Memorial Sloan Kettering Cancer Center

PATIENT & CAREGIVER EDUCATION

About Your Portal Vein Embolization (PVE)

This information will help you get ready for your portal vein embolization (EM-boh-lih-ZAY-shun) at MSK.

What is your portal vein?

Your portal vein is a vein that carries blood to your liver. It splits into the left and right portal veins that branch into smaller blood vessels. Your blood vessels send blood throughout your liver (see Figure 1).

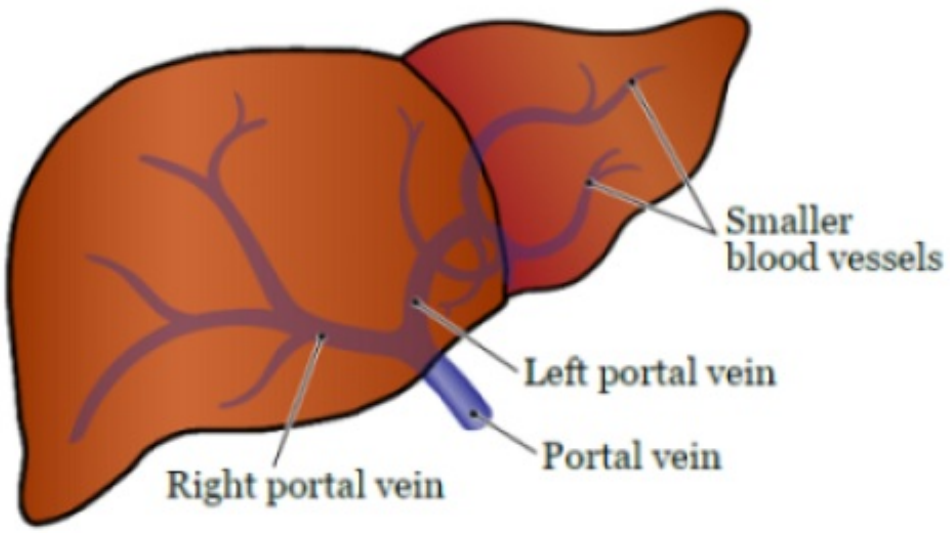

Figure 1. Portal vein, branches, and blood vessels in your liver

What is a PVE?

A PVE is a procedure to block blood flow to liver tumors. This shrinks the part of your liver that has tumors. More blood will flow to the healthy part of your liver and make it grow. About 3 to 4 weeks after your PVE, you will have liver resection surgery. This procedure safely removes the shrunken part of your liver that has tumors.

During your PVE, you'll get contrast dye (also called contrast). Contrast is a liquid used in X-rays. It helps your healthcare provider get a better look at your organs and blood flow. Tell your healthcare provider if you've had an allergic reaction to contrast dye in the past. Read *Preventing An Allergic Reaction to Contrast Dye* (www.mskcc.org/pe/allergic-reaction-contrast) to learn more.

You will get general anesthesia (medicine to make you sleep during your procedure). Your healthcare provider will numb the right side of your neck, and either:

- The left side of your abdomen (belly) near your spleen.
- The right side of your abdomen near your liver. They will do this if they cannot access the left side of your abdomen.

An interventional radiologist (IR doctor) will do your PVE. An IR doctor is a specialist in image-guided procedures.

Your IR doctor will use ultrasound and images from fluoroscopy (real-time X-rays) to guide your PVE. They'll use these images to access your portal vein and decide which branch of your portal vein to block. These images will also help them guide a catheter (small, flexible tube) through your portal vein. Then, they'll inject tiny particles into your portal vein (see Figure 2). These particles will block blood flow to that part of your liver.

Your PVE will take about 2 to 3 hours.

