All About Penile Cancer

What is the penis?

The penis is an external male sex organ that also functions as part of the urinary system. It is made up of skin, nerves, smooth muscle, and blood vessels. The penis is made up of different parts including the glans, the shaft, the corpus cavernosum, the corpus spongiosum, the meatus, and the urethra. The glans, also known as the head of the penis, is the tip of the penis that is covered by skin called mucosa. This mucosa is the skin that is removed when a male is circumcised. The main part of the penis is referred to as the shaft and houses the corpus cavernosum and the corpus spongiosum. The corpus cavernosum is the two cylindrical shaped tissues that run along the sides of the penis. The corpus spongiosum is the sponge-like tissue that is within the front of the penis and ends at the glans. The urethra sits inside the corpus spongiosum. The urethra is a thin tube that is attached to the bladder and its function is to excrete urine and semen to the outside of the body. The opening on the glans of the penis where semen and urine exit the body is called the meatus.

What is penile cancer?

Normally, cells in the body will grow and divide to replace old or damaged cells in the body. This growth is highly regulated, and once enough cells are produced to replace the old ones, normal cells stop dividing. Tumors occur when there is an error in this regulation and cells continue to grow in an uncontrolled way. Tumors can either be benign or malignant. Although benign tumors may grow in an uncontrolled fashion sometimes, they do not spread beyond the part of the body where they started (metastasize) and do not invade into surrounding tissues. Malignant tumors, however, will grow in such a way that they invade and damage other tissues around them. They also may spread to other parts of the body, usually through the bloodstream or through the lymphatic system where the lymph nodes are located. Over time, the cells within a malignant tumor become more abnormal and appear less like normal cells. This change in the appearance of cancer cells is called the tumor grade, and cancer cells are described as being well-differentiated, moderately-differentiated, poorly-differentiated, or undifferentiated. Well-differentiated cells are quite normal appearing and resemble the normal cells from which they originated. Undifferentiated cells are cells that have become so abnormal that often we cannot tell what types of cells they started from.

Penile cancer is cancer that has developed either in or on the penis; however, almost all cases of penile cancer start in the skin cells of the penis. Most of these cancers develop from the squamous cells which are flat skin cells. The earliest stage of squamous cell cancer in the penis is called carcinoma in situ and only affects the top layers of skin. Carcinoma in situ of the glans is called erythroplasia of Queyrat and if it is on the shaft it is called Bowen disease. Squamous cell cancers can develop anywhere on the penis but most commonly occur on the foreskin of uncircumcised men or on the glans. They are slow-growing and the earlier they are diagnosed the greater the cure rate. The other more rare types of penile cancer include melanoma, basal cell carcinoma, adenocarcinoma, and sarcoma.

What causes penile cancer and am I at risk?

Penile cancer is rare in the United States and it is expected that there will be about 2,080 new cases diagnosed in the US each year. In Asia, Africa, and South America, it is much more commonly diagnosed. There are a number of risk factors that can lead to penile cancer. However, having one or more risk factors does not mean that you will get penile cancer. You could also have no risk factors and get penile cancer. Circumcision just after birth, a procedure in which the skin covering the tip of the penis is removed, appears to protect men from developing the disease. Phimosis, or an unretractable foreskin, is also associated with an increase in the risk of penile cancer. It is believed that the reasons circumcision decreases the incidence of penile cancer include avoiding the development of phimosis and preventing the retention of smegma (skin that has been shed combined with moisture and oil from skin). Poor hygiene, chronic retention of smegma, and having a sexually transmitted disease (such as HPV or human papillomavirus 16 or 18) may also increase a man's risk of developing cancer of the penis. Smoking also is
associated with penile cancers and the incidence of penile cancer is approximately eight-fold higher in HIV-infected men. Men who have been treated for a skin condition called psoriasis with medications called psoralens and UV (ultraviolet) light have been found to have a higher incidence of penile cancer. It is important that a man receiving this treatment covers his genitals during exposure to the UV light.

How can I prevent penile cancer?

To prevent penile cancer it is best to avoid known risk factors such as smoking, and contraction of HPV and HIV. There are HPV vaccines available for men and women. It is also important for men to practice proper hygiene. Uncircumcised men should retract the foreskin when cleansing the penis. Although not having a circumcision is a risk factor in penile cancer, studies do not necessarily find the circumcision will prevent penile cancer.

