medication to your simulation. Take it 1 hour before your procedure. If you think you may get anxious during your procedure, speak with your doctor about whether medication may be helpful.

Day of your simulation

Dress comfortably. Wear a shirt with no collar. Do not wear earrings or necklaces.

When you arrive for your simulation, your radiation therapist will greet you. He or she will take a photograph of your face. This picture will be used to identify you throughout your treatment.

Your therapist will then explain the procedure to you. If you have not already signed a consent form, your doctor will review it with you, and ask for your signature. Your therapists will not begin the simulation without your permission.

During your simulation

You will not need to undress for your simulation. However, if you wear a wig, turban, or cap, you will need to remove it.

Your therapists will help you lie down on the table. Most likely, you will be lying on your back, but this will depend on what area of your head will be treated. Although the table will have a sheet on it, it is hard and has no cushion. If you haven't taken pain medication and think you may need it, tell your therapists before your simulation begins. Also, the room is usually cool. If you feel uncomfortable at any time, let your therapists know.

Throughout your simulation, you will feel the table move to different positions. The lights in the room will turn on and off and you will see red laser lights on each wall. Your therapists use these laser lights as a guide when they position you on the table. **Do not look directly into the red beam because it may hurt your eyes.**

Although your therapists will walk in and out of the room during your simulation, there will always be someone who can see and hear you. You will hear your therapists speaking to each other as they work. They will explain what they are doing, but please do not speak once they begin because it may change your position. However, if you are uncomfortable or need assistance, tell your therapists. To help pass the time, your therapists can play a CD for you. You may bring one of your own from home, if you wish.

Positioning

You will be lying on your back during your simulation and each treatment. To help you stay in the correct position, you will wear a mask or chin strap. Your therapists will make this for you.

To make the mask, your therapists will place a warm, wet sheet of plastic mesh over your face while you are lying on the simulation table. He or she will then shape it to fit around your head (see Figure 1). You won't have any trouble hearing or seeing while the mask is on.

As the mask cools, it will harden. You will feel some pressure as your therapists fit the mask to your face. If you feel uncomfortable at any time, tell your therapists.

Markings will be made on the mask and tattoos may be made on your scalp. The tattoos, which are made with a sterile needle and a drop of ink, are no bigger than the head of a pin. The sensation of getting one feels like a pinprick. They are permanent and won't wash off in the shower.

After the mask is made, your therapists will take several photographs of you in your simulation position. The photographs and markings will be used as guides to position you correctly for your treatments. This part of the procedure takes about 15 minutes.

During your simulation, and every day of your treatment, the mask will be put on your face. It will be secured to the table on which you are lying. This helps ensure that you are in the correct position during each treatment.

Sometimes, a chin strap is made instead of a mask. It is a piece of cloth that is placed under your chin to hold your head in place (see Figure 2). It will be secured to the table on which you are lying. Like the mask, it ensures that you are in the correct position during your simulation and treatments.

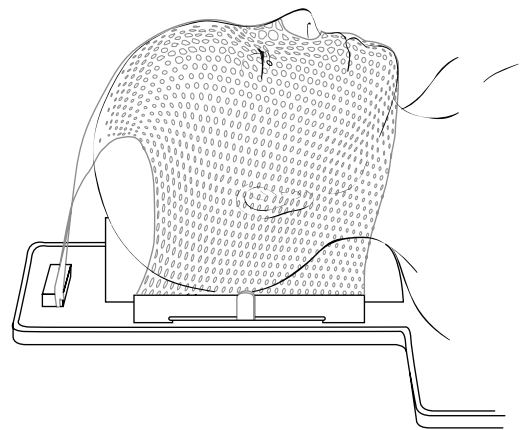


Figure 1: Mask

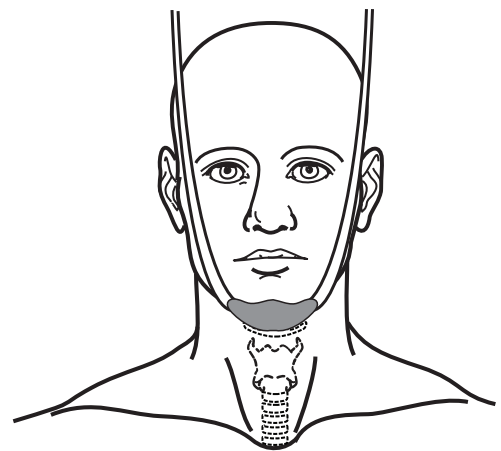


Figure 2: Chin strap

If you have a chin strap, your therapists will draw on your skin with a felt marker. You may receive 2 tattoos, 1 on either side of your head, above your ears. After the tattoos are made, your therapists will take several photographs of you lying on the table. The photographs and tattoos will be used as guides to position you correctly during your treatments.

