



Treating Malignant Mesothelioma

Making treatment decisions

After the cancer is found and staged, your cancer care team will discuss your treatment options with you. The main factors in selecting treatment for mesotheliomas are the location and extent of the tumor, whether it has spread to lymph nodes or other organs, and your health and personal preferences. Based on these factors, your treatment options may include:

- [Surgery](#)
- [Radiation therapy](#)
- [Chemotherapy](#)

More than one of these treatments may be used in many cases. To learn about the most common approaches to treating mesothelioma, see "[Treatment of mesothelioma based on the extent of the cancer.](#)"

Mesothelioma can be hard to treat because it typically does not grow as a single tumor mass. It tends to spread along nearby surfaces, nerves, and blood vessels. This often makes it very hard to get rid of the cancer completely with surgery and/or radiation. For some people, [palliative procedures](#) might be used to help treat some symptoms of mesothelioma.

Because mesothelioma is a rare cancer, it has been hard for doctors to compare the value of different treatments. Only a few large clinical trials of treatments for mesothelioma have been done. In addition, many doctors have very little experience treating this disease. They usually refer patients to specialists who treat large numbers of mesothelioma patients at major medical centers.

You might 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 **surgical oncologist**: a doctor who treats cancer with surgery
- A **radiation oncologist**: a doctor who treats cancer with radiation therapy.
- 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

Many other specialists might be part of your treatment team as well, including other doctors, physician assistants (PAs), nurse practitioners (NPs), nurses, respiratory therapists, social workers, and other health professionals. See [Health Professionals Associated With Cancer Care](#) for more on this.

Before deciding on a treatment plan, it's very important to have an idea of its likely benefits and possible risks. You will probably have many questions about the treatment options suggested. You can also find some other questions to ask in the section "[What should you ask your doctor about malignant mesothelioma?](#)"

Mesotheliomas are rare, so if time allows it's often a good idea to get a second opinion from a doctor who has a lot of experience in treating people with these cancers. A second opinion can give you more information and help you feel more confident about the treatment plan you choose.

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. You can also call our clinical trials matching service at 1-800-303-5691 for a list of studies that meet your medical needs, or see the [Clinical Trials](#) section on our website 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 of our website 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, support groups, 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 on call 24 hours a day, every day.

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 Malignant Mesothelioma

Surgery for mesothelioma may be done for 2 reasons:

- To try to cure the cancer (potentially curative surgery)
- To relieve pain and other symptoms caused by the tumor (palliative surgery)

Potentially curative surgery may be an option if you are in otherwise good health and the cancer has not spread too far to be removed completely. Unfortunately, even when

the surgeon can remove all of the cancer that can be seen, some cancer cells are often left behind. These cells can grow and divide, causing the cancer to come back after surgery. Because of this, not all doctors agree on the exact role of surgery. In most cases it's not likely to cure you, but it may help you live longer. Still, potentially curative surgery is being done in some major cancer centers, and a small number of people who have had the surgery have had long remissions of their disease.

Palliative surgery may be an option if the tumor has already spread beyond where it started and would be hard to remove completely, or if you are too ill for a more extensive operation. The goal of this surgery is to relieve or prevent symptoms, as opposed to trying to cure the cancer.

Surgery for pleural mesothelioma

Surgery for pleural mesothelioma can be done either to help prevent or relieve symptoms or to try to remove all of the cancer. Unfortunately, these tumors often have spread too far to be removed completely. Sometimes, the surgeon might not be able to tell the full extent of the cancer – and therefore which type of surgery might be best – until the operation has started.

Extrapleural pneumonectomy (EPP): This is an extensive operation, but it may offer the best chance to remove all of the cancer for many patients. It's most often used when the surgeon thinks a cure is possible – typically in patients with resectable epithelioid mesothelioma that has not spread to the lymph nodes.

In this operation, the surgeon removes the lung on the side of the cancer along with the pleura lining the chest wall on that side, the diaphragm on that side, the pericardium (the sac around the heart), and nearby lymph nodes. The diaphragm and the pericardium are then reconstructed with man-made materials.

This is a difficult operation that is done only by experienced surgeons in large medical centers. You must be in good overall health with good lung function and no other serious illnesses to withstand this surgery. Several tests must be done beforehand to be sure you're healthy enough for this surgery. Major complications can occur in as many as 1 in 3 people who have this operation.