What screening tests are used for penile cancer?

There are no specific screening tests for penile cancer. However, cancer of the penis can be visible. If a man finds any type of lesion, wart, blister, sore, ulcer, white patch or any other abnormality he should have it assessed by a medical provider. Most likely it is not cancer but it could be an infection, sexually transmitted disease or some other type of condition that should be treated. Most likely, if it is cancer and it is found early, it can be treated early with little or no damage to the penis.

What are the signs of penile cancer?

Penile cancer commonly presents as a lump, mass or ulcer on the penis. Lesions can be raised and wart-like or flat. The penile lesion can be sore and inflamed, and there may be itching and burning in the region as well. Generally, penile cancers affect the head or foreskin of the penis rather than the shaft of the penis. Penile cancers can look very different, anything from a small bump to very large, infected, and aggressive lesion. The cause for such a wide range of presentations can be explained in the delay in diagnosis.

Some men with penile cancer will have swollen groin lymph nodes at diagnosis. This occurs because penile cancer lesions can often become infected and cause lymph node swelling. As the disease progresses, the cancer cells may form a raised lesion that can sometimes cause parts of the tissue of the penis to die and erode away. Spread of the disease is rare and symptoms in other parts of the body are uncommon.

How is penile cancer diagnosed?

After performing a physical examination, it is usually necessary to obtain a tissue sample, or biopsy, of the cancerous cells for examination under the microscope by the pathologist. Tissue is obtained by inserting a needle into the area of abnormal skin or tissue or by removing the entire tumor in a surgical procedure called a wide local excision. In some cases, a procedure called a cystoscopy may be performed, in which a tiny camera (scope) is inserted through the opening of the penis and advanced all the way to the bladder to look for spread of cancer to the urethra (tube connecting the bladder to the penis) and/or bladder. A CT or MRI of the penis may also be performed to determine if the tumor has spread to the deeper structures of the penis. Ultrasound may also be used to determine how deeply the cancer has grown into the penis.

How is penile cancer staged?

Once a penile cancer is found, it is necessary to perform more tests to see if the tumor has spread so that appropriate treatment can be recommended. The staging of a cancer describes how much it has grown before the diagnosis is made. Staging documents the extent of disease. Keep in mind that penile cancer rarely spreads, but it is possible.

The staging system for penile cancer is the “TNM” system described by the American Joint Committee on Cancer. The “T” describes the size or invasiveness of the tumor; the “N” describes the spread of the tumor to any glands, or lymph nodes, near the tumor; and the “M” describes any distant spread, or metastasis, to other organs or sites of the body. This is then interpreted as a stage somewhere from I (one) denoting more limited disease to IV (four) denoting more advanced disease. Grade, or how well the tumor cells are organized, is also used in making treatment decisions but is not included in the official "TNM" staging system.
Though complicated, these staging systems help providers determine the extent of the cancer and make treatment decisions. The stage of cancer, or extent of disease, is based on the information gathered through the various tests done (described above) as the diagnosis and work-up of the cancer is being performed. Your healthcare provider will use the results of the diagnostic work-up to assign the TNM result. The TNM breakdown is quite technical, and the entire staging system is outlined at the end of this article.

**How is penile cancer treated?**

The goal of treatment of penile cancer is to not only remove all the cancer but also to prevent recurrence and to maintain as much of the function and form of the penis. Because changes to the size, shape, and function of the penis can cause distress it has become common in recent years to use the most organ sparing treatment possible. The most commonly used treatment for penile cancer is surgery. Surgery may be used with radiation and/or chemotherapy which is referred to as adjuvant therapy.

**Surgery**

Surgery forms the foundation of treatment and can be useful in all stages of penile cancer. We will look at the most commonly used surgical procedures. For early stage penile cancer, excisional surgery can be used. It is the traditional surgical removal of cancerous cells that involves numbing the area with local anesthesia and removing the entire area of concern with a border or margin of healthy tissue with a scalpel (surgical knife). The skin is then closed with sutures (stitches) and the tissue is sent to a laboratory for a pathologist to ensure all the cancer has been removed. If the cancer is only on the foreskin, a circumcision may be done, which is removal of the foreskin. This is similar to an excisional surgery.

In some cases, a glansectomy is used for treatment. A glansectomy is the removal of part or all of the tip of the penis. A skin graft from another part of the body may be used to rebuild the tip of the penis.