X-ray images or CT scan

If you have a mask, you will wear it while x-ray images are taken of the area to be treated. These may be taken on the treatment machine or on a CT scanner. Occasionally, a nurse may start an intravenous (IV) line so that contrast, or dye, can be given to you before your scan. The contrast helps us get clear images of the area to be treated.

You will hear the x-ray machines as they turn on and off. Even if the noise seems loud, your therapists will be able to hear you if you need to speak with them. It will take 45 minutes to have the scan or x-rays taken.

These scans are used only to plan your treatment. They are not used for diagnosis or to find tumors.

Before Your Treatment

Set-up procedure

Before your first treatment, you will be scheduled for a set-up procedure. This procedure usually takes about 1 hour. You will begin your treatment the same day as your set-up procedure or the following day.

If medication was helpful to relax or relieve your pain during your simulation, you may want to take it before your set-up procedure.

Your 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 did during your simulation. Special x-rays called beam films will be taken to make sure your position and the area being treated are correct. The beam films will be repeated throughout your treatment. They are not used to see how your tumor responds to treatment.

Vitamins and dietary supplements

Many patients ask about taking vitamins during treatment. You may take a daily multivitamin, if you wish. Do not take any other vitamins or any supplements without talking with your doctor. This includes both nutritional and herbal supplements.

Treatment

Radiation treatments are given daily, Monday through Friday for about _____ weeks. You must come in every day for your treatment. If additional time is needed due to unforeseen circumstances, your radiation oncologist will tell you.

Plan to be in the department for about 1 hour each day. You will be in the treatment room for 10 to 30 minutes, depending on your treatment plan. Most of the time will be spent positioning you correctly. The actual treatment only takes a few minutes.

What to expect

Each day, after you check in at the reception desk, you will have a seat in the waiting room. When you are called in for treatment, your therapists will position you exactly as you were during your set-up procedure. They will then leave the room, close the door, and begin your treatment. You will not see or feel the radiation, although you may hear the machine as it is turned on and off and moves around you.

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

Weekly visits during your treatment

Your radiation oncologist and radiation nurse will see you each week to evaluate your response to treatment. This visit will be before or after your treatments each _____. You should plan on being in the department about 1 extra hour on those days.

During these visits, you should ask questions and discuss any concerns you have. If you need to speak with your radiation oncologist or radiation nurse any time in between these weekly visits, ask the support staff or your therapists to contact them when you come in for treatment.

Side Effects

Some patients develop side effects from radiation therapy. The type and how severe they are depend on many factors. These include the dose of radiation, the number of treatments, and your overall health. Side effects may be worse if you are also getting chemotherapy. Below are the most common side effects of radiation therapy to the brain. You may have all, some, or none of these.

Swelling of the brain

Radiation therapy to the brain may cause swelling. If you had neurological symptoms before you began treatment, they could return, or you could have new symptoms. These symptoms include:

- Headaches
- Nausea and vomiting
- Blurry vision
- Difficulty walking
- Confusion

If you have any new or worsening symptoms, call your doctor or nurse immediately. They will want to evaluate you. Medication(s) can be prescribed if needed. These include:

- Steroids, such as dexamethasone (Decadron®). They reduce swelling of the brain from the tumor itself or from the effects of radiation therapy.
 - Take steroids only as directed by your doctor. Your dose may be changed as needed during your treatment. When your doctor decides it is safe, you will be given a schedule to gradually reduce the dose of the medication. **Do not stop taking dexamethasone unless instructed by your doctor.**
 - Steroids can cause stomach pain, so always take it with food. You may be given another medication to reduce the risk of stomach irritation.
 - Steroids can increase the risk of certain lung infections. You may be given an antibiotic called sulfamethoxazole and trimethoprim (Bactrim®) to reduce this risk.
- Medications, such as levetiracetam (Keppra®), phenytoin (Dilantin®), carbamazepine (Tegretol®), phenobarbital (Luminal®), or valproic acid (Depakene®) may be given to control seizures.
 - If you are taking any of these antiseizure medications, you will need to have blood tests to make sure you are receiving the right dose.
 - Speak with your doctor about whether or not it is safe for you to drive while taking these medications.