Pleurectomy/decortication (P/D): This is a less extensive operation in which all of the pleura lining the chest wall (on the side with the cancer) is removed, along with the pleura coating the lung on that same side. The pleura coating the mediastinum and the diaphragm is also removed. The lung and diaphragm are not removed.

In a slightly more extensive version of this operation (known as a *radical or extended P/D*), the diaphragm and/or pericardium are removed as well.

This surgery can be used to try to cure some early cancers, but it can also be used as a palliative procedure to relieve symptoms if the entire tumor can't be removed. It can help control the buildup of fluid, improve breathing, and lessen pain caused by the cancer.

Debulking (partial pleurectomy): The goal of this surgery is to remove as much of the mesothelioma as possible. In general, less tissue is removed in this operation than in a P/D procedure.

Possible side effects of surgery

The operations used to treat mesothelioma can have serious risks and side effects, although these depend on the extent of the surgery and the person's health beforehand. Serious complications of EPP can include bleeding, blood clots, wound infections, changes in heart rhythm, pneumonia, fluid buildup in the chest, and loss of lung function. Most of these are less common with less extensive operations.

Because the surgeon must often spread the ribs during surgery, the incision will hurt for some time afterward. Your activity will be limited for at least a month or two.

Surgery for peritoneal mesothelioma

Surgical treatment of peritoneal mesothelioma can be done either to help relieve symptoms or to remove the tumor from the wall of the abdomen and digestive organs. As is the case with pleural mesothelioma, these tumors often have spread too far to be removed completely.

Debulking: The goal of this surgery is to remove as much of the mesothelioma as possible. Sometimes this means removing pieces of the intestine as well.

After the cancer is debulked (but before the operation is finished), [chemotherapy](#) may be given into the abdomen. This is called *intraoperative chemotherapy*. If the chemotherapy drugs are heated, it is called *heated intraoperative (or intraperitoneal) chemotherapy* or *HIPEC*. In either treatment, the drugs are left in for a short time, and the incision is closed after they are removed.

Omentectomy: The omentum is an apron-like layer of fatty tissue that drapes over the organs inside the abdomen. Cancers in the peritoneum often spread to this tissue, so it

may be removed as part of surgery for peritoneal mesothelioma.

Surgery for pericardial mesothelioma

Surgery can remove a mesothelioma from the pericardium (the sac around the heart).

Surgery for mesothelioma of the tunica vaginalis

Surgery for mesothelioma of the tunica vaginalis, which covers the testicles, rarely cures this cancer. Most of the time surgery is done when the tumor is mistaken for a hernia. The surgeon attempts to treat a suspected hernia and only realizes the diagnosis after the surgery has begun. This kind of mesothelioma typically can't be removed entirely.

For more on surgery as a treatment for cancer, see [Cancer Surgery](#).

- [References](#)

[See all references for Malignant Mesothelioma](#)

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Palliative Procedures for Malignant Mesothelioma

Mesotheliomas can often be hard to remove or destroy completely. Still, treatments can often help keep the cancer under control for a time or relieve symptoms from it. For example, some types of [surgery](#) or [radiation therapy](#) might help keep the cancer in check. [Chemotherapy](#) might also be helpful.

If the mesothelioma is causing fluid to build up in the body, it can often cause trouble breathing or other problems. Procedures can sometimes be used to remove the fluid or help keep it from coming back.

Removal of fluid

Procedures such as thoracentesis, paracentesis, and pericardiocentesis can be used to remove fluid that has built up and is causing symptoms such as trouble breathing. In these procedures, a doctor uses a long, hollow needle to remove the fluid. These procedures are described in [How Is Malignant Mesothelioma Diagnosed?](#) The major drawback to these techniques is that the fluid often builds up again, so they might need to be repeated.

Pleurodesis

This procedure may be done to try to prevent fluid from building up in the chest. A small cut is made in the skin of the chest wall, and a hollow tube (called a *chest tube*) is placed into the chest so that the fluid can drain out. Then the doctor uses the tube to put a substance into the chest, such as talc mixed in a fluid (talc slurry), the antibiotic doxycycline, or the chemotherapy drug bleomycin. This irritates the linings of the lung (visceral pleura) and chest wall (parietal pleura) so that they stick together, sealing the space and preventing further fluid buildup. The tube is generally left in for a day or two to drain any new fluid. Pleurodesis can also be done during a [thoracoscopy](#).

