Rare but Inopportune Testicular Cancer-A Brief Discussion

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Abstract

Despite this seemingly insignificant statistic, testicular cancer is a significant condition in men because in virtually all parts of the world it is the most common solid malignancy affecting young men. Although it is rare disorder; it accounts for just 1% of all cancers in males. Moreover, it is responsible for ten percent of all cancer deaths in men aged 15-35 years. Testicular cancer typically develops in one or both testicles in young men. It is a highly treatable and usually curable type of cancer. Present article emphasis on histopathology, symptoms and treatment of this rare but inopportune disease

Key words: Testis, Cancer, Diagnosis, Treatment and Precaution.

Introduction

The body is made up of trillions of living cells. Normal body cells grow, divide, and die in an orderly way. During the early years of a person's life, normal cells divide faster to allow the person to grow. After the person becomes an adult, most cells divide only to replace worn-out, damaged, or dying cells. Cancer begins when cells in a part of the body start to grow out of control. There are many kinds of cancer, but they all start because of this out-of-control growth of abnormal cells. When cancer cells get into the bloodstream or lymph vessels, they can travel to other parts of the body. There they begin to grow and form new tumors that replace normal tissue. This process is called metastasis (muh-tas-tuh-sis). No matter where a cancer may spread, it is always named for the place where it started. Prostate cancer that has spread to the bone is called metastatic prostate cancer, not bone cancer. They grow at different rates and respond to different treatments. That is why people with cancer need treatment that is aimed at their own kind of cancer. Not all tumors are cancerous. Tumors that aren't cancer are called benign (be-nine). Benign tumors can cause problems they can grow very large and press on healthy organs and tissues. But they cannot grow into other tissues.

Testicular cancer:

Testicular cancer is rare; it accounts for just 1% of all cancers in males. Despite this seemingly insignificant statistic, testicular cancer is a significant condition in men because in virtually all parts of the world it is the most common solid malignancy affecting young men.1 Moreover, it is responsible for ten percent of all cancer deaths in men aged 15-35 years. Testicular cancer typically develops in one or both testicles in young men. It is a highly treatable and usually curable type of cancer. The testicles (also called the testes; a single testicle is called a testis) are part of the male reproductive system. These 2 organs are each normally somewhat smaller than golf ball in adult males and are contained within a sac of skin called the scrotum. The scrotum hangs beneath the base of the penis. The testicles make the male hormone testosterone. They also produce sperm.

Fig. 1 Showing Testicles and Male reproductive organ.
Sperm cells are carried from the testicle through the vas deferens to the seminal vesicles, where they are mixed with a fluid produced by the prostate gland. During ejaculation, sperm cells, seminal vesicle fluid, and prostatic fluid enter the urethra, the tube in the center of the penis through which both urine and semen leave the body.\[1-4]\n
**Etiology:** Tumors of the tarter are uncommon with a prevalence of five cases per 1000000 population & occur mainly in young man between the age of 20 & 40 years they often secrete human maker which provide good indices for both diagnosis prognosis seminoma & teratoma accent for 85% of all tumors are less common\[5]\n
**Age:** About half of testicular cancers occur in men between the ages of 20 and 34. But this cancer can affect males of any age, including infants and older men.

**Race and ethnicity:** White American men are about 5 times more likely to get testicular cancer than are African-American men. Whites have more than 3 times the risk of Asian-American and American Indian men. The risk for Hispanics falls between that of Asians and non-Hispanic whites. The reason for these differences is not known.\[6-8]\n
**Signs and symptoms of testicular cancer**

In most cases of testicular cancer, the man has a lump on a testicle or notices that the testicle is swollen or larger. Most of the time there is no pain. Men with testicular cancer may also notice a feeling of heaviness or aching in the lower belly or scrotum. In rare cases, men with germ cell cancer notice their breasts are sore or have gotten bigger. This happens because some germ cell tumors give off high levels of a hormone called human chorionic gonadotropin (HCG), which causes the breasts to grow. Blood tests can measure HCG levels. These tests are important in finding, staging, and follow-up of some testicular cancers. Some stormily tumors can make hormones. If the tumor makes male hormones (androgens), it can cause the growth of facial and body hair at a very early age in boys. The extra androgens are not likely to cause any symptoms in men. Some stormily tumors make female hormones (estrogens) and not male hormones. The female hormones can cause a man to grow breasts and/or lose his sex drive.

