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## Treating Lung Carcinoid Tumors

If you've been diagnosed with a lung carcinoid tumor, your treatment team will discuss your options with you. It's important to weigh the benefits of each treatment option against the possible risks and side effects.

### How are lung carcinoid tumors treated?

Treatment options for people with lung carcinoid tumors can include:

- [Surgery to Treat Lung Carcinoid Tumors](#)
- [Supportive Procedures for Lung Carcinoid Tumor Symptoms](#)
- [Chemotherapy for Lung Carcinoid Tumors](#)
- [Other Drug Treatments for Lung Carcinoid Tumors](#)
- [Radiation Therapy for Lung Carcinoid Tumors](#)

### Common treatment approaches

Treatments might be used alone or in different combinations. 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, symptoms you are having, and if you have any other serious medical conditions.

- [Treatment of Lung Carcinoid, by Type and Extent of Disease](#)

### Who treats lung carcinoid tumors?

Based on your treatment options, you might have different types of doctors on your treatment team. These doctors could 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 and targeted therapy
- 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

You might have many other specialists on your treatment team as well, including physician assistants, nurse practitioners, nurses, nutrition specialists, social workers, and other health professionals.

- [Health Professionals Associated with Cancer Care](#)

### **Making treatment decisions**

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

It's also very important to ask questions if there is anything you're not sure about.

If time permits, it is often a good idea to seek a second opinion. A second opinion can give you more information and help you feel more confident about the treatment plan you choose.

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- [Find Support Programs and Services in Your Area](#)

## 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.

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 to your doctors and you make that 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.

- [If Cancer Treatments Stop Working](#)

*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.*

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# 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.
- **Lobectomy:** An entire section (lobe) of a lung is removed.
- **Segmentectomy or wedge resection:** Part of a lobe is removed.
- **Sleeve resection:** Part of a large airway is removed. Picture a tumor in a large airway as a stain on a shirt sleeve, about an inch or two 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. When this surgery can be done instead of a pneumonectomy, more lung function can be preserved.

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 slow down. Generally, your time in the hospital after surgery can range from 3 to 7 days depending on the type of surgery that is done.

### **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 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,

## References

Flores RM, Park BJ, Dycoco J, et al. Lobectomy by video-assisted thoracic surgery (VATS) versus thoracotomy for lung cancer. *J Thorac Cardiovasc Surg*. 2009 Jul;138(1):11-8. doi: 10.1016/j.jtcvs.2009.03.030.

Hilal T. Current understanding and approach to well differentiated lung neuroendocrine tumors: an update on classification and management. *Therapeutic Advances in Medical Oncology*

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*.) For most people, removing the fluid can relieve breathing problems right away, 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



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 cancer cells.
- **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 compared to 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 then injected into the bloodstream 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.

## More information about palliative care

To learn more about how palliative care can be used to help control or reduce symptoms caused by cancer, see [Palliative Care](#)<sup>1</sup>.

To learn about some of the side effects of cancer or treatment and how to manage them, see [Managing Cancer-related Side Effects](#)<sup>2</sup>.

## Hyperlinks

1. [www.cancer.org/treatment/treatments-and-side-effects/palliative-care.html](http://www.cancer.org/treatment/treatments-and-side-effects/palliative-care.html)
2. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html)

## References

Cho CS, Lubner SJ, Kavanagh BD. Chapter 125: Metastatic Cancer to the Liver. In: DeVita VT, Lawrence TS, Rosenberg SA, eds. *DeVita, Hellman, and Rosenberg's Cancer: Principles and Practice of Oncology*. 10<sup>th</sup> ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2015.

Nguyen DM and Manning EW. Chapter 127: Malignant Pleural and Pericardial Effusions. In: DeVita VT, Lawrence TS, Rosenberg SA, eds. *DeVita, Hellman, and Rosenberg's Cancer: Principles and Practice of Oncology*. 10<sup>th</sup> ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2015.

Thomas CF, Jett JR, Strosberg JR. Lung neuroendocrine (carcinoid) tumors: Treatment and prognosis. UpToDate website. <https://www.uptodate.com/contents/lung-neuroendocrine-carcinoid-tumors-treatment-and-prognosis>. Updated Feb. 6, 2018. Accessed July 17, 2018.

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# 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 almost 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, have not responded to [other medicines](#), or atypical carcinoids that are dividing quickly. Sometimes, it may be given after [surgery](#).

Because chemo does not always shrink carcinoid tumors, it is important to ask your doctor 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:

- Etoposide (VP-16)
- Cisplatin
- Carboplatin
- Temozolomide
- Oxaliplatin
- 5-fluorouracil (5-FU)
- Streptozocin

Chemo drugs can be used together or alone, and often along with other types of medicines. Frequently used chemo drugs/combinations include carboplatin/etoposide, cisplatin/etoposide, temozolomide, and oxaliplatin .

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, 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 avoid or lessen these side effects. 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](#)<sup>1</sup>.

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 keep the effects from worsening.

## More information about chemotherapy

For more general information about how chemotherapy is used to treat cancer, see [Chemotherapy](#)<sup>2</sup>.

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#)<sup>3</sup>.

## Hyperlinks

1. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/peripheral-neuropathy.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/peripheral-neuropathy.html)
2. [www.cancer.org/treatment/treatments-and-side-effects/treatment-](http://www.cancer.org/treatment/treatments-and-side-effects/treatment-)

[types/chemotherapy.html](#)

3. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html)

## References

Fazio N, Ungaro A, Spada F, et al. The role of multimodal treatment in patients with advanced lung neuroendocrine tumors. *Journal of Thoracic Disease*. 2017;9(Suppl 15):S1501-S1510. doi:10.21037/jtd.2017.06.14.

