



# Treating Gastrointestinal Stromal Tumors

If you've been diagnosed with a gastrointestinal stromal tumor (GIST), your cancer care team will discuss your treatment options with you. It's important to weigh the benefits of each treatment option against the possible risks and side effects.

## Which treatments are used for GISTs?

Not all GISTs need to be treated right away. But if treatment is needed, the main types used include:

- [Surgery](#)
- [Targeted therapy drugs](#)

Other treatments, such as [ablation and embolization](#), [chemotherapy](#), and [radiation therapy](#), are used much less often.

See [Treatment Choices for Gastrointestinal Stromal Tumors Based on Tumor Spread](#) to learn more about some of the most common treatment plans.

## Which doctors treat GISTs?

Based on your treatment options, you might have different types of doctors on your treatment team, including:

- A **surgical oncologist**: a doctor who treats cancer with surgery
- A **medical oncologist**: a doctor who treats cancer with medicines
- A **gastroenterologist**: a doctor who specializes in treatment of diseases of the gastrointestinal (digestive) system
- A **radiation oncologist**: a doctor who treats cancer with radiation therapy

You might have many other specialists on your treatment team as well, including physician assistants (PAs), nurse practitioners (NPs), nurses, nutrition specialists, social workers, rehabilitation specialists, psychologists, and other health professionals. See [Health Professionals Associated With Cancer Care](#) for more on this.

## Making treatment decisions

It's important to discuss all treatment options, including their goals and possible side effects, with your doctors to help make the decision that best fits your needs. Some important things to consider include:

- Your age and expected life span
- Any other serious health conditions you have
- The location and [stage](#) of your tumor
- The likelihood that treatment will cure your tumor (or help in some other way)
- Your feelings about the possible side effects from treatment

You may feel that you need to decide quickly, but it's important to give yourself time to absorb the information you have learned. It's also very important to ask questions if there is anything you're not sure about. See [Questions to Ask About Gastrointestinal Stromal Tumors](#) for ideas.

## Getting a second opinion

If you have time, it is often a good idea to seek a [second opinion](#). This can give you more information and help you feel more confident about the treatment plan you choose. If you aren't sure where to go for a second opinion, ask your doctor for help.

## Thinking about taking part in a clinical trial

Clinical trials are carefully controlled research studies that are done to get a closer look at promising new treatments or procedures. Clinical trials are one way to get state-of-the-art cancer treatment. Sometimes they may be the only way to get access to newer treatments. They are also the best way for doctors to learn better methods to treat cancer. Still, they are not right for everyone.

If you would like to learn more about clinical trials that might be right for you, start by asking your doctor if your clinic or hospital conducts clinical trials. See [Clinical Trials](#) to learn more.

## Considering complementary and alternative methods

You may hear about alternative or complementary methods that your doctor hasn't mentioned to treat your cancer or relieve symptoms. These methods can include vitamins, herbs, and special diets, or other methods such as acupuncture or massage, to name a few.

**Complementary methods** refer to treatments that are used *along with* your regular medical care. **Alternative treatments** are used *instead of* a doctor's medical treatment. Although some of these methods might be helpful in relieving symptoms or helping you feel better, many have not been proven to work. Some might even be dangerous.

Be sure to talk to your cancer care team about any method you are thinking about using. They can help you learn what is known (or not known) about the method, which can help you make an informed decision. See the [Complementary and Alternative Medicine](#) section to learn more.

## Choosing to stop treatment or choosing no treatment at all

For some people, when treatments have been tried and are no longer controlling the cancer, it could be time to weigh the benefits and risks of continuing to try new treatments. Whether or not you continue treatment, there are still things you can do to help maintain or improve your quality of life. Learn more in [If Cancer Treatments Stop Working](#).

Some people, especially if the cancer is advanced, might not want to be treated at all. There are many reasons you might decide not to get cancer treatment, but it's important to talk this through with your doctors before you make this decision. Remember that even if you choose not to treat the cancer, you can still get supportive care to help with pain or other symptoms.

## Help getting through cancer treatment

Your cancer care team will be your first source of information and support, but there are other resources for help when you need it. Hospital- or clinic-based support services are an important part of your care. These might include nursing or social work services, financial aid, nutritional advice, rehab, or spiritual help.

The American Cancer Society also has [programs and services](#) – including rides to treatment, lodging, and more – to help you get through treatment. Call our National Cancer Information Center at 1-800-227-2345 and speak with one of our trained specialists.