**Signs of advanced testicular cancer**

Even when the cancer has spread to other organs, few men have any symptoms. Lower back pain is a symptom of later-stage testicular cancer. Signs that the cancer has spread to the lungs can include: Shortness of breath, Chest pain, Cough, Spitting up blood,

A number of problems other than cancer, such as an injury to the testicle, infection, or inflammation, can cause symptoms like those of testicular cancer. If you have any of the signs or symptoms above, see a doctor right away. Remember, the sooner cancer is found the sooner you can start treatment. And the earlier you get treatment, the better it is likely to work. For more details, see our document and lastly Medical history and physical exam.

**Ultrasound:** This test uses sound waves to make pictures of internal organs. The computer shows the picture on a screen. An ultrasound can help doctors tell whether lump (or mass) is solid or filled with fluid. If the lump is solid, then it is more likely to be cancer. This is a very easy test to have done, and it uses no x-rays. You just lie on a table while a flat wand is moved over the skin of the scrotum. Usually, your skin is coated with gel first.

**Blood tests:** Certain blood tests can help diagnose testicular cancer. Many cancers make proteins (called tumor markers) that can be found in the blood. The levels of these tumor markers might be used to tell the doctor how much cancer is present, how well treatment is working, and whether the cancer has come back.\[9-10]\n
**Pathology**

When given a specimen of a testicular cancer, the pathologist’s first task is to identify the type of cell from which the tumor originates. Non-germ cell tumors account for 5 to 10% of all testicular cancers four-fifths of these are lymphoma and the remainder are rare tumors such as Sertoli cell tumors, interstitial tumors and Para testicular embryonic sarcomas. The other 90 to 95% are germ cell tumors, which for clinical purposes, as mentioned, above are classified into Seminomas Non seminoma germ cell tumors (NSGCTs) Differentiating these histological is relatively easy. Approximately 40% of testicular cancers are seminomas, 35% are NSGCTs, and 15% are mixed seminomas and NSGCT while the remaining 10% or less, as indicated above, constitute the non-germ cell tumors. Seminomas on gross examination are irregularly nodular or lobulated, with the tumor compressing the normal testicular tissue. On section, they are usually firm and grayish white to yellow in color with occasional foci of hemorrhage.

The majority of testicular cancers arise from the germ cells of the testis and occur in two main forms: Seminomas cancers that grow slowly and are sensitive to radiation therapy non seminomas tumors that contain different cell types and grow more quickly than seminomas testicular cancer has a typical age distribution a small peak in incidence around two years of age followed by low rates until round 15 years. After this the incidence climbs rapidly. The tumors seen during childhood and early adult life usually show germ cell histology, while the tumors seen in older men (after the age of 65 years) are mainly of the non-germ cell type, principally lymphomas.\[11]\n
**Pathological Classification**

The recommended pathological classification (modified from the 2004 version of the World Health Organization [WHO] is shown below

1. **Germ cell tumors:**
- Intratubular germ cell neoplasia, Seminoma (including cases with syncytiotrophoblastic cells), Spermatocytic seminoma (mention if there is sarcomatous component), Embryonal carcinoma, Yolk sac tumour, Choriocarcinoma,
Teratoma (mature, immature, with malignant component), Tumor with more than one histological type (specify % of individual components)

2. Sex cord/gonadal stromal tumors:
Leydig cell tumour, Malignant Leydig cell tumour, Sertoli cell tumour, lipid-rich variant, sclerosing, large cell calcifying, Malignant Sertoli cell tumour, Granulosa cell tumour, Thecoma /fibroma group of tumors, Other sex cord/gonadal stromal tumors, incompletely differentiated, mixed and Tumors containing germ cell and sex cord/gonadal stromal (gonadoblastoma)

