



HEALTHY MALE
ANDROLOGY AUSTRALIA

Testicular Cancer



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Health information in this booklet describes TESTICULAR CANCER. Diagnosis and treatment options are described to help men and their families understand the health problem, make men aware of the available treatment options, and to help make talking with their doctor easier.

The information contained in this booklet is based on up-to-date medical evidence. It has been provided for educational purposes only. It is not intended to take the place of a clinical diagnosis or medical advice from a fully qualified health professional. Healthy Male urges readers to seek the services of a qualified health professional for any personal health concerns.

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At A Glance

What is testicular cancer?

Testicular cancer starts as an abnormal growth or tumour in a testis. A cancer will usually appear as a painless lump in a testis. If a man sees a doctor as soon as a lump, swelling or pain in a testis is noticed, the cancer can remain localised (remain within the testis). However, if not treated, the cancer typically spreads to other parts of the body via the blood or lymphatic system. Testicular cancer has a very good cure rate (over 95 per cent).

How common is testicular cancer?

Testicular cancer is not very common, being diagnosed in about 700 Australian men each year; however, in men aged 18-39 years it is the second most common form of cancer.

What are the symptoms of testicular cancer?

A hard lump in either testis is the usual symptom of testicular cancer. The lump is usually painless but in about one in 10 men it is painful or tender. In a few men, constant backache, coughing or breathlessness, and enlarged or tender nipples may mean that the cancer has spread. A man with any of these symptoms should see a doctor straight away; however, there may be many other reasons for these symptoms.

At A Glance

How is testicular cancer diagnosed?

To determine whether a lump in the testis is cancer a doctor will take a detailed medical history, do a physical examination and an ultrasound scan of the testes, and may request blood tests and other scans.

Many lumps are found to be fluid-filled cysts within the scrotum and are not cancer. The chest and abdomen will also be checked in case the cancer has spread to other parts of the body.

How is testicular cancer treated?

The treatment options for testicular cancer depend on the type and stage of cancer. An orchidectomy (surgical removal of the affected testis) is the first stage of treatment for all suspected cases of testicular cancer. The removed testis is then sent to a pathology laboratory to confirm the stage and type of cancer. In recent years, surveillance (careful monitoring) has become a more popular option after orchidectomy for localised testicular cancer. This is where the man is checked regularly to assess

whether the cancer has moved elsewhere in the body, including the other testis. Chemotherapy or radiotherapy may be given after surgery to kill off any cancer cells that may have spread to other parts of the body. The level or amount of chemotherapy and radiotherapy will be different for each man and will depend on the stage and type of cancer. The doctor will look at each case individually to assess the chance of the cancer moving from the testes before deciding on the best treatment.

Can testicular cancer cause infertility?

Men who are diagnosed with testicular cancer are more likely to have lower fertility, or complete infertility, even before any treatment starts.

Fertility can be further affected by cancer treatments such as radiotherapy and chemotherapy. For this reason, men with suspected cancer should have their fertility assessed prior to any treatment, with semen analysis and hormone level tests. Sperm should be frozen (ideally prior to orchidectomy) to be used at a later date if required.

It is important to remember however, that after a cancerous testis is removed, in many men, the remaining testis continues to make testosterone and sperm and fertility may be unaffected.

Does testicular cancer treatment affect masculinity?

Testicular cancer treatment does not normally affect masculinity. The removal of one testis because of cancer does not usually affect hormone levels. The body adjusts, with the remaining testis producing enough testosterone so that all the important effects of the male sex hormone, including muscle and bone strength, libido (sex drive) and energy levels, are the same as before removal of a single testis.

Should I check my testes regularly?

Testicular cancer has a very good cure rate. To help find testicular cancer early, it is recommended that young men check their testes regularly for any lumps or swellings and if concerned, see their doctor straight away.

Even if you have had testicular cancer, or are being treated, it is important to still perform a testicular self-examination. About one in 25 men who have had testicular cancer may develop cancer in the other testis.

Testicular Cancer

What is cancer?

Cancer is a disease where abnormal cells divide without control. New cells constantly replace worn out or damaged cells in all parts of the body as a natural process. But sometimes the cells multiply without control to form a lump or tumour.

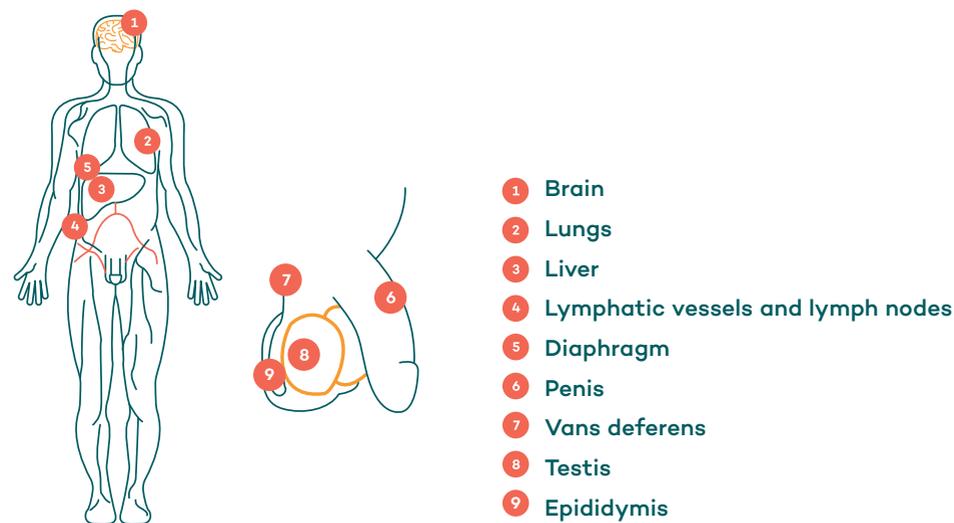
Tumours can be benign (non-cancerous) or malignant (cancerous). Benign tumours do not normally spread, whereas malignant tumours can spread to other parts of the body if left untreated.

How does cancer spread?

