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## Treating Testicular Cancer

If you've been diagnosed with testicular cancer, 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 is testicular cancer treated?

Depending on the type and stage of the cancer, as well as other factors, treatment options for testicular cancer can include:

- [Surgery for Testicular Cancer](#)
- [Radiation Therapy for Testicular Cancer](#)
- [Chemotherapy for Testicular Cancer](#)
- [High-Dose Chemotherapy and Stem Cell Transplant for Testicular Cancer](#)

### Common treatment approaches

In recent years, a lot of progress has been made in treating testicular cancer. Surgical methods have been refined, and doctors know more about the best ways to use chemotherapy and radiation to treat different types of testicular cancer. In some cases, more than one of type of treatment might be used.

- [Treatment Options for Testicular Cancer, by Type and Stage](#)

### Who treats testicular cancer?

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 **urologist**: a surgeon who specializes in treating diseases of the urinary system and male reproductive system
- A **radiation oncologist**: a doctor who treats cancer with radiation therapy
- A **medical oncologist**: a doctor who treats cancer with medicines like chemotherapy

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 treatment options, including their goals and possible side effects, with your doctors to help make the decision that best fits your needs. You may feel that you need to make a decision quickly, but it's important to give yourself time to absorb the information you have learned. Ask your cancer care team questions.

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.

Where you're treated is important. There's no substitute for experience. You have the best chance for a good outcome if you go to a hospital that treats many men with testicular cancer.

- [Questions to Ask About Testicular Cancer](#)
- [Seeking a Second Opinion](#)

### **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're 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.



- [Programs & Services](#)

## **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

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# **Surgery for Testicular Cancer**



it's as safe and effective as the standard "open" surgery in removing all of the lymph nodes that may contain cancer. Because of this uncertainty, doctors are more likely to recommend chemotherapy after laparoscopic surgery if cancer is found in the lymph nodes.

This procedure is most often used for patients with early-stage non-seminomas to see if the lymph nodes contain cancer. As with the standard open procedure, this is a complex operation that should only be done if the surgeon is very experienced.

## **Possible risks and side effects of surgery**

The short-term risks of any type of surgery include reactions to anesthesia, excess bleeding, blood clots, and infections. Most men will have at least some pain after the operation, which can be helped with pain medicines, if needed.

### **Effects of orchiectomy**

Losing one testicle usually has no effect on a man's ability to get an erection and have sex. But if both testicles are removed, sperm cannot be made and a man becomes infertile. Also, without testicles, a man cannot make enough testosterone, which can decrease sex drive and affect his ability to have erections. Other effects could include fatigue, hot flashes, and loss of muscle mass. These side effects can be avoided by taking testosterone supplements, either in a gel, a patch, or a shot. Pills are generally not reliable sources of testosterone.

Usually men with testicular cancer are young and may be concerned about changes in how they look. They may be dating and worry about a partner's reaction, or they may be athletic and feel embarrassed by the missing testicle when in locker rooms.

To restore a more natural look, a man can have a testicular prosthesis surgically implanted in his scrotum. The prosthesis approved for use in the United States is filled with saline (salt water) and comes in different sizes to match the remaining testicle. When in place, it can look like a normal testicle. There can be a scar after the operation, but it's often partly hidden by pubic hair. Some men might want a prosthesis, while others might not. You should discuss your wishes with your surgeon before surgery. It could also help to talk with someone who has a testicular prosthesis, to hear what it has been like for them.

### **Effects of lymph node dissection**

Surgery to remove retroperitoneal lymph nodes is a major operation. Serious

complications are not common, but they can happen. About 5% to 10% of patients have short-term problems after surgery, such as infection or bowel obstruction (blockage). The standard approach for an RPLND requires a large incision in the abdomen, which will leave a scar and can take some time to heal. Your ability to get up and around after the operation will be limited for some time. This is less likely to be an issue if you have laparoscopic surgery, which uses smaller incisions.

This type of surgery does not cause impotence – a man can still have erections and sex. But it might damage some of the nerves that control ejaculation. If these nerves are damaged, when a man ejaculates, the semen doesn't come out through the urethra to exit the body but rather goes backwards into the bladder. This is called **retrograde ejaculation**, and it can make it hard to father children.

