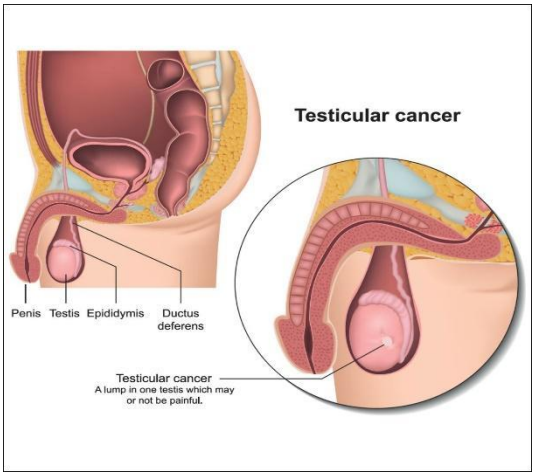
Testicular cancer

Introduction:

Definition and overview:



Testicular cancer is not a common cancer, but it is the second common cancer in young men aged from 20 to 39.

The most common testicular cancers are germ cell tumors. There are two main types, seminoma and non-seminoma. Seminoma usually occurs in men aged between 25 and 45 years and tends to develop more slowly than non-seminoma cancers. Non-seminomas are more common in younger men, usually in their late teens or early 20s.

Historical context:

The first detailed description of testicular cancer was in the 19th century.

Epidemiology:

Testicular cancer is the most common neoplasm among young men aged 15–40 years. Overall, it is a rare malignancy and represents about 1% of adult neoplasms and 5% of urological tumors.

Etiology:

Causes and Risk factors:

There is no specific cause for testicular cancer. It starts when some changes happen to the DNA of testicle cells. This causes a lot of extra cells in the testicle that can form a mass called a tumor.

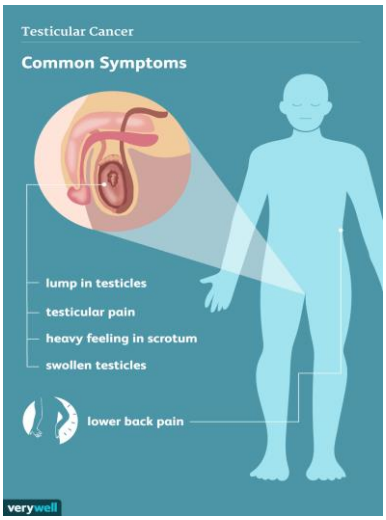
There are some causes for increase the risk of having testicular cancer including family history (having one of your family with testicular cancer), personal history (having cancer in one testicle), infertility, HIV and AIDS, people born with Hypospadias, which causes the urethra

to open on the underside of the penis, are at an increased risk of testicular cancer and people born with Hypospadias, which causes the urethra to open on the underside of the penis, are at an increased risk of testicular cancer.

Genetic and Environmental influences:

While there is not a specific gene linked to testicular cancer, the disease is highly heritable and can be passed from generation to generation. In addition, the average age at diagnosis is two to three years younger than the general population if a first-degree relative has testicular cancer.

Clinical features:



Signs and symptoms:

A lump or swelling in either testicle, A feeling of heaviness in the scrotum, A dull ache in the lower belly or groin, Sudden swelling in the scrotum, Pain or discomfort in a testicle or the scrotum, Enlargement or tenderness of the breast tissue, Back pain.

Disease Stages and Progression:

Stage 1 means the cancer is found only in the testicle, stage 2 means it has spread to the lymph nodes in the abdomen or pelvis, and stage 3 means the cancer has spread beyond the lymph nodes to other areas of the body such as the lungs and liver.

Complications:

Men diagnosed with testicular cancer have a higher risk of infertility and low testosterone. You may also have a decrease in sperm growth after chemotherapy or radiation that will usually recover. If lymph nodes were removed, it may be harder to ejaculate.

Diagnosis:

Diagnostic criteria:

If the patient has lumps, swelling or other symptoms of testicular cancer, then he needs some tests to find if there is cancer. He might have other tests to see if testicular cancer is the reason of these symptoms.

Diagnostic Tests and Procedures:

Tests used to diagnose testicular cancer include a testicular ultrasound test that uses sound waves to make pictures. It can be used to make pictures of the scrotum and testicles. A blood test can detect proteins made by testicular cancer cells. This type of test is called a tumor marker test.

Differential Diagnosis:

It's common for men to mistake a testicular cyst (also called a spermatocele) for testicular cancer, Epididymitis (When the coiled tube at the back of the testicle becomes inflamed.), Hydrocele (Fluid buildup that causes swelling of the skin pouch that holds the testicles, called the scrotum.) and Orchitis (A condition in which one or both testicles become inflamed).