3. Miscellaneous non-specific stromal tumors:
Ovarian epithelial tumors, Tumors’ of the collecting ducts and ret testis, Tumors (benign and malignant) of non-specific stroma.[12]

Causative Factors:
Undescended testicle One of the main risk factors for testicular cancer is a problem called cryptorchidism, or undescended testicle(s). Before birth, the testicles normally develop in the belly of the fetus and then move down (descend) into the scrotum before birth. But in about 3% of boys, the testicles do not move into the scrotum. Sometimes the testicle stays inside the belly. In other cases, the testicle starts to come down, but gets stuck in the groin. 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 way. Among men with a history of this problem, most cancers start in the testicle that has not moved down. But about 1 out of 4 occurs in the normal testicle. Because of this, some doctors think that cryptorchidism is not the direct cause of testicular cancer. They believe that some other problem causes both the cancer risk and the cryptorchidism. Most testicles will descend on their own in the child's first year. Sometimes surgery (called orchiopexy) is needed to bring the testicle down into the scrotum. Surgery done when a child is younger may be more likely to reduce the risk of testicular cancer than surgery done when the child is older, but the best time to do this surgery is not clear.[13]

Family history: A family history of testicular cancer increases the risk. If a man has the disease, there is a higher risk that his brothers or sons may also get it. But very few cases of testicular cancer are actually found in families.

HIV infection: 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. No other infections have been shown to increase testicular cancer risk.

CIS (carcinoma in situ): It isn't clear how often CIS in the testicles becomes cancer. It is sometimes found when a man is tested for infertility. It may also be found when a man has a testicle removed because of cryptorchidism. Radiation or surgery (to remove the testicle) is used to treat CIS. Since we don’t know how often CIS becomes true (invasive) cancer, it isn’t clear that treating CIS is a good idea. Some experts think that it may be better to wait and see if the disease gets worse or becomes a true cancer. This could allow many men with CIS to avoid the risks and side effects of treatment.

Age: About half of testicular cancers occur in men between the ages of 20 and 34. But this cancer can affect males of any age, including infants and older men.

Race and ethnicity: White American men are about 5 times more likely to get testicular cancer than are African-American men. Whites have more than 3 times the risk of Asian-American and American Indian men. The risk for Hispanics falls between that of Asians and non-Hispanic whites. The reason for these differences is not known.

Diagnosis:
Clinical examination: Testicular cancer generally affects young men in the third or fourth decade of life. It normally appears as a painless, unilateral mass in the scrotum or the casual finding of an intrascrotal mass. In approximately 20% of cases the first symptom is scrotal pain and up to 27% of patients with testicular cancer may have local pain Occasionally, trauma to the scrotum may reveal the presence of a testicular mass. Gynaeacomastia appears in 7% of cases and is more common in non-seminomatous tumors. Back and flank pain are present in about 11% of cases (Reduction in testis size can precede a testicular tumour. In about 10% of cases, a testicular tumour can mimic an orchioepididymitis, with consequent delay of the correct diagnosis. Ultrasound must be performed in any doubtful case. Physical examination reveals the features of the mass and must always be carried out in conjunction with a general examination in order to find possible (supravacular) distant metastases, a palpable abdominal mass or gynaeacomastia. A correct diagnosis must be established in all patients with an intrascrotal mass.

Imaging of the testis: Currently, diagnostic ultrasound serves to confirm the presence of a testicular mass and to explore the contralateral testis. Its sensitivity in detecting a testicular tumour is almost 100%, and it has an important role in determining whether a mass is intra or extratesticular. Ultrasound is an inexpensive test, but it is unnecessary when the presence of a testicular tumour is clinically evident. Ultrasound of the testis has to be performed in young men without a palpable testicular mass who have retroperitoneal or visceral masses or elevated serum human chorionic gonadotrophin (hCG) or AFP. Ultrasound is recommended in the follow-up of the contralateral testis in the follow-up of patients at risk. Magnetic resonance imaging (MRI) offers higher sensitivity and specificity than ultrasound for diagnosing tumors’ and may be able to differentiate seminomatous from non-seminomatous tumors. MRI of the scrotum offers a sensitivity of 100% and a specificity of 95-100%, but its high cost does not justify its use for diagnosis.

