

## Uterine Fibroid Treatment

This article will discuss uterine fibroid embolization (UFE) and magnetic resonance-guided focused ultrasound (MRgFUS) as minimally invasive procedures that doctors perform through the skin or through a tiny incision for patients with symptomatic uterine fibroids. Uterine fibroids are benign tumors within the uterus that may be causing bleeding, pelvic pain, and/or frequent urination.

Your doctor will use medical imaging to determine if you are a candidate for UFE or MRgFUS and tell you how to prepare. Always tell your doctor if there's a possibility you are pregnant. UFE or MRgFUS may not be suitable for pregnant patients. Discuss any recent illnesses, medical conditions, allergies, and medications you're taking.

Your doctor may advise you to stop taking aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs) or blood thinners several days prior to your procedure. They may also instruct you to fast for several hours beforehand. Leave jewelry at home and wear loose, comfortable clothing. You may need to change into a gown. Plan to have someone drive you home afterward.



### What is Uterine Fibroid Treatment?

Uterine fibroids are abnormal, benign growths in the uterus. These non-cancerous lesions, also known as myomas, arise from the muscular wall of the uterus. It is extremely rare for fibroid tumors to become cancerous.

Uterine fibroids are very common. They often do not cause symptoms. However, in some cases, uterine fibroids can impair one's quality of life by causing:

- heavy menstrual bleeding
- prolonged menstrual periods
- pelvic pain and pressure
- frequent urination.

Minimally invasive uterine fibroid treatments include:

- Uterine fibroid embolization (UFE)
- Magnetic resonance-guided focused ultrasound (MRgFUS).

Minimally invasive treatments do not require a large incision. Instead, doctors perform them through the skin or through a tiny nick in the skin.

### What is Uterine Fibroid Embolization (UFE)?

Uterine fibroid embolization (UFE) (also known as UAE or Uterine Artery Embolization) shrinks uterine fibroids by depriving them of a blood supply using small particles called embolic agents.

In UFE, the doctor uses fluoroscopy to inject the agents through a catheter and into the arteries that supply blood to the fibroids. The small particles block blood flow to the fibroids and cause them to shrink. Nearly 90 percent of patients with fibroids who undergo UFE experience relief from their symptoms.

## What is Magnetic Resonance-Guided Focused Ultrasound (MRgFUS)?

Magnetic Resonance-guided Focused Ultrasound (MRgFUS) delivers a series of targeted ultrasonic pulses (also called sonications) to heat and destroy uterine fibroids. This procedure uses MRI guidance to precisely target the fibroids and avoid nearby healthy tissue. MRgFUS is also known as focused ultrasound surgery or focused ultrasound ablation.

## What are some common uses of UFE and MRgFUS?

Doctors use UFE and MRgFUS to treat symptomatic fibroids in the uterus. These procedures are non-surgical alternatives to hysterectomy and myomectomy.

MRgFUS helps preserve the uterus and the patient's ability to become pregnant. Doctors do not fully understand the effect of UFE on fertility. Therefore, they typically use it in patients who no longer wish to become pregnant. However, patients who want to avoid a hysterectomy may choose to undergo UFE. Doctors have used embolization of the uterine arteries for decades to stop severe pelvic bleeding caused by:

- trauma
- malignant gynecological tumors
- hemorrhage after childbirth.

## How should I prepare?

You will undergo magnetic resonance imaging (MRI) or ultrasound of the uterus to determine if you are a candidate for treatment. These exams will also assess the size, number and location of your fibroids and help develop your treatment plan. *For information on how to prepare for these exams, see the Body MRI (<https://www.radiologyinfo.org/en/info/bodymr>) and Sonohysterography (<https://www.radiologyinfo.org/en/info/hysterosono>) pages.*

Your doctor may recommend a pregnancy test. Pregnant patients should not undergo UFE or MRgFUS. Your doctor may want to look directly at your uterus by performing a laparoscopy. If you are bleeding heavily between periods, they may biopsy the endometrium (inner lining of the uterus) to rule out cancer. *See the Abnormal Vaginal Bleeding page (<https://www.radiologyinfo.org/en/info/vaginalbleeding>) for more information.*

Tell your doctor about all the medications you take, including herbal supplements. List any allergies, especially to local anesthetic, general anesthesia, or contrast materials. Your doctor may tell you to stop taking aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs) or blood thinners before your procedure. Tell your doctor about recent illnesses or other medical conditions.

