



PATIENT & CAREGIVER EDUCATION

About Mapping Arteriogram and Selective Internal Radiation Therapy (SIRT) Treatment

This information will help you get ready for your mapping arteriogram and selective internal radiation therapy (SIRT) treatment at MSK.

What is SIRT?

SIRT is a treatment that uses tiny radioactive beads to destroy liver tumors. SIRT is sometimes called radioembolization (RAY-dee-oh-EM-boh-lih-ZAY-shun), or Y90.

An interventional radiologist (IN-ter-VEN-shun-al RAY-dee-AH-loh-jist), also called an IR doctor, will do your treatment. An interventional radiologist is a doctor with special training in using image-guided procedures to diagnose and treat disease.

Your IR doctor will inject the radioactive beads directly to the tumor through the arteries (blood vessels) in your liver. The beads give off radiation (invisible energy waves) that damages cancer cells and makes it hard for them to reproduce. The beads help limit the amount of radiation that gets to the rest of your liver and the rest of your body.

What is a mapping arteriogram procedure?

About a month before your SIRT treatment, you'll have a mapping arteriogram (ar-TEER-ee-oh-gram) procedure. This is an X-ray of your arteries. The images from this procedure are used to plan for your SIRT treatment.

The first part of the mapping procedure will tell us which liver arteries bring blood to the liver tumors. It will also tell us if there are arteries that carry blood outside of your liver to other areas in your abdomen (belly). If these arteries are found, they are blocked so that the radiation won't harm your other organs. The second part of the procedure will check for any possible flow of radiation from your liver to your lungs.

Getting ready for your mapping arteriogram procedure

What to do before your procedure

Ask about your medicines

You may need to stop taking some of your usual medicines before your procedure. Talk with your healthcare provider about which medicines are safe for you to stop taking.

We've included some common examples below, but there are others. Make sure your care team knows all the prescription and over-the-counter medicines you take. A prescription medicine is one you can only get with a prescription from a healthcare provider. An over-the-counter medicine is one you can buy without a prescription.



It is very important to take your medicines the right way in the days leading up to your procedure. If you don't, we may need to reschedule your procedure.

Anticoagulants (blood thinners)

A blood thinner is a medicine that changes the way your blood clots. Blood thinners are often prescribed to help prevent a heart attack, stroke, or other problems caused by blood clots.

If you take a blood thinner, ask the healthcare provider doing your procedure

what to do before your procedure. They may tell you to stop taking the medicine a certain number of days before your procedure. This will depend on the type of procedure you're having and the reason you're taking a blood thinner.

We've listed some examples of common blood thinners below. There are others, so be sure your care team knows all the medicines you take. **Do not stop taking your blood thinner without talking with a member of your care team.**

- Apixaban (Eliquis®)
- Aspirin
- Celecoxib (Celebrex®)
- Cilostazol (Pletal®)
- Clopidogrel (Plavix®)
- Dabigatran (Pradaxa®)
- Dalteparin (Fragmin®)
- Dipyridamole (Persantine®)
- Edoxaban (Savaysa®)
- Enoxaparin (Lovenox®)
- Fondaparinux (Arixtra®)
- Heparin injection (shot)
- Meloxicam (Mobic®)
- Nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen (Advil®, Motrin®) and naproxen (Aleve®)
- Pentoxifylline (Trental®)
- Prasugrel (Effient®)
- Rivaroxaban (Xarelto®)
- Sulfasalazine (Azulfidine®, Sulfazine®)
- Ticagrelor (Brilinta®)
- Tinzaparin (Innohep®)
- Warfarin (Jantoven®, Coumadin®)

Other medicines and supplements can change how your blood clots. Examples include vitamin E, fish oil, and nonsteroidal anti-inflammatory drugs (NSAIDs). Ibuprofen (Advil®, Motrin®) and naproxen (Aleve®) are examples of NSAIDs, but there are many others.

Read *How To Check if a Medicine or Supplement Has Aspirin, Other NSAIDs, Vitamin E, or Fish Oil* (www.mskcc.org/pe/check-med-supplement). It will help you know which medicines and supplements you may need to avoid before your procedure.

