



Treating Lung Carcinoid Tumors

Making treatment decisions for lung carcinoid tumors

After the lung carcinoid tumor is found and staged, your cancer care team will discuss your treatment options with you. The main factors in selecting a treatment are the type of carcinoid, the size and location of the tumor, whether it has spread to lymph nodes or other organs, and if you have any other serious medical conditions. Based on these factors, the main treatment options for people with lung carcinoid tumors can include:

- [Surgery](#)
- [Chemotherapy](#)
- [Other drug treatments](#)
- [Radiation therapy](#)

These treatments might be used alone or in different combinations, [depending on the type and extent of the disease](#).

Selecting a treatment plan is an important decision, and you should take the time to think about all of your choices. Be sure to discuss all of your treatment options as well as their possible side effects with your doctors to help make the decision that best fits your needs. (See [What Should You Ask Your Doctor About Lung Carcinoid Tumors?](#) for some questions to ask.)

Seeking a second opinion is often a good idea if time permits. It can give you more information and help you feel more confident about the treatment plan you choose.

You may have different types of doctors on your treatment team, [depending on the stage of your cancer](#) and your treatment options. These doctors may include:

- A thoracic surgeon: a doctor who treats diseases of the lungs and chest with surgery
- A medical oncologist: a doctor who treats cancer with medicines such as

chemotherapy

- A pulmonologist: a doctor who specializes in medical treatment of diseases of the lungs
- A radiation oncologist: a doctor who treats cancer with radiation therapy

Many other specialists might be part of your treatment team as well, including physician assistants (PAs), nurse practitioners (NPs), nurses, nutrition specialists, social workers, and other health professionals. To learn more about who may be on your cancer care team, see [Health Professionals Associated With Cancer Care](#).

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. In some cases 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.

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 to Treat Lung Carcinoid Tumors

Surgery is the main treatment for lung carcinoid tumors whenever possible. If the tumor hasn't spread, it can often be cured by surgery alone.

Types of lung surgery

Different operations can be used to treat (and possibly cure) lung carcinoid tumors. These operations require general anesthesia (where you are in a deep sleep) and are usually done through a surgical incision between the ribs in the side of the chest (called a *thoracotomy*).

- **Pneumonectomy:** An entire lung is removed in this surgery.
- **Lobectomy:** An entire section (lobe) of a lung is removed in this surgery.
- **Segmentectomy or wedge resection:** Part of a lobe is removed in this surgery.

Sleeve resection, another type of operation, may be used to treat some cancers in large airways in the lungs. If you think of the large airway with a tumor as similar to the sleeve of a shirt with a stain an inch or 2 above the wrist, this surgery would be like cutting across the sleeve above and below the stain and sewing the cuff back onto the shortened sleeve. A surgeon may be able to do this operation instead of a pneumonectomy to preserve more lung function.

With any of these operations, nearby lymph nodes are also removed to look for possible spread of the cancer.

The type of operation your doctor recommends depends on the size and location of the tumor and on how well your lungs are functioning. People whose lungs are healthier can withstand having more lung tissue removed.

When you wake up from surgery, you will have a tube (or tubes) coming out of your chest and attached to a special canister to allow excess fluid and air to drain out. The tube(s) will be removed once the fluid drainage and air leak subside. Generally, you will need to spend 5 to 7 days in the hospital after the surgery.

Lymph node sampling

With any of these operations, lymph nodes near the lungs are usually removed to look for possible spread of the cancer. This is important because the carcinoid might have spread to lymph nodes by the time it is diagnosed. (This risk is higher for atypical carcinoids than for typical carcinoids.) If the lymph nodes containing cancer are not removed, it will increase the risk of the carcinoid tumor spreading even farther, to other organs. If this happens, you may no longer be able to be cured by surgery. Checking for cancer cells in the lymph nodes can also provide some indication of your risk of having the cancer come back.

Video-assisted thoracic surgery (VATS)

This is a less invasive type of surgery for some cancers in the lungs. During this operation, a thin, rigid tube with a tiny video camera on the end is placed through a small cut in the side of the chest to help the surgeon see inside the chest. One or two other small cuts are created in the skin, and long instruments are passed through these cuts to do the same operation that would be done using an open approach (thoracotomy). Because only small incisions are needed, there is less pain after the surgery and a shorter hospital stay – usually around 4 to 5 days.

Most experts recommend that only smaller tumors near the outside of the lung be treated this way. The cure rate after this surgery seems to be the same as with surgery done with a larger incision. But it is important that the surgeon doing this operation be experienced because it requires a great deal of technical skill.