If a tumour is malignant cancer cells can spread to nearby tissues and also through the blood and lymphatic system to other parts of the body, such as the liver, bones, lungs or brain. When they reach the new site, the cancer cells settle and grow, forming another tumour (secondary tumour) in the new location. This is called metastatic (or advanced) cancer.

What are the testes?

The testes (testis: singular) are a pair of egg shaped glands that sit in the scrotum next to the base of the penis on the outside of the body. In adult men each testis is normally between 15 and 35 millilitres (mL) in volume. The testes are needed for the male reproductive system to function normally.



The male body showing the reproductive and lymphatic systems

The testes have two related but separate roles:

- to make sperm
- to make testosterone.

The testes develop inside the abdomen in the male fetus and then move down (descend) into the scrotum before or just after birth. The descent of the testes is important for fertility as a cooler temperature is needed to make sperm and for normal testicular function. The location of the testes in the scrotum keeps the testes about 2°C below normal core body temperature. This is the reason that in cold weather the scrotum contracts and brings the testes closer to the body and in hotter weather, the scrotum relaxes.

Testicular Cancer

Most men can be completely cured of testicular cancer

What is testicular cancer?

Testicular cancer starts as an abnormal growth or tumour in a testis. A cancer will usually appear as a painless lump in a testis. If a man sees a doctor as soon as a lump, swelling or pain in a testis is noticed, the cancer can remain localised (remain within the testis). However, if not treated, the cancer typically spreads to other parts of the body via the blood or lymphatic system.

Testicular cancer has a very good cure rate (over 95 per cent).

How common is testicular cancer?

Testicular cancer is not very common, being diagnosed in about 700 Australian men each year; however, in men aged 18-39 years it is the second most common form of cancer.

What are the types of testicular cancer?

There are two main types of testicular cancer: seminoma and non-seminomatous germ cell tumour (NSGCT). Other types of testicular cancer occur, but they are quite rare.

What is a seminoma?

A seminoma is a form of testicular cancer containing only one type of cancer cell. It is normally found in men between the ages of 30 and 60 years, but can happen at other ages.

What is a non-seminomatous germ cell tumour?

A non-seminomatous germ cell tumour (NSGCT, often known as a non-seminoma) is made up of many different types of cancer cells grouped together. It is more common in younger men, most often between late teens and early 40s.

What is an intra-tubular germ cell neoplasia?

Intra-tubular germ cell neoplasia or ITGCN (sometimes referred to as testicular 'carcinoma in situ') is a type of 'pre-cancer'. However, not all of these pre-cancer cells will develop into cancer. Men with this health problem have a one in two chance of developing testicular cancer within five years. When men are diagnosed with cancer in one testis, ITGCN is sometimes found in the other unaffected testis, making it important to continue monitoring for cancer in the remaining testis. This may include a biopsy of the other testis.

What is a teratoma?

A teratoma is a benign (non-cancerous) growth that can be part of a non-seminoma or is sometimes found following chemotherapy for testicular cancer. Its removal after chemotherapy is recommended as it can sometimes grow and become cancerous.

Symptoms

If you notice a hard lump or any change in the testes you should see your local doctor (GP) straight away

What are the symptoms of testicular cancer?

A hard lump in either testis is the usual symptom of testicular cancer. The lump is usually painless but in about one in 10 men it is painful or tender. In a few men, constant backache, coughing or breathlessness, and enlarged or tender nipples may mean that the cancer has spread. A man with any of these symptoms should see a doctor straight away; however, there may be many other reasons for these symptoms.

What are the types of non-cancerous lumps found in the testes?

There are other lumps that can be found in the testis or scrotum that are benign (non-cancerous). It is important to see a doctor to make sure any lumps felt are not testicular cancer. An ultrasound examination of the testis can help find out what type of lump it is.

When should I see a doctor if I have a lump in my testis?

If you notice a hard lump or any change in your testes, see your local doctor (GP) straight away. You may be referred to a urologist. Urologists are doctors (surgeons) who specialise in diseases of the urinary tract in men and women, and the genital organs of men.

THE MAIN TYPES OF NON-CANCEROUS LUMPS AND CYSTS FOUND IN THE SCROTUM

Epididymal cyst	A common fluid-filled cyst that feels slightly separate from the top of the testis. Epididymal cysts happen at any age and are often discovered when about the size of a pea. They can slowly increase in size and can feel like a third testis within the scrotum. They should be left alone when small but can be removed with surgery if they get bigger and cause bother.
Spermatocele	Similar to an epididymal cyst but the lump is usually connected to the testis. The swelling is filled with fluid containing sperm and sperm-like cells.
Hydrocele	A swelling in the scrotum caused by a build-up of fluid around the testes. Hydroceles are usually painless but gradually increase in size and can become very large. Hydroceles in younger men may be a warning of an underlying testis cancer but this is rare. In older men, hydroceles are almost always benign, but an ultrasound of the scrotum can be done to make sure.
Hydatid of Morgagni	A small common cyst found at the top of the testis. They are movable and can cause pain if they twist. These cysts should be left alone unless causing pain.
Adenomatoid tumour	A benign nodule located on the outside of the testis.

Causes

What causes testicular cancer?

In most cases of testicular cancer the causes are unknown. However, there are certain risk factors that have been linked with the disease.

What are the risk factors for testicular cancer?

Young men (about 20 to 40 years of age) are most at risk of developing testicular cancer.

Due to the higher risk of testicular cancer in men with a history of undescended testes, it is important for families to share details of medical history with boys in early adolescence so they are aware of the need to regularly check their testes.

Some men with testicular cancer are also found to have low sperm counts. However, it is not proven if this is because of the testicular cancer or is a sign of an underlying infertility problem.