Diabetes medicines

If you take insulin or other diabetes medicines, talk with the healthcare provider doing your procedure and the healthcare provider who prescribes it. Ask them what to do before your procedure. You may need to stop taking it or take a different dose (amount) than usual. You may also need to follow different eating and drinking instructions before your procedure. Follow your healthcare provider's instructions.

Your care team will check your blood sugar levels during your procedure.

Weight loss medicines

If you take medicine for weight loss (such as a GLP-1 medicine), talk with the healthcare provider doing your procedure. Ask them what to do before your procedure. You may need to stop taking it, follow different eating and drinking instructions before your procedure, or both. Follow your healthcare provider's instructions.

We've listed some examples of medicines that cause weight loss below. There are others, so be sure your care team knows all the medicines you take. Some of these are meant to be used to help manage diabetes but are sometimes prescribed just for weight loss.

- Semaglutide (Wegovy®, Ozempic®, Rybelsus®)
- Tirzepatide (Zepbound®, Mounjaro®)
- Dulaglutide (Trulicity®)
- Liraglutide (Saxenda®, Victoza®)

Diuretics (water pills)

A diuretic is a medicine that helps control fluid buildup in your body. Diuretics are often prescribed to help treat hypertension (high blood pressure) or edema (swelling). They can also be prescribed to help treat certain heart or kidney problems.

If you take a diuretic, ask the healthcare provider doing your procedure what to

do before your procedure. You may need to stop taking it the day of your procedure.

We've listed some examples of common diuretics below. There are others, so be sure your care team knows all the medicines you take.

- Bumetanide (Bumex®)
- Furosemide (Lasix®)
- Hydrochlorothiazide (Microzide®)
- Spironolactone (Aldactone®)

Weight loss medicines

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We've listed some examples of medicines that cause weight loss below. There are others, so be sure your care team knows all the medicines you take. Some of these are meant to be used to help manage diabetes but are sometimes prescribed just for weight loss.

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Reactions to contrast

Contrast is a special dye that makes it easier for your doctor to see differences in your internal organs. You'll be given contrast as part of your procedure. Some people can have an allergic reaction to contrast. Be sure to tell your doctor or nurse about any allergies you have or if you've had a reaction to contrast in the past.

Take devices off your skin

You may wear certain devices on your skin. Before your scan or procedure, some device makers recommend you take off your:

- Continuous glucose monitor (CGM)
- Insulin pump

Talk with your healthcare provider about scheduling your appointment closer to the date you need to change your device. Make sure you have an extra device with you to put on after your scan or procedure.

You may not be sure how to manage your glucose while your device is off. If so, before your appointment, talk with the healthcare provider who manages your diabetes care.

Arrange for someone to take you home

You must have a responsible care partner take you home after your procedure. A responsible care partner is someone who can help you get home safely. They should be able to contact your care team if they have any concerns. Make sure to plan this before the day of your procedure.

If you don't have a responsible care partner to take you home, call one of the agencies below. They'll send someone to go home with you. There's a charge for this service, and you'll need to provide transportation. It's OK to use a taxi or car service, but you still need a responsible care partner with you.

Agencies in New York

VNS Health: 888-735-8913

Caring People: 877-227-4649

Agencies in New Jersey

Caring People: 877-227-4649

Tell us if you're sick

If you get sick (including having a fever, cold, sore throat, or flu) before your procedure, call your IR doctor. You can reach them Monday through Friday from 9 a.m. to 5 p.m.

After 5 p.m., during the weekend, and on holidays, call 212-639-2000. Ask for the Interventional Radiology fellow on call.

Note the time of your appointment

A staff member will call you 2 business days before your procedure. If your procedure is scheduled for a Monday, they'll call you on the Thursday before. They'll tell you what time to get to the hospital for your procedure. They will also remind you where to go.