Hair loss

Two to 3 weeks after your treatment begins, you will probably lose some of the hair on your scalp. Ask your doctor or nurse what to expect. For most patients, the hair grows back after treatment is completed. This can take anywhere from 2 months to 1 year. The color and texture of your hair may be different after your treatment. Many patients find this to be an upsetting side effect. You can cover your scalp with a scarf, turban, wig, or toupee if it makes you feel comfortable.

If you are planning to buy a hairpiece, select it early on in your treatment so that you can match the color and style to your own hair. Hairpieces used during cancer treatment are tax-deductible and may be covered in part by your health insurance. Check with your insurance carrier.

Skin reactions

During radiation therapy, your skin and scalp in the area being treated will change. This may include your forehead, ears, and back of your neck. Ask your nurse to point out the areas of your skin and scalp that will be affected.

After 2 or 3 weeks, your skin will become pink or tanned. As treatment goes on, it may become bright red or very dark. It may also feel dry and itchy and look flaky. These symptoms will gradually decrease about 3 or 4 weeks after you finish your treatments.

Below are guidelines to help you care for your skin during treatment. Follow these guidelines until your skin gets better. **These guidelines refer only to the skin in the area being treated.**

Keep your skin clean

- Bathe or shower daily using warm water and a mild unscented soap, such as Dove[®], Basis[®], or Cetaphil[®]. Rinse your skin well and pat it dry with a soft towel.
- Wash your hair daily with your usual shampoo, unless it is medicated.
- When washing your hair, be gentle with your skin and scalp. Do not use a washcloth or a scrubbing cloth or brush. Do not dye your hair or use hair spray.
- The tattoo marks you received before treatment are permanent and won't wash off. You may get other markings during your treatment, such as an outline of your treatment area with a purple felt-tipped marker. Use mineral oil to remove these lines when your 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 often

- If you are likely to get skin reactions, your nurse will recommend that you start using a moisturizer. You should start using it the first day of treatment to minimize the reactions. If you are not likely to develop skin reactions, you will not need a moisturizer unless your skin becomes dry or itchy. Your nurse will give you instructions. If you are not sure whether you should use a moisturizer, please ask your nurse.
- There are many moisturizers you can use. Some can be purchased over the counter, and some require a prescription. Over-the-counter moisturizers you can use include Aquaphor[®], Eucerin[®], or a pure aloe vera gel. Please note that using aloe vera directly from the plant is more likely to cause an allergic reaction than using pure aloe vera gel. We recommend that you use the pure aloe vera gel. Moisturizers your doctor may prescribe are Biafine[®] Topical Emulsion or a product with hyaluronic acid. Let your doctor or nurse know if you don't like the feel of the moisturizer they have recommended so you can try another product.
- Apply the moisturizer 2 times a day. Do not wash off the moisturizer before your treatments. Your skin could become irritated.

- If you are treated in the morning, apply the moisturizer:
 - After your treatment
 - Before you go to bed
- If you are treated in the afternoon, apply the moisturizer:
 - In the morning, at least 4 hours before your treatment
 - Before you go to bed
- On the weekends, apply the moisturizer:
 - In the morning
 - Before you go to bed

Avoid irritating your skin in the area being treated

- Do not wear tight caps or turbans that will cause friction against your skin.
- Use only the moisturizers, creams, or lotions your doctor or nurse recommend.
- Do not use makeup, perfumes, or powders in the area being treated.
- Do not put any tape on your treated skin.
- If your skin or scalp is itchy, do not scratch it. Apply a sprinkling of cornstarch to your scalp, or if your hair has fallen out, apply extra moisturizer. Tell your nurse so he or she can tell you how to relieve the itching.
- Do not shave over your treated skin. If you must shave, use only an electric razor. Stop shaving if your skin becomes irritated.
- Do not expose your treated skin to extreme hot or cold temperatures. This includes hot tubs, water bottles, heating pads, and ice packs.
- If you don't have skin problems during your treatment, you can swim in a chlorinated pool. However, be sure to rinse off the chlorine immediately after getting out of the pool.
- Avoid tanning or burning your skin during and after your treatment. If you are going to be in the sun, use a PABA-free sunblock with an SPF of 30 or higher. Wear a hat and clothing that covers the treated area as much as possible.
- If you develop a skin rash at any time during your treatment, tell your doctor or nurse so it can be evaluated.

Fatigue

Most patients develop fatigue (i.e., lack of energy, sleepiness, weakness, and not being able to concentrate) after 2 or 3 weeks of treatment. This will gradually go away after your treatment is done, but can last for several months. There are a lot of reasons patients develop fatigue during treatment, including:

- The effects of radiation on your body
- Traveling to and from treatment
- Not having enough restful sleep at night
- Not eating enough protein and calories

- Having pain or other symptoms
- Feeling anxious or depressed

Some patients find that their fatigue is worse at certain times of the day. Below are suggestions to help you manage your fatigue.