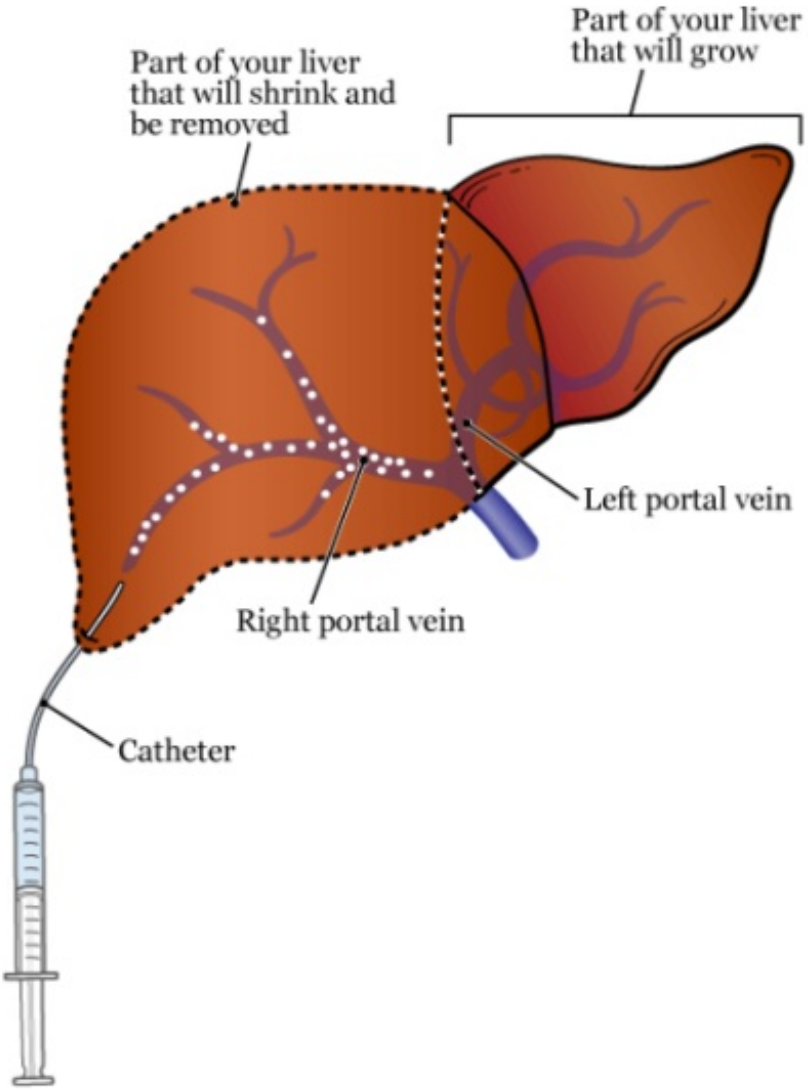

Figure 2. PVE in the right portal vein of the liver

What to do before your PVE

Ask about your medicines

You may need to stop taking some of your usual medicines before your procedure. Or, you may need to take a different dose (amount) than usual. Talk with your healthcare provider about how to take your medicines before your procedure. Do not change how you take your medicines without talking with a healthcare provider.

This section lists some examples of medicines, but there are many others. **Make sure your care team knows all the prescription medicines, over-the-counter medicines, and dietary supplements 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's very important to take your medicines and supplements the right way in the days before your procedure. If you don't, we may need to reschedule your procedure.

Anticoagulants (blood thinners)

A blood thinner is a medicine that changes how 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 your healthcare provider what to do before your procedure. They may tell you to stop taking it 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.

Here are some examples of blood thinners. 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).

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 your MSK healthcare provider and the healthcare provider who prescribes it. Ask them what to do before your surgery or 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 surgery or procedure. Follow your healthcare provider's instructions.

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

GLP-1 medicines for weight loss

It's important to tell your healthcare provider if you take a GLP-1 medicine. You will need to follow special eating and drinking instructions before your surgery or procedure. **It is very important to follow these instructions. If you do not follow them, your surgery or procedure may be delayed or canceled.**

- **Follow a clear liquid diet the day before your surgery or procedure.** Do not eat any solid food. Read *Clear Liquid Diet* (www.mskcc.org/pe/clear-liquid-diet) to learn more.
- **Stop drinking 8 hours before your arrival time.** Do not eat or drink anything after this time, including clear liquids. You can have small sips of water with your medicines.

To learn more, read *Eating and Drinking Before Your Surgery or Procedure When Taking GLP-1 Medicines* (www.mskcc.org/pe/eat-drink-glp1).

Here are some examples of GLP-1 medicines. There are others, so be sure your care team knows all the medicines you take. Sometimes, these are prescribed to help manage diabetes or other conditions. Other times, they are prescribed for weight loss.

• Semaglutide (Wegovy®, Ozempic®, Rybelsus®) • Dulaglutide (Trulicity®)	• Tirzepatide (Zepbound®, Mounjaro®) • 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®)

Take devices off your skin

You may wear certain devices on your skin. Before your procedure, surgery, or scan, 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 to bring an extra device with you to put on after your procedure, surgery, or scan.