Moh's surgery is a procedure performed by a trained specialist in the office under local anesthesia. With Moh’s surgery, very precise surgery is performed with attempts to remove the least amount of tissue while the margins, or edges, of the resection, are examined under a microscope immediately to ensure all of the cancer is removed. Laser surgery can also be used where a laser is used to remove small lesion(s) rather than use a scalpel. Cryosurgery may also be used in which the tissue containing the cancerous cells is frozen and removed. Both laser surgery and cryosurgery are useful techniques but not as often used.

Penectomy, either partial or total penectomy, can be an effective way to treat penile tumors. Earlier stage tumors are treated with partial penectomy in which part of the penis is removed. Larger tumors generally require removal of the entire penis, also called a total penectomy. In a total penectomy the entire penis is removed along with the roots that extend into the pelvis. The removal of the entire penis will interfere with a man’s ability to urinate. Therefore, the surgeon will create an opening between the scrotum and the anus known as a perineal urethrostomy. The urethral sphincter will remain so a man will be able to control when he wants to urinate.

Some patients may also need to have their lymph nodes biopsied or removed. This can sometimes result in severe swelling in the groin and legs. There are other options using less extensive lymph node removal, which have been studied. One option is to have a selective dissection of the groin nodes using a sentinel mapping technique (where a dye or radioactive material is used to find the lymph nodes most likely to be involved with cancer such that only they are removed). If these nodes are negative, further dissection is not needed. It may also be possible to only remove some of the nodes as opposed to all of the nodes of the groin (modified inguinal lymphadenectomy). Your surgeon will discuss which surgical options for the groin nodes are best for you.

In men with positive nodes, removal of lymph nodes of both sides of the groin is recommended. A short period of surveillance with antibiotic treatment can be considered because in some people the enlarged nodes are due to infection. However, if antibiotics fail to resolve the enlarged nodes, resection of the nodes should be performed. If multiple groin lymph nodes are found to be involved with cancer, or if a patient presents with groin nodes that can be felt on exam or seen on imaging studies, the surgeon may also remove nodes from both the deep groin and pelvis to assess for further spread of disease. After removal of involved lymph nodes, chemotherapy and radiation therapy are often given additionally to ensure that all cancers cells have been eradicated.

The treatment of advanced tumors may require more extensive surgery called emasculation. This surgery removes the penis and may also remove the scrotum and testicles. Men who undergo this surgery will require a testosterone supplement since the
testicles are removed.

**Radiation Therapy**

Radiation can also be used in the treatment of penile cancer.

The radiation comes in the form of high energy x-rays. These x-rays are similar to those used for diagnostic x-rays, but they are of a much higher energy. The high energy of x-rays in radiation therapy results in damage to the DNA of cells. Cancer cells divide faster than healthy cells, and so their DNA is more likely to be damaged than that of normal cells. Additionally, cancer cells are generally less able to repair damaged DNA than normal cells are, so cancer cells are killed more easily by radiation than normal cells are. Radiation therapy exploits this difference to treat cancers by killing cancer cells, while killing fewer cells in normal, healthy tissue.

Prior to the initiation of radiation, a circumcision should be performed. This is done to manage the swelling and tightening of the foreskin that can be a result of radiation therapy. Radiation can offer the advantage of penis preservation by avoiding a penectomy in some early stage cases.

Both external radiation (radiation that comes from a machine rotating around the patient) and brachytherapy (a procedure in which radioactive seeds are inserted directly into the tumor) can be used. There are two types of brachytherapy that can be used:

- **Interstitial**: In the operating room, hollow needles are placed into the penis and held in place with a plastic holder. Radioactive pellets are placed in the needles and left in for different periods of time. This can be done over several days. When treatment is complete the pellets and needles are removed.
- **Plesiobrachytherapy**: A plastic cylinder is placed over the penis and another cylinder that contains a source of radiation is placed over top of the first cylinder. Treatment is often given several days in a row and is used only for tumors that are near the surface of the penis.

Radiation therapy can be used alone or it can be used with or without chemotherapy following surgery in patients who have advanced disease. In advanced disease, poorly differentiated tumors, and when lymph nodes are involved, chemotherapy and radiation together is used to treat the pelvis and groin in order to help prevent the cancer from returning in the pelvis, groin, or penis. The radiation and chemotherapy are given after the lymph nodes in the groin have been removed by the surgeon. Radiation may also be used in advanced disease to slow the growth of the cancer to manage symptoms caused by the cancer.