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Serum tumor markers at diagnostic: Serum tumors markers are prognostic factors and contribute to diagnosis and staging.

The following markers should be determined: AFP (Produced by yolk sac cells), hCG (Expression of trophoblasts), Lactate de hydrogenise (LDH) (marker of tissue destruction) is recommended for patients with metastatic disease. Globally, there is an increase in these markers in 51% of cases of testicular cancer. It should be noted that negative marker levels do not exclude the diagnosis of a germ cell tumour. Other markers studied include placental alkaline phosphates (PLAP) which may be of value in monitoring patients with pure seminoma. Cyto genetic and molecular markers are available in specific centre, but at present only contribute to research studies. Measurement of serum AFP, hCG and LDH (in advanced tumors’) is mandatory, while PLAP is optional.

Inguinal exploration and orchidectomy: Every patient with a suspected testicular mass must undergo inguinal exploration with exteriorization of the testis within its tunic and, immediate orchidectomy with division of the spermatic cord at the internal inguinal ring has to be performed if a tumour is found. If the diagnosis is not clear, a testicular biopsy is taken for frozen section histological examination. In cases of disseminated disease and life-threatening metastases, it is current practice to start with up-front chemotherapy and orchidectomy may be delayed until clinical stabilization has occurred.

Organ sparing surgery: Although organ sparing surgery is not indicated in the presence of non-tumoural contralateral testis, it can be attempted in special cases with all the necessary precautions. In synchronous bilateral testicular tumors’, metachronous contralateral tumors or in a tumour in a solitary testis with normal pre-operative testosterone levels, organ preserving surgery can be performed when the tumour volume is less than 30% of the testicular volume and surgical rules are respected. In those cases, the rate of associated Tin is high (at least up to 82%) and all patients have to be treated with adjuvant radiotherapy (20 Gy) at some point in time. Infertility will result after radiotherapy and the risk of long-term Leydig cell insufficiency after radiotherapy of a solitary testis is increased. Radiation treatment may be delayed in fertile patients who wish to father children. The option has to be carefully discussed with the patient and surgery performed in a centre with experience.

Pathological examination of the testis:
Mandatory pathological requirements are as follows-Macrosopic features: side, testis size, maximum tumour size and macroscopic features of epididymis, spermatic cord and tunica vaginalis’. Sampling: 1cm² section for every cm of maximum tumour diameter, including normamacroscopic parenchyma (if present), albuginea and epididymis, with selection of suspected areas. At least one proximal and one distal section of spermatic cord plus any suspected area. Microscopic features and diagnosis: histological type (specify individual components and estimate amount as percentage) according to WHO 2004, Presence or absence of per-tumoural venous and/or lymphatic invasion, Presence or absence of albuginea, tunica vaginalis, ret testis, epididymis or spermatic cord invasion, Presence or absence of intratubular germ cell neoplasia (Tin) in non-tumour parenchyma intratubular germ cell neoplasia, pT category according to TNM 2002, Immuno histochemical studies: in seminoma and mixed germ cell tumour, AFP and hCG.

Advisable immunohistochemical markers, in cases of doubt, are:
• In seminoma: cytokeratins (CAM 5.2), PLAP, c-kit
• In intratubular germ cell neoplasia: PLAP, c-kit
• Other advisable markers: chromogranine A (Cg A), Ki-1 (MIB-1).

Management of primary testicular tumor
Before commencing treatment for primary testicular cancer, as mentioned above, it is imperative that the tumor be clinically staged. Stage I tumor is defined as a tumor confined to the testis, while stage II is a tumor that has spread to the retroperitoneal lymph nodes. Stage II tumors are often subdivided into:
IIa—nodes less than 1 cm in diameter
IIb—nodes between 1 and 5 cm in diameter
IIC—nodes greater than 5 cm in diameter
Stage III disease indicates that the cancer has spread beyond the retroperitoneal lymph nodes.