Your doctor will likely tell you to fast after midnight before your procedure. Your doctor will tell you which medications you may take in the morning. The nurse will give you a gown to wear. Ask your doctor if you will need to stay overnight at the hospital following your procedure. If no, plan to have someone drive you home.

## What does the equipment look like?

UFE typically uses one or two x-ray tubes, a catheter, embolic agents, and a video monitor. Fluoroscopy converts x-rays into video images. Doctors use it to watch and guide procedures. The x-ray machine and a detector suspended over the exam table

produce the video. UFE may use other equipment, including an intravenous line (IV), ultrasound machine, and devices that monitor your heart beat and blood pressure.

The doctor will use fluoroscopy to insert and guide the catheter to the uterine arteries. They will inject the embolic agent through the catheter and into the artery to stop the fibroid's blood supply. Different types of agents include:

- polyvinyl alcohol, a plastic material that resembles coarse sand
- Gelfoam™, a gelatin sponge material
- microspheres, polyacrylamide spheres with a gelatin coating.

All of these embolic agents are safe and effective for UFE.

MRgFUS uses magnetic resonance imaging (MRI). The traditional MRI unit is a large cylinder-shaped tube surrounded by a circular magnet with a moveable examination table that slides into the center of the magnet. MRgFUS uses a specialized MRI unit. It has a high-energy, focused ultrasound transducer attached to a moveable arm under the exam table. A radiologist in an adjacent room will operate the transducer remotely.

Prior to the procedure, the technologist will screen you for the presence of any metal objects in or on your body. *For complete information on how to prepare for MRI, see the Body MRI (<https://www.radiologyinfo.org/en/info/bodymr>) page.*

## How does the procedure work?

UFE uses fluoroscopy to insert a catheter through the groin and guide it to the uterine arteries. Once the catheter is in place, the doctor will inject the embolic agents through the catheter and into the arteries to block the fibroid's blood supply. As the fibroids die and begin to shrink over time, the uterus will recover.

MRgFUS uses MRI to focus ultrasonic energy on a small area inside the body without damaging the tissue around it. A transducer sends concentrated, high-energy sound waves at the targeted fibroid. These focused pulses of high-frequency sound waves (sonications) raise the temperature at the targeted spot, destroying tissue. The process is like focusing sunlight with a lens to burn a hole in a leaf.

## How is the procedure performed?

### UFE

The interventional radiologist performs UFE in a catheterization lab or occasionally in the operating room. This is may be an inpatient or outpatient procedure. Talk with your doctor about whether you will need to stay in the hospital after the procedure. Many physicians perform UFE as an outpatient procedure.

You will change into a gown and lie on the procedure table. The doctor or nurse may connect you to monitors that track your heart rate, blood pressure, oxygen level, and pulse. A nurse or technologist will insert an intravenous (IV) line into a vein in your hand or arm to provide sedation and medication as needed.

They will sterilize and cover this area with a surgical drape. Your doctor will numb the area with a local anesthetic. This may briefly burn or sting before the area becomes numb. The doctor will make a tiny skin incision at the site and insert the catheter into the femoral artery (a large groin blood vessel) or radial artery (a smaller blood vessel in the wrist).

Using x-ray guidance, the doctor will maneuver the catheter to the treatment site. The doctor will inject the embolic agent through the catheter until the blood vessels on both sides are blocked. *See the Catheter Embolization page (<https://www.radiologyinfo.org/en/info/cathembol>) for more information.*

## MRgFUS

The interventional radiologist performs MRgFUS as an outpatient procedure in an MRI scanning room.

