Penile Cancer: An Overview

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Although rare in the Western world, there will be 1,280 new penile cancer cases diagnosed in the United States, and 290 men will die of penile cancer this year. One in every 100,000 males will be diagnosed with this disease (American Cancer Society, 2007a & b). It is one of the most devastating cancers to affect men because penile cancer adversely affects sexuality and sexual function. Penile cancer can affect the glans penis, the prepuce, or foreskin in uncircumcised males, and the two erectile tissues within the penis, the corpora cavernosa and corpus spongiosum. The incidence of penile cancer has historically been much higher in Africa. In Uganda, penile cancer was the most common cancer in males, but more recent data indicate declining incidence of penile cancer, possibly as a result of improved standards of hygiene (Owor, 1984; Wabinga, Parkin, Wabwire-Mangen, & Mugerva, 1993).

Penile cancer, though relatively uncommon in the western world, does affect more than 1,200 men in the United States annually. It is a devastating cancer for men because it adversely affects sexual function. There are numerous causes and presentations of penile cancer, but the most common is a penile lesion, which can be mistaken for a sexually transmitted disease. The causes, presentation, and treatment options for penile cancer are examined.

Table 1. Risk Factors for Penile Cancer

<table>
<thead>
<tr>
<th>Risk Factor</th>
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<tr>
<td>Human papillomavirus (HPV)</td>
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<td>Lichen sclerosus</td>
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<tr>
<td>Balanitis xerotica obliterans (BXO)</td>
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<tr>
<td>Increasing age</td>
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<tr>
<td>Phimosis</td>
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<tr>
<td>Poor personal hygiene</td>
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<td>Smoking</td>
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Risk Factors

*Human papillomavirus.* Human papillomavirus (HPV) infection is a risk factor in penile cancer (see Table 1). The role of circumcision has been debated in the urologic literature. However, studies have demonstrated circumcision’s preventive role in the development of invasive penile cancer by eliminating the possibility of phimosis, which is cited as a significant risk factor. Uncircumcised men have a 3.4 times greater risk, and men circumcised after the neonatal period have a three times greater risk of developing penile cancer (Madden, Sherman, & Beckman, 2003). Male circumcision is associated with a reduced risk of penile HPV infection (Castellsague et al., 2002). Epidemiologic population-based case-control studies showed a consistently strong association between HPV infection and the development of penile cancer regardless of circumcision status (Daling et al., 2005).

*Lichen sclerosus.* Lichen sclerosus, an unusual chronic mucocutaneous condition of the penis, has been implicated in penile squamous cell carcinoma (Velazquez & Cubilla, 2003). Studies also reported a relationship between lichen sclerosus and vulvar squamous cell carcinoma in females (Powell, Robinson, Cranston, Wojnarowska, & Turner, 2001). Clinical presentation of lichen sclerosus usually precedes the diagnosis of squamous cell carcinoma by many years.

*Balanitis xerotica obliterans.* Balanitis xerotica obliterans (BXO) is described as an atrophic and sclerotic condition of the glans penis, which can result in stenosis and the obliteration of the external meatal orifice. Studies have shown that a significant number of patients with penile malignancy have a histologic diagnosis of BXO. Males with BXO and those in whom BXO persists despite circumcision should undergo biopsy and
further evaluation (Goolamali & Pakianathan, 2006; Peitrzak, Hadway, Corbishley, & Watkin, 2006).

Age. Increasing age is a factor in development of penile cancer. Penile cancer is more often diagnosed in males at age 60 and above (dePaula et al., 2007; Seyam et al., 2006; Soria et al., 1997).

Phimosis. Phimosis, a condition in which the foreskin of the uncircumcised male becomes contracted and cannot be retracted over the glans, is cited as a risk factor for penile cancer. Phimosis is often caused by chronic infection resulting from poor local hygiene (Tsien, Morgenstern, Mack, & Peters, 2001).

Hygiene. Poor personal hygiene increases the likelihood for penile cancer development. Smegma, a combination of exfoliated epithelial cells, moisture, and bacteria can accumulate under the foreskin of the uncircumcised male. It emits a characteristic malodorous smell and is believed to be a contributory factor in the development of penile cancer (Brinton et al., 1991).

Smoking. A consistent association was found between penile cancers and smoking that was dose-dependent and not explained by other confounding variables. Cigarette smoking is associated with a 4.5-fold risk of invasive penile cancer. Smoking cessation is cited as a preventive strategy for penile cancer (Daling et al., 2005; Dillner, von Krogh, Horenblas, & Meijer, 2000).