*The treatment information given here is not official policy of the American Cancer Society and is not intended as medical advice to replace the expertise and judgment of your cancer care team. It is intended to help you and your family make informed decisions, together with your doctor. Your doctor may have reasons for suggesting a treatment plan different from these general treatment options. Don't hesitate to ask him or her questions about your treatment options.*

## **Surgery for Gastrointestinal Stromal Tumor**

Surgery is usually main treatment for gastrointestinal stromal tumors (GISTs) that haven't spread. The goal of the surgery is to remove all of the cancer.

The type of surgery needed depends on the location and size of the tumor.

### **Surgery for small GISTs**

If the tumor is small, it often can be removed along with a small area of normal tissue around it. This is done through a cut (incision) in the skin. Unlike many other cancers, GISTs almost never spread to the lymph nodes, so removing nearby lymph nodes is usually not needed.

For some small cancers, “keyhole” (laparoscopic) surgery is an option. Instead of making a large incision in the skin to remove the tumor, several small ones are used. The surgeon inserts a thin lighted tube with a tiny video camera on the end (a laparoscope) through one of them. This lets him or her see inside the belly. Long, thin surgical tools are then used through the other incisions to remove the tumor. Because the incisions are small, patients usually recover more quickly from this type of surgery than from traditional surgery that requires a longer incision.

### **Surgery for larger GISTs**

If the tumor is large or growing into other organs, the surgeon might still be able to

remove it entirely. To do this, parts of organs (such as a section of the intestines) might need to be removed. The surgeon might also remove tumors that have spread elsewhere in the abdomen, such as the liver.

Another option for tumors that are large or have grown into nearby areas might be to have the patient take the [targeted drug](#) imatinib (Gleevec) first. This can often shrink the tumor, which can make it easier to remove with surgery.

## Choosing your surgeon

No matter what type of surgery is done, it's very important that it is done by a surgeon experienced in treating GISTs. GISTs are often delicate tumors, and surgeons must be careful not to open the outer lining that surrounds them (known as the *capsule*), because it might increase the risk of spreading the cancer. GISTs also tend to have a lot of blood vessels, so your surgeon has to be careful to control any bleeding from the tumor.

For more information about surgery, see [Cancer Surgery](#).

- [References](#)

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# Ablation and Embolization to Treat Gastrointestinal Stromal Tumors

If a gastrointestinal stromal tumor (GIST) has spread to the liver, treatments such as ablation and embolization might be used.

## Ablation

Ablation is the destruction of tumors using extreme heat or cold, or using chemicals. It can sometimes be used to destroy GISTs that have spread as no more than a few small tumors in the liver. Because ablation often destroys some of the normal tissue around the tumor, it might not be a good choice for treating tumors near important structures like major blood vessels, the diaphragm (the thin breathing muscle above the liver), or major ducts in the liver.

There are several types of ablation:

- **Radiofrequency ablation (RFA)**, which uses high-energy radio waves to heat the tumor and destroy cancer cells
- **Ethanol (alcohol) ablation**, where concentrated alcohol is injected directly into the tumor to kill cancer cells
- **Microwave thermotherapy**, where microwaves transmitted through a probe placed in the tumor are used to heat and destroy the cancer cells
- **Cryosurgery (cryotherapy)**, which destroys a tumor by freezing it using a thin metal probe. This method sometimes requires general anesthesia (where you are deeply asleep and not able to feel pain)

## What to expect

Usually, you don't need to stay in the hospital for this type of treatment. Ablation can often be done without surgery by inserting a needle or probe into the tumor through the skin. The needle or probe is guided into place with ultrasound or CT scanning. Sometimes, though, to be sure the treatment is aimed at the right place, it is done during surgery.

## Possible side effects of ablation

Possible side effects after ablation therapy include abdominal (belly) pain, infection in the liver, and bleeding into the chest cavity or abdomen. Serious complications are uncommon, but they can happen.

## Embolization

Embolization is a procedure that injects substances to try to block or reduce the blood flow to cancer cells in the liver.

The liver is unusual in that it has 2 blood supplies. Most normal liver cells are fed by branches of the portal vein, whereas cancer cells in the liver are usually fed by branches of the hepatic artery. Blocking the branch of the hepatic artery feeding the tumor helps kill off the cancer cells, but it leaves most of the healthy liver cells unharmed because they get their blood supply from the portal vein.