To save the normal ejaculation function, surgeons have developed a type of retroperitoneal lymph node surgery called **nerve-sparing surgery** that's very successful when done by experienced doctors. Testicular cancer often affects men at an age when they might be trying to have children. These men may wish to discuss nerve-sparing surgery with their doctors, as well as sperm banking (freezing and storing sperm cells obtained before treatment). Men with testicular cancer often have lower than normal sperm counts, which can sometimes make it hard to collect a good sperm sample. See [Fertility and Men With Cancer](#)<sup>1</sup> for more about this.

## More information about Surgery

For more general information about surgery as a treatment for cancer, see [Cancer Surgery](#)<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/cancer/managing-cancer/side-effects/fertility-and-sexual-side-effects/fertility-and-men-with-cancer.html](http://www.cancer.org/cancer/managing-cancer/side-effects/fertility-and-sexual-side-effects/fertility-and-men-with-cancer.html)
2. [www.cancer.org/cancer/managing-cancer/treatment-types/surgery.html](http://www.cancer.org/cancer/managing-cancer/treatment-types/surgery.html)
3. [www.cancer.org/cancer/managing-cancer/side-effects.html](http://www.cancer.org/cancer/managing-cancer/side-effects.html)

## References

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# **Radiation Therapy for Testicular Cancer**



Radiation is also sometimes used to treat testicular cancer (both seminoma and non-seminoma) that has spread to distant organs (like the brain).

### **Possible side effects of radiation therapy**

Radiation therapy can affect nearby healthy tissue along with the cancer cells. To reduce the risk of side effects, doctors carefully figure out the exact dose you need and aim the beams to hit the tumor. The treatment of testicular cancer often uses lower radiation doses than those needed for other types of cancer.

Common [side effects](#)<sup>1</sup> can include:

- Fatigue
- Nausea
- Diarrhea

Some men have a skin changes such as redness, blistering, or peeling, but those are uncommon.

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2. [www.cancer.org/cancer/managing-cancer/side-effects/fertility-and-sexual-side-effects/fertility-and-men-with-cancer/how-cancer-treatments-affect-fertility.html](http://www.cancer.org/cancer/managing-cancer/side-effects/fertility-and-sexual-side-effects/fertility-and-men-with-cancer/how-cancer-treatments-affect-fertility.html)

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## **Chemotherapy for Testicular Cancer**

Chemo is often used to cure testicular cancer when it has spread outside the testicle. It's also used to help decrease the risk of cancer coming back after the testicle is removed. It's not used to treat cancer that's only in the testicle.

## Chemo drugs used

Chemo is given 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. The main drugs used to treat testicular cancer are:

- Cisplatin
- Etoposide (VP-16)
- Bleomycin
- Ifosfamide (Ifex<sup>®</sup>)
- Paclitaxel (Taxol<sup>®</sup>)
- Vinblastine

Using 2 or more chemo drugs often works better than using any single drug alone. The chemo regimens most commonly used as the first treatment for testicular cancer are:

- BEP (or PEB): bleomycin, etoposide, and cisplatin
- EP: etoposide and cisplatin
- VIP: VP-16 (etoposide) or vinblastine plus ifosfamide and cisplatin

Some doctors use more intensive plans for patients with high-risk disease, and may suggest a different combination of chemo drugs or even a stem cell transplant .

## 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 certain side effects.

The [side effects](#)<sup>1</sup> of chemo depend on the type and dose of drugs used and how long they are given. These side effects can 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 (extreme tiredness, often from having too few red blood cells)

Some of the drugs used to treat testicular cancer can have other side effects. For example:

- Cisplatin and ifosfamide can cause kidney damage. This can be lessened by giving lots of fluids (usually into a vein – IV) before and after these drugs are given.
- Cisplatin, etoposide, paclitaxel, and vinblastine can damage nerves (known as [neuropathy](#)<sup>2</sup>). This can lead to numbness or tingling in the hands and feet, and sensitivity to cold or heat. In most cases, this gets better once treatment is stopped, but it may last a long time in some people.
- Cisplatin can also cause loss of hearing (called ototoxicity)
- Bleomycin can damage the lungs, causing shortness of breath and trouble with physical activity.
- Ifosfamide can cause the bladder to bleed (called hemorrhagic cystitis). To prevent this, the patient is given plenty of fluids and the drug mesna is given along with ifosfamide.