Use this area to write down the date, time, and location of your procedure:

If you don't get a call by noon (12 p.m.) on the business day before your procedure, call 646-677-7001. If you need to cancel your procedure for any reason, call the healthcare provider who scheduled it for you.

What to do the day before your procedure

Instructions for eating



Stop eating at midnight (12 a.m.) the night before your procedure. This includes hard candy and gum.

Your healthcare provider may have given you different instructions for when to stop eating. If so, follow their instructions. Some people need to fast (not eat) for longer before their procedure.

What to do the day of your procedure

Instructions for drinking

Between midnight (12 a.m.) and 2 hours before your arrival time, only drink the liquids on the list below. Do not eat or drink anything else. Stop drinking 2 hours before your arrival time.

- Water.
- Clear apple juice, clear grape juice, or clear cranberry juice.
- Gatorade or Powerade.
- Black coffee or plain tea. It's OK to add sugar. Do not add anything else.
 - Do not add any amount of any type of milk or creamer. This includes plant-based milks and creamers.
 - Do not add honey.
 - Do not add flavored syrup.

If you have diabetes, pay attention to the amount of sugar in your drinks. It will be easier to control your blood sugar levels if you include sugar-free, low-sugar, or no added sugar versions of these drinks.

It's helpful to stay hydrated before procedures, so drink if you are thirsty. Do not drink more than you need. You will get intravenous (IV) fluids during your procedure.



Stop drinking 2 hours before your arrival time. This includes water.

Your healthcare provider may have given you different instructions for when to stop drinking. If so, follow their instructions.

Things to remember

- Take only the medicine your doctor told you to take the morning of your procedure. Take them with a few sips of water.
- Don't put on any cream (thick moisturizer) or petroleum jelly (Vaseline®). You can use deodorant and light moisturizers.
- Don't wear eye makeup.
- Remove any jewelry, including body piercings.
- Leave all valuables, such as credit cards and jewelry, at home.
- If you wear contact lenses, wear your glasses instead, if possible. If you don't have glasses, please bring a case for your contacts.

What to bring with you

- A list of the medicine you take at home.
- Medicine for breathing problems (such as inhalers), medicine for chest pain, or both.
- A case for your glasses or contacts.
- Your Health Care Proxy form, if you have completed one.

- If you use a CPAP or BiPAP machine to sleep at night, please bring your machine with you, if possible. If you can't bring your machine with you, we will give you one to use while you're in the hospital.

What to expect when you arrive

Many staff members will ask you to say and spell your name and date of birth. This is for your safety. People with the same or similar names may be having procedures on the same day.

When it's time to change, you'll get a hospital gown, robe, surgical head covering, and nonskid socks to wear.

Meet with a nurse

You'll meet with a nurse before your procedure. Tell them the dose of any medicines you took after midnight (12 a.m.) and the time you took them. Make sure to include prescription and over-the-counter medications, patches, and creams.

Your nurse may place an intravenous (IV) line in one of your veins, usually in your arm or hand. If your nurse does not place the IV, your anesthesiologist will do it in the procedure room.

You may not need to see an anesthesiologist.

Going into the procedure room

When it's time for your procedure, you'll take off your eyeglasses, hearing aids, dentures, prosthetic devices, wig, and religious articles. You'll either walk into the procedure room or a staff member will bring you there on a stretcher.

Inside the procedure room

A member of the procedure room team will help you onto the procedure table. They may put compression boots on your lower legs. These gently inflate and deflate to help blood flow in your legs. You'll be attached to equipment to monitor your heart rate, breathing, and blood pressure. You'll get oxygen through a thin tube that rests below your nose called a nasal cannula.

While lying on your back on the table, you'll get sedation medicine through your IV. This medicine will make you sleepy and relaxed. After you're sedated, a member of your care team will clean your groin area or wrist. They will shave the area if needed and cover it with sterile drapes.

Your IR doctor will inject local anesthesia into the area of your body where they will be working. Local anesthesia is medicine that numbs an area of your body. They will place a catheter through the artery in your groin or wrist. The catheter will go up to the arteries that bring blood to your liver.