Clinical Presentation

A painless lump or ulcer is the most common presentation of penile cancer (Ritchie, Foster, & Fowler, 2004). Lesions may be found distally on the glans and/or prepuce. Patients may also present with a change in skin coloring, as in a red rash or bluish growths. Thickening of the penile skin or wart-like growths are other possible presentations. Malodorous and persistent discharge from the penis is a late symptom. In the advanced stage of penile cancer, palpable inguinal nodes may be noted and signify lymphatic regional spread.

Patients often confuse these symptoms with sexually transmitted disease and may delay seeing a clinician. Seeking late medical attention due to embarrassment or other reasons adversely affects the clinical outcome. Penile cancer, if detected early, may be curable. Any penile lesion that fails to heal despite medical treatment needs further evaluation by a urologic specialist.

Diagnosis and Workup

A thorough physical examination is necessary, including assessment and palpation of the inguinal lymph nodes. The size, location, and character of the penile lesions should be noted. Patients suspected of penile cancer may undergo various multiple invasive and noninvasive tests. The urologic oncologist must evaluate whether the penile lesion is benign or malignant. If malignant, it must be determined whether the lesion is superficial or invasive.

Depending on the site and size of the penile lesions, excision or incision biopsy is done for accurate diagnosis. The definitive diagnosis is confirmed by biopsy. Similarly, fine needle aspiration performed under local anesthesia is done to determine whether any enlarged lymph nodes are malignant.

Ultrasoundography is usually the initial imaging modality as it provides detailed anatomic information and reveals certain characteristic features of tissue constitution and blood supply. European studies have shown that the use of positron emission tomography and computed tomography (PET/CT) with (18) F-FDG in the primary staging or followup of penile cancer patients may be prognostically crucial in the search for lymph node metastases. The additional information gained from PET/CT may be useful for planning surgery (Scher et al., 2005).

Magnetic resonance imaging provides a degree of tissue specificity and helps in the detection and staging of penile cancer. Prostaglandin maybe injected into the penile shaft to keep the penis erect while the test is in progress. Chest X-rays and/or computed tomography can determine if the penile cancer has metastasized to the lungs.

Sentinel node biopsy is performed to determine whether nonenlarged inguinal lymph nodes contain cancer. The biopsy results prevent unnecessary removal of lymph nodes, which can predispose patients to lymphedema and delayed wound healing. Other studies demonstrated that sentinel node biopsy results are not always reliable. The most current studies indicate that dynamic sentinel node biopsy in penile carcinoma has more diagnostic, prognostic, and therapeutic value. The procedure involves lymphoscintigraphy around the primary tumor. The sentinel node is then intraoperatively identified with the aid of patent blue dye and a gamma ray detection probe. Lymph node dissection is performed only if sentinel node metastasis is found. A Netherlands 10-year followup study on the use of dynamic sentinel node biopsy showed the 5-year disease-specific survival rate of 96% and 66% for patients with a tumor-negative sentinel node and tumor-positive sentinel node respectively (Kroon et al., 2005).

Staging

Once the diagnosis of penile cancer is confirmed, determination must be made regarding the extent of the cancer. Treatment will depend on the stage of the cancer. Penile preservation, as appropriate, is the goal. In early stages, this can be achieved. In later stages, partial or total penectomy and inguinal lymphadenectomy maybe inevitable. The American Joint Committee on
Cancer tumor, node, metastasis (TNM) system is used to describe penile cancer stage. Using the TNM system, information on the tumor, node, and metastasis assigns the cancer stage. Using numeric numbers 0 to 4, the higher number indicates increasing severity. Tables 2, 3, and 4 show the TNM classification for penile cancer.

**Stage Groupings**

To simplify, TNM combinations are grouped together into sets of stages listed below.