Most side effects are short-term and go away overtime after treatment ends, but some can last a long time and may never go away completely. Tell your treatment team about any side effects or changes you notice while getting chemo so you can get prompt treatment for them. There are often ways to prevent or lessen side effects. For example, there are drugs to help prevent or reduce nausea and vomiting. 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 side effects from getting worse.

Some of the drugs used to treat testicular cancer can cause long-term side effects. These include some of the things mentioned earlier, like hearing loss and kidney or lung damage. Development of a [second cancer](#)<sup>3</sup> (like leukemia) is a very serious but rare side effect of chemo, occurring in less than 1% of testicular cancer patients treated with chemo. People who've had chemo for testicular cancer seem to have a higher risk of heart problems later in life. Several studies have also suggested that chemo can sometimes cause high blood cholesterol to develop over time, which may later require

treatment.

## More information about chemotherapy

For more general information about how chemotherapy is used to treat cancer, see [Chemotherapy](#)<sup>4</sup>.

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#)<sup>5</sup>.

## Hyperlinks

1. [www.cancer.org/cancer/managing-cancer/side-effects.html](http://www.cancer.org/cancer/managing-cancer/side-effects.html)
2. [www.cancer.org/cancer/managing-cancer/side-effects/nervous-system/peripheral-neuropathy.html](http://www.cancer.org/cancer/managing-cancer/side-effects/nervous-system/peripheral-neuropathy.html)
3. [www.cancer.org/cancer/survivorship/long-term-health-concerns/second-cancers-in-adults.html](http://www.cancer.org/cancer/survivorship/long-term-health-concerns/second-cancers-in-adults.html)
4. [www.cancer.org/cancer/managing-cancer/treatment-types/chemotherapy.html](http://www.cancer.org/cancer/managing-cancer/treatment-types/chemotherapy.html)
5. [www.cancer.org/cancer/managing-cancer/side-effects.html](http://www.cancer.org/cancer/managing-cancer/side-effects.html)

## References

American Society of Clinical Oncology. Testicular Cancer: Treatment Options. 09/2016. Accessed at [www.cancer.net/cancer-types/testicular-cancer/treatment-options](http://www.cancer.net/cancer-types/testicular-cancer/treatment-options) on May 1, 2018.

National Comprehensive Cancer Network, Clinical Practice Guidelines in Oncology (NCCN Guidelines®), Testicular Cancer, Version 2.2018 -- February 16, 2018. Accessed at [www.nccn.org/professionals/physician\\_gls/pdf/testicular.pdf](http://www.nccn.org/professionals/physician_gls/pdf/testicular.pdf) on May 1, 2018.

Smith ZL, Werntz RP, Eggener SE. Testicular Cancer: Epidemiology, Diagnosis, and Management. *Med Clin N Am*. 2018;102:251-264.

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# High-Dose Chemotherapy and Stem Cell Transplant for Testicular Cancer

- [More information about stem cell transplant](#)

In general, testicular cancers respond well to chemotherapy (chemo), but not all of them are cured. Even though higher doses of chemo might work better, they're not given because they could severely damage the bone marrow, which is where new blood cells form. This could lead to life-threatening [infections](#)<sup>1</sup>, bleeding, and other problems because of low blood cell counts.

But a stem cell transplant allows doctors to use higher doses of chemo. Stem cells used to be taken from the bone marrow, but this is done less often now. In the weeks before treatment, a special machine collects blood-forming stem cells from the patient's bloodstream. They are frozen and stored.

The patient then gets high-doses of chemo. After chemo, the patient gets his stem cells back again. This is called a transplant, but it doesn't involve surgery – the cells are infused into a vein much like a blood transfusion. The stem cells settle in the bone marrow and start making new blood cells over the next few weeks.

Stem cell transplant is most often used to treat testicular cancers that have [come back](#)<sup>2</sup> after treatment with chemo. Current studies are looking at whether a stem cell transplant may be valuable as part of the first treatment for some patients with advanced germ cell cancers.

A stem cell transplant is a complex treatment that can cause life-threatening side effects because of the high doses of chemotherapy used. Be sure you understand the possible benefits and risks. If the doctors think you might benefit from a transplant, it should be done at a hospital where the staff has experience with the procedure and with managing the recovery phase.