Then, they will give you contrast dye through the catheter. Your doctor will use fluoroscopy (X-ray) to take images of your blood vessels. The contrast dye helps them see your blood vessels in the images. They will use these images to find the tumor in your liver. Once they reach the tumor, they will inject radioactive particles into the area.

Your doctor will remove the catheter and seal the artery before you leave the procedure room.

After your mapping arteriogram procedure

After your mapping procedure, you'll go to a room in the Molecular Imaging and Therapy Service for a scan. This is also known as Nuclear Medicine. This scan will check if any of the radioactive imaging dye injected into your liver artery traveled to your lungs or anywhere else outside of your liver. This will help us decide whether it will be safe to proceed with your SIRT treatment.

Your scan will take about 45 minutes.

In the Post-Anesthesia Care Unit (PACU)

You'll be in the PACU when you wake up after your procedure. A nurse will be keeping track of your temperature, pulse, blood pressure, and oxygen levels. You may get oxygen through a tube resting below your nose or a mask over your nose and mouth. You may also have compression boots on your lower legs.

A nurse will ask you to lie flat with your right leg straight for 1 to 4 hours. You'll be in the recovery area for 3 to 4 hours before you go home.

Getting ready for your SIRT treatment

A few weeks after your mapping arteriogram procedure, you'll have your SIRT treatment. The preparation for your SIRT treatment will be almost the same as the preparation for your mapping arteriogram. Please follow the instructions in the "Before Your Mapping Arteriogram Procedure" section of this resource, as well as the additional instructions in the following sections.

You'll need to have a blood test before you have your SIRT treatment to test your liver function. Your nurse will arrange this for you before your treatment.

What to do 5 days before your treatment

Your nurse will give you a prescription for a medicine to help prevent stomach pain, if you aren't already taking one. Start taking this medicine 5 days before you have your SIRT treatment. You'll continue to take this medicine after your treatment.

What to do the day of your SIRT treatment

Your SIRT treatment will be almost the same as your mapping arteriogram procedure. Follow the same instructions on what to bring, where to park, and where to go.

What to expect when you arrive

Many staff members will ask you to say and spell your name and date of birth. This is for your safety. People with the same or similar names may be having procedures on the same day.

When it's time to change, you'll get a hospital gown, robe, surgical head

covering, and nonskid socks to wear.

Meet with a nurse

You'll meet with a nurse before your procedure. Tell them the dose of any medicines you took after midnight (12 a.m.) and the time you took them. Make sure to include prescription and over-the-counter medications, patches, and creams.

Your nurse may place an intravenous (IV) line in one of your veins, usually in your arm or hand. If your nurse does not place the IV, your anesthesiologist will do it in the procedure room.

You may not need to see an anesthesiologist.

Going into the procedure room

When it's time for your procedure, you'll take off your eyeglasses, hearing aids, dentures, prosthetic devices, wig, and religious articles. You'll either walk into the procedure room or a staff member will bring you there on a stretcher.

Inside the procedure room

A member of the procedure room team will help you onto the procedure table. They may put compression boots on your lower legs. These gently inflate and deflate to help blood flow in your legs. You'll be attached to equipment to monitor your heart rate, breathing, and blood pressure. You'll get oxygen through a thin tube that rests below your nose.

While lying on your back on the table, you'll get sedation medicine through your IV. This medicine will make you sleepy and relaxed. After you're sedated, a member of your care team will clean your groin area or wrist. They will shave the area if needed and cover it with sterile drapes.

The IR doctor doing your treatment will inject local anesthesia into the area where they will be working. They will place a catheter through the artery in your groin or wrist. The catheter will go up to the arteries that supply blood to your liver. Then, they will give you contrast dye through the catheter.

Your doctor will take images. Once they reach the tumor, they will inject radioactive beads into your liver artery. Before you leave the procedure room, they will remove the catheter and seal the artery.

After Your SIRT Treatment

In the Post-Anesthesia Care Unit (PACU)

You'll be in the PACU when you wake up after your procedure. A nurse will be keeping track of your temperature, pulse, blood pressure, and oxygen levels. You may get oxygen through a tube resting below your nose or a mask over your nose and mouth. You may also have compression boots on your lower legs.