You will change into a gown and lie on the procedure table. The doctor or nurse may connect you to monitors that track your heart rate, blood pressure, oxygen level, and pulse. A nurse or technologist will insert an intravenous (IV) line into a vein in your hand or arm to provide medication as needed.

During MRgFUS, the doctor will insert a Foley catheter into your bladder to drain it during treatment. A full bladder will move the uterus and the positioning of the fibroids. The doctor may fill your rectum with an ultrasound gel to move it away from the uterus during treatment. You will need to wear compression stockings to help prevent deep vein thrombosis (*blood clots* (<https://www.radiologyinfo.org/en/info/bloodclot>)).

Each sonication lasts about 15 to 25 seconds, during which time the radiologist monitors the progress and reviews temperature-sensitive images. The procedure usually requires 50 or more sonications. The entire process typically takes several hours, depending on the size and number of fibroids to be treated.

Following the procedure, the doctor will perform additional imaging to verify that the fibroids have been destroyed. You will receive light sedation during MRgFUS, so you should plan to have someone drive you home.

## What will I experience during and after the procedure?

If the procedure uses sedation, you will feel relaxed, sleepy, and comfortable. You may or may not remain awake, depending on how deeply you are sedated.

## UFE

You may feel pressure when the doctor inserts the catheter into the blood vessel. However, you will not feel serious discomfort. The doctor will inject contrast material into the uterine arteries to assist in maneuvering the catheter into place. As the contrast material passes through your body, you may feel warm. This will quickly pass.

When UFE is complete, the doctor will remove the catheter and apply pressure to stop any bleeding. Sometimes, your doctor may use a closure device to seal the small hole in the artery. This will allow you to move around more quickly. No stitches are visible on the skin. The nurse will cover this tiny opening in the skin with a dressing. UFE is usually complete within 90 minutes. If any discomfort is under control, you may be able to go home the same day of the procedure. Some patients may require observation in the hospital for pain control. If you stay overnight at the hospital, you should be able to return home the day after the procedure.

You may experience pelvic cramps for several days after UFE. You may also have mild nausea and low-grade fever. The cramps are most severe during the first 24 hours after the procedure and will improve rapidly over the next several days. These symptoms can usually be managed well with medications.

Once you return home, your doctor will prescribe pain and other oral medications. You should be able to return to your normal activities within one to two weeks after UFE.

It is common for menstrual bleeding to be diminished during your first period following UFE. You may miss a menstrual cycle or two. Rarely, patients may stop having periods after undergoing UFE. Relief from symptoms usually takes two to three weeks to be noticeable. The fibroids are typically done shrinking and softening by six months.

## MRgFUS

The radiologist will perform the exam while working at a computer in an adjacent room. You will be able to talk to the technologist and doctor via an intercom. The radiologist will inform you when the MR images are being acquired and when you

are receiving sonications.

During treatment, it is normal to feel a warming sensation in the pelvic region. You also may experience pain similar to that of a menstrual cramp. You can immediately stop the procedure at any time by using the handheld safety button provided to you. In addition, you'll be asked about your comfort level throughout the treatment so that the doctor may adjust your medication and make any other necessary changes.

Most MRI exams are painless. However, some patients find it uncomfortable to remain still. Others may feel closed-in (claustrophobic) while in the MRI scanner. The scanner can be noisy.

After the procedure is complete, you will rest for a few hours in the clinic while the sedative wears off. You'll then be able to return home. You should be able to resume your normal daily activities within a day or two after treatment.

You may experience some abdominal or pelvic pain in the days following the procedure. In most cases, this can be treated with over-the-counter medications such as ibuprofen (Advil, Motrin IB, others) or acetaminophen (Tylenol, others).

