

Interventional Radiology: Yttrium-90 Radiotherapy

Treatment for liver tumors

This handout explains what Yttrium-90 radiotherapy is and what to expect when you have it done.

What is Yttrium-90 radiotherapy?

Yttrium-90 (Y-90) is a radioactive substance. It is used in radiation therapy (radiotherapy) to treat cancer.

Why do I need this treatment?

Your doctors have found a tumor (or tumors) in your liver. These may have started in your liver (*hepatocellular carcinoma*) or spread to it from another part of your body. There are many treatments for liver tumors, but certain ones work best for certain people.

External radiation is used to treat many types of tumors. But, the doses of external radiation needed to kill liver tumors would cause serious harm the healthy parts of your liver.

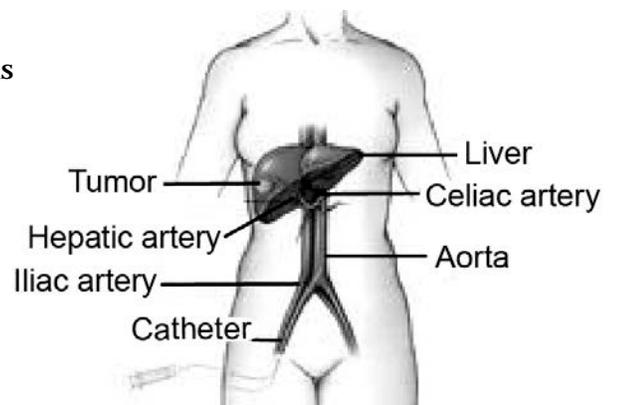
This is why our team of experts believes that Y-90 radiotherapy is the best option for you at this time. Y-90 radiotherapy sends radiation energy into the liver tumors by way of blood vessels.

This treatment does not cure liver tumors. But, it often controls or shrinks them. After this therapy, your doctors may advise other options such as chemotherapy or surgery.

How does it work?

In Y-90 radiotherapy, millions of tiny radioactive beads are injected directly into the arteries that carry blood to your tumor(s).

These beads will stay in the blood vessels around your tumor(s). They will emit radiation for about 10 days. During this time, they will deliver very strong radiation directly to the tumor(s).



In Y-90 radiotherapy, tiny radioactive beads are inserted into your arteries through a catheter (tube).

Even after they are no longer radioactive, the beads still work for several months to kill the tumor. They do this by blocking the flow of blood and oxygen to the tumor. There will be very little effect on healthy parts of your liver or other tissues in the area such as your intestines or skin.

Y-90 radiotherapy is a *minimally invasive* treatment. This means that only small medical tools are used and your body is not opened up. Your body will recover more quickly than it would after other types of surgery.

What beads are used in Y-90 radiotherapy?

The beads used in Y-90 radiotherapy are made of either plastic or glass. Two types of beads can be used for this treatment:

- *SIR-Spheres* are approved by the U.S. Food and Drug Administration (FDA) for people with tumors in the liver that have spread from colon cancer. We sometimes use this material for other types of liver cancer, too.
- *TheraSphere* is approved by the FDA as a *humanitarian use device* (HUD) to treat *hepatocellular carcinoma*. An HUD is a device that has been approved for treating a small number of people with a specific health condition.

Both types of bead have been used safely in thousands of patients with liver tumors, with good results. We will choose the type of bead that will work best for you.

How is the procedure done?

Y-90 radiotherapy is done by an *interventional radiologist*. This is a doctor who specializes in procedures that use X-rays to guide their work.

The treatment is done in several steps over a few months.

Step 1: Mapping Angiogram

Step 1 is a procedure called a *mapping angiogram*. It takes 2 to 4 hours.

During this procedure:

- You will lie on your back on an X-ray table.
- There will be a short burning feeling when the local *anesthetic* (numbing medicine) is applied to your skin. After that, you should not have any discomfort.
- Your doctor will place a small plastic tube (*catheter*) into an artery in your groin and thread it to your liver arteries. X-rays will help your doctor guide this catheter to the right place.
- *Angiograms* (X-ray pictures) are done to help your doctor see how blood flows to your liver. This will tell your doctor if we can use Y-90 therapy for you.

If the angiogram shows that Y-90 therapy:

- Will not work for you, the procedure will end.
- Will work for you, your doctor will go ahead with the next steps.
- Your doctor will use small metal wires (*coils*) to block off blood vessels that should not receive radiation. This is called *coiling of your accessory arteries*.
- A harmless *tracer agent* will be injected into your liver arteries. The angiogram shows how much tracer enters the tissues around your liver.
- Then, you will be taken down the hall to the Nuclear Medicine department for a SPECT scan. SPECT stands for *single photon emission computed tomography*. This scan will show how much of the tracer has left your liver and entered your lungs or other organs.