Stage I Non seminoma Germ Cell Tumors (NSGCT)
A Clinical stage I NSGCT is, by definition, a germ cell tumor that is confined to the testis without evidence of metastatic disease. If serum levels of αFP and βhCG are normal and CT scans of the abdomen, pelvis, and chest following inguinal orchidectomy are normal, it can be assumed that the disease has not metastasized. Approximately 70% of clinical stage I patients have a good prognosis and do not relapse. Among those who do relapse, in the vast majority tumor recurrence first manifests itself in the retroperitoneal lymph nodes. A large retrospective trial of clinical stage I NSGCT patients by the UK Medical Research Council determined that retroperitoneal recurrence could be predicted by12 The presence of vascular and or lymphatic invasion by the primary tumor The presence of embryonal carcinoma. The absence of yolk sac elements. This high-risk group had approximately 50% chance of recurrence, compared to a risk of 2% in the low-risk group.

The cure rate in clinical stage I NSGCT should approach 100%. Treatment needs to be individualized and should be undertaken in a center that has experience in treating testicular cancer. Primary retroperitoneal lymph node
dissection is the therapeutic option usually employed in the United States. However, in other countries (for example, Australia) the approach that is currently in vogue is surveillance. The rationale for the latter approach is to prevent over-treatment of patients with stage I NSGCT, because about 70% of such patients who undergo retroperitoneal lymph node dissection have no evidence of metastases in these nodes and so are subject to the morbidity of a major operation without any benefits.\[16\]

If patients on surveillance protocols suffer a recurrence, most do so within the first two years. Surveillance usually requires regular physical examination together with CT scans of the abdomen, chest, and pelvis every one to two months for the first year. One drawback to adopting a surveillance approach is the uncertainty associated with this approach, which can have a psychological impact on young patients. The key requirement for success with surveillance is patient compliance, which requires that these patients understand the need to conscientiously adhere to the follow-up protocol and remain motivated to comply with therapeutic advice.

Primary chemotherapy avoids the morbidity of invasive surgical procedures and is useful for patients who are at high risk of recurrence. Standard regimes usually utilize two cycles of bleomycin, etoposide, and cisplatin. This regime is associated with low morbidity, but it is important to note that this may still over treat half the patient population, because only 50% of the high-risk patients are destined to relapse. Nonetheless, recent studies have shown that if all patients are treated with a regime of chemotherapy, the risk of disease relapse decreases from 50% to less than 10%.

**Stag II Seminoma:**

As with the stage I NSGCTs, about a third of patients with clinical stage I seminomas have occult retroperitoneal disease at the time of diagnosis. However, the characteristic of seminomas is that as a rule they are exquisitely radiosensitive and can usually be cured with adjuvant radiation therapy. Disease control is obtained in up to 98% of patients by using moderate-dose radiation. Because the lymphatic drainage of the testes goes directly to the paraaortic lymph nodes, most radiation oncologists focus radiation on these nodes. There has been a recent tendency to omit radiation to the pelvic lymph nodes because metastases in these nodes are relatively uncommon.

**Treatment for testicular cancer:**

This information represents the views of the doctors and nurses serving on the American Cancer Society's Cancer Information Database Editorial Board. These views are based on their interpretation of studies published in medical journals, as well as their own professional experience. The treatment information in this document is not official policy of the Society and is not intended as medical advice to replace the expertise and judgment of your cancer care team. It is intended to help you and your family makes informed decisions, together with your doctor.

Your doctor may have reasons for suggesting a treatment plan different from these general treatment options. Don't hesitate to ask him or her questions about your treatment options.

Making treatment decisions In recent years, much 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. After the cancer is diagnosed and staged, your cancer care team will discuss treatment options with you. You should take time and think about all of the choices. The type and stage of the cancer, as well as your overall physical health are factors to consider when choosing your treatment plan. When time permits, getting a second opinion is often a good idea. It can give you more information and help you feel good about the chosen treatment plan. Some insurance companies may require a second opinion before they will agree to pay for treatments. Where you are treated is important. There is no substitute for experience. You have the best chance for a good outcome if you go to a hospital that treats many testicular cancer patients.