Occasionally, MRgFUS may cause redness on your abdominal skin, skin burns, bleeding and/or bruising immediately after treatment. These effects usually resolve within a week or two. Irregular menstrual bleeding may occur for a few weeks after the procedure.

Over months and even years, your body will gradually and naturally absorb the treated tissue. Most patients' fibroid-related symptoms significantly improve within the first six months after MRgFUS. Patients should continue to have symptom relief for three years following treatment.

IV contrast manufacturers indicate mothers should not breastfeed their babies for 24-48 hours after contrast material is given. However, the most recent American College of Radiology (ACR) Manual on Contrast Media reports that studies show the amount of contrast absorbed by the infant during breastfeeding is extremely low. *For further information please consult the ACR Manual on Contrast Media (<https://www.acr.org/Clinical-Resources/Contrast-Manual>) and its references.*

## Who interprets the results and how do I get them?

The interventional radiologist will discuss the results with you and coordinate follow-up care with your primary care physician or gynecologist. You may have follow-up imaging to assess how you are responding to treatment.

## What are the benefits vs. risks?

### Benefits of UFE

- Uterine fibroid embolization with local anesthesia is much less invasive than open or laparoscopic surgery to remove individual uterine fibroids (myomectomy) or the whole uterus (hysterectomy).
- No surgical incision is necessary—only a small nick in the skin that does not need stitches.
- Patients ordinarily can resume their usual activities much earlier than if they had surgery to treat their fibroids.
- Compared to surgery, UFE does not require general anesthesia, and recovery time is much shorter with virtually no blood loss.
- Follow-up studies have shown that nearly 90 percent of patients who have their fibroids treated by UFE experience either significant or complete resolution of their fibroid-related symptoms. This is true both for patients who have heavy bleeding and for those who have bulk-related symptoms including urinary frequency, incontinence, leg and back pain, or pelvic pain or pressure. On average, fibroids will shrink to half their original volume following UFE. More importantly, they soften and no longer put pressure on the pelvic organs.
- Follow-up studies over several years have shown that it is uncommon for treated fibroids to regrow or for new fibroids to develop after UFE. This is because all fibroids present in the uterus, even early-stage nodules, are treated during the

procedure. UFE is a more permanent solution than hormonal therapy. Once hormonal therapy is stopped, fibroid tumors usually grow back. Regrowth also has been a problem with laser treatment of uterine fibroids.

## Risks of UFE

- Any procedure that penetrates the skin carries a risk of infection. The chance of infection requiring antibiotic treatment appears to be less than one in 1,000.
- Any procedure that places a catheter inside a blood vessel carries certain risks. These risks include damage to the blood vessel, bruising or bleeding at the puncture site, and infection. The doctor will take precautions to mitigate these risks.
- When performed by an experienced interventional radiologist, the chance of any of these events occurring during UFE is less than one percent.
- There is always a chance that an embolic agent can lodge in the wrong place and deprive normal tissue of its oxygen supply.
- Occasionally, patients may have an allergic reaction to the x-ray contrast material used during a UFE. These range from mild itching to severe reactions that can affect a patient's breathing or blood pressure. Patients undergoing UFE are carefully monitored by a physician and a nurse during the procedure, so that any allergic reaction can be detected immediately and addressed.
- Approximately two to three percent of patients will pass small pieces of fibroid tissue out of their body after a UFE. This occurs when fibroids located inside the uterine cavity detach after embolization. If this occurs, you may require a D & C (dilatation and curettage) procedure to be certain that all the material is removed to prevent bleeding or infection from developing.
- Most patients who undergo UFE return to a normal menstrual cycle after the procedure. However, in approximately one percent to five percent of patients, menopause occurs following the UFE procedure. This occurs more commonly in patients who are over the age of 45.
- Although the goal of UFE is to cure fibroid-related symptoms without surgery, some patients may eventually need a hysterectomy because of infection or persistent symptoms. The likelihood of requiring hysterectomy after UFE depends on how close a patient is to menopause. The younger the patient, the greater the tendency to develop new fibroids and/or recurrent symptoms.
- Patients are exposed to x-rays during UFE. However, the level of exposure is so low there is little risk of adverse effects on the patient or future childbearing.
- The question of whether UFE impacts fertility has not yet been answered. However, many healthy pregnancies have been documented in patients who have undergone UFE. Doctors may recommend that those who wish to become pregnant in the future consider surgical removal of the individual tumors rather than undergoing UFE. If this is not possible, UFE may still be the best option.
- It is not possible to predict whether the uterine wall is weakened by UFE, which might pose a problem during childbirth. Therefore, the current recommendation is to use contraception for six months after the procedure and to undergo a Cesarean section for future pregnancies. This should reduce the risk of rupturing the wall of the uterus by the intense muscular contractions that occur during labor.