Hilal T. Current understanding and approach to well differentiated lung neuroendocrine tumors: an update on classification and management. *Therapeutic Advances in Medical Oncology*. 2017;9(3):189-199. doi:10.1177/1758834016678149.

Melosky B. Low Grade Neuroendocrine Tumors of the Lung. *Frontiers in Oncology*. 2017;7:119. doi:10.3389/fonc.2017.00119.

National Comprehensive Cancer Network. NCCN Clinical Practice Guidelines in Oncology: Neuroendocrine and Adrenal Tumors. V.2.2018. Accessed at [https://www.nccn.org/professionals/physician\\_gls/pdf/neuroendocrine.pdf](https://www.nccn.org/professionals/physician_gls/pdf/neuroendocrine.pdf) on July 11, 2018.

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## Other Drug Treatments for Lung Carcinoid Tumors

For people with metastatic lung carcinoid tumors, several medicines can help control symptoms and tumor growth.

### 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](#)<sup>1</sup> (facial flushing, diarrhea, wheezing, rapid heart rate) and in people whose

tumors show up on a [somatostatin receptor scintigraphy](#)<sup>2</sup> (SRS) scan.

**Octreotide** is helpful in treating the symptoms of carcinoid syndrome. Sometimes octreotide can temporarily shrink carcinoid tumors, but it does not cure them.

The original version of octreotide (Sandostatin<sup>®</sup>) is injected under the skin (subcutaneously) at least twice daily. Some people learn to give this injection themselves at home. A long-acting version of the drug (Sandostatin LAR<sup>®</sup>) is injected into a muscle once a month by your doctor or nurse. Depending on the severity of symptoms, some people are given injections every day when first starting treatment. Once the doctor finds the correct dose, the longer-acting monthly injection may then be used.

Side effects can include pain or burning at the injection site, stomach cramps, nausea, vomiting, headaches, dizziness, and fatigue.

**Lanreotide** 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.

## 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. They often have different side effects than chemotherapy.

The targeted drug, **everolimus** (Afinitor<sup>®</sup>), has been shown to help treat advanced lung carcinoid tumors. It can be used with or without somatostatin drugs, such as octreotide. Common side effects include diarrhea, fatigue, rash, mouth sores and swelling of the legs or arms.

See [Targeted Cancer Therapy](#)<sup>3</sup> for more information about this type of drug.

## Hyperlinks

3. [www.cancer.org/treatment/treatments-and-side-effects/treatment-types/targeted-therapy.html](http://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/targeted-therapy.html)

## References

Fazio N, Granberg D, Grossman A, et al. Everolimus plus octreotide long-acting repeatable in patients with advanced lung neuroendocrine tumors: analysis of the phase 3, randomized, placebo-controlled RADIANT-2 study. *Chest*. 2013;143:955-62.

National Comprehensive Cancer Network. NCCN Clinical Practice Guidelines in Oncology: Neuroendocrine and Adrenal Tumors. V.2.2018. Accessed at [https://www.nccn.org/professionals/physician\\_gls/pdf/neuroendocrine.pdf](https://www.nccn.org/professionals/physician_gls/pdf/neuroendocrine.pdf) on July 11, 2018.

Radiation therapy can also be used to help relieve symptoms such as pain if the cancer has spread to the bones or other areas.



To learn more about how radiation is used to treat cancer, see [Radiation Therapy](#)<sup>2</sup>.

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#)<sup>3</sup>.

## Hyperlinks

1. [www.cancer.org/treatment/treatments-and-side-effects/treatment-types/radiation/external-beam-radiation-therapy.html](http://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/radiation/external-beam-radiation-therapy.html)
2. [www.cancer.org/treatment/treatments-and-side-effects/treatment-types/radiation.html](http://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/radiation.html)
3. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html)

## References

Fazio N, Ungaro A, Spada F, et al. The role of multimodal treatment in patients with advanced lung neuroendocrine tumors. *Journal of Thoracic Disease*. 2017;9(Suppl 15):S1501-S1510. doi:10.21037/jtd.2017.06.14.

Hilal T. Current understanding and approach to well differentiated lung neuroendocrine tumors: an update on classification and management. *Therapeutic Advances in Medical Oncology*. 2017;9(3):189-199. doi:10.1177/1758834016678149.

Imhof A, Brunner P, Marincek N, et al. Response, survival, and long-term toxicity after therapy with the radiolabeled somatostatin analogue [90Y-DOTA]-TOC in metastasized neuroendocrine cancers. *J Clin Oncol*. 2011; 29(17):2416–23. doi:10.1200/JCO.2010.33.7873

National Comprehensive Cancer Network. NCCN Clinical Practice Guidelines in Oncology: Neuroendocrine and Adrenal Tumors. V.2.2018. Accessed at [https://www.nccn.org/professionals/physician\\_gls/pdf/neuroendocrine.pdf](https://www.nccn.org/professionals/physician_gls/pdf/neuroendocrine.pdf) on July 11, 2018.

Thomas CF, Jett JR, Strosberg JR. Lung neuroendocrine (carcinoid) tumors: Treatment and prognosis. UpToDate website. <https://www.uptodate.com/contents/lung-neuroendocrine-carcinoid-tumors-treatment-and-prognosis>. Updated Feb. 6, 2018. Accessed July 17, 2018.

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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 [Supportive 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](#)

and prognosis. UpToDate website. <https://www.uptodate.com/contents/lung-neuroendocrine-carcinoid-tumors-treatment-and-prognosis>. Updated Feb. 6, 2018. Accessed July 17, 2018.

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### **Written by**

The American Cancer Society medical and editorial content team  
([www.cancer.org/cancer/acs-medical-content-and-news-staff.html](http://www.cancer.org/cancer/acs-medical-content-and-news-staff.html))

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