The main methods of treatment for testicular cancer are:

- **Surgery**
- **Radiation therapy**
- **Chemotherapy**
- **Ayurvedic treatment**

The first part of this section describes the various types of treatments used for testicular cancers. This is followed by a description of the most common approaches used based on the type and extent of the disease. Surgery for testicular cancer surgery is typically the first treatment for all testicular cancers.

**Surgery**

**Radical inguinal orchiectomy:** This type of surgery removes the testicle (or testicles) containing the cancer. An incision is made in the groin, and the testicle is taken from the scrotum through the opening. A cut is made through the spermatic cord that attaches the testicle to the abdomen. The surgeon takes special precautions to avoid spreading cancer cells into the surgical wound or dislodging them from the tumor into the bloodstream. All stages of testicular cancer are typically treated with this type surgery.

**Retroperitoneal lymph node dissection:** Depending on the type and stage of your cancer, some lymph nodes behind the abdomen may also be removed at the same time or during a second operation. (In some patients, after the affected testicle is removed, surgery will not be done on the retroperitoneal lymph nodes, but the patient is carefully watched with frequent clinical exams and CT scans.) Retroperitoneal lymph node dissection can be a major operation. A large incision is often made to remove these lymph nodes. About 5% to 10% of patients have temporary complications after surgery, such as bowel obstruction or wound infections. This is a difficult and long operation. It should be done by a surgeon who does them often. Experience counts.

**Laparoscopic surgery:** In some cases, the surgeon can remove lymph nodes through very small skin incisions in the abdomen by using a laparoscope (a narrow, lighted tube, which lets doctors operate on the abdomen without
making a large incision and scar). Laparoscopic surgery seems to be a lot easier for the patient, but doctors are unsure if it is as safe and efficient as the open surgery in removing all of the potentially cancerous lymph nodes. That is why if the lymph nodes removed contain cancer, the patient is often treated with chemotherapy, as well. In laparoscopic surgery, after being put to sleep, the patient is turned onto his side. Small keyhole-like incisions are made on the abdomen. The surgeon’s hands are not inside the patient’s body during surgery. A video camera and long instruments are inserted through these incisions. The surgeon sees the inside of the abdomen on a television monitor. Using these long instruments, the lymph nodes around the aorta and inferior vena cava (large blood vessels) can be removed through one of the incisions. The small incisions are closed and the patient is awakened. Patients recover much more quickly from this operation than the standard open procedure and are walking soon after surgery. The hospital stay ranges from 2 to 4 days. There is usually less pain and patients are eating sooner. This procedure is most often used for patients with early stage non-seminomas to see if the lymph nodes contain cancer. This procedure should only be done if the surgeon is very experienced.

Possible side effects
Surgery to remove retroperitoneal lymph nodes may damage nearby nerves that control ejaculation. If these nerves are damaged, when a male ejaculates, the semen is not propelled forward through the urethra to exit the body but rather goes backwards into the bladder. This is known as retrograde ejaculation. This type of surgery does not cause impotence a man can still have erections and sexual intercourse but retrograde ejaculation can make it harder to father children. To save the normal ejaculation function, surgeons have developed a type of retroperitoneal lymph node surgery called nerve-sparing surgery that has a very high rate of success in experienced hands. If both testicles are removed, sperm cells cannot be produced and a man becomes infertile. Also, without testicles, a man cannot make enough testosterone. He will need to take supplements, either in the form of a gel, a patch, or a shot. Pills are generally not reliable sources of testosterone. Testicular cancer often affects men at an age when they may 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 may make it difficult to collect a good sperm sample. Men with testicular cancer are usually young and may be concerned that their appearance has changed. They may be single and dating and worry about a partner's reaction, or they may be athletic and feel embarrassed by the missing testicle when in locker rooms. Since the operation also removes the cord above the testicle, that side of the scrotum can look and feel empty to them. 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 it 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 is often partly hidden by pubic hair. Some men want to have a prosthesis and others do not. You should discuss your wishes with your surgeon before considering this surgery. It may also help to talk with someone who has a testicular prosthesis, to see what their experience has been like. Losing a testicle usually has no effect on a man's ability to get an erection and have sex. Men who have had both testicles removed are also still able to have sex as long as they are getting enough testosterone.[$^{17}$]

