Introduction
The testicles are two oval glands situated in the scrotum (sac) and are the male sexual organs that produce male sex hormones and sperm. They form part of the male reproductive system. The epididymis is a soft tubular structure behind each testicle which collects, stores and carries sperm. It connects with the vas deferens that joins the urethra in the prostate gland. The Sertoli Cells (germ cells) produce sperm while the Leydig Cells produce the male sex hormone testosterone.

According to the National Cancer Registry (2003) the lifetime risk of developing testicular cancer is as follows:

<table>
<thead>
<tr>
<th>Category</th>
<th>Lifetime Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>All males</td>
<td>1 : 1 839</td>
</tr>
<tr>
<td>Asian males</td>
<td>1 : 1 035</td>
</tr>
<tr>
<td>Black males</td>
<td>1 : 7 728</td>
</tr>
<tr>
<td>Coloured males</td>
<td>1 : 2 041</td>
</tr>
<tr>
<td>White males</td>
<td>1 : 348</td>
</tr>
</tbody>
</table>

Testicular cancer is a disease in which cells in one or both testicles become malignant (cancerous). It is not contagious and cannot spread from one person to another. This form of cancer is relatively rare when compared with other types of cancer. Testicular cancer accounts for approximately 1 percent of all cancers in men. However, it is the most common male cancer in men between the ages of 15 and 39 (National Cancer Institute; Mayo Clinic).

Testicular Cancer
Testicular cancer arises mostly (98,9%) in the germ cells of the testes in adults. Non-germ cell testicular tumours are uncommon and comprise a heterogeneous group.

Within the germ cell neoplasms tumours can be classified, based on pathologic and clinical features, into two broad histologic groups: seminomas and non-seminomas. Seminomas tend to grow more slowly and are very sensitive to radiation therapy, compared to non-seminomas which are more clinically aggressive and do not respond well to radiotherapy. Because these two types of cancers grow and spread differently, they are treated differently (SEER Survival Monograph; National Cancer Institute).

Causes of Testicular Cancer
The exact cause of testicular cancer is unknown. We do, however, know that there are several risk factors linked to testicular cancer.

A risk factor is something that affects a person’s chance of getting a particular disease. Different cancers have different risk factors. Some risk factors, such as smoking, can be controlled. Others, like a person’s age or race, cannot be changed. However, having a risk factor, or even...
several risk factors, does not mean that a person will get the disease. Not having any risk factors does also not mean that someone will not get the disease (American Cancer Society).

Risk Factors for Testicular Cancer

There is no way to prevent testicular cancer (Mayo Clinic). Any person who believes that he may be at risk for testicular cancer should discuss this with his medical practitioner.

The following have been identified as risk factors for testicular cancer:

**Having had an Undescended testicle** – before birth, the testicles normally develop in the belly of the foetus and then move down into the scrotum before the baby is born. It is estimated that in about 3% of boys, the testicles do not move down into the scrotum before birth (American Cancer Society). Sometimes the testicle stays inside the belly, while in other cases, it starts to move down, but gets stuck in the groin. Undescended testes is also known as cryptorchidism.

Men who have had cryptorchidism are several times more likely to get testicular cancer than those who did not have the problem. The risk is higher for men with a testicle in the belly as opposed to one that has moved down at least part of the way. Among men with a history of this problem, most cancers start in the testicle that has not moved down (National Cancer Institute).

**Having had abnormal development of the testicles and/or other organs** - men born with abnormalities of the testicles, penis and/or urethra (hypospadias), or kidneys, as well as those with inguinal hernia (hernia in the groin area, where the thigh meets the abdomen), may be at increased risk (CancerHelp UK).

**Having a personal history of testicular cancer** – Men who have been cured of cancer of one testicle have an increased risk (about 3-4%) of getting cancer in the other testicle (American Cancer Society).

**Having a family history of testicular cancer** - A family history of testicular cancer increases the risk. If a man has the disease, there is a slight increased risk that his brothers or sons may also get it. Approximately 10% of testicular cancers appear to be genetically linked. It is believed that the genes do not cause testicular cancer, but rather make the man more susceptible to it. (National Cancer Institute; Mark Kantrowitz).

**HIV Infection** – Recent research has shown that there is some evidence that men infected with HIV (human immunodeficiency virus) have an increased risk of testicular cancer. This may be especially true for men who have Aids (Acquired Immunodeficiency Syndrome). No other infections have been shown to increase testicular cancer risk (American Cancer Society).

**Race** – being white increases the risk of testicular cancer. White men are about 5 times more likely to get testicular cancer. The reason for this difference is not known (American Cancer Society; National Cancer Institute). Please also refer to the statistics from the National Cancer Registry quoted above.

**Age** – On average 9 out of 10 cases of testicular cancers occur in men between the ages of 20 and 54. However, this cancer can affect males of any age, including infants and older men (American Cancer Society).
Having fertility problems – studies have confirmed that men with fertility problems have an increased risk of testicular cancer. The problems they identified were low semen concentration, sperm that did not move around as much as normal, or a high proportion of abnormal sperm (CancerHelp UK).

Occupation - Certain occupations (miners, oil or gas workers, janitors, leather workers, food and beverage workers, or workers involved in the manufacturing or application of pesticides) have an increased risk of testicular cancer (Mark Kantrowitz).

Having a family history of breast cancer or malignant melanoma - men who have family members with breast cancer or malignant melanoma have an increased risk of testicular cancer (CancerHelp UK).

Body size – Some studies have shown that the risk of testicular cancer in somewhat higher in tall men, but other studies have not shown a link (American Cancer Society).

