

## TESTICULAR CANCER

Symptoms may also include one or more of the following:

- a lump in one testis which may or may not be painful
- sharp pain or a dull ache in the lower abdomen or scrotum
- a feeling often described as "heaviness" in the scrotum
- breast enlargement (gynecomastia) from hormonal effects of  $\beta$ -hCG
- low back pain (lumbago) tumor spread to the lymph nodes along the back

It is not very common for testicular cancer to spread to other organs, apart from the lungs. However, if it has, the following symptoms may be present:

- shortness of breath (dyspnea), cough or coughing up blood (hemoptysis) from metastatic spread to the lungs
- a lump in the neck due to metastases to the lymph nodes

### Diagnosis

The main way testicular cancer is diagnosed is via a lump or mass inside the testis. More generally, if a young adult or adolescent has a single enlarged testicle, which may or may not be painful, this should give doctors reason to suspect testicular cancer.

Other conditions may also have symptoms similar to testicular cancer:

- Epididymitis or epididymoorchitis
- Hematocele
- Varicocele

Incorrect or mistaken diagnosis can delay access to appropriate treatment; this is thought to occur in up to 25% of cases.

The nature of any palpated lump in the scrotum is often evaluated by scrotal ultrasound, which can determine exact location, size, and some characteristics of the lump, such as cystic vs solid, uniform vs heterogeneous, sharply circumscribed or poorly defined. The extent of the disease is evaluated by CT scans, which are used to locate metastases.

The differential diagnosis of testicular cancer requires examining the histology of tissue obtained from an inguinal orchiectomy - that is, surgical excision of the entire testis along with attached structures (epididymis and spermatic cord). A biopsy should not be performed, as it raises the risk of spreading cancer cells into the scrotum.

Inguinal orchiectomy is the preferred method because it lowers the risk of cancer cells escaping. This is because the lymphatic system of the scrotum, through which white blood cells (and, potentially, cancer cells) flow in and out, links to the lower extremities, while that of the testicle links to the back of the abdominal cavity (the retroperitoneum).

A transscrotal biopsy or orchiectomy will potentially leave cancer cells in the scrotum and create two routes for cancer cells to spread, while in an inguinal orchiectomy only the retroperitoneal route exists.

Blood tests are also used to identify and measure tumor markers (usually proteins present in the bloodstream) that are specific to testicular cancer. AFP alpha1 fetoprotein, Beta-HCG, and LDH are the typical markers used to identify testicular cancer.

A pregnancy test may be used to identify high levels of Beta-HCG, however the first sign of testicular cancer is normally a lump.

## Treatment

The three basic types of treatment are surgery, radiation therapy, and chemotherapy.

Surgery is performed by urologists; radiation therapy is administered by radiation oncologists; and chemotherapy is the work of medical oncologists. In most patients with testicular cancer, the disease is cured readily with minimal long-term morbidity.

While treatment success depends on the stage, the average survival rate after five years is around 95%, and stage 1 cancers cases (if monitored properly) have essentially a 100% survival rate (which is why prompt action, when testicular cancer is a possibility, is extremely important).

### Initial treatment (orchidectomy)

The initial treatment for testicular cancer is surgery to remove the affected testicle (orchidectomy). While it may be possible, in some cases, to remove testicular cancer tumors from a testis while leaving the testis functional, this is almost never done, as the affected testicle usually contains pre-cancerous cells spread throughout the entire testicle.

Thus removing the tumor alone without additional treatment greatly increases the risk that another cancer will form in that testicle.

Since only one testis is typically required to maintain fertility, hormone production, and other male functions, the afflicted testis is almost always removed completely in a procedure called inguinal orchidectomy. (The testicle is almost never removed through the scrotum; an incision is made beneath the belt line in the inguinal area.) In the UK, the procedure is known as a **radical orchidectomy**.

### Retroperitoneal Lymph Node Dissection (RPLND)

In the case of nonseminomas that appear to be stage I, surgery may be done on the retroperitoneal/Para-aortic lymph nodes (in a separate operation) to accurately determine whether the cancer is in stage I or stage II and to reduce the risk that malignant testicular cancer cells that may have metastasized to lymph nodes in the lower abdomen. This surgery is called retroperitoneal lymph node dissection (RPLND).

However, this approach, while standard in many places, especially the United States, is out of favor due to costs and the high level of expertise required to perform successful surgery. The urologist may take extra care in the case of males who have not fathered children, to preserve the nerves involved in ejaculation.

Many patients are instead choosing surveillance, where no further surgery is performed unless tests indicate that the cancer has returned. This approach maintains a high cure rate because of the growing accuracy of surveillance techniques.

## Adjuvant treatment

Since testicular cancers can spread, patients are usually offered adjuvant treatment - in the form of chemotherapy or radiotherapy - to kill any cancerous cells that may exist outside of the affected testicle.

The type of adjuvant therapy depends largely on the histology of the tumor (i.e. the size and shape of its cells under the microscope) and the stage of progression at the time of surgery (i.e. how far cells has 'escaped' from the testicle, invaded the surrounding tissue, or spread to the rest of the body). If the cancer is not particularly advanced, patients may be offered careful surveillance by periodic CT scans and blood tests, in place of adjuvant treatment.

Before 1970, survival rates from testicular cancer were low. Since the introduction of adjuvant chemotherapy, chiefly platinum-based drugs like cisplatin and carboplatin, the outlook has improved substantially. Although 7000 to 8000 new cases of testicular cancer occur in the United States yearly, only 400 men are expected to die of the disease.

In the UK, a similar trend has emerged: since improvements in treatment, survival rates have risen rapidly to cure rates of over 95%.

## Radiation therapy

Radiation may be used to treat stage 2 seminoma cancers, or as adjuvant (preventative) therapy in the case of stage 1 seminomas, to minimize the likelihood that tiny, non-detectable tumors exist and will spread (in the inguinal and para-aortic lymph nodes). Radiation is ineffective against and is therefore never used as a primary therapy for nonseminoma.

## Chemotherapy

### Non-seminoma

Chemotherapy is the standard treatment for non-seminoma when the cancer has spread to other parts of the body (that is, stage 2B or 3). The standard chemotherapy protocol is three, or sometimes four, rounds of Bleomycin-Etoposide-Cisplatin (BEP).

BEP as a first-line treatment was first reported by Professor Michael Peckham in 1983. The landmark trial published in 1987 which established BEP as the optimum treatment was conducted by Dr. Lawrence Einhorn at Indiana University.<sup>[24]</sup> An alternative, equally effective treatment involves the use of four cycles of Etoposide-Cisplatin (EP).

Lymph node surgery may also be performed after chemotherapy to remove masses left behind (stage 2B or more advanced), particularly in the cases of large nonseminomas.

## Seminoma

As an adjuvant treatment, use of chemotherapy as an alternative to radiation therapy in the treatment of seminoma is increasing, because radiation therapy appears to have more significant long-term side effects (for example, internal scarring, increased risks of secondary malignancies, etc.).

Two doses, or occasionally a single dose of carboplatin, typically delivered three weeks apart, is proving to be a successful adjuvant treatment, with recurrence rates in the same ranges as those of radiotherapy.

The concept of carboplatin as a single-dose therapy was developed by Tim Oliver, Professor of Medical Oncology at Barts and The London School of Medicine and Dentistry. However, very long term data on the efficacy of adjuvant carboplatin in this setting does not exist.

Since seminoma can recur decades after the primary tumor is removed, patients receiving adjuvant chemotherapy should remain vigilant and not assume they are cured 5 years after treatment.