- **Stage O.** Tis, Ta, N0, M0. Abnormal cells are found only on the surface of the penile skin. Stage O is also called carcinoma in situ.
- **Stage I.** T1, N0, M0. Cancer has formed and spread to connective tissue just under the penile skin.
- **Stage II.** T1-2, N1, M0 or T2, N0, M0. Cancer has spread to connective tissues just under the penile skin and to one lymph node in the groin; or, cancer has spread to erectile tissue, and may have spread to one lymph node in the groin.
- **Stage III.** T1-2, N2, M0 or T3, N0-2, M0. Cancer has spread to connective tissue or erectile tissue of the penis and to more than one lymph node on one or both sides of the groin; or cancer has spread to the urethra or prostate, and may have spread to one or more lymph nodes on one or both sides of the groin.
- **Stage IV.** T4, N1-3, M0 or T1-3, N3, M0 or any T, any N, M1. Cancer has spread to tissues near the penis and may have spread to lymph nodes in the groin or pelvis; or, cancer has spread anywhere in or near the penis and in one or more lymph nodes deep in the pelvis or groin; or, cancer has spread to distant parts of the body.

### Table 2. Primary Tumor (T) Categories

<table>
<thead>
<tr>
<th>T0</th>
<th>No evidence of primary tumor</th>
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</thead>
<tbody>
<tr>
<td>Tis</td>
<td>Carcinoma in situ</td>
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</table>
| Ta        | Verrucous (wart-like) carcino-
|           | ma that does not invade other tissue or deeply |
| T1        | Tumor invades subepithelial connective tissue (tissue below the top layers of skin) |
| T2        | Tumor invades corpus spongiosum or corpora cavernosum (internal chambers of the penis) |
| T3        | Tumor invades the urethra or prostate gland |
| T4        | Tumor invades other adjacent structures |

### Table 3. Regional Lymph Nodes (N) Categories

<table>
<thead>
<tr>
<th>N0</th>
<th>No regional lymph node metastasis</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1</td>
<td>Metastasis to a single superficial inguinal lymph node</td>
</tr>
<tr>
<td>N2</td>
<td>Metastasis to two or more superficial inguinal lymph nodes on the same side or both sides of the body</td>
</tr>
<tr>
<td>N3</td>
<td>Metastasis to lymph nodes deep within the groin or pelvis or either one or both sides of the body</td>
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</tbody>
</table>

### Table 4. Metastasis (M)

<table>
<thead>
<tr>
<th>M0</th>
<th>No distant metastasis</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>Distant metastasis has occurred</td>
</tr>
</tbody>
</table>

**Survival**

The National Cancer Institute’s data on penile cancer (1973-2000) showed an overall 5-year survival rate of 76.9%, decreasing to 63.5% at 10 years. Statistics also show that in penile cancer diagnosed in situ, the 5-year survival rate is 95%. If the lymph nodes are not involved, the 5-year survival rate is 80%, but if the lymph nodes are involved, the survival rate drops to 52%. If the tumor spreads beyond the inguinal lymph nodes, the relative survival rate is 18% (National Cancer Institute, 2007). More recent statistics from the National Cancer Database (1995-2000) show a 5-year relative survival of 75% (National Cancer Database, 2007).

**Penile Cancer Types**

Because the penis contains different types of cells, penile cancer can develop in each type of cell. Cell type is important in indicating the severity of the cancer and its concomitant treatment. Table 5 lists types of penile cancer.

- **Epidermoid penile cancer** develops in the skin of the penis. Squamous cell carcinoma of the penis arises from this type and composes 95% of penile cancers. While it can
be found anywhere in the penis, it frequently affects the prepuce and glans.

- **Verrucous carcinoma**, sometimes called Buschke-Lowenstein tumor, which appears as a genital wart, is a low-grade tumor that can spread deeply into the surrounding tissue.

- **Adenocarcinoma**, a rare type of penile cancer, develops from the sweat glands of the penile skin. Paget disease of the penis (not to be confused with Paget’s disease of the bone) is a condition in which adenocarcinoma cells are found in penile skin.

- **Erythroplasia of Queyrat** is another name given for carcinoma in situ of the glans penis.

- **Bowen’s disease** is carcinoma in situ of the penile shaft.

- **Penile melanomas** compose about 2% of penile cancers and spread more aggressively.

- **Basal cell penile cancers** represent less than 2% of penile cancers and are slow-growing tumors.

- **Sarcomas** compose 1% of penile cancers and develop from blood vessels, smooth muscles, and other connective tissue of the penis.

### Table 5. Penile Cancer Types

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>Epidermoid penile cancer</td>
<td>Squamous cell carcinoma</td>
</tr>
<tr>
<td>Squamous cell carcinoma</td>
<td>Verrucous carcinoma</td>
</tr>
<tr>
<td>Adenocarcinoma</td>
<td>Erythroplasia of Queyrat</td>
</tr>
<tr>
<td>Bowen’s disease</td>
<td>Bowen’s disease</td>
</tr>
<tr>
<td>Basal cell penile cancer</td>
<td>Sarcomas</td>
</tr>
<tr>
<td>Sarcomas</td>
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### Treatment

The health care team should consider the patient and his significant other as partners in decision making regarding treatment. Information about the treatment plan, its risks, and benefits must be addressed so an informed consent can be given. Treatment depends on the type and stage, performance status, patient preference about treatments, potential side effects, and the patient’s overall health.