Pathophysiology:

Mechanism of Disease Development:

Most testicular cancers are derived from the lack of differentiation of primordial germ cell into spermatogonia. Germ cells testicular tumor have some genetic component while most sex cord stromal testicular cancer are hormonal dependent

Cellular and Molecular Changes:

Specific gene mutations, such as those affecting the KIT and OCT3/4 genes, play a role in tumor growth and development.

Impact on Body Systems:

Some cells might break away and spread to other parts of the body. Testicular cancer most often spreads to the lymph nodes, liver and lungs. When testicular cancer spreads, it's called metastatic testicular cancer. Nearly all testicular cancers begin in the germ cells.

Management and Treatment:

Medical and Surgical Treatments:

- Surgery to remove the testicle: This procedure is called a radical inguinal orchiectomy. It's the first treatment for most testicular cancers.
- Surgery to remove nearby lymph nodes. If there's concern that your cancer may have spread beyond your testicle, you might have surgery to remove some lymph nodes.

Pharmacological Therapies:

Chemotherapy treatment uses strong medicines to kill cancer cells. Chemotherapy travels throughout the body. It can kill cancer cells that may have spread beyond the testicle.

Chemotherapy is often used after surgery. It can help kill any cancer cells that are still in the body. When testicular cancer is very advanced, sometimes chemotherapy is used before surgery.

Lifestyle and Dietary Modifications:

don't use any tobacco products, don't drink alcohol, maintain a body mass index below 25, be physically active every day, Eat a diet rich in fruits and vegetables and low in processed meats.

Rehabilitation and Supportive Care:

Supportive care includes physical, psychological, social, and spiritual support for patients and their families. There are many types of supportive care. Examples include pain management, nutritional support, counseling, exercise, music therapy, meditation, and palliative care.

Prevention and Control:

Primary, Secondary, and Tertiary Prevention Strategies:

Primary prevention includes a healthy lifestyle. Secondary prevention includes self-examining, increasing the awareness of testicular cancer and teach people about it. Tertiary prevention includes early diagnosis and treatment and regular checkups.

Public Health Interventions:

TCAF is dedicated to the fight against testicular cancer through awareness and outreach, promoting the importance of monthly self-exams and helping support those affected by the disease.

Vaccination and Screening programs:

therapeutic vaccines for testicular cancer boost the body's natural tumor defense and help eliminate local and systemic metastases. Moreover, vaccines can be administered as adjuvant therapy in conjunction with standard care that is currently involved in surgery and chemotherapy.

Prognosis:

Disease Outcomes and Survival Rates:

The testicular cancer survival rate is exceptionally high. Patients who are diagnosed with localized cancer (cancer that has not spread outside of the testicle) have a 99 percent five-year survival rate, meaning that 99 percent of patients live at least five years after their diagnosis.

Factors Influencing Prognosis:

Potential prognostic factors included age, pre-orchiectomy values of β-human chorionic gonadotropin (β-hCG) and lactate dehydrogenase (LDH), tumor size, tumor multifocality, tumor necrosis, lymph vascular invasion, pagetoid rete involvement, and invasion of rete testis, hilar soft tissue, epididymis, spermatic cord.

Quality of Life:

Testicular cancer may negatively affect the fertility, the shape of scrotum and the interest in sex. This may last a short time or might be permanent.

Current Research and Future Directions:

Recent Advances and Discoveries

In recent years, researchers have found that changes in certain genes, such as PLAP, NANOG, SOX2, and REX1, appear to be linked to testicular cancer. These findings could someday help identify men at higher risk, but they need to be studied more.

Ongoing Clinical Trials:

A Databank Study of Molecular Circulatory Biomarkers in Non-localized Renal and Testicular Cancer Patients. There is also a Study of Nivolumab in Relapsed/Refractory Primary Central Nervous System Lymphoma (PCNSL) and Relapsed/Refractory Primary Testicular Lymphoma (PTL).

Future Research Needs:

A compelling need exists to expand the research base into the late effects of testicular cancer and its treatment, especially with regard to factors that confer an enhanced susceptibility to the long-term toxicities of cisplatin-based chemotherapy and radiotherapy.

Case Studies:

Example Cases:

21-year-old Max Schuller was an avid biker. He noticed some enlargement in his right testicle after his last century ride but attributed the swelling to the 100 miles spent on his bike. He continued to train the following week and noticed that the swelling was not decreasing. Upon physical examination, he could feel a small mass in his right testicle. At that point, he made an appointment with his family physician.

Max's doctor told him he suspected he may have testicular cancer, because of the swelling and the palpable mass. He referred Max to an oncologist for further testing.

On physical examination, the oncologist noted a firm mass, about 4 cm in diameter, in the right testicle. The epididymis appeared normal in size. The left testicle also appeared normal. The oncologist ordered an ultrasound which is used to confirm the mass and rule out swelling due to a hydrocele or varicocele.