RISK FACTORS FOR TESTICULAR CANCER

Undescended testes (cryptorchidism)	<p>A condition when, at birth, one or both of the testes are not lowered into the scrotum but are in the abdomen or only part way down into the scrotum. Undescended testes are found in about three to five boys in every 100. About one in 100 boys will need an operation to bring the testes into the scrotum.</p> <p>Men with a history of undescended testes have about ten times the chance of testicular cancer compared to men with normally descended testes. The risk of testicular cancer may be lower if surgery to fix the problem takes place in the baby's first year of life. Where there has been a single undescended testis, the risk of testicular cancer is generally, but not always, limited to that testis.</p>
Previous testicular cancer	<p>Testicular cancer in one testis is a major risk factor for the development of cancer in the other testis. About 1 in 25 men who have had testicular cancer develop cancer in the other testis.</p>
Previous male infertility	<p>Men who have been previously diagnosed with fertility problems, particularly those who had undescended testes, may also have a greater chance of developing testicular cancer compared to men with normal fertility. Pre-cancer cells (ITGCN) are sometimes found in testicular biopsies from infertile men but not all pre-cancer cells will develop into cancer.</p>
Family history	<p>Having a father, brother or uncle with testicular cancer is only a minor risk factor for testicular cancer.</p>
Down syndrome	<p>Studies have suggested that men with Down syndrome are genetically more likely to get testicular cancer, gastrointestinal cancer and leukaemia.</p>

Prevention and Early Detection

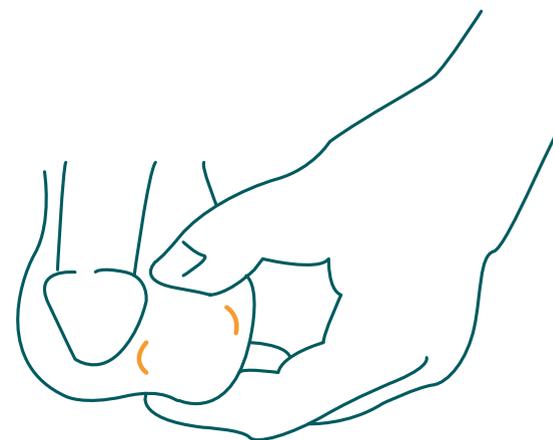
Can I do anything to prevent testicular cancer?

As the causes of testicular cancer are largely unknown, there are no known ways to prevent it. There is no evidence that injury or sporting strains, life-style (for example smoking or diet), or sexual activity are linked with testicular cancer. However, an injury to the groin area may sometimes prompt men to check or notice a problem with the testes that needs further investigation by a doctor.

Should I check my testes regularly?

Testicular cancer has a very good cure rate. To help find testicular cancer early, it is recommended that young men check their testes regularly for any lumps or swellings and if concerned, see their doctor straight away.

Even if you have had testicular cancer, or are being treated, it is important to still perform a testicular self-examination. About one in 25 men who have had testicular cancer may develop cancer in the other testis.



Testicular self-examination

What is testicular self-examination (TSE)?

A testicular self-examination (TSE) is a quick and simple process which may be easier after a warm bath or shower when the skin of the scrotum is relaxed. A testicular self-examination involves feeling the testes, one at a time, using the fingers and thumb, and should only take a few minutes.

Prevention and Early Detection

How is testicular self-examination done?

Using the palm of your hand, support your scrotum. Gently roll one testis between thumb and fingers to feel for any lumps or swellings in or on the surface of the testis. Repeat with the other testis. The testes should feel firm and the surface should feel smooth.

Using the thumb and fingers, feel along the epididymis at the back of the testis. The epididymis is a soft, highly coiled tube that carries sperm from the testis to the vas deferens. Check for any swelling in this area.

If there is any change to how the testes feel normally, see your local doctor (GP) straight away.

It is normal for one testis to be slightly bigger than the other and the left testis often hangs lower than the right.

Diagnosis

How is testicular cancer diagnosed?

To determine whether a lump in the testis is cancer a doctor will take a detailed medical history, do a physical examination and an ultrasound scan of the testes, and may request blood tests and other scans.

What happens when a medical history is taken?

The doctor will ask about any previous problems with the testes and any family history of testicular cancer. Specific questions about undescended testes (cryptorchidism) will be asked. The failure of the testes to lower into the scrotum before birth is a problem normally fixed with surgery in the first few years of life. However, even when this operation is a success, undescended testes increase the chance of developing testicular cancer in adult life.

The doctor may also ask about history of fertility. Men who have a problem with achieving a pregnancy with their partner (infertility) are more likely to have testis cancer.

Diagnosis

What happens in a physical examination?

During the physical examination the doctor will check the affected testis and the other testis to look for possible tumours. The chest and abdomen will also be checked in case the cancer has spread to other parts of the body.

Ultrasound of the testes is usually done to make sure that the lump is solid and is located within the testis. Many lumps are found to be fluid-filled cysts within the scrotum and are not cancer.

An ultrasound uses sound waves to make a picture of the testis and is painless, safe and quick.

What other tests for testicular cancer may be done?

The doctor may order blood tests for chemical markers released into the blood by tumours, such as beta-human chorionic gonadotrophin (beta-hCG), alpha-fetoprotein (AFP) and lactic dehydrogenase (LDH). Slight increases in the levels of these chemical markers are common, even when the cancer is localised (remains within the testis). Very high levels of chemical markers may mean that the cancer has spread and needs more aggressive treatment.

A chest x-ray or computerised tomography (CT) scan of the lungs may be done to see if the cancer has spread. A CT scan is a specialised X-ray taking many cross-sectional images (combined to make 3-dimensional images) of organs in the body to help find abnormal changes within them. A CT scan of the abdomen and pelvis will often be done to make sure that there is no spread of the cancer to the organs in the abdomen, particularly the lymph glands.

Other scans that the doctor might request are magnetic resonance imaging (MRI) or positron emission tomography scanning (PET). In some cases, these scans may give further information about the cancer, including if it has spread, and may help to guide the treatment.

Treatment

An orchidectomy (surgical removal of the affected testis) is the first stage of treatment for all suspected cases of testicular cancer

How is testicular cancer treated?

The treatment options for testicular cancer depend on the type and stage of cancer.