Embolization does reduce some of the blood supply to the normal liver tissue, so it may not be a good option for some patients whose liver has already been damaged by diseases such as hepatitis or cirrhosis.

### What to expect

The main type of embolization used to treat GISTs that have spread to the liver is arterial embolization (also known as **trans-arterial embolization or TAE**). In this procedure, a catheter (a thin, flexible tube) is put into an artery through a small cut in the inner thigh and threaded up into the hepatic artery in the liver. A dye is usually injected into the bloodstream at this time to help the doctor see the path of the catheter via angiography, a special type of x-ray. Once the catheter is in place, small particles are injected into the artery to plug it up.

Typically, you won't have to stay in the hospital for this treatment.

### Possible side effects of embolization

Possible complications after embolization include abdominal (belly) pain, fever, nausea, infection in the liver, gallbladder inflammation, and blood clots in the main blood vessels of the liver. Because healthy liver tissue can be affected, there is a risk that liver function will get worse after treatment. This risk is higher if a large branch of the hepatic artery is embolized. Serious complications are not common, but they are possible.

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## Targeted Therapy for Gastrointestinal Stromal Tumor

Some drugs can target the [gene changes](#) in gastrointestinal stromal tumor (GIST) cells that have been found in recent years. These drugs work differently from standard [chemotherapy](#) (chemo) drugs. Targeted drugs are very helpful in treating GISTs, while standard chemo drugs are usually not helpful.

All of these targeted drugs are pills, taken once a day.

### Imatinib (Gleevec)

This drug is used to treat most patients with GISTs at some point. It targets both the KIT and PDGFRA proteins, blocking their ability to make tumor cells grow and divide. In most GISTs, the cells have too much of one of these proteins.

Overall, most tumors shrink by at least half when treated with imatinib. Some other tumors shrink less or at least stop growing for a time. A small number of tumors are not helped by this treatment.



Imatinib can be helpful in different situations:

- If a GIST has been completely removed by [surgery](#), doctors typically recommend taking imatinib for at least a year afterward (unless the risk of the cancer coming back is low). This is known as **adjuvant therapy**. Many doctors now recommend at least 3 years of imatinib after surgery for patients who are at a higher risk of their tumors returning (based on the tumor's size, location, and growth rate).
- For larger tumors that may be hard to remove, imatinib may be used first to try to shrink the tumor and make surgery easier. This is known as **neoadjuvant therapy**. Imatinib is often given again after surgery as well.
- Imatinib is usually the treatment of choice for **advanced GISTs** that have spread too far to be removed by surgery. It doesn't seem to cure these tumors, but it can often shrink or slow their tumors' growth for several years, helping patients live longer and feel better. If the drug stops working and the tumor starts growing again, raising the dose of imatinib may help stop the growth for some time, but higher doses can have more side effects.

Side effects can include mild stomach upset, diarrhea, muscle pain, and skin rashes. The stomach upset is lessened if the drug is taken with food. Imatinib can also make people retain fluid. Often this causes some swelling in the face (around the eyes) or in the ankles. Rarely the drug causes more severe problems, with fluid building up in the lungs or in the abdomen. It can also affect heart function in some people.

One other concern when using this drug to treat large GISTs is that these tumors often have a lot of fragile blood vessels. If imatinib causes the tumor to shrink quickly, it could lead to internal bleeding. For this reason, doctors watch patients carefully when they first start taking this drug.

## **Sunitinib (Sutent)**

This drug can be useful in treating GIST if imatinib is no longer working or if a person can't take imatinib because of its side effects.

Sunitinib targets the KIT and PDGFRA proteins, as well as several other proteins that imatinib does not target.

Sunitinib helps some patients, usually by slowing the growth of the tumor. It can also shrink tumors in a small number of patients. More importantly, patients getting the drug may live longer.

Common side effects of sunitinib include fatigue, diarrhea, mouth irritation, and skin and

hair color changes. More serious side effects can include high blood pressure, increased risk of bleeding, swelling, heart problems, and serious liver problems.

## Regorafenib (Stivarga)

Regorafenib can be used to treat GIST if imatinib and sunitinib stop working. This drug targets many proteins, including KIT and PDGFRA.

Regorafenib can slow tumor growth and even shrink some tumors. So far, though, it's not clear if it helps people live longer.