- If you are working and are feeling well, continue to do so. However, working less may help increase your energy.
- 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 take short naps 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 shopping, cooking, and cleaning.
- Some patients have more energy when they exercise. If your doctor approves, try light exercise such as walking.
- Eat foods that are high in protein and calories.
- Some patients 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.

Nausea

Some people experience nausea, with or without vomiting, at some time during treatment. This may occur as early as your first treatment. If you have nausea or vomiting, tell your doctor or nurse. Medication can be prescribed to relieve this. Making changes to your diet can also be helpful. Below are suggestions to help reduce your nausea and ensure you take in enough foods and liquids:

- Eat a light meal before your treatment.
- When feeling nauseous, start by nibbling on dry, starchy foods (toast, crackers, pretzels), and move on to small, frequent meals throughout the day.
- Some people find drinking ginger tea helpful for managing nausea. You can drink ginger tea if you have no sores in your mouth.
- Drink only a small amount of liquid with your meals to prevent feeling full or bloated.
- Sip liquids in between meals throughout the day. Using a straw may help. Try freezing your favorite beverages in ice cube trays and sucking on these during the day.
- Select foods that will not cause nausea. Foods that are usually well tolerated include:
 - Foods at room temperature or cooler
 - Liquids that are cooled or chilled
 - Dry, starchy foods, such as toast, soda crackers, Melba toast, dry cereal, pretzels, and angel food cake
 - Yogurt, sherbet, and clear liquids (e.g., apple juice, Jell-O®, ginger ale)
 - Cold chicken or turkey, baked or broiled, with the skin removed
 - Soft fruits and vegetables

- Avoid foods and liquids that may increase nausea. These include:
 - Hot foods with strong odors
 - Spicy, fatty, greasy, and fried foods
 - Very sweet foods
 - Acidic or citrus foods and juices (e.g., orange, grapefruit, pineapple, tomato)
 - Alcohol

Other possible side effects

Ask your doctor about other side effects you may experience during treatment. The direction of the radiation beam is based on the area being treated. The beam may pass through other parts of the body, which can cause other side effects.

Sexual health

You may be sexually active during your treatment, unless your radiation oncologist gives you other instructions. However, if you are of childbearing age, you must use contraception to prevent pregnancy during your treatment.

You may have concerns about the effects of cancer on your sexuality. An excellent resource is the booklet *Sexuality and Cancer*. There are two versions available, one for men and one for women. You can get a copy from the American Cancer Society. Call 1-800-227-2345 and tell them which version you want.

Memorial Sloan-Kettering Cancer Center (MSKCC) has a Sexual Health Program to help patients address the impact of their disease and treatment on sexual health. You can meet with a specialist before, during, or after your treatment.

- Female Sexual Medicine and Women's Health Program: call (646) 888-5076 for an appointment
- Male Sexual and Reproductive Medicine Program: call (646) 497-9068 for an appointment

Emotional health

The diagnosis and treatment of cancer can be a very stressful and overwhelming event. You may feel depressed, anxious, confused, afraid, or angry. You may have strong feelings about any permanent changes. These changes can have an impact on your emotional and mental well-being. Help is available for you at any time. If you would like counseling, your nurse can give you a referral to see a social worker, psychiatrist, or counselor.

Also, you may find it comforting to speak with a cancer survivor or caregiver who has been through a similar treatment. Through our Patient-to-Patient Support Program, you have the chance to speak with former patients and caregivers. To learn more about this service, please call (212) 639-5007.

After Your Treatment

Please be sure to keep your follow-up appointments with your oncologists. They will evaluate your response to treatment. You may have blood tests, x-rays, and scans during these visits. Before coming, write down your questions and concerns. Bring this and a list of all your medications. If you are running low on any medication you need, let your doctor know before you run out.

The MSKCC Resources for Life After Cancer (RLAC) Program provides support services after your treatment is finished. To learn more about these services, call (646) 888-4740.

Contact Information

If you have any questions or concerns, please speak with your radiation oncologist or radiation nurse. You can reach them Monday through Friday from 9:00 am to 5:00 pm at the numbers listed below.

Radiation oncologist: _____

Telephone: _____

Radiation nurse: _____

Telephone: _____

After 5:00 pm, during the weekend, and on holidays, please call (212) 639-2000 and ask for the radiation oncologist on call.



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