An orchidectomy (surgical removal of the affected testis) is the first stage of treatment for all suspected cases of testicular cancer. The removed testis is then sent to a pathology laboratory to confirm the stage and type of cancer.

In recent years, surveillance (careful monitoring) has become a more popular option after orchidectomy for localised testicular cancer. This is where the man is checked regularly to assess whether the cancer has moved elsewhere in the body, including the other testis.

Chemotherapy or radiotherapy may be given after surgery to kill off any cancer cells that may have spread to other parts of the body. The level or amount of chemotherapy and radiotherapy will be different for each man and will depend on the stage and type of cancer.

The doctor will look at each case individually to assess the chance of the cancer moving from the testes before deciding on the best treatment.

What is an orchidectomy?

A solid lump within the testis needs complete surgical removal of the whole affected testis (an orchidectomy). An orchidectomy is done under general anaesthetic. A cut is made in the groin on the side of the testicular lump. The cord carrying

the blood vessels to and from the testis on that side is cut and the testis, with its cord, is removed in one piece.

An orchidectomy can often be done as a day procedure or may need a one night stay in hospital. Wound infections and bruising can happen. Most men recover fully within a few days but should not lift heavy weights for one month.

Orchidectomy will usually cure the cancer if there is no spread to other parts of the body.

There is a small chance (about one in 20) that the removed testis may be benign (non-cancerous). It is not possible to confirm this without surgery. The surgical removal of one testis should still allow the man to have an erection, have an active sex life and be fertile (unless there are other reasons for infertility).

What is surveillance?

Surveillance (careful monitoring) is where the man is checked regularly by the doctor after surgery. This is to make sure there is no sign of the cancer anywhere else in the body, including the other testis. Surveillance check-ups involve a physical examination, blood tests for tumour markers (beta-hCG, AFP, LDH), and x-ray or CT scans. The check-ups may be every three or four months at first but then become less frequent over time.

Men may continue surveillance for up to five or 10 years. If new cancer is found during surveillance, other options will be used to treat the cancer.

Treatment

What is chemotherapy?

Chemotherapy involves injecting highly toxic medicines into a vein to circulate around the body. Chemotherapy medicines act to stop or slow the growth of cancer cells. A medical oncologist supervises the treatment.

The course of treatment is usually over three to four months. One cycle of chemotherapy is given every three weeks, followed by a rest period to allow the body to recover from the side-effects of treatment. In some cases it may be given more often. The length of treatment depends on the type of testicular cancer.

Sometimes chemotherapy is given for early cases to prevent the cancer returning, in which case only one or two cycles may be given.

Cisplatin is a chemotherapy drug that was found to work very well in treating testicular cancer in the 1970s and is still widely used today. It is usually given together with other chemotherapy medicines, such as Bleomycin and Etoposide. Carboplatin may also be recommended.

What is radiotherapy?

Radiotherapy uses high energy X-rays to kill cancer cells in a specific area while limiting damage to normal cells. A radiation oncologist will decide on the length of treatment, which may last between two and five weeks, given on a daily basis during the working week.

How is early-stage testicular cancer treated?

If there is no sign of cancer on chest x-ray or abdomen and pelvis CT scan, most men will be cured after they have had surgery to remove the affected testis. However, in about one in five men, tiny deposits of the cancer may still be there and may only show up some time after the surgery.

To kill any cancer cells that may have spread, some men have a single or short course of chemotherapy or radiotherapy after surgery. The type of treatment after surgery depends on whether the testicular cancer is a seminoma (a form of testicular cancer containing only one type of cancer cell) or non-seminoma (cancer made up of many different types of cancer cells grouped together). This will be decided after surgery when the doctor reviews the pathology results.

Treatment

How are seminomas treated after surgery?

After orchidectomy, seminomas are often treated with surveillance and/or a single dose of chemotherapy (carboplatinum). Radiotherapy is sometimes used after testicular surgery to prevent the cancer from coming back, by destroying any cancer cells that may have spread to the lymph nodes in the abdomen.

How are non-seminomas treated after surgery?

Non-seminomatous germ cell tumours (NSGCT) are less predictable in the way they spread and tend to be more widely spread in the body. This makes them less suitable for preventive localised treatment such as radiation. Chemotherapy may be given after surgery.

Some NSGCT, which are thought to be unlikely to return, are generally managed after surgery with surveillance (careful monitoring). The surveillance check-ups may be every three or four months at first but then become less frequent over time. Men may continue surveillance for up to five or 10 years. If new cancer is found during surveillance, other options will be used to treat the cancer.

About one in three men with non-seminomas who have surveillance after surgery develop further tumours. Chemotherapy is generally recommended if a new tumour grows.

How is advanced or relapsed testicular cancer treated?

Men with advanced cancer that has spread to other body parts (both seminomas and non-seminomas), or those whose early stage disease returns (relapsed cancer), are generally referred for chemotherapy, with excellent results. Even men with widespread cancer usually have successful outcomes with modern treatments.

What is retroperitoneal lymph node dissection and when is it used?