Possible risks and side effects of lung surgery

Possible complications depend on the extent of the surgery and the person's health beforehand. Serious complications can include excessive bleeding, wound infections, and pneumonia.

Lung surgery is a major operation, and recovering from the operation typically takes weeks to months. If the surgery is done through a thoracotomy, the surgeon must spread the ribs to get to the lung, so the area near the incision will hurt for some time after surgery. Your activity will be limited for at least a month. People who have VATS instead of thoracotomy have less pain after surgery and tend to recover more quickly.

If your lungs are in good condition (other than the presence of the cancer) you can usually return to normal activities after a lobe or even an entire lung has been removed. If you also have non-cancerous diseases such as emphysema or chronic bronchitis (which are common among heavy smokers), you may become short of breath with activity after surgery.

- [References](#)

[See all references for Lung Carcinoid Tumor](#)

Last Medical Review: February 5, 2015 Last Revised: February 24, 2016

American Cancer Society medical information is copyrighted material. For reprint requests, please see our [Content Usage Policy](#).

Palliative Procedures for Lung Carcinoid Tumor Symptoms

If you can't have major surgery because your lung function is reduced or you have other serious medical problems, or if the cancer has spread too far to be removed, other treatments may be used to relieve some symptoms.

These treatments, called *palliative procedures*, can relieve symptoms, but they do not cure the cancer and are recommended only if you can't have surgery to completely remove the tumor. If you are treated with these procedures you may also get [radiation therapy](#).

Treating airway blockage

If the tumor is blocking airways in the lung, it might lead to pneumonia or shortness of breath. Removing most of the tumor through a bronchoscope or destroying most of it with a laser (on the end of a bronchoscope) can be helpful. In some cases, a bronchoscope may be used to place a stent (a stiff tube) made of metal or silicone in the airway after treatment to help keep it open.

Treating fluid buildup

In rare instances, fluid can build up inside the chest (outside of the lungs), press on the lungs and affect breathing. Usually, a hollow needle is put through the skin and into the pleural space to remove the fluid. (This is known as a *thoracentesis*.) Removing the fluid can relieve breathing problems right away in most patients, but the fluid will often build up again quickly if nothing else is done.

Pleurodesis: To remove the fluid and keep it from coming back, doctors sometimes do a procedure called *pleurodesis*. A small cut is made in the skin of the chest wall, and a hollow tube is placed into the chest to remove the fluid. Either talc or a drug such as doxycycline or a chemotherapy drug is then instilled into the chest cavity. This causes the linings of the lung (visceral pleura) and chest wall (parietal pleura) to stick together, sealing the space and limiting further fluid buildup. The tube is often left in for a day or two to drain any new fluid that might collect.

Catheter placement: This is another way to control fluid buildup. One end of the catheter (a thin, flexible tube) is placed in the chest through a small cut in the skin, and the other end is left outside the body. This is done in a doctor's office or hospital. Once in place, the catheter can be attached to a special bottle or other device to allow the fluid to drain out on a regular basis.

Procedures to relieve symptoms of liver metastases

If the cancer spreads to the liver, treating the liver tumors may help with symptoms. When there are only 1 or 2 tumors in the liver, they may be removed with surgery. If there are more than just a few liver tumors (or if a person is too sick for surgery), other techniques may be used.

Ablation

Ablation techniques destroy tumors without removing them. They are generally not used for large tumors, and are best for tumors no more than about 2 cm (a little less than an inch) across.

Radiofrequency ablation (RFA) uses high-energy radio waves for treatment. A thin, needle-like probe is placed through the skin and into the tumor. Placement of the probe is guided by ultrasound or CT scans. The tip of the probe releases a high-frequency current that heats the tumor and destroys the cancer cells.

Ethanol (alcohol) ablation (also known as *percutaneous ethanol injection*) kills the cancer cells by injecting concentrated alcohol directly into the tumor. This is usually done through the skin using a needle guided by ultrasound or CT scans.

Microwave thermotherapy uses microwaves to heat and destroy the abnormal tissue.

Cryosurgery (cryotherapy) destroys a tumor by freezing it with a metal probe. The probe is guided through the skin and into the tumor using ultrasound. Then very cold gasses are passed through the probe to freeze the tumor, killing the cancer cells. This method may be used to treat larger tumors than the other ablation techniques, but it sometimes requires general anesthesia (where you are asleep).