## Benefits of MRgFUS

- The procedure may provide rapid improvement of symptoms associated with uterine fibroids without invasive surgery.
- MRgFUS offers a brief recovery time and may allow a quick return to normal activities after the procedure.
- The procedure has a low risk of complications.
- MRgFUS preserves the uterus. A number of patients have had successful pregnancies after MRgFUS treatment for uterine fibroids. However, doctors are still studying the long-term effects of MRgFUS on a patient's ability to become pregnant and carry a baby to term. Because MRgFUS hasn't been in use as long as other fibroid treatments, there is less long-term data available on its safety and effectiveness and its effects on fertility and pregnancy.
- MRI is a noninvasive imaging technique that does not involve exposure to radiation. MRI poses almost no risk to the average patient when appropriate safety guidelines are followed.

- The MRI gadolinium contrast material is less likely to cause an allergic reaction than the iodine-based contrast materials used for x-rays and CT scanning.

## Risks of MRgFUS

- If sedation is used, there is a risk of using too much. However, your vital signs will be monitored to minimize this risk.
- The strong magnetic field is not harmful to you. However, it may cause implanted medical devices to malfunction or distort the images.
- Nephrogenic systemic fibrosis is a recognized complication related to injection of gadolinium contrast. It is exceptionally rare with the use of newer gadolinium contrast agents. It usually occurs in patients with serious kidney disease. Your doctor will carefully assess your kidney function before considering a contrast injection.
- There is a very slight risk of an allergic reaction if your exam uses contrast material. Such reactions are usually mild and controlled by medication. If you have an allergic reaction, a doctor will be available for immediate assistance.
- Although there are no known health effects, evidence has shown that tiny amounts of gadolinium can remain in the body, particularly the brain, after multiple MRI exams. This is most likely to occur in patients receiving multiple MRI exams over their lifetime for monitoring chronic or high-risk health conditions. The contrast agent is mostly eliminated from the body through the kidneys. If you are a patient in this category, consult with your doctor about the possibility of gadolinium retention, as this effect varies from patient to patient.
- MRgFUS may cause burns to the skin on your lower abdomen with possible scar formation.
- The procedure carries a possible, but rare, risk of bowel injury.
- MRgFUS may result in temporary or permanent nerve damage and cause numbness, muscle weakness, or sensory loss.
- Blood clots may occur as a result of the procedure.

## What are the limitations of Uterine Fibroids Treatment?

UFE should not be performed in patients who have no symptoms from their fibroid tumors, when cancer is a possibility, or when there is inflammation or infection in the pelvis. UFE is not an option for patients who are pregnant. A patient who is known to be severely allergic to contrast materials that contain iodine will require pre-treatment before UFE or may need to consider a different treatment option.

MRgFUS may not be a good choice for some patients, including:

- pregnant patients
- patients with multiple abdominal scars
- patients with many fibroids or very large fibroids

As with many other fibroid treatments, MRgFUS may not be able to treat some fibroids. You may require further treatment if your symptoms return. Not all insurance companies cover MRgFUS. Check with your provider for more information.

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