Common side effects include diarrhea, fatigue, high blood pressure, mouth irritation, hair loss, loss of appetite, and problems with redness, pain, or even blistering of the palms of the hands and soles of the feet (called *hand-foot syndrome*).

Several other targeted drugs are now being studied for use against GISTs as well.

More information about these types of drugs can be found in [Targeted Cancer Therapy](#).

- [References](#)

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# Chemotherapy for Gastrointestinal Stromal Tumor

Chemotherapy (chemo) is the use of drugs to treat cancer. Often, these drugs are injected into a vein (IV) or given by mouth. They enter the bloodstream and reach throughout the body, making this treatment potentially useful for cancers that have spread beyond the organ they started in.

Any drug used to treat cancer can be considered chemo – even the [targeted therapy drugs](#) like imatinib (Gleevec) that are now commonly used to treat gastrointestinal stromal tumors (GISTs). But the term *chemo* is usually used to describe certain drugs that work by attacking quickly growing cells anywhere in the body, which includes cancer cells.

Before targeted therapy drugs were found to be helpful in treating GISTs, traditional chemo drugs were often tried. But GISTs rarely shrank in response to these drugs, so traditional chemo is rarely used today. Patients considering chemo may want to consider taking part in a [clinical trial](#).

## Possible side effects

Chemo drugs can cause [side effects](#). These depend on the specific drugs used, their doses, and how long treatment lasts. Common side effects of chemo include:

- Nausea and vomiting
- Loss of appetite
- Mouth sores
- Diarrhea
- Hair loss
- An increased chance of infection (from a shortage of white blood cells)
- Problems with bleeding or bruising (from a shortage of blood platelets)
- Fatigue or shortness of breath (from low red blood cell counts)

Along with the risks above, some chemo drugs can cause other side effects.

Ask your health care team about what side effects you can expect based on the specific

drugs you will get. Be sure to tell your doctor or nurse if you do have side effects, as there are often ways to help with them. For example, drugs can be given to help prevent or reduce nausea and vomiting.

To learn more, see [Chemotherapy](#).

- [References](#)

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## Radiation Therapy for Gastrointestinal Stromal Tumor

Radiation therapy is the use of high-energy x-rays (or particles) to kill cancer cells. Radiation is not very helpful in treating gastrointestinal stromal tumors (GISTs), so it is not used often. But sometimes it can be used to relieve symptoms like bone pain.

Before your treatment starts, the radiation team will take careful measurements to find the correct angles for aiming the radiation beams and the proper dose of radiation. This planning session, called *simulation*, usually includes getting [imaging tests](#) such as CT or MRI scans.

Radiation therapy is much like getting an x-ray, but the radiation is much stronger. The treatment itself is painless. It lasts only a few minutes, although the setup time – getting you into place for treatment – usually takes longer. You might get radiation treatment for several days in a row.

## **Possible side effects**

Depending on where the radiation is aimed, [side effects](#) may include:

- Skin changes in areas getting radiation, ranging from redness to blistering and peeling
- Nausea and vomiting
- Diarrhea
- Fatigue
- Low blood counts

Most side effects go away a short while after treatment ends, although fatigue and skin changes may last longer. Talk with your doctor about the possible side effects and the ways to reduce or relieve them.

For more information, see [Radiation Therapy](#).

- [References](#)

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# Treatment Choices for Gastrointestinal Stromal Tumor Based on Tumor Spread

Treatment for gastrointestinal stromal tumors (GISTs) depends mainly on the size of the tumor, where it is, how far it has spread, and how quickly it is growing (its [mitotic rate](#)).

## Localized, smaller (resectable) tumors

Most small GISTs will need to be treated. But for some very small tumors (less than 2 centimeters across) that are not causing any symptoms, one option may be just to watch the tumor carefully with [endoscopy](#) once or twice a year. If it is not growing, you might not need further treatment.

[Surgery](#) is the main treatment for most small tumors. The need for further treatment depends on the risk of the GIST coming back after surgery.

Tumors that are small and are not growing quickly typically have a low risk of coming back, so often no further treatment is needed.

The risk of a GIST coming back after surgery is higher if the tumor is larger, if it did not start in the stomach, or if the cancer cells are dividing quickly (have a high mitotic rate). If the doctor thinks that the cancer has an intermediate or high risk of coming back based on these factors, adjuvant treatment with the [targeted drug](#) imatinib (Gleevec) is typically recommended for at least a year after surgery. For tumors that are highly likely to come back, many doctors now recommend at least 3 years of imatinib.