Stem cell transplants sometimes require a long hospital stay and can cost a lot. Even if your insurance covers the transplant, your co-pays or other costs could add up to a lot of money. Before deciding on a transplant it's important to find out what your insurer will cover to get an idea of what you might have to pay.

## More information about stem cell transplant

To learn more about stem cell transplants, including how they are done and their potential side effects, see [Stem Cell Transplant for Cancer](#)<sup>3</sup>.

For more general information about side effects and how to manage them, see [Managing Cancer-related Side Effects](#)<sup>4</sup>.

## Hyperlinks

1. [www.cancer.org/cancer/managing-cancer/side-effects/low-blood-counts/infections.html](http://www.cancer.org/cancer/managing-cancer/side-effects/low-blood-counts/infections.html)
2. [www.cancer.org/cancer/survivorship/long-term-health-concerns/recurrence.html](http://www.cancer.org/cancer/survivorship/long-term-health-concerns/recurrence.html)
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4. [www.cancer.org/cancer/managing-cancer/side-effects.html](http://www.cancer.org/cancer/managing-cancer/side-effects.html)

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# Treatment Options for Testicular Cancer, by Type and Stage

- [Carcinoma in situ \(stage 0\) testicular tumors](#)
- [Seminomas](#)
- [Non-seminomas](#)
- [Stage III seminomas and non-seminomas](#)
- [Recurrent testicular cancer](#)
- [Sertoli cell and Leydig cell tumors](#)





**Radiation therapy:** Radiation aimed at para-aortic lymph nodes is another option. These nodes are in the back of the abdomen (belly), around the large blood vessel called the aorta. Because seminoma cells are very sensitive to radiation, low doses can be used. About 10 to 15 treatments are given over 2 to 3 weeks.

**Chemotherapy:** An option that works as well as radiation is 1 or 2 cycles of chemo with the drug carboplatin after surgery. Many experts prefer chemo over radiation because it seems to be easier to tolerate.

### Stage IS seminomas

In this stage, one or more tumor marker levels is still high after the testicle containing the seminoma has been removed. This is very rare, and it can be treated with chemo.

### Stage IIA seminomas

**Radiation:** After surgery to remove the testicle (radical inguinal orchiectomy), one treatment option is radiation to the retroperitoneal lymph nodes. These are the lymph nodes at the back of the abdomen (belly). Usually stage II seminomas are given higher doses of radiation than stage I seminomas.

**Chemotherapy:** Another option is chemo, with either 4 cycles of EP (etoposide and cisplatin) or 3 cycles of BEP (bleomycin, etoposide, and cisplatin). The doctor will then watch closely (every 3 to 6 months) for any signs that the cancer has [come back](#)<sup>5</sup>.

### Stage IIB seminomas

These seminomas have spread to cause larger lymph nodes or have spread to many different lymph nodes.

**Chemotherapy:** This is typically the preferred treatment. It is usually either 4 cycles of EP (etoposide and cisplatin) or 3 cycles of BEP (bleomycin, etoposide, and cisplatin).

**Radiation:** This may be an option instead of chemo if the lymph nodes aren't enlarged from cancer spread.

### Stage IIC seminomas

Treatment is typically chemotherapy with 4 cycles of EP (etoposide and cisplatin) or 3 or 4 cycles of BEP (bleomycin, etoposide, and cisplatin). Another option might be VIP (etoposide, ifosfamide, and cisplatin) for 4 cycles. Radiation therapy is generally not

used for stage IIC seminoma.

## Non-seminomas

### Stage I non-seminomas

Nearly all of these cancers can be cured, but the treatment is different from that of seminomas. As with seminomas, the initial treatment is [surgery](#) to remove the testicle and tumor (called radical inguinal orchiectomy). The other treatment choices will depend on the stage.