Once you're discharged from the PACU, you'll go to a room in the Molecular Imaging and Therapy Service for a scan. In some cases, this may happen after your procedure, before you go to the PACU. The scan will take about 45 minutes.

Your recovery time will be about the same as for the mapping procedure. If you have cancer on both sides of your liver, you may get 2 separate SIRT treatments. The second treatment is about 6 weeks after the first.

Take your Medrol dose pack

A Medrol dose pack is a low dose steroid that you'll need to take after your treatment to prevent fatigue (feeling more tired or weak than usual) caused by radiation. You'll start taking your Medrol dose pack before breakfast the day after your treatment procedure. Follow the instructions on the package for taking the medicine. The Medrol dose pack doesn't completely stop fatigue, but it usually makes it more manageable. Steroids can increase blood glucose so don't take the Medrol dose pack if you're diabetic. Your doctor will give you more information.

Follow radiation safety precautions

Follow the radiation safety precautions below, and the instructions the health physicist (staff member who specializes in radiation safety) gave you, to keep from exposing other people to radiation.

- After your SIRT treatment, you'll have a small amount of radiation in your body fluids, such as in your blood, urine (pee), bowel movements (poop), and vomit (throw up). This will slowly decrease and become inactive over time. A health physicist will give you written instructions to follow at home.
- You don't need to avoid contact with other people after your SIRT treatment. You can be in the same room with anyone, including pregnant women and small children.
- You should not become pregnant or father a baby while you're undergoing SIRT treatment. To find out more information about sexual activity during treatment, ask your nurse for the resource *Sex and Your Cancer Treatment* (www.mskcc.org/pe/sex-cancer-treatment).
- If you're breastfeeding, talk with your doctor about continuing after your SIRT treatment.
- If you have to go to a doctor, the emergency room, or if you need surgery within 3 days of your SIRT treatment, tell the medical staff that you had treatment with a small amount of radioactive material.
- Some types of security equipment (such as at the airport or outside a tunnel) can detect very small amounts of radiation. A staff member will give you a card that says you received radioactive medicine and that you may give off small amounts of radioactivity for up to 1 month after your treatment. If you're stopped by law enforcement at a checkpoint, show them this card.

For 24 hours after your SIRT treatment:

- Sit down to urinate (pee) to avoid splashing urine. Do not use a urinal.
- If your urine is being collected in a catheter bag, empty your bag into a toilet and flush it.
- Wear gloves when wiping up any body fluids or when handling clothing stained with body fluids. Flush any tissue with your body fluids down the toilet.
- Wash your hands with soap and water for at least 20 seconds after using the bathroom, and after touching body fluids or clothing and linens that have body fluids on them.
- Wash any clothes and linens that have body fluids on them separately from your other clothes.
- Use a condom during sexual activity.
- Follow these precautions for 24 hours after your SIRT treatment. After 24 hours, you don't need to follow these precautions.
- If you have any questions about radiation safety, call 212-639-7391 Monday through Friday from 9 a.m. to 5 p.m.

Side effects of SIRT treatment

After leaving the hospital, some people develop side effects from SIRT treatment, including:

- A fever of 100.4 °F (38 °C) or higher)
- Abdominal pain
- Nausea

When to call your healthcare provider

Call your healthcare provider when you have any of the following:

- A fever of 100.4 °F (38 °C) or higher.
- Pain that doesn't go away, especially around your abdomen or groin.
- Nausea or vomiting that is worse than it was before your mapping procedure or treatment.
- Any symptoms that worry you.

If you have questions or concerns, contact your healthcare provider. A member of your care team will answer Monday through Friday from 9 a.m. to 5 p.m. Outside those hours, you can leave a message or talk with another MSK provider. There is always a doctor or nurse on call. If you're not sure how to reach your healthcare provider, call 212-639-2000.

For more resources, visit www.mskcc.org/pe to search our virtual library.

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