## Localized, larger (marginally resectable) tumors

Tumors that are larger or in places that make them harder to remove (resect) completely might require more extensive [surgery](#), which could cause health problems later on. Because of this, surgery is not typically the first treatment.

Before starting treatment, it's important to be sure that the tumor is in fact a GIST, so a biopsy is needed. Once a biopsy is done, treatment with the [targeted drug](#) imatinib is usually started to try to shrink the tumor. It is continued at least until the tumor stops

shrinking.

If the tumor shrinks enough, surgery might be done if the doctor thinks he or she can remove it safely. Imatinib will likely be continued after surgery to help lower the chance that the cancer will come back.

If the tumor doesn't shrink enough to make surgery possible, imatinib is often continued for as long as it seems to help. If it's no longer working, sometimes upping the dose can be helpful. If this is no longer helpful, or if the side effects are too severe, the targeted drug sunitinib (Sutent) may be tried instead. If sunitinib is no longer working, regorafenib (Stivarga) may help some patients.

## **Tumors that are not removable or have spread to distant sites (unresectable tumors)**

Treatment options for GISTs that cannot be removed with surgery or have spread (metastasized) depends on why they are unresectable and, if they have spread, how extensive the spread is.

[Surgery](#) is not typically the first treatment for these tumors, so before starting treatment, it's important to confirm that the tumor is in fact a GIST with a biopsy.

Once a biopsy is done, the [targeted drug](#) imatinib is typically the preferred first treatment. It is continued as long as the tumor doesn't grow (and the patient can tolerate the side effects of the drug). If the tumor starts to grow again, it may respond to increasing the dose of imatinib. If the tumor continues to grow or the side effects from imatinib are too severe, a switch to sunitinib may be helpful. If sunitinib is no longer working, regorafenib may help some patients.

If the tumor shrinks enough with targeted therapy, surgery may then be an option for some patients. This might be followed by more targeted therapy if it is still effective.

If the cancer has spread to only 1 or 2 sites in the abdomen (such as the liver), the surgeon may advise removing the main tumor and trying to remove these other tumors as well. If this is the case, be sure to talk with your doctor about what the goals of treatment are (whether it is to try to cure the cancer, to help you live longer, or to prevent or reduce symptoms), as well as its possible benefits and risks. Usually this should be considered only for tumors that are slow growing or those causing complications such as uncontrollable bleeding.

Other options to treat cancers that have spread to the liver include [ablation and embolization](#) to try to destroy these tumors.

Cancers that are no longer responding to the [targeted drugs](#) discussed above can be hard to treat. Some doctors may recommend trying other targeted drugs, such as sorafenib (Nexavar), dasatinib (Sprycel), nilotinib (Tasigna), or pazopanib (Votrient), although it's not yet clear how helpful these drugs are.

Standard [chemotherapy drugs](#) are usually not very effective. Taking part in a [clinical trial](#) of a newer treatment may be a good option for some people.

## Recurrent tumors

When a cancer comes back after treatment, it is called a *recurrence*. If the cancer comes back (recurs) in or near the place it started, it is called a *local recurrence*. If it recurs at other sites (like the lungs or liver), it is called a *distant recurrence*. Treatment options for recurrent GISTs depend on the location and extent of the recurrence.

For most recurrences, treatment with the [targeted drug](#) imatinib is probably the best way to shrink any tumors, as long as it is still effective and the patient can tolerate taking it. If the starting dose of imatinib doesn't work, the dose can be increased. Another option is to try other targeted drugs, such as sunitinib or regorafenib.

If the cancer comes back as one or more well-defined tumors, [removing](#) or [destroying](#) the tumor may be an option. Doctors are still not certain if removing GISTs that come back after treatment helps people live longer. You should discuss the risks and benefits of this treatment with your doctor and family.

If the targeted drugs mentioned above are no longer helpful, some doctors may recommend trying other targeted drugs, such as sorafenib (Nexavar), dasatinib (Sprycel), nilotinib (Tasigna), or pazopanib (Votrient), although it's not yet clear how helpful these drugs are.

Because these cancers are often hard to treat, you may want to consider taking part in [clinical trials](#) of newer treatments as well.

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