Shunt placement

A shunt is a device that allows fluid to move from one part of the body to another. For example, a pleuro-peritoneal shunt lets excess fluid in the chest move into the abdomen, where it is more likely to be absorbed by the body. This may be used if pleurodesis or other techniques are not effective.

The shunt is a long, thin, flexible tube with a small pump in the middle. In the operating room, the doctor inserts one end of the shunt into the chest space and the other end into the abdomen. (The pump part stays just under the skin over the ribs.) Once the shunt is in place, the patient pushes down on the pump several times to move the fluid from the chest to the abdomen. This is typically done a few times each day.

Catheter placement

This is another approach sometimes used to control fluid buildup. One end of the catheter (a thin, flexible tube) is placed in the chest or abdomen 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 drain fluid out on a regular basis.

- [References](#)

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Radiation Therapy for Malignant Mesothelioma

Radiation therapy uses high-energy x-rays or particles to kill cancer cells. Mesotheliomas are often hard to treat with radiation therapy. They don't usually grow as single, distinct tumors, so it can be hard to aim radiation at them while avoiding nearby normal tissues. But new radiation therapy techniques may make this form of treatment more useful.

Uses of radiation therapy

Radiation therapy can be used in different ways to treat mesothelioma:

- It can be used after [surgery](#) to try to kill any small areas of cancer that couldn't be seen and removed during surgery. This is called *adjuvant radiation therapy*.
- It can be used as a [palliative procedure](#) to ease symptoms of mesothelioma such as shortness of breath, pain, bleeding, or trouble swallowing.

Types of radiation therapy

Two main types of radiation therapy can be used to treat mesothelioma:

External beam radiation therapy (EBRT): This type of radiation therapy uses x-rays from a machine outside the body to kill cancer cells. It is the most common form of radiation therapy for mesothelioma.

Before your treatments start, the medical team will take careful measurements to find the correct angles for aiming the radiation beams and the proper dose of radiation. Each

treatment lasts only a few minutes, although the setup time – getting you into place for treatment – usually takes longer. The treatment is much like getting an x-ray, but the radiation is much stronger. The procedure itself is painless. Most often, radiation treatments are given 5 days a week for several weeks.

With newer techniques, doctors can treat mesotheliomas more accurately while reducing the radiation reaching nearby healthy tissues such as the lungs. This might offer a better chance of increasing the success rate and reducing side effects.

For example, *intensity-modulated radiation therapy (IMRT)* is an advanced form of 3-dimensional radiation therapy. It uses a computer-driven machine that moves around the patient as it delivers radiation. It shapes the radiation beams to fit the tumor and aims them at the tumor from several angles, as well as adjusting the intensity (strength) of the beams to limit the dose reaching nearby normal tissues.

Brachytherapy: For this type of radiation therapy, a radiation source is put inside the body, in or near the cancer. The radiation given off travels only a very short distance, which limits the possible damage to nearby healthy tissues. Brachytherapy is seldom used for this type of cancer.

Possible side effects

Side effects of external radiation therapy can include fatigue and sunburn-like skin problems and hair loss where the radiation enters the body. These usually go away once treatment is finished. Chest radiation therapy can damage the lungs over time and lead to trouble breathing and shortness of breath. Abdominal radiation therapy may cause [nausea](#), [vomiting](#), diarrhea, and loss of appetite.

If radiation therapy is used together with [chemotherapy](#), the side effects are often worse.

If you are having any side effects from radiation therapy, talk with your doctor. There are often ways to help control these symptoms.

For more on radiation therapy, see [Radiation Therapy](#).

- [References](#)

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Chemotherapy for Malignant Mesothelioma

Chemotherapy (chemo) is treatment with anti-cancer drugs.

Uses of chemotherapy

For mesotheliomas that can be treated with surgery, chemo may be given before surgery to try to shrink the cancer and lower the risk of spread. This is called *neoadjuvant therapy*.