If the scan shows:

- **Too much tracer** in the tissue outside your liver, Y-90 treatment will not work for you, and the procedure will end.
- **Little or no tracer** in the tissue outside your liver, you will be approved to go to Step 2.

After mapping, Interventional Radiology staff will contact you to set up your Y-90 treatment. This treatment occurs about 10 to 14 days after the mapping.

Step 2: Y-90 Treatment

If you are approved for Y-90 therapy after Step 1, your precise dose of radiation will be calculated and delivered to the hospital at a specific time. About 2 weeks after Step 1, you will have a 2nd procedure.

For your Y-90 infusion:

- Another catheter will be placed in the artery in your groin. Like the last time, the catheter will be threaded to your liver.
- The beads coated with Y-90 will be slowly injected into your liver artery.

This procedure takes about 1 hour.

Step 3: 2nd Y-90 Infusion (if needed)

We often treat only half of the liver in Step 2. If you need a 2nd Y-90 infusion to treat other parts of your liver, it will be 4 to 6 weeks after Step 2.

Step 4: Scans

About 1 month after your last Y-90 infusion, you will have a *magnetic resonance imaging* (MRI) or *computed tomography* (CT) scan. This scan will show how the tumors have responded to the treatment.

Your doctor will review your scans, blood test results, and overall health. They will then talk with you about any other treatments, if needed.

Are there any special precautions after the Y-90 infusions?

The radiation released by the Y-90 beads travels less than ½ inch. But, your doctor may restrict your activities after treatment. Depending on the type of treatment you have, you may need to limit your contact with others for up to 7 days.

Are there any risks or side effects?

The most common side effect after Y-90 radiotherapy is *fatigue* (feeling very tired). This can be mild or severe. It can last up to a few weeks.

Other side effects include:

- Poor appetite
- Mild abdominal pain
- Slight fever
- Nausea

These symptoms should slowly go away over 1 to 2 weeks.

There are other much less common side effects and problems. Some of these can be serious. Your doctors will talk with you about these risks before you start treatment. Please ask any questions you have. Make sure all of your concerns are addressed before you begin Y-90 treatment.

Before Your Procedure

Arrival Time

If you are an *outpatient* (not already staying in the hospital), a nurse will call you the afternoon before your procedure. If your procedure is on a Monday, the nurse will call you the Friday before. The nurse will:

- Tell you when to arrive at the hospital
- Remind you what to do on the morning of your procedure
- Answer any questions you have

Interpreter Services

If you do not understand English well enough to understand these instructions or the details of the procedure, tell us **right away**. We will arrange for a hospital interpreter to help you. This service is free. **A family member or friend may not interpret for you.**

Allergies

If you have had an allergy or bad reaction to *contrast* (X-ray dye) in the past, please call our Interventional Radiology Nurse Coordinator (see numbers on the last page). You may need medicine for this allergy before the procedure.

Medicine to Protect Your Kidneys

If we need to give you contrast for the procedure and your kidneys are not working normally, we may prescribe a medicine for you to take before and after your procedure. This medicine will help protect your kidneys.

Blood Test

You most likely will need a blood test done within the 14 days before your procedure. Sometimes, we do this when you arrive for your procedure. We will tell you if we need to draw blood before that day.

Blood-thinning Medicines

If you take a blood thinner such as Lovenox (enoxaparin), Coumadin (warfarin), or Plavix (clopidogrel), you may need to stop taking it for 1 to 10 days before the procedure. The length of time depends on which medicine you are taking. If you have not been told what to do, talk with your provider or the clinic that prescribes the medicine. Ask when to stop taking this medicine.

IMPORTANT: If you have ever had a heart stent, a prosthetic heart valve, or a pulmonary embolism, or if you have atrial fibrillation with a history of a stroke, you **must** contact the provider who prescribes your blood-thinning medicine. Tell them that you are having a procedure and ask what to do about your medicine dose before your procedure.

Diabetes Medicines

If you have diabetes and take insulin or metformin (Glucophage), we will give you instructions about holding or adjusting your dose for the day of your procedure.

Sedation

Before your Y-90 infusions, you will be given a *sedative* (medicine to make you relax) through an *intravenous line* (IV) in one of your arm veins. You will stay awake, but feel sleepy. This is called *moderate sedation*. You will still feel sleepy for a while after the procedure.

For some people, using moderate sedation is not safe. If this is true for you, you will need general *anesthesia* (medicine to make you sleep during the procedure).