#### Choices for stage IA (T1)

- **Careful observation (surveillance):** Surveillance is preferred by most experts, but it requires a lot of doctor visits and tests. A typical schedule might include visits every 2 months for the first year, with CT scans every 4 to 6 months; then every 3 months for the second year, with scans every 6 to 12 months. As time goes on and you have no problems, the time between visits and tests gets longer. If the cancer does come back (relapse), it's usually within the first year or two. Relapses are generally treated with chemo. Even though more patients will have a relapse with surveillance than with lymph node dissection, the cure rates are much the same because the relapses are usually found early.
- **Retroperitoneal lymph node dissection (RPLND):** Having the lymph nodes at the back of the abdomen (belly) removed has the advantage of a high initial cure rate, but the disadvantages of major surgery with its possible complications, including losing the ability to ejaculate normally. After RPLND, if cancer is found in the nodes, chemo may be recommended.
- **Chemotherapy:** Instead of surgery, the doctor may suggest 1 cycle of the BEP regimen (bleomycin, etoposide, and cisplatin). This helps reduce the risk of relapse.

#### Choices for stage IB (T2, T3, or T4)

- **Retroperitoneal lymph node dissection (RPLND):** This is surgery to remove the lymph nodes at the back of the abdomen (belly). If cancer is found in the lymph nodes, chemo is often recommended depending on the number of nodes with cancer in them. (See below.)
- **Chemotherapy:** Instead of surgery, the doctor may recommend 1 cycle of the BEP

regimen (bleomycin, etoposide, and cisplatin). This can help reduce the risk that the cancer will come back. If cancer was found in the lymph nodes after surgery, 2 to 4 cycles of BEP or EP (etoposide and cisplatin) may be given, depending on how many nodes had cancer in them. This has a high cure rate, but it can have side effects (which are mostly short-term).

- **Careful observation (surveillance):** This requires frequent doctor visits and tests for several years. This may be an option for some T2 tumors that haven't reached blood vessels.

### Stage IS non-seminoma

If your tumor marker levels (like AFP or HCG) are still high even after the cancer has been removed, but the CT scan doesn't show a tumor, chemo is typically recommended. This may be either 3 cycles of BEP (bleomycin, etoposide, and cisplatin) or 4 cycles of EP (etoposide and cisplatin).

### Stage II non-seminomas

Surgery is done first to remove the testicle and spermatic cord (called a [radical inguinal orchiectomy](#)). After surgery, treatment choices depend on the details of the cancer.

### Stage IIA non-seminomas

Treatment depends on [tumor marker](#)<sup>6</sup> levels after surgery and the extent of spread to the retroperitoneal lymph nodes. These are the lymph nodes at the back of the abdomen (belly).

If tumor marker levels are normal, there are 2 main options:

- **Retroperitoneal lymph node dissection (RPLND):** This is surgery to remove the lymph nodes at the back of the abdomen. If the lymph nodes that were removed contain cancer, chemo (typically for 2 cycles) might be given. If there's no cancer in the nodes, the doctor will watch closely for signs that the cancer has come back.
- **Chemotherapy:** This would include either 4 cycles of EP (etoposide and cisplatin) or 3 cycles of BEP (bleomycin, etoposide, and cisplatin). Surgery might be done after this if there are signs there might still be cancer present.

If tumor markers are still higher than normal after the initial surgery, treatment is

typically with chemo as listed above (EP or BEP)..

### **Stage IIB non-seminomas**

Treatment depends on [tumor marker](#)<sup>7</sup> levels after surgery and the extent of spread to

chemo first.

Once chemo is complete, the doctor looks for any cancer that's left. If scans and tumor marker levels are normal, no further treatment may be needed.

Sometimes a few tumors might be left after treatment. These are most often in the lung or in the retroperitoneal lymph nodes. Further treatment at this point depends on the [type](#)<sup>8</sup> of cancer:

- A **stage III seminoma** that's still there after chemo or doesn't "light up" on a PET scan, will be watched with CT scans to see if it grows. If it does, more treatment is needed. If the tumors do light up on a PET scan, they could be cancer, and treatment is needed. Treatment may be surgery (such as a retroperitoneal lymph node dissection) or chemo (using a different combination of drugs).
- A **stage III non-seminoma** tumor that remains after treatment is usually removed surgically, which may result in a cure. If cancer is found in the tumors removed, you might need more chemo, maybe with different drugs. After this, surgery might be done to take out any tumors that remain.

If the cancer is resistant to chemo or has spread to many organs, the usual doses of chemo may not always be enough. The doctor might recommend high-dose chemo followed by a stem cell transplant. Enrolling in a [clinical trial](#)<sup>9</sup> of a newer chemo regimen might be another good option.





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