Embolization

Arterial embolization (also known as *transarterial embolization* or TAE): This is another option for tumors that can't be removed completely. It can be used for larger tumors (up to about 5 cm or 2 inches across). This technique reduces the blood flow to the cancer cells by blocking the branch of the hepatic artery feeding the area of the liver containing the tumor. Blood flow is blocked (or reduced) by injecting materials that plug up the artery. Most of the healthy liver cells will not be affected because they get their blood supply from the portal vein.

In this procedure a catheter is put into an artery in the inner thigh and threaded up into the liver. A dye is usually injected into the bloodstream at this time to allow the doctor to monitor the path of the catheter via angiography, a special type of x-ray. Once the catheter is in place, small particles called *microspheres* are injected into the artery to plug it up.

Radioembolization: In the United States, this is done by injecting small radioactive beads into the hepatic artery. The beads travel to the tumor and give off small amounts of radiation only at the tumor sites.

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

- [References](#)

[See all references for Lung Carcinoid Tumor](#)

American Cancer Society medical information is copyrighted material. For reprint requests, please see our [Content Usage Policy](#).

Chemotherapy for Lung Carcinoid Tumors

Chemotherapy (chemo) is the use of anti-cancer drugs that are injected into a vein or taken by mouth. These drugs enter the bloodstream and reach all areas of the body, making this treatment useful for some types of lung cancer that have spread to organs beyond the lungs.

Unfortunately, carcinoid tumors usually do not respond very well to chemo. It is mainly used for carcinoid tumors that have spread to other organs, are causing severe symptoms, and have not responded to [other medicines](#). In some cases it may be given after surgery.

Because chemo does not always shrink carcinoid tumors, it is important to ask your doctors about the chances of it helping and if the benefits are likely to outweigh the risk of side effects.

Some of the chemo drugs that may be used for advanced lung carcinoids include:

- Streptozocin
- Etoposide (VP-16)
- Cisplatin
- Carboplatin
- Temozolomide
- Cyclophosphamide (Cytosan[®])
- 5-fluorouracil (5-FU)
- Doxorubicin (Adriamycin[®])
- Dacarbazine (DTIC)

In most cases, chemo drugs are used together, often along with other types of medicines.

Doctors give chemo in cycles, with each period of treatment followed by a rest period to allow the body time to recover. Chemo cycles generally last about 3 to 4 weeks, and initial treatment is typically 4 to 6 cycles. Chemo is often not recommended for patients in poor health, but advanced age by itself is not a barrier to getting chemo.

Possible side effects of chemotherapy

Chemo drugs attack cells that are dividing quickly, which is why they work against cancer cells. But other cells in the body, such as those in the bone marrow (where new blood cells are made), the lining of the mouth and intestines, and the hair follicles, also divide quickly. These cells are also likely to be affected by chemo, which can lead to side effects.

The [side effects](#) of chemo depend on the type and dose of drugs given and the length of time they are taken. Common side effects can include:

- Hair loss
- Mouth sores
- Loss of appetite
- [Nausea and vomiting](#)
- Diarrhea or constipation
- Increased chance of [infections](#) (from having too few white blood cells)
- Easy bruising or bleeding (from having too few blood platelets)
- [Fatigue](#) (from having too few red blood cells)

These side effects usually go away after treatment is finished. There are often ways to lessen these side effects or keep them from occurring. For example, drugs can be given to help prevent or reduce nausea and vomiting.

Some drugs can have other side effects. For example, cisplatin can damage nerve endings (a condition called *neuropathy*). This may lead to symptoms (mainly in the hands and feet) such as pain, burning or tingling sensations, sensitivity to cold or heat, or weakness. In most cases this goes away once treatment is stopped, but it may last a long time in some people. For more information, see [Peripheral Neuropathy Caused by Chemotherapy](#).

You should tell your medical team about any side effects or changes you notice while getting chemotherapy, so that they can be treated promptly. In some cases, the doses of the chemo drugs may need to be reduced or treatment may need to be delayed or stopped to prevent the effects from getting worse.

For more general information about chemotherapy, see [Chemotherapy](#) on our website.

- [References](#)

[See all references for Lung Carcinoid Tumor](#)

Last Medical Review: February 5, 2015 Last Revised: February 24, 2016

American Cancer Society medical information is copyrighted material. For reprint requests, please see our [Content Usage Policy](#).

Other Drug Treatments for Lung Carcinoid Tumors

For people with metastatic lung carcinoid tumors, several medicines can help control symptoms and may help keep the tumor from growing for a time.

Somatostatin analogs

These drugs are related to somatostatin, a natural hormone that seems to help slow the growth of neuroendocrine cells. They are especially useful in people who have carcinoid syndrome (facial flushing, diarrhea, wheezing, rapid heart rate) and in people whose tumors show up on a [somatostatin receptor scintigraphy](#) (SRS) scan.