Having had a vasectomy - having had a vasectomy does not increase the risk of testicular cancer (West).

Testicular Cancer Survival Rates
The survival statistics quoted here come from the National Cancer Institute’s Surveillance, Epidemiology, and End Results (SEER) database, and are based on patients who were diagnosed in the United States of America with testicular cancer between 1999 and 2007.

<table>
<thead>
<tr>
<th>Type of Testicular Cancer</th>
<th>5-year relative survival rate* of</th>
<th>10-year relative survival rate of</th>
</tr>
</thead>
<tbody>
<tr>
<td>Localised testicular cancer</td>
<td>99%</td>
<td>96%</td>
</tr>
<tr>
<td>Regional spread testicular cancer</td>
<td>96%</td>
<td></td>
</tr>
<tr>
<td>Distant spread testicular cancer</td>
<td>72%</td>
<td></td>
</tr>
</tbody>
</table>

[* The 5-year relative survival rate refers to the percentage of patients who live at least 5 years after being diagnosed with cancer. Many of these patients live much longer than 5 years after diagnosis. The rates quoted above takes into account the fact that some patients with cancer will die from other causes and compare the observed survival with what would be expected for people without the cancer. This is seen to be a better way to see the impact of the cancer on survival.]

Signs and Symptoms of Testicular Problems
Like any other part of the boy, the testicles can be affected by various conditions and diseases, which can lead to symptoms. The most common signs and symptoms in the testicles and scrotum include:

- Lumps (masses)
- Swelling
- Pain

Cancer is only one of the possible causes of testicular symptoms. More often the symptoms are caused by injury, infection, or something else.
Signs and Symptoms of Testicular Cancer
One cannot be sure as to whether a person has testicular cancer based on the presence of symptoms alone. It is, therefore, important that a medical practitioner is consulted in cases where symptoms become obvious.

The symptoms of testicular cancer include:
- Uncomfortable feeling in a testicle
- Presence of a painless lump on a testicle – the lump can sometimes be as small as a grain of rice and feel like hard rubber
- An enlarged or swollen testicle
- Significant shrinking of a testicle
- A change in the consistency of a testicle
- A heavy or aching feeling in the back, lower abdomen, groin, or scrotum
- Any painless lump on a testicle that does not respond promptly to antibiotic treatment
- If the cancer has already spread to the lungs, problems like shortness of breath, chest pain, or cough (even coughing up blood) may develop
- In rare cases, testicular cancer spreads to the brain and can cause headaches and confusion
- Enlargement of breasts with tenderness in cases of testicular germ cell tumours
- In Leydig cell tumours, oestrogen-producing tumours can cause loss of sexual desire or make the male’s breasts to grow
- Also in Leydig cell tumours, androgen-producing tumours can cause growth of facial and body hair at an abnormally early age in boys

(American Cancer Society; Testicular Cancer Symptoms).

Diagnosis of Testicular Cancer
The diagnosis of testicular cancer is done on the presence of symptoms followed by a physical examination and laboratory and diagnostic tests. These tests include:

- Blood tests that measure the levels of tumour markers like alpha-fetoprotein (AFP), beta-human chorionic gonadotropin (βHCG), and lactate dehydrogenase (LDH)
- Ultrasound – a test in which high-frequency sound waves are bounced off the testicles. The echoes produce a picture called a sonogram which can show the presence and size of a mass in the testicle
- Biopsy (microscopic examination of testicular tissue by pathologist) to determine whether cancer is present
- If testicular cancer is found, more tests are needed to find out if the cancer has spread from the testicle to other parts of the body. Determining the stage of the cancer helps the planning of appropriate treatment

Treatment of Testicular Cancer
The three types of standard treatment for testicular cancer are:

*Surgery* – to remove the affected testicle. This is usually done through an incision in the groin and is called a radical inguinal *orchidectomy*. This usually does not affect the man’s ability to get an erection and to produce sperm (unless both testicles have been removed). For cosmetic
purposes, a prosthesis (artificial testicle) can be placed in the scrotum at the time of the operation, or at any time afterward.

_Radiation therapy_ – which is also referred to as radiotherapy. Use is made of high-energy rays to kill cancer cells and shrink tumours. Radiation therapy affects normal as well as cancerous cells. The side effects depend mainly on the treatment dose.

_Chemotherapy_ – use is made of anticancer drugs to kill cancer cells. When chemotherapy is given to testicular cancer patients, it is usually given as adjuvant therapy (after surgery) to destroy cancerous cells that may remain in the body. Chemotherapy may also be the initial treatment if the cancer is advanced (has already spread outside the testicle). (National Cancer Institute).

Follow-up Treatment
Regular follow-up treatment is very important as testicular cancer can recur and affect the remaining testicle. The person should consult his medical doctor for regular blood tests to measure tumour marker levels (National Cancer Insitute).

Prevention of Testicular Cancer
There is no way to prevent testicular cancer. Unfortunately, testicular cancer is a type of cancer that can’t easily be prevented. There are simply no proven prevention methods.

With most cancers, the best method of prevention is to avoid the risk factors and to do monthly testicular self-examinations. There is no way to avoid the risk factors for testicular cancer because most are out of the person’s control, like age, race, and conditions occurring at birth. (Mayo Clinic; About.com).

CANSA Support
The Cancer Association of South Africa (CANSA): www.cansa.org.za
Toll free line (08:00 to 16:30 on weekdays): 0800 22 66 22
E-mail: info@cansa.org.za

References and Consulted Sources:


CancerHelp UK. Testicular Cancer.
Testicular Cancer Fact Sheet – Updated October 2011
Prepared and updated by Prof Michael C Herbst