Radiation therapy for testicular cancer
Radiation therapy uses a beam of high-energy rays (such as gamma rays or x-rays) or particles (such as electrons, protons, or neutrons) to destroy cancer cells or slow their rate of growth. In treating testicular cancer, radiation is used mainly to kill cancer cells that have spread to lymph nodes. Radiation therapy for testicular cancer is delivered by a carefully focused beam of radiation from a machine outside the body. This is known as external beam radiation. The treatment is much like getting an x-ray, but the radiation is more intense. The procedure itself is painless. Before your treatments start, the medical team will take careful measurements to determine the correct angles for aiming the radiation beams and the proper dose of radiation. Each treatment lasts only a few minutes, but the setup time getting you into place for treatment usually takes longer. In general, radiotherapy is mainly used for patients with seminoma, which is very sensitive to radiation. It does not seem to work well for non-seminomas. Sometimes it is used after orchiectomy (the operation to remove the testicle) and is directed at the lymph nodes at the back of the abdomen (the retroperitoneal lymph nodes). This is to kill any tiny bits of cancer in those lymph nodes that can’t be seen. Radiotherapy can also be used to treat small amounts of seminoma that are known to have spread to the nodes (based on changes seen on CT and PET scans).

Possible side effects
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 beam as accurately as they can to hit the target. Generally, treatment of testicular cancer uses lower radiation doses than those needed for other types of cancer. Common side effects include fatigue, nausea, or diarrhea. Some men experience a skin reaction that is like a sunburn, but it’s uncommon. This slowly fades away. Radiation to the healthy testicle can affect fertility (sperm counts), so a special protective device is placed over the remaining testicle to help protect it. Radiation can also increase the risk of getting a second cancer (outside of the testicle). This risk was higher in the past when higher doses were used and more tissue was exposed to radiation.
Chemotherapy for testicular cancer

Chemotherapy (chemo) is the use of drugs for treating cancer. The drugs can be swallowed in pill form, or they can be injected by needle into a vein or muscle. To treat testicular cancer, the drugs are usually given into a vein. Chemo is considered systemic therapy. This means that the drug enters the bloodstream and circulates throughout the body to reach and destroy the cancer cells. Chemo is an effective way to destroy any cancer cells that break off from the main tumor and travel in the bloodstream to lymph nodes or distant organs. Chemo is often used to cure testicular cancer when it has spread outside the testicle or to decrease the risk of cancer coming back after the testicle is removed. It is not used to treat the cancer that is only in the testicle. Doctors give chemotherapy 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. Using 2 or more chemotherapy drugs is often more effective than using any single drug. The main drugs used to treat testicular cancer are: Cisplatin, Vinblastine, Bleomycin, Cyclophosphamide (Cytoxan), Etoposide (VP-16), Paclitaxel (Taxol), Ifosfamide (Ifex)

These drugs are used in various combinations. The chemotherapy regimens most commonly used as the initial treatment for testicular cancer are bleomycin, etoposide, and cisplatin (called BEP or PEB), or etoposide and cisplatin (also known as EP). Another combination that may be used is called VIP and includes the drugs VP-16 (etoposide) or vinblastine plus ifosfamide and cisplatin. Some doctors believe that a more intensive regimen should be used for patients with high-risk disease, and may suggest a different combination of chemotherapy drugs or even a stem cell transplant.

Vinblastin: It is primarily with other drugs in Hodgkin's disease and testicular carcinoma bone marrow depression is more prominent while neurotoxicity and alopecia are less marked then with vincristine .Dose: 0.1-0.15 mg/kg i.v weekly 3 doses

Cisplatin: It is a platinum coordination complex that is hydrolysis intracellular to produce highly reactive moiety which causes cross linking of DNA .it can also react with –SH group in protein and has radiomimetic property .it is bound to plasma protein enter tissues and slowly excreted unchanged in urine.