Octreotide: This drug is very helpful in treating the symptoms of carcinoid syndrome. Sometimes octreotide can temporarily shrink carcinoid tumors, but it does not cure them. Side effects can include pain or burning at the injection site, stomach cramps, nausea, vomiting, headaches, dizziness, and fatigue.

The original version of octreotide (Sandostatin[®]) is injected under the skin (subcutaneously) at least twice daily. Some people learn to give this injection themselves at home. A newer, long-acting version of the drug (Sandostatin LAR[®]) is injected into a muscle once a month by your doctor or nurse. When first starting treatment, most people are given injections every day. Once the doctor finds the correct dose, the longer-acting monthly injection may be used.

Lanreotide: Lanreotide (Somatuline[®]) is a drug similar to octreotide. It is injected under the skin once a month. It may be given by your doctor or nurse, or you may learn how to

give the injection at home. Side effects are similar to those of octreotide, although pain at the injection site is less common.

Interferons

These drugs are natural substances in the body that normally help activate the immune system. They also suppress the growth of some tumors. Interferon alfa can sometimes help shrink or slow the growth of metastatic carcinoid tumors and improve symptoms of carcinoid syndrome. But its flu-like side effects, which can be severe, limit its usefulness. It can also cause depression. Interferon alfa is injected, either daily or several times a week.

Targeted drugs

In recent years, anti-cancer drugs that work differently from [standard chemotherapy](#) drugs have been developed for some types of cancer. These drugs target specific parts of cancer cells. They are sometimes helpful when chemotherapy is not, and they often have less severe side effects.

Two targeted drugs, sunitinib (Sutent[®]) and everolimus (Afinitor[®]), have been shown to help treat neuroendocrine tumors that start in the pancreas. These drugs may also be helpful against carcinoid tumors, which are a type of neuroendocrine tumor. Studies are now trying to prove this, but some doctors already use these drugs for carcinoid tumors.

Other medicines can be used to help control specific symptoms. It is important to describe your symptoms to your doctor so that they can be treated effectively.

- [References](#)

[See all references for Lung Carcinoid Tumor](#)

Last Medical Review: February 5, 2015 Last Revised: February 24, 2016

American Cancer Society medical information is copyrighted material. For reprint requests, please see our [Content Usage Policy](#).

Radiation Therapy for Lung Carcinoid Tumors

Radiation therapy is the use of high-energy rays (such as x-rays) or radioactive particles

to kill cancer cells. Unfortunately, radiation therapy usually has only a limited effect on lung carcinoid tumors.

[Surgery](#) is the main treatment for most carcinoid tumors, but radiation therapy may be an option for those who can't have surgery for some reason. It may also be given after surgery in some cases if there's a chance some of the tumor was not removed. Radiation therapy can also be used to help relieve symptoms such as pain if the cancer has spread to the bones or other areas.

External beam radiation therapy

External beam radiation therapy uses a machine that delivers a beam of radiation to a specific part of the body. This is the type of radiation used most often for lung carcinoid tumors.

Before your treatments start, the radiation team will determine the correct angles for aiming the radiation beams and the proper dose of radiation. Treatment is much like getting an x-ray, but the radiation dose is stronger. The procedure itself is painless. Each treatment lasts only a few minutes, but the setup time – getting you into place for treatment – usually takes longer. Most often, radiation treatments are given 5 days a week for several weeks, but this can vary based on the reason it's being given.

The main side effects of lung radiation therapy are [fatigue](#) (tiredness) and temporary sunburn-like skin changes where the radiation passed through the skin. If high doses are given, radiation therapy can cause scar tissue to form in the lungs over time, which might lead to trouble breathing and an increased risk of pneumonia.

Radioactive drugs

Drugs containing radioactive particles may be useful in treating some widespread carcinoid tumors. For this type of treatment, doctors use some of the same drugs used in radionuclide scans (see [How Are Lung Carcinoid Tumors Diagnosed?](#)), such as MIBG and octreotide, but they are attached to more strongly radioactive particles than are used in the scans. Once injected into the body, these drugs attach to carcinoid tumor cells. This lets doctors deliver high doses of radiation directly to the tumors. Some early results have been promising, but this type of treatment is not widely used at this time (see [What's New in Lung Carcinoid Tumor Research and Treatment?](#)).

For more general information about radiation therapy, see [Radiation Therapy](#).

- [References](#)

[See all references for Lung Carcinoid Tumor](#)

Last Medical Review: February 5, 2015 Last Revised: February 24, 2016

American Cancer Society medical information is copyrighted material. For reprint requests, please see our [Content Usage Policy](#).