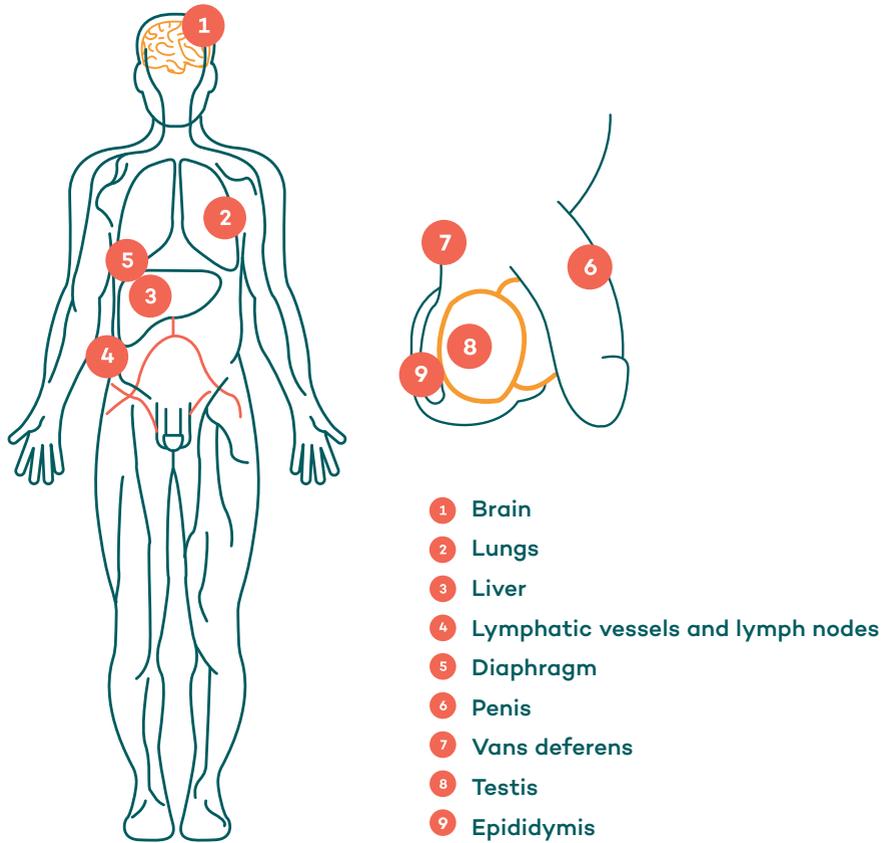
At the end of a course of treatment, a full check is done by the doctor including a physical examination, a chest X-ray and CT or other scans. If these tests show up any leftover cancer or deposits of secondary cancers, more surgery is usually recommended. The most common operation at this stage of treatment is a retroperitoneal lymph node dissection (RPLND).

RPLND is not a common procedure and is only done in advanced cases of testicular cancer. It involves the removal of the lymph nodes running up behind all the major organs in the abdomen. Sometimes surgery to remove nodes from the lungs is also needed.

RPLND is usually needed if chemotherapy is not thought to be completely successful and lumps can still be seen in the lymph nodes on a CT scan. While the lumps may be scar tissue, they may also be left-over cancer or a benign growth (teratoma). Chest surgery may also be done if deposits can be seen on the x-ray.

Even men with widespread cancer usually have successful outcomes with modern treatments

Treatment



The male body showing the reproductive and lymphatic systems

Who is involved in testicular cancer treatment?

Several doctors and other health professionals (a multidisciplinary team) are involved in diagnosing and treating testicular cancer. A man should first see his local doctor (GP) if he notices any kind of lump or swelling in the testes. The doctor will refer the man to a urologist if they think it may be testicular cancer.

After examination and tests, the urologist will operate to remove the affected testis if it is likely that it is cancer. A sample of tissue or cells will be sent to a histopathologist to confirm the diagnosis. The histopathologist will send a report to the treating doctors on the diagnosis and details about the cancer that help to assess how the cancer might develop.

The treatment options will be discussed by the multidisciplinary team and the recommended treatment will vary according to the type of cancer found in the sample. Each member of the multidisciplinary team will be involved as appropriate for the type of treatment.

If hormone levels have been affected by treatment, an endocrinologist may prescribe testosterone replacement therapy. If both testes are removed, testosterone replacement therapy is needed to keep testosterone levels normal, which is important for muscle and bone strength, libido (sex drive) and energy levels. A testicular cancer diagnosis can cause stress and anxiety that may be eased by talking with a psychologist, psychiatrist or counsellor. Some men have serious concerns about body image or ongoing psychological problems related to erectile function following treatment and may find professional counselling helpful.

Treatment

MEMBERS OF A MULTI-DISCIPLINARY TEAM TREATING TESTICULAR CANCER

Urologist	A doctor (surgeon) who specialises in diseases of the urinary tract in men and women, and the genital organs in men
Medical oncologist	A doctor who specialises in the diagnosis and treatment of cancer, particularly the use of chemotherapy and other medicines to treat cancer
Oncology nurse	A nurse with special training in oncology. An oncology nurse has a number of tasks including giving chemotherapy under the direction of a medical oncologist
Radiation oncologist	A doctor who specialises in the treatment of cancer patients using radiation
Radiation therapist	A health professional who gives radiation under the direction of a radiation oncologist
Endocrinologist	A doctor who specialises in problems in the endocrine system (hormones and hormonal function)
Histopathologist	A doctor who specialises in the tissue diagnosis of cancer
Psychologist / psychiatrist	A therapist, not necessarily a doctor, who treats psychological or mental problems / A doctor who specialises in diagnosis and treatment of psychological or mental problems

What are the short-term side-effects of treatment?

Most side-effects of radiotherapy and chemotherapy are short-term and can be minimised with other treatments. A common side-effect of radiotherapy and chemotherapy is tiredness. Nausea can happen but this can be treated with medicines.

Most side-effects of radiotherapy and chemotherapy are short-term and can be minimised with other treatments

SHORT-TERM SIDE EFFECTS OF TESTICULAR CANCER TREATMENTS

RADIOTHERAPY	CHEMOTHERAPY
Temporary hair loss within the area of treatment that usually grows back once treatment stops	Temporary hair loss
Bowel upsets or diarrhoea happen rarely	Kidney damage
	Tinnitus (hearing loss/ringing in the ears)
	Neuropathy (nerve damage) with decreased sensation or numbness in hands and feet
	Bone marrow suppression leading to a lower white cell count that may cause an increase in infections, and sometimes anaemia (low blood red cell count)
	Inflammation of the gums, possibly with mouth ulcers
	Inflammation and scarring in the lung after chemotherapy using bleomycin

Treatment

Can diet help with cancer treatment?

Healthy eating habits can help the body to cope with cancer treatment and its possible side-effects. Possible changes to diet should be talked about with a doctor. There are no known foods that are proven to help men recover from testicular cancer.

Is it OK to exercise during cancer treatment?