Patients should be encouraged to seek second opinions if needed to ensure that the most appropriate treatment is performed by a skilled urologic oncology team. Surgery is still the predominant treatment modality with the extent of the resection dependent on the cancer stage. Organ-sparing surgery using laser ablation and reconstructive procedures to preserve glans or phallic length have been developed (Busby & Pettaway, 2005). Urethral reconstructions have been attempted to allow the patient to stand and direct his urinary stream. Depending on the cancer stage, a modified or radical inguinal lymphadenectomy may be necessary.

- **Stage O** penile cancers can be treated with topical chemotherapy, laser surgery, cryosurgery, topical biologic therapy, and Mohs microsurgery. The latter involves cutting the penile skin in thin layers and checking microscopically for malignancy, with more pieces of tumor removed until the skin samples are cancer free.

- **Stage I** penile cancer involving the prepuce alone can be treated with wide local excision and circumcision. However, stage I treatment may involve partial or total penectomy with or without removal of the inguinal lymph nodes. Perineal urethrostomy is done to divert urine after total penectomy.

- **Stage II** penile cancer treatment involves penectomy (partial or total) with or without lymph node dissection. Radiation, using brachytherapy or external beam follows surgery.

- **Stage III** treatment includes those involved in stage II treatment, plus a clinical trial of chemotherapy or radiosensitizers before or after surgery.

- **Stage IV** treatment is usually palliative in nature and includes penectomy or wide local excision and lymphadenectomy, radiation, and chemotherapy.

### Nursing Implications

**Sexuality.** Caring for patients with a diagnosis of penile cancer requires specialty skills and compassion for the patient who faces an assault to his sexuality and sexual function. The patient’s spouse or significant other’s involvement in care is crucial. The effects of penile cancer on sexuality should be addressed before, during, and after treatment. Discussions about alternative ways of expressing intimacy are crucial to a man who has undergone total penectomy. Assurance as to his ability to have an orgasm despite his phallic loss and frank discussions on alternative ways to provide pleasure to his partner is part of the plan of care (Blanco-Yarosh, 2006). Referral to a urology clinical nurse specialist, a social worker, and a sexual dysfunction practitioner is essential.

**Skin.** Radiation effects must be addressed, especially the skin issues following radiation treatment. The urology nurse should be alert for the possibility of urethral stricture and urethro-cutaneous fistula. If the patient had preoperative radiation, wound healing may be delayed and meticulous skin care of the previously radiated skin is a necessity. In the presence of catheters in the perineal area, the urology nurse must be alert for urine leaks, which could further compromise the surrounding skin.

**Laboratory tests.** If the patient received systemic chemotherapy
from single or combined agents, the urology nurse should check the patient’s complete blood count because the patient may be predisposed to infection secondary to decreased white count, or to bleeding due to decreased platelets.

**Tube care.** Urologic tube care is a basic critical element in the care of all urologic patients. In patients who have had a total penectomy, teaching is required on the care of the perineal urethrostomy site as well as the perineal catheter through which urine now exits. Patients and their significant others will require teaching on the care of the catheter itself. Teaching perineal care after bowel movements, per institutional guidelines and standards, is vital to avert the potential for contamination and urinary tract infection.

**Wound care.** Wound and incision care are vital elements of the plan of care. Preventing infection and operative site edema, proper drainage to prevent fluid collection under the operative site, and monitoring of flap viability if the patient has had a penile reconstruction are vital assessments to be done every shift until the wound and incision are healed and approximated. If the patient had an inguinal lymphadenectomy, the urology nurse must watch for early signs of lymphedema and treat the lymphedema according to institutional guidelines.

**Prevention of embolic event.** Pulmonary emboli prevention with the use of sequential or alternating compression device and early activity progression will avert a potentially fatal complication.

**Conclusion**

As a final note, the patient’s care must be approached from a multidisciplinary model of care. Referrals and followup by the social worker, chaplain, and human sexual dysfunction experts will assist the patient in coping with a devastating disease.

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**References**