Let us know **right away** if you:

- Have needed anesthesia for basic procedures in the past
- Have *sleep apnea* or chronic breathing problems (you might use a CPAP or BiPAP device while sleeping)
- Use high doses of opioid pain medicine
- Have severe heart, lung, or kidney disease

- Cannot lie flat for about 1 hour because of back or breathing problems
- Have a hard time lying still during medical procedures
- Weigh more than 300 pounds (136 kilograms)

If you have any of these health issues, we may need to give you different medicines. Instead of a sedative, you might receive:

- Only a *local anesthetic* (numbing medicine), such as lidocaine.
- A local anesthetic plus a single pain or anxiety medicine. This is called *minimal sedation*.
- *General anesthesia* (medicine to make you sleep). This medicine is given by an anesthesia provider.

Day Before Your Procedure

- Drink lots of fluids the day before your procedure. You may eat as usual.
- If you are an *outpatient* (not staying overnight in the hospital):
 - Plan for a responsible adult to drive you home after your procedure. **You may NOT drive yourself home or take a bus, taxi, or shuttle by yourself.** You may take a bus, taxi, or shuttle **if** you have a responsible adult to ride with you.
 - IMPORTANT:** Your procedure will be rescheduled if you do not have a responsible adult who will escort you home.
 - Also plan for a responsible adult to stay with you overnight.

Procedure Day

At Home

- Take your usual medicines on the day of the procedure, unless the doctor or a nurse tells you to hold them. (Some patients may need to stop taking their blood-thinning or other prescription medicines.)
- Do **not** take vitamins or other supplements. They can upset an empty stomach.
- Starting **6 hours** before your procedure, **stop eating solid foods.** You may have only *clear liquids* (liquid you can see through), such as water, broth, cranberry juice, or weak tea.
- Starting **2 hours** before your procedure, take **nothing** at all by mouth.
- If you must take medicines, take them with **only** a sip of water.
- Bring with you a list of all the medicines you take.
- Plan to spend most of the day in the hospital.

At the Hospital

- You may have been told to go to Outpatient Lab for blood draw. Do this before you check in. The lab is on the 3rd floor of the hospital, next to Outpatient Pharmacy, near the Cascade elevators.
- Unless you are told otherwise, check in at Admitting on the 2nd floor, next to Radiology. Take the Pacific elevator to the 2nd floor.
- After checking in, you will be directed to go to Radiology Reception Desk to check in for your procedure.
- If there is a delay in starting your procedure, it is usually because we need to treat other people with unexpected and urgent problems. Thank you for your patience if this occurs.
- When we are ready to start your procedure, a staff member will:
 - Take you to a pre-procedure area
 - Give you a hospital gown to put on
 - Give you a bag for your belongings
- While you are in the pre-procedure area:
 - Your family or a friend can be with you.
 - A nurse will ask you some health questions, take your vital signs (such as heart rate), place an *intravenous* (IV) tube in your arm, and go over what to expect.
 - If you are scheduled to have general anesthesia, the anesthesia care provider will meet you and go over your health history.
 - A radiologist or physician assistant will talk with you about the risk and benefits of the procedure. They will ask you to sign a consent form, if you have not already signed one.
 - You will be able to ask any questions you have.

What happens during the procedure?

- The nurse will take you to the radiology suite. This nurse will be with you for the entire procedure.
- If needed, an interpreter will be in the room or will be able to talk with you and hear you through an intercom.
- You will lie flat on your back on an X-ray table.
- We will place wires on your body to help us monitor your heart rate.
- You will have a cuff around your arm. It will inflate from time to time to check your blood pressure.

- Prongs in your nose will give you oxygen. A probe on one of your fingers will show us how well you are breathing the oxygen.
- A radiology technologist will clean your skin around the puncture site with a special soap. Tell this person if you have any allergies. We may need to shave some hair in the area where the doctor will be working.

What can I expect after the procedure?

In the Hospital

- Nurses will watch you for a short time in the Radiology department or recovery room.
- You will then go to Nuclear Medicine for the SPECT scan. This will take about 30 to 45 minutes.
- If you:
 - Are an outpatient (not staying overnight in the hospital), you will then be moved to a room on a short-stay unit in the hospital for the rest of your recovery time.
 - Will stay overnight in the hospital, you will be moved to a room on an inpatient unit. Most patients are able to go home the next morning.
- Once you are moved to your room:
 - Your family member or friend can be with you.
 - You will need to rest on a stretcher or bed flat for 2 to 6 hours. You must keep your leg where the catheter was inserted very still for that time, to lower the risk of bleeding from the artery. The length of time depends on whether or not a *vascular closure device* was used to help stop bleeding. If you have one of these devices, you will need to lie flat for only about 2 hours. If we use manual pressure to stop bleeding, you will need to lie flat for about 6 hours.
 - You will be able to eat and drink.
 - If you had coiling of your accessory arteries (see page 3), we will give you a copy of the bar codes of the coils. Keep these bar codes in your wallet or personal medical files. Show this bar code to providers at other hospitals, or if you get a *magnetic resonance imaging scan* (MRI). It tells the providers what type of coil was used.
 - Before you get up to walk, we will assess you to make sure you can walk safely. A nurse or aide will help you get out of bed. Most times, we will place a gait belt around you for extra safety.
- If you are an outpatient, you will be able to go home when:
 - You are fully awake
 - You can eat, drink, and use the restroom