Treatment of Lung Carcinoid, by Type and Extent of Disease

The treatment of lung carcinoid tumors depends largely on the [type](#) (typical versus atypical) and extent of the cancer. Other factors, such as a person's overall health and ability to withstand surgery, are also important.

Many doctors use the TNM staging system (see [How Are Lung Carcinoid Tumors Staged?](#)) to formally describe the extent of these cancers. But for treatment purposes most doctors use a simpler system, dividing these tumors into 2 groups:

- **Resectable tumors:** those that can be treated with surgery
- **Unresectable tumors:** those that can't be removed completely

Resectable lung carcinoid tumors

Resectable carcinoid tumors haven't spread far beyond where they started and can be removed completely. In the TNM staging system, this includes most stage I, II, and IIIA cancers.

For people who are healthy enough to withstand it, these cancers are treated with [surgery](#). The extent of the surgery depends on the type of carcinoid tumor and the size and location of the cancer. Atypical carcinoids may need more extensive surgery than typical carcinoids. Nearby lymph nodes are usually removed as well, especially if you have an atypical carcinoid.

Most patients with resectable lung carcinoid tumors are cured with surgery alone and don't need other treatments. Some experts recommend further treatment for people with an atypical carcinoid that has spread to lymph nodes. This can be [chemotherapy](#), [radiation therapy](#), or both. But it's not clear if the added treatments lower the chance of

the cancer coming back, or if they help people live longer.

Unresectable lung carcinoid tumors

Unresectable carcinoid tumors include those that have grown too much or spread too far to be removed completely by surgery (including most stage IIIB and stage IV cancers), as well as tumors in people who are not healthy enough for surgery.

Treatment depends on the stage of the cancer, where the cancer is, whether it is a typical or atypical carcinoid, and whether you have symptoms of the carcinoid syndrome.

For stage IIIA cancers in people who can't have surgery, experts typically recommend radiation to treat typical carcinoids, and chemotherapy (chemo) and radiation for atypical carcinoids.

Some type of [systemic treatment](#) is often recommended for more advanced cancers (stages IIIB and IV), sometimes along with radiation therapy. Somatostatin analogs like octreotide (Sandostatin) or lanreotide (Somatuline) can be helpful for patients who have carcinoid syndrome or whose tumors can be seen on somatostatin receptor scintigraphy (OctreoScan). Chemo and targeted therapy are also options.

In general, typical carcinoids tend to grow slowly, and [chemotherapy](#) is often not very successful. If you have only a small number of tumors that can be removed, surgery (both on the lung and at the site of metastasis) is likely to be your best option.

Lung carcinoid tumors usually spread to the liver first. If the carcinoid has spread only to your liver but can't be removed with standard surgery, another option might be to have a liver transplant. This is a very complex operation that most doctors still consider experimental. It is done at only a few transplant centers.

If the carcinoid is in your liver and is causing symptoms, procedures such as ablation or hepatic artery embolization may be helpful. They may relieve symptoms or slow the growth of the cancer, but are very unlikely to result in a cure. These treatments are discussed in detail in [Palliative Procedures for Lung Carcinoid Tumor Symptoms](#).

For people with earlier stage cancers who can't have surgery, most doctors recommend radiation therapy for typical carcinoids and chemotherapy plus radiation therapy for atypical carcinoids.

External radiation therapy can also be used to relieve symptoms caused by tumors such

as bone pain. For more widespread disease, radioactive drugs may be helpful.

Recurrent carcinoid tumors

When cancer comes back after treatment, it is called a *recurrence*. Recurrence can be local (in or near the same place it started) or distant (spread to organs such as the liver or bone).

Carcinoid tumors can sometimes come back, even several years after the initial treatment. If this happens, further treatment options depend on where the cancer is and what treatments have already been used. Cancers that recur locally or in only 1 or 2 areas can sometimes be treated with further surgery. If surgery is not an option, [radiation therapy](#), [chemotherapy](#), or [other drugs](#) may be tried. Because recurrent cancers can often be hard to treat, [clinical trials](#) of new types of treatment may be a good option.

- [References](#)

[See all references for Lung Carcinoid Tumor](#)

Last Medical Review: February 5, 2015 Last Revised: February 24, 2016

American Cancer Society medical information is copyrighted material. For reprint requests, please see our [Content Usage Policy](#).

2016 Copyright American Cancer Society

For additional assistance please contact your American Cancer Society
1-800-227-2345 or www.cancer.org