Staying active is usually helpful while going through cancer treatment. Moderate exercise, such as walking, is often recommended. Men should be aware of the body's limits and slow down if tired.

Are there other options to help recovery from cancer or treatment?

Relaxation techniques can be helpful for some men to reduce tension and anxiety. Some men find they can cope better with the disease and its treatment if anxiety about the diagnosis or treatment is managed.

Long-Term Follow Up

What follow-up is needed after testicular cancer treatment?

Follow-up and ongoing health checks by qualified health professionals are important after surgery, radiotherapy and chemotherapy, to make sure that the cancer has not returned. Check-ups may include physical examination, blood tests, X-rays and scans, and continue for at least ten years after treatment. If any new symptoms appear between check-ups, it is important to see a doctor straight away.

What is the chance of testicular cancer returning?

Cancer in one testis is a major risk factor for the development of cancer in the other testis. About one in 25 men who have had testicular cancer in one testis will have ITGCN or changes in the other testis that may develop into cancer. Regular testicular self-examination is therefore highly recommended for men who have had a single testis removed because of cancer.

The chance of the cancer returning in other parts of the body depends on the type and the initial spread of the cancer, and should be talked about with a specialist in the multidisciplinary treating team.

Long-Term Follow Up

What is peripheral stem cell transplantation?

Men whose cancer has returned after standard chemotherapy are generally given aggressive chemotherapy. These strong chemotherapy medicines can destroy bone marrow. Peripheral stem cell transplantation is sometimes needed to treat the side-effects of heavy doses of chemotherapy. Stem cell transplantation can help restore the damaged blood cells and repair the bones.

What are the long-term side-effects of treatment?

The major long-term side-effect of both radiotherapy (depending on the area needing treatment) and chemotherapy can be reduced fertility. Since testicular cancer generally affects men at the age when they may want to have children, sperm storage or banking (saving sperm for later use) should be talked about with the doctor before treatment is started.

After radiotherapy for seminoma at a young age, there is a small increase in the chance of getting another cancer later in life.

If cancer is found in both testes and both need to be surgically removed, men do not produce enough of the male sex hormone testosterone to remain healthy. Testosterone replacement therapy is then needed. A referral to an endocrinologist (a specialist who manages hormone function) may be needed.

Men who have gone through RPLND have a longer recovery time after surgery. They can have abdominal swelling and short-term bowel problems.

Damage to nerves that control ejaculation is the main long-term side-effect of RPLND. Erections and orgasm (sexual climax) are still normal but ejaculation sometimes does not happen.

The major long-term side-effect of both radiotherapy (depending on the area needing treatment) and chemotherapy can be reduced fertility

Fertility

Can testicular cancer cause infertility?

Men who are diagnosed with testicular cancer are more likely to have lower fertility, or complete infertility, even before any treatment starts. Fertility can be further affected by cancer treatments such as radiotherapy and chemotherapy.

For this reason, men with suspected cancer should have their fertility assessed prior to any treatment, with semen analysis and hormone level tests. Freezing of sperm should be offered (ideally prior to orchidectomy) to be used at a later date if required.

How do cancer treatments affect fertility?

Cancer treatments can cause temporary (up to five years following treatment) or long-term (permanent) fertility problems.

The level of fertility after treatment depends on the number of rounds of treatment, the dose, the area being treated, and whether several types of treatment are used together.

How does surgery affect fertility?

After a cancerous testis is removed, in many men, the remaining testis continues to make testosterone and sperm and fertility may be unaffected.

However, for those men who have pre-existing severely low or even absent sperm production, a urologist or andrologist (doctor who specialises in male sexual and reproductive health) may be able to surgically explore the testis at the time of orchidectomy, to try and extract some sperm which could be frozen for use at a later date. This is known as a microtesticular sperm extraction (microTESE).

How does radiotherapy affect fertility?

Radiation treatment or 'radiotherapy' uses high energy X-rays to kill cancer cells in a specific area while limiting damage to normal cells.

Radiotherapy for testicular or other cancers near the testes can damage the testis, leaving permanent problems with sperm production. During radiotherapy, the other non-affected testis is shielded from the X-rays but some exposure may happen. The effects of radiotherapy can be temporary or permanent.

Radiotherapy to the whole body (used before a bone marrow transplant) and radiation to the brain can also lower male fertility by affecting the glands that produce hormones that act on the reproductive system.

As radiation can cause genetic damage in the early development stages of sperm (germ cells), it is best to avoid attempting a pregnancy for six to 12 months (depending on the type of treatment) after radiotherapy.

Fertility

Sperm storage should ideally take place before orchidectomy

How does chemotherapy affect fertility?

Chemotherapy medicines act to stop or slow the growth of cancer cells. Chemotherapy also attacks normal cells, such as the cells in the lining of the sperm-producing tubes in the testis. Chemotherapy can temporarily or permanently destroy developing sperm cells. Some men will return to the level of fertility they had before chemotherapy but this is highly dependent on the type and duration of chemotherapy. It can take up to five years for fertility to recover after chemotherapy and in some cases fertility is permanently reduced.

Why is sperm storage important?

Men with testicular cancer often have lower fertility before treatment starts and the treatment can further reduce their fertility. All men who are diagnosed with possible testicular cancer should speak to their doctors about their fertility before treatment begins.

It is highly recommended that men produce semen samples (through masturbation) for sperm storage (also known as sperm banking).

Semen can be frozen, using special equipment, and stored long-term for future use. If a man wants to father a child at a later stage, the frozen semen is thawed and used in fertility treatments such as IVF (in vitro fertilisation).

Why is it important for young males to think about storing sperm?

Sperm storage for adolescents with testicular cancer needs careful management. It can be extremely difficult for males to come to terms with the diagnosis of cancer at a young age and there may be body image problems following surgery; fatherhood is not usually the main concern. Producing a semen sample by masturbation can also be stressful for young males. Family support and encouragement without pressure can be very valuable.

When should sperm be stored?

To avoid having to delay treatment for testicular cancer, it is important to think about sperm storage early. It is recommended that sperm are collected before orchidectomy.