- Your nausea and pain are under control
- Your vital signs are stable
- You can move about safely
- You have a responsible adult to take you home
- You have a responsible person to stay with you at home overnight

Self-care

For 24 Hours

The sleep medicine that you were given will stay in your body for several hours. It could affect your judgment. You may be lightheaded or feel dizzy.

For **24 hours**, also follow these instructions:

- Do **not** drive a car.
- Do **not** use machines or power tools.
- Do **not** drink alcohol.
- Do **not** take medicines such as tranquilizers or sleeping pills, unless your doctor prescribed them.
- Do **not** make important decisions or sign legal documents.
- Do **not** be responsible for children, pets, or an adult who needs care.
- Do only light activities and get plenty of rest.
- Have a responsible adult stay with you overnight.

After your procedure:

- Eat as usual.
- Drink lots of fluids.
- Resume your regular medicines as ordered by your provider, unless you have been told otherwise.

For 48 to 72 Hours

- Do **not** lift anything that weighs more than 5 to 10 pounds (a gallon of milk weighs almost 9 pounds).
- Do only moderate activities. This will allow your puncture site to heal.
- Avoid strenuous work. Do not do any exercise that increases your heart or breathing rate.

Dressing Care

- Keep your puncture site covered with the dressing for 24 hours. Make sure it stays clean and dry.

- After 24 hours, remove the dressing. Check the puncture site (see “When to Call” on page 11).
- You may feel as small bump at the puncture site. This is from the device used to close the artery. This will go away over time.
- Do not take a bath, sit in a hot tub, go swimming, or submerge the puncture site in water until it is fully healed.
- After 24 hours, you may shower. Do not scrub the puncture site. Allow warm soapy water to gently run over the site.
- After your shower:
 - Pat the site dry with a clean, dry towel.
 - Do **not** apply lotions, ointments, or powders to the site.
 - You may apply a new Band-Aid.
- If you apply a new Band-Aid, for the next few days, change it every day and check the site (see “When to Call” on page 11).

Side Effects

After Y-90 Mapping

After Y-90 mapping, you should have only minor pain at the puncture site. Most patients do not need to take pain medicine. If your doctor says it is OK to take acetaminophen (Tylenol), this will help to ease any discomfort.

After Y-90 Radiotherapy

Most patients have some side effects after the Y-90 treatment. These include pain, nausea, a low-grade fever, or chills. This is called *post-embolization syndrome*.

- You may have fevers for up to 1 week.
- Pain occurs because the beads block blood and oxygen from reaching the tumor. Lack of oxygen causes pain in any tissue. Most times, this pain can be treated with medicines you take by mouth.
- Fatigue and loss of appetite are common for 2 weeks. They may last longer. These are often part of a normal recovery. Most patients can return to their normal activities within 1 week.

After your Y-90 treatment, we will give you prescriptions to help with pain, nausea, constipation, and acidic stomach. If you do not have diabetes, we will also give you a prescription for a steroid to help with pain and inflammation.

When to Call

Call one of the numbers listed below under “Who to Call” if you have any of these symptoms:

- Bleeding from the puncture site that will not stop, even after you apply pressure for 15 minutes
- Swelling at the puncture site
- A lot of bruising around the puncture site
- Signs of infection at the puncture site: redness, warmth, tenderness, or discharge that smells bad
- Fever higher than 101°F (38.3C) or chills
- A new rash that does not go away
- A lot of abdominal pain, or pain that does not go away after you take pain medicines, if they were prescribed.
- Nausea that is not relieved by the anti-nausea medicine, when it has been taken as directed
- A deep level of fatigue that is ongoing

Urgent Care

Call 911 or go to the nearest emergency room if you have any of these symptoms:

- Chest pain
- Trouble breathing
- Your leg on the side of the puncture that turns cold or blue
- Slurred speech
- Balance problems, or trouble using your arms or legs

Who to Call

If you have any of the symptoms listed under “When to Call”:

- Weekdays from 8 a.m. to 4:30 p.m., call the Interventional Radiology Nurse Coordinator at 206.598.6209.
- After hours and on weekends and holidays, call 206.598.6190 and ask to page the Interventional Radiology Fellow on call.

Questions?

Your questions are important. Call your doctor or healthcare provider if you have questions or concerns.

UWMC Imaging Services:
206.598.6200