Chemo can also be given after surgery to try to kill any cancer cells that were left behind. This type of treatment, called *adjuvant therapy*, may help delay or prevent the cancer growing back.

For cancers that can't be removed with surgery, chemo may be the main treatment (alone or along with [radiation therapy](#)). Chemo may shrink the cancer or slow its growth, but it is very unlikely to make it go away completely.

How chemotherapy is given

Doctors usually 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. Chemo is often not recommended for patients in poor health, but advanced age by itself is not a barrier to getting it.

There are 2 main ways chemo can be given to treat mesothelioma.

In *systemic* therapy, chemo is injected into a vein. The drug enters the bloodstream and travels throughout the body to reach and destroy the cancer cells wherever they may be.

Chemo drugs can also be placed directly into the body space where the cancer is – either *intrapleurally* (directly into the chest) or *intraperitoneally* (into the abdomen). This is done with a small catheter (tube) placed through a small cut in the chest or abdominal

wall. Chemo drugs given this way are still absorbed into the bloodstream, but the highest concentrations of the drugs go directly to where the cancer cells are.

For intrapleural or intraperitoneal chemo, the drugs are sometimes heated before they are put directly into a body space (called *hyperthermic chemotherapy*), which may help them work better. Sometimes this treatment is given as a single dose in the operating room, right after surgery to remove the cancer. This approach is called *heated intraoperative chemotherapy*. It is more often used to treat peritoneal cancers, in which case it may be called *heated intraperitoneal chemotherapy* or HIPEC.

Chemotherapy drugs used for mesothelioma

Several chemo drugs can be used to treat mesothelioma, including:

- Pemetrexed (Alimta[®])
- Cisplatin
- Carboplatin
- Gemcitabine (Gemzar[®])
- Methotrexate
- Vinorelbine
- Mitomycin
- Doxorubicin (Adriamycin[®])

These may be given as combinations of 2 drugs, but single drugs can be used in people who may not be able to tolerate more than one drug.

When 2 drugs are used, most doctors give pemetrexed and cisplatin. Pemetrexed lowers levels of folic acid and vitamin B12 in the body, so patients get these as well to help avoid certain side effects. Other possible combinations include pemetrexed with carboplatin, or cisplatin with gemcitabine.

For HIPEC, either mitomycin or the combination of cisplatin plus doxorubicin is most often used.

Possible side effects

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 how long they are used for. Common side effects include:

- Hair loss
- Mouth sores
- Loss of appetite
- [Nausea and vomiting](#)
- Diarrhea
- 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. For example, drugs can be given to help prevent or reduce nausea and vomiting. Be sure to ask your doctor or nurse about medicines to help reduce side effects, and let him or her know if you have side effects, so they can be managed effectively.

Some drugs can have other side effects. For example, cisplatin and carboplatin can damage nerves (called [neuropathy](#)). This can sometimes lead to hearing loss or symptoms in the hands and feet such as pain, burning or tingling sensations, sensitivity to cold or heat, or weakness. This usually goes away once treatment is stopped, but it can last a long time in some people.

Be sure to report any side effects or changes you notice while getting chemo to your medical team so that you can get them treated promptly. In some cases, the doses of the drugs may need to be reduced or treatment may need to be delayed or stopped to keep the effects from getting worse.

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

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Treatment of Mesothelioma Based on the Extent of the Cancer

The [stage](#) (extent) of a mesothelioma is an important factor in determining treatment options. But other factors, such as whether the doctor feels the cancer is resectable (all visible cancer can be removed by surgery), as well as a person's general health and preferences, also play a role.

Mesotheliomas can be hard to treat, whether the cancer is resectable or not. It's very important that you understand the goal of treatment before it starts – whether it is to try to cure the cancer or to help relieve symptoms – as well as the possible benefits and risks. This can help you make an informed decision when looking at your treatment options.

Resectable mesotheliomas

In general, most stage I and some stage II and III pleural mesotheliomas are potentially resectable, but there are exceptions. Whether a tumor is resectable is also based on the subtype (most doctors don't believe that sarcomatoid tumors are helped by resection), where it is in the body, how far it has grown into nearby tissues, and if the person is healthy enough to have [surgery](#).