Semen quality may be poor so some males may need to provide samples on two or three separate occasions. Some men may require specialist sperm retrieval (microTESE) if their sperm levels are severely low or absent. Modern IVF treatments can be successful with just a few moving sperm.

Where can sperm be stored?

Specialist centres providing in vitro fertilisation (IVF) and other ART (assisted reproductive technologies) often have sperm storage facilities. Sperm are frozen and kept in liquid nitrogen (-196 °C) for long-term storage. A storage fee will apply. Sperm can last for decades when stored in a frozen 'sperm bank'.

Sexuality

Does testicular cancer treatment affect sexual function?

Many men find that testicular cancer and its treatment do not affect their sexual performance (that is sex drive, erectile function, ejaculation or orgasm) in any way. However, the stress and anxiety of cancer can affect sexual function. Concerns about changes in body image may also cause sexual problems and anxiety.

If relevant and where possible, it is important that partners are involved and informed about the diagnosis, treatment and likely outcomes. The support and understanding of the partner will help if sexual function becomes a concern.

Does testicular cancer treatment affect masculinity?

Testicular cancer treatment does not normally affect masculinity. The removal of one testis because of cancer does not usually affect hormone levels. The body adjusts, with the remaining testis producing enough testosterone so that all the important effects of the male sex hormone, including muscle and bone strength, libido (sex drive) and energy levels, are the same as before removal of a single testis.

When is hormone replacement necessary after testicular cancer treatment?

In a small number of men, testosterone therapy may be needed after the removal of a single testis. A referral to an endocrinologist may be needed if there are concerns about body strength, energy levels and changes to virility.

Some men whose cancer comes back have the second testis removed. These men must be given testosterone therapy to return the testosterone levels in the blood to normal for general health, well-being, sexual function and other effects of testosterone.

What are testicular implants?

Testicular implants are prostheses or artificial devices made of moulded silicone or filled with a salt solution. Some men choose, for cosmetic or psychological reasons, to have testicular implants during or after cancer treatment to give the scrotum a normal appearance. The implants serve no physiological function and the decision to have one inserted is a very personal choice.

Where can I get a testicular implant?

Men who would like to have a testicular implant should speak with their treating urologist. The urologist can get an implant from a medical company and will do the surgical implant procedure.

Testicular cancer treatment does not normally affect masculinity

Support

It is important to see a doctor straight away if you find a lump in the testis

This booklet gives information about testicular cancer and may be helpful when talking with your doctor and/or specialist.

A local doctor (GP) is the first health professional you should see if you find a lump in your testis. The GP will be able to answer any questions you may have, refer you for tests or to a urologist, and show you how to do a testicular self-examination.

You can always ask the doctor if you have questions about any aspects of your health or treatment. You can also talk to the doctor about any feelings or concerns you may have about treatment and its effect on general health and well-being. Specialists you may be referred to can also answer any questions. Men having treatment for testicular cancer are advised to prepare questions before meeting with the specialist to help when talking with the specialist.

For some men, a diagnosis of testicular cancer may cause anxiety. It is important to talk to a doctor, psychologist or other health professional with experience in mental health for support. For some men, it can also be helpful to talk with others who have similar problems, or to speak with trained therapists who work with men with testicular cancer, to get further support.

The Australian Cancer Councils offer a range of services to help people who have cancer, and those that care for and support people with cancer. In addition to help hotlines and peer support programs, the Cancer Councils provide useful booklets and pamphlets on aspects of cancer and the treatments, such as chemotherapy and radiotherapy.

beyondblue is a national, independent, not-for-profit organisation working to increase awareness and understanding of anxiety and depression in Australia and to reduce the associated stigma. A range of support and information resources are available, including a fact sheet on 'Anxiety disorders and depression in men with testicular cancer'.

CanTeen is a national organisation that gives support for young people (aged 12-24) living with cancer. CanTeen also provides support to parents, siblings and children.

Support

Please note that websites developed overseas may describe treatments that are not available or approved in Australia

If you have any questions about the information in these or other sources please talk with your doctor

Websites

Healthy Male

www.healthymale.org.au

beyondblue

www.beyondblue.org.au

CanTeen

www.canteen.org.au

Cancer Council Australia

www.cancer.org.au

Urological Society of Australia and New Zealand

www.usanz.org.au

Urology Channel

www.urologychannel.com

Glossary

alpha (AFP)-

Protein found in the blood that can be a marker of testicular cancer

andrologist-

Doctor specialising in male sexual and reproductive health

benign- Non-cancerous

beta-human chorionic

gonadotrophin (beta-hCG)-

Protein found in the blood that can be a marker of testicular cancer

cancer-

Disease in which abnormal cells divide without control. Cancer cells can spread to nearby tissues and through the blood and lymphatic systems to other parts of the body

carcinoma in-situ-

See Intra-tubular germ cell neoplasia or ITGCN

chemotherapy-

Highly toxic medicines injected into a vein to circulate around the body to stop or slow the growth of cancer cells

cryptorchidism-

See Undescended testis

CT (computerized tomography) scan-

A specialised X-ray taking many cross-sectional images (combined to make 3-dimensional images) of organs in the body to help find abnormal changes within them

endocrinologist-

A doctor who specialises in problems of the endocrine system (hormones and body functions controlled by hormones)

epididymis-

A highly coiled tube at the back of the testes in which sperm are stored and mature. All sperm must pass along this tube to reach the vas deferens

fertility-

Being able to conceive or reproduce

germ cell-

A cell involved with reproduction. In men, sperm develop from germ cells in the testes

histopathologist-

A doctor who specialises in the tissue diagnosis of cancer

hormones-

Chemical messengers made by glands in the body that are carried in the blood to act on various organs. Hormones are needed for growth, reproduction and well-being

intra-tubular germ cell neoplasia or ITGCN-

Sometimes loosely referred to as testicular 'carcinoma in situ', ITGCN is a type of 'pre-cancer'. However, not all of these pre-cancer cells will develop into cancer. When men are diagnosed with cancer in one testis, ITGCN is sometimes found in the other unaffected testis, making it important to continue monitoring for cancer in the remaining testis