You may not be sure how to manage your glucose (blood sugar) 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.

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 PVE

Instructions for eating

Important: If you take a GLP-1 medicine, do not follow these instructions. Follow the instructions in *Eating and Drinking Before Your Surgery or Procedure When Taking GLP-1 Medicines* (www.mskcc.org/pe/eat-drink-glp1) instead.

Stop eating at midnight (12 a.m.) the night before your surgery or 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 surgery or procedure.

What to do the day of your PVE

Instructions for drinking

> **Important:** If you take a GLP-1 medicine, do not follow these instructions. Follow the instructions in *Eating and Drinking Before Your Surgery or Procedure When Taking GLP-1 Medicines* (www.mskcc.org/pe/eat-drink-glp1) instead.

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 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 surgeries and procedures, so drink if you are thirsty. Do not drink more than you need. You will get intravenous (IV) fluids during your surgery or 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 healthcare provider told you to take the morning of your procedure. Take them with a few sips of water.
- Do not use cream or petroleum jelly (Vaseline®). You can use deodorant and light moisturizers.
- Do not wear eye makeup.
- Remove any jewelry, including body piercings.
- Leave all valuables at home. This includes credit cards and jewelry.
- If you wear contact lenses, wear your glasses instead, if you can.

What to bring

- Medicine for breathing problems. This includes inhalers, medicine for chest pain, or both.
- An extra CGM or insulin pump, if you wear one and had to remove it before your procedure.
- A case for your glasses or contacts, if you wear them.
- Your Health Care Proxy form and other advance directives, if you filled them out.
- Your CPAP or BiPAP machine if you use one. If you cannot bring yours 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 birth date. This is for your safety. People with the same or similar names may be having a procedure 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. You'll need to remove any prosthetic devices, wigs, and religious articles, if you have them.

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 medicine, 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.

Meet with your IR doctor

You will talk with your IR doctor before your PVE. They'll talk with you about the procedure and answer any questions you have before you sign a consent form. Signing this form means that you agree to the procedure and understand the risks.

Meet with an anesthesiologist

You will also meet with an anesthesiologist (A-nes-THEE-zee-AH-loh-jist). An anesthesiologist is a doctor with special training in anesthesia. They will give you anesthesia during your procedure. They will also:

- Review your medical history with you.
- Ask if you've had any problems with anesthesia in the past. This includes nausea (feeling like you're going to throw up) or pain.
- Talk with you about your comfort and safety during your procedure.

- Talk with you about the kind of anesthesia you'll get.
- Answer questions you have about anesthesia.

Going into the procedure room

When it's time for your procedure, you'll remove your hearing aids, glasses, and dentures, if you have them. 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 your care team will help you onto the bed. They may place compression boots on your lower legs. These gently inflate and deflate to help blood flow in your legs.

Once you're comfortable, your anesthesiologist will give you anesthesia through your IV line and you'll fall asleep. You'll also get fluids through your IV line during and after your procedure.

Your healthcare provider will clean your skin with an antiseptic. This is a liquid used to kill germs and bacteria. Your care team will clean this area after your procedure. Your skin may appear orange for a short time. This will fade away within a day.

Your IR doctor will give you local anesthesia. This is medicine to numb the area where they will put the needle into your skin. They will use ultrasound to guide the needle into your skin. Then, the IR doctor will do your PVE.

After your procedure, they will remove the catheter. They will put a bandage over where the needle went into your skin.

After your PVE

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'll also have compression boots on your lower legs.

Tell your nurse if you're feeling pain. They may give you medicine for your pain.

Your care team will tell you when it's safe to go home. You will need a responsible care partner to go with you.

Follow-up care

You will have a computed tomography (CT) scan 3 to 4 weeks after your procedure. This will help your healthcare provider see how your liver has changed.

The blocked part of your liver should be smaller. The other part of your liver should be bigger. This will help them safely do liver resection surgery to remove the part of your liver that has tumors. Your care team will schedule your liver resection surgery around this time.

When to call your healthcare provider

Call your healthcare provider if you have:

- A fever of 100.4 °F (38.0 °C) or higher.
- New, or worsening pain that does not get better with medicine.
- Shortness of breath or trouble breathing.
- Chest pain.
- Dizziness.
- Bruising.
- Nausea (feeling like you're going to throw up) or vomiting (throwing up).
- A faster heart rate than usual.
- Any new symptoms.

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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