Bleomycine: This is a mixture of closely related glycopeptide antibiotic having potent antitumor activity .it chelate copper or iron produces superoxide ions and intercalates between DNA stand causes chain scission and inhibits repair. Dose: 30mg twice weekly IV.

Etoposide: It is a semi synthetic derivative of podophyllotoxin a plant glycoside , It is not a mitotic inhibitor but arrest cell in the G2 phase and causes DNA break by affecting DNA topoisomerase II function. Dose: 50-100mg /day i.v. or oral

Cyclophosphamide: It is inactive as such :produces few at effect an it not locally damaging. transformation in to active metabolites (aldophosphamid ,phosphamid mustard) occur in the liver and avoid rang of antitumor actions. Dose : 2-3mg /kg /day oral, 10-15mg /kg IV.

Ifosfamide: This congener of cyclophosphamide has a logger and dose- dependent t1/2 .it has found utility in bronchogenic ,breast, testicular ,bladder and head and neck carcinoma .

Possible side effects

Chemo drugs work by attacking 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, 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 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, Increased chance of infections (due to low white blood cell counts), Easy bruising or bleeding (due to low blood platelet counts), Fatigue (due to low red blood cell counts)

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 damage. Development of a second cancer (like leukemia) is a very serious but fortunately, a rare side effect of chemo. It occurs in less than 1% of testicular cancer patients treated with chemo. People who have had chemo for testicular cancer seem to have a higher risk of heart problems later in life. Several studies have also suggested that this chemotherapy treatment can sometimes cause high blood cholesterol to develop over time, which may later require treatment.

Ayurvedic treatment for cancer

In ancient times the rishis of vedic discipline have given many methods of treatment which are very similar to modern cancer treatment methods, and also Ayurvedic treatments are without side effects that are widely experienced and feared in allopathic science.

In Ayurveda the Methods are: A) The tumor is applied with medicated oils and an ointment which is then covered with a metal plate made of different metals including gold silver, copper etc. these plates when applied on the tumor in heated state produce radiation which kills cancerous cells B) Heated pre-medicated oils are poured on the tumor which is one type of radiation. C) Medicines are applied on the tumor in the form of a paste bound in bandage and heated, is one type of radiation. D) Medicated steam is used in Panchkarma therapy to remove toxins from the body

Advantage of ayurvedic treatment

(i) It is completely free from side effects, (ii) Food also becomes a part of treatment, (iii) Ayurvedic treatment improves metabolism in the patient, (iv) Increases the digestion power in the body.(v) Rejuvenates the body, increasing the self confidence of the patient. Resulting in positive improvement, (vi) Tumor or the ulcer caused by
the cancer gets localized first, reducing the chances of metastasis in other parts or organs, and is subsequently eradicated from the body. (vii) Regular intake of medicines reduces the chances of recurrence, (viii) In a deadly disease like cancer, the patient's quality of life improves, adding years and peace to his life, (ix) Compared to modern treatments it is much less expensive and effective. The rate of success depends on the regularity of the patient in intake of medicines and care taken in observance of food and life style.

**Nutritional supplement for cancer:** - Consume cow ghee more - Consume goat milk - Consume sesame oil as a cooking medium. - Sprouted beans, soups of vegetables, nuts, raisins, figs. - Fresh seasonal fruit juices to be consumed more. - Special herbal juice therapy is very helpful in controlling cancerous growth.

**Precaution for cancer Diet & cancers:** - Fat free diet in liver cancers - Water and fluid restricted diet in ascitis, plural, peritoneal, pericardial cancers - Nuts in brain, bone and blood cancers - Salt free diet in renal cancers. - Non-spiced diet in Gastro Intestinal tract cancers.

**Food articles to be avoided:** - Deep fried foods, Junk and fast foods, Tin packed foods, Spicy foods Vatta dosha aggravating foods.

**References**