**Chemotherapy**

Chemotherapy is most commonly used in patients whose cancer has spread throughout the body to distant sites, and who need systemic therapy (therapy that reaches all parts of the body). Chemotherapy may be used in conjunction with radiation when the tumor involves the lymph nodes. Once the cancer has spread to other organs, chemotherapy is used to try to help manage side effects and slow the growth of the cancer, but does not generally cure the cancer. Chemotherapy can also be used before surgery when patients present with more advanced disease, such as spread to the lymph nodes in the groin or pelvis. Because the number of cases of penile cancer is so few, there is no standard chemotherapy regimen used for penile cancer. The chemotherapies used vary due to the lack of research. The most commonly used chemotherapies are: cisplatin, ifosfamide, fluorouracil, capecitabine, mitomycin C and paclitaxel. The two most commonly used regimens are cisplatin and fluorouracil and TIP which include paclitaxel, ifosfamide, and cisplatin.

Topical chemotherapy medications are occasionally used to treat non-invasive penile cancers. Fluorouracil (5-FU) is a type of chemotherapy often used intravenously for other types of cancer; however, it is also approved for topical use. The 5-FU cream is applied to the area as directed by your provider. Imiquimod is also an approved topical medication. This cream, which is thought to work by stimulating the immune system, is applied directly to the skin.

**Clinical Trials**

There are clinical research trials for most types of cancer, and at every stage of the disease. Clinical trials are designed to determine the value of specific treatments. Trials are often designed to treat a certain stage of cancer, either as the first form of treatment offered, or as an option for treatment after other treatments have failed to work. They can be used to evaluate...
medications or treatments to prevent cancer, detect it earlier, or help manage side effects. Clinical trials are extremely important in furthering our knowledge of this disease. It is through clinical trials that we know what we do today, and many exciting new therapies are currently being tested. Talk to your provider about participating in clinical trials in your area. You can also explore currently open clinical trials using the OncoLink Clinical Trials Matching Service.

**Follow-Up Care and Survivorship**

Follow-up care for patients who have been treated for penile cancer will depend on the extent of the cancer and how it was treated. Patients are often seen every 3-6 months for the first 2 years and then once a year for years 3-5. No matter how often you are being seen it is very important to notify your provider of any new symptoms you are experiencing. These could be caused by the treatment you received or could be signs of recurrence. Going to all scheduled appointments is especially important for those patients who have not undergone removal of lymph nodes, since there is a risk of spread of the cancer to the lymph nodes. The cornerstone of follow-up care is physical examination, although sometimes imaging studies such as ultrasound of the groin may detect spread of cancer to lymph nodes even before those nodes can be felt on examination. CT scanning of the pelvis is also helpful in detecting abnormal nodes that cannot be detected on physical examination. If a patient has undergone removal of the penis, reconstruction of the penis by plastic surgery may be considered.

Fear of recurrence, sexuality issues, financial impact of cancer treatment, employment issues and coping strategies are common emotional and practical issues experienced by penile cancer survivors. Your healthcare team can identify resources for support and management of these practical and emotional challenges faced during and after cancer.

Cancer survivorship is a relatively new focus of oncology care. With nearly 17 million cancer survivors in the US alone, there is a need to help patients transition from active treatment to survivorship. What happens next, how do you get back to normal, what should you know and do to live healthy going forward? A survivorship care plan can be a first step in educating yourself about navigating life after cancer and helping you communicate knowledgeably with your healthcare providers. Create a survivorship care plan today on [OncoLink](http://www.oncolink.org).

**Resources for More Information**

**The American Cancer Society**
Dedicated to helping persons who face cancer. The ACS supports research, patient services, early detection, treatment and education. The ACS maintains a national database of patient support services, support groups and resources.
[www.cancer.org](http://www.cancer.org)

**Imerman’s Angels**
Dedicated to providing personalized connections that enable one-on-one support among cancer fighters, survivors and caregivers.
[www.imermanangels.org](http://www.imermanangels.org)

**Cancer Support Community**
An international non-profit dedicated to providing support, education and hope to people affected by cancer.
[www.cancersupportcommunity.org](http://www.cancersupportcommunity.org)

**Appendix: Complete Penile Cancer Staging**

American Joint Committee on Cancer, TNM STaging for Penile Cancer. (8th ed., 2017)

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