IVF (in vitro fertilisation)-

A form of assisted reproduction in which sperm collected from the male are mixed with the female partner's eggs outside the body

lactic dehydrogenase (LDH)-

A substance produced by some testicular tumours and found in the blood. This substance is useful for finding and following testicular cancer

localised cancer-

Cancer that remains in the location where the first lump or growth developed and has not yet spread to other parts of the body

lymphatic system-

The tissues and organs that produce, store and carry white blood cells that fight infection and disease. This system includes a network of thin tubes that branch, like blood vessels, into all the tissues of the body

malignant cancer-

Potentially fatal cancer cells that may spread through the body if not treated

medical oncologist-

A doctor who is specially trained in the diagnosis and treatment of cancer and who specialises in the use of chemotherapy and other medicines to treat cancer

metastatic-

Cancer that has spread to another location in the body where another tumour can form (secondary tumour)

microtesticular sperm extraction (mTESE)-

An operation to retrieve sperm from the testis using a surgical microscope. Can be performed at the same time as orchidectomy.

non-seminomatous germ cell tumour (NSGCT, often known as a non-seminoma)-

A type of testicular cancer that is made up of many different types of cancer cells grouped together. It is more common in younger men, usually between the late teens and early 40s

orchidectomy-

The surgical removal of one or both testes

prosthesis-

An artificial replacement for a missing body part, often used for cosmetic purposes

radiation oncologist-

A doctor who specialises in the treatment of cancer using radiation

radiotherapy-

A treatment that uses high energy X-rays to kill cancer cells in a specific area while limiting damage to normal cells

scrotum-

The skin pouch that holds the testes

semen-

Fluid that is ejaculated (released) from the penis during sexual activity; it contains sperm and other fluids from the testes, prostate and seminal vesicles

seminoma-

A form of testicular cancer containing only one type of cancer cell

sperm-

Male sex cell

sperm bank-

Facility where sperm are kept frozen in liquid nitrogen for later use in artificial insemination

teratoma-

Non-cancerous growth which has the potential to grow and become larger. Its removal after chemotherapy is recommended as it can sometimes grow and become cancerous

testis/testicle (plural: testes)-

The male reproductive organ that makes sperm and male sex hormones

testosterone-

Male sex hormone (androgen)

tumour-

Abnormal lump of cells that grows in the body. It can be benign (non-cancerous) or can spread to other parts of the body

ultrasound-

Medical process using special sound waves to take images or pictures used to examine organs inside the body without making cuts or incisions

undescended testis-

A condition where the testis does not move down (descend) from the groin or abdomen into the scrotum before birth. Also known as cryptorchidism

urologist-

A doctor (surgeon) who specialises in diseases of the urinary tract in men and women, and the genital organs in men

Expert reviewers

Dr Gideon Adam Blecher

MBBS (Hons), FRACS (Urol)

Gideon Blecher is a Uro-Andrologist currently working at University College London Hospital (UK). His Australian training has involved working at large tertiary referral centres including Monash Medical Centre and The Alfred Hospital in Melbourne. He completed subspecialty fellowships in both Andrology and Robotic oncology and currently maintains an interest in male subfertility, male related cancers, erectile dysfunction, Peyronie's disease and penile reconstruction.

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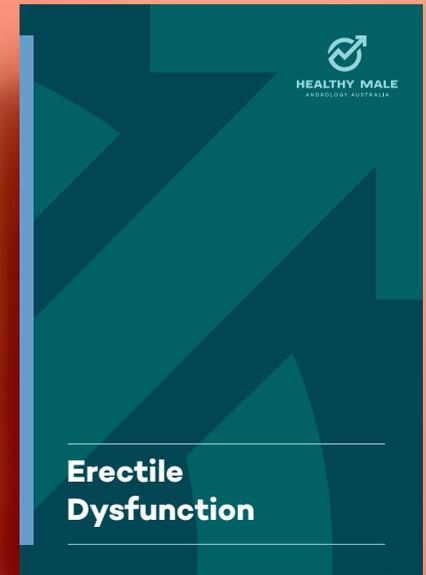
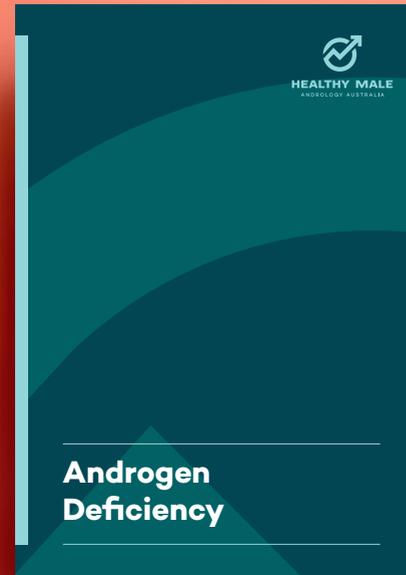
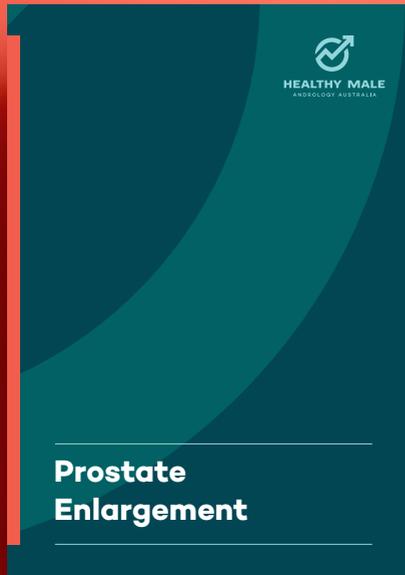
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If you would like more information about a range of male reproductive and sexual health issues, visit the Healthy Male website at healthymale.org.au.

You can also download or order resources on male reproductive and sexual health issues from the Healthy Male website.



For more information,
go to **healthymale.org.au**

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