Many people with resectable pleural mesothelioma have their cancer removed by either pleurectomy/decortication (P/D) or extrapleural pneumonectomy (EPP). Surgery is more likely to result in long-term benefit in early stage cancers, where there is a better chance that most or all of the cancer can be removed. EPP might offer the best chance to remove the cancer, but it is a complex and extensive operation that is more likely to result in complications, and not all patients can tolerate it.

Patients with early-stage peritoneal mesotheliomas might also benefit from surgery that removes as much of the cancer as possible. This may be combined with [heated intraperitoneal chemotherapy \(HIPEC\)](#). Some patients have long remissions after this treatment. Surgery may also be helpful for some later-stage cancers, but the benefits are more likely to last only a short time.

Sometimes, the surgeon may think the cancer is resectable based on imaging tests (such as CT scans) done before surgery, but once the operation starts it becomes clear that not all of the cancer can be removed. In these cases the surgeon may switch to a less extensive operation like P/D (which is easier to tolerate) or even stop the surgery

altogether if it's not likely to be helpful. Treatment would then be the same as for unresectable mesotheliomas (see below).

Doctors are still studying whether giving [chemotherapy](#) (chemo) before surgery (*neoadjuvant therapy*) or giving chemo or [radiation therapy](#) after surgery (*adjuvant therapy*) is helpful, but not all doctors agree on the best course of treatment. Some doctors prefer to give chemo, either before or after surgery. Radiation therapy might be used after surgery, either alone or along with chemo.

If you are not healthy enough to have a major operation, you will be treated for unresectable mesothelioma (discussed below).

If you have symptoms because of fluid buildup in the chest or abdomen, other approaches such as thoracentesis/paracentesis or pleurodesis (described in the section on [palliative procedures](#)) may be helpful.

Because these cancers can be hard to treat, taking part in a [clinical trial](#) of a newer form of treatment may be a reasonable option. These types of studies are usually done in large medical centers.

Unresectable mesotheliomas

Stage IV mesotheliomas, as well as many earlier-stage mesotheliomas, can't be removed completely by [surgery](#). This can be because of the extent or subtype of the cancer or because a person may not be healthy enough for an operation.

[Chemo](#) is the main treatment for these cancers. It may improve symptoms and shrink or slow the growth of the cancer for a time. Although chemo may help people live longer, it's very unlikely to cure these cancers. Before starting treatment, the goals of treatment should be clear to you and your family.

In people with early-stage mesotheliomas that are likely to grow slowly and aren't causing any symptoms, watching them closely at first may be a reasonable option. Treatment can then be started if there are signs that the cancer is growing quickly or if it starts to cause symptoms.

Because these cancers can be hard to treat, taking part in a [clinical trial](#) of a newer form of treatment may be a reasonable option.

In many cases, treatment aimed at relieving symptoms and making you more comfortable may be a good choice. This could include treatments that prevent or reduce

fluid buildup in the body, such as thoracentesis/paracentesis or pleurodesis (described in the section on palliative procedures). Sometimes [pleurectomy/decortication](#) can help with breathing and pain in the chest.

[Pain management](#) is another important aspect of care for these cancers. Some minor operations and types of [radiation therapy](#) can help relieve pain if needed. Doctors can also prescribe strong pain-relieving drugs. Some people with cancer are worried about taking opioid drugs (such as morphine) for fear of being sleepy all the time or becoming addicted to them. But many people get very effective pain relief from these medicines without serious side effects. It's very important to let your cancer care team know if you are having pain so that it can be treated effectively.

Recurrent mesotheliomas

Cancer is called *recurrent* when it come backs after treatment. Recurrence can be local (in or near the same place it started) or distant (spread to organs such as the brain or liver). Mesotheliomas often come back after the initial treatment. If this happens, further treatment options depend on where the cancer is, what treatments have already been used, and a person's general health.

In most cases the options will be similar to those listed above for unresectable mesotheliomas. For example, [chemo](#) or [radiation therapy](#) may be used to try to shrink or slow the growth of the cancer and to relieve any symptoms. Because recurrent cancers can often be hard to treat, [clinical trials](#) of new types of treatment may be a good option. For more information on dealing with a recurrence, see [Coping With Cancer Recurrence](#).

- [References](#)

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