Prostate Cancer Patient Care
Screening, Diagnosis, and Treatment

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LEARNING OUTCOME AND OBJECTIVES: Upon completion of this course, you will have increased your understanding of the epidemiology, diagnosis, and treatment of prostate cancer; approaches to prostate cancer screening and diagnosis; and evaluation of nursing and medical interventions for patients with prostate cancer and their significant others. Specific learning objectives include:

- Discuss the epidemiology of prostate cancer.
- Identify the anatomy and physiology of the normal, healthy prostate gland.
- Describe the pathogenesis and risk factors for development of prostate cancer.
- List prostate cancer signs and symptoms.
- Discuss screening, diagnostic testing, grading, and staging of prostate cancer.
- Describe surgical and nonsurgical treatment options, along with their risks and side effects.
- Summarize special concerns and related care for patients undergoing prostate cancer treatment and for their significant others.
- Outline rehabilitation interventions for complications the patient with prostate cancer may experience.

INTRODUCTION

Prostate cancer is the most common type of cancer among men worldwide and is the second leading cause of cancer death among U.S. men. Prostate cancer is a slowly progressing disease, however, and many men die of other causes without ever knowing they also have prostate cancer.
Prostate cancer is often found when an autopsy is performed, and studies indicate that about 80% of men who reach the age of 80 have cancer cells in their prostate (Robinson, 2017).

Prostate cancer arises in the genital area, threatening that part of the body concerned with sexual function and body waste. Because the prostate is close to several vital structures, prostate cancer and its treatment strategies can disrupt normal bladder, bowel, and sexual functioning. Permanent urinary incontinence and impotence may be the result of the disease and/or treatment. Thus, when the diagnosis of prostate cancer is made, it has a profound impact on both the patient and his significant others. Prostate cancer can strike at the core of some men’s sense of masculinity and identity as a man.

Most often prostate cancer grows slowly and is confined initially to the prostate gland, causing no serious harm and requiring little or no treatment. However, other types are very aggressive and spread quickly. Early treatment is usually successful. Treating prostate cancer when it is small and confined inside the prostate can often cure the disease.

Healthcare providers are critical in the management of prostate cancer throughout the disease continuum. Education, care, and emotional support to the patient, his partner, and family are vital from screening to diagnosis and throughout the treatment and management of prostate cancer.

EPIDEMIOLOGY OF PROSTATE CANCER

The National Cancer Institute estimated 164,690 new cases of prostate cancer would be diagnosed in the year 2018, and in 2015 there were an estimated 3,120,176 men living with prostate cancer in the United States. Prostate cancer represents 9.5% of all new cancer cases in the United States (NCI, 2018a).

Since 1975 new prostate cancer cases have gone from a low of 94 per 100,000 to a high of 214.9 in 1990. They have declined 53% since 1992, when prostate-specific antigen (PSA) screening became widespread. This decline is believed to be attributed to two factors. First, after decades of widespread PSA screening to detect prostate cancer, there are few men with high PSA levels that have not already been diagnosed. Second, and perhaps more importantly, PSA screening is now becoming less common, the impact of which has yet to be determined (Downer et al., 2017).

Prostate Cancer by Race, Age, Ethnicity

The CDC (2018) reports that prostate cancer is the most common cancer in all men regardless of race or ethnicity. However prostate cancer is more common in black men than in white men, and it is less common in Hispanic, Asian, Pacific Islander, and Native American men than in white men.

Black men of African descent have a 60% higher risk of being diagnosed with prostate cancer and a two to three times greater risk of dying from it compared to white men of European descent (Bollig-Fischer et al., 2017).
Prostate cancer is most often diagnosed among men ages 65 to 74. Median age at diagnosis is 66. About 1 man in 9 will be diagnosed with prostate cancer during his lifetime, and about 6 in 10 cases are diagnosed in men aged 65 or older. It is rarely diagnosed before age 40 (ACS, 2018a).

### PROSTATE CANCER RATE BY RACE/ETHNICITY

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Rate per 100,000</th>
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<tr>
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<td>Native American Indian/Alaska Native</td>
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</tr>
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</table>

Source: CDC, 2018.

### PROSTATE CANCER RATE BY AGE

<table>
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<th>Rate per 100,000</th>
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<td>377.6</td>
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<tr>
<td>85+</td>
<td>326.8</td>
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</tbody>
</table>

Source: CDC, 2018.

**Prostate Cancer Mortality**

Death rates from prostate cancer have gone from a high of 39.3% in 1991 to a low of 18.9% in 2015 (NCI, 2018a). The marked decline in U.S. prostate cancer mortality rates are due to the impact of PSA screening. Such screening is responsible for about 80% of the decline in distant and/or advanced-stage diagnoses (Downer et al., 2017).

Death rates are higher in black men, men who have advanced-stage cancer, and men who are between the ages of 75 and 84. The median age at death is 80. Prostate cancer is the sixth leading
cause of cancer death in the United States and the second leading cause of cancer death in American men, second only to lung cancer. About 1 man in 40 will die of prostate cancer (ACS, 2018a).

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Deaths per 100,000</th>
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<tbody>
<tr>
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<tr>
<td>White</td>
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<td>Black</td>
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<td>Asian/Pacific Islander</td>
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<td>Hispanic</td>
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<tr>
<td>Non-Hispanic</td>
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Source: NCI, 2018a.

<table>
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<tr>
<th>Age in Years</th>
<th>Percent of Deaths</th>
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<td>75–84</td>
<td>34.0</td>
</tr>
<tr>
<td>85+</td>
<td>33.5</td>
</tr>
</tbody>
</table>

Source: NCI, 2018a.

Prostate Cancer Survival Rates

Relative survival rates are used when discussing a person’s prognosis. Relative survival rates compare men with prostate cancer to men in the overall population. A 90% relative survival rate means that men who have that cancer are, on average, about 90% as likely as men who do not have that cancer to live for at least 5 years after being diagnosed.

Current relative survival rates for all stages of prostate cancer are:

- 5 years: 99%
- 10 years: 98%
• 15 years: 96%

The **5-year survival rates** based on stages of prostate cancer are:

- Local (confined to the prostate only): Nearly 100%
- Regional (cancer has spread from the prostate to nearby areas): Nearly 100%
- Distant (cancer has spread to distant lymph nodes, bones, or other organs): About 29% (ACS, 2018a)

The disease statistics suggest that prostate cancers are slow-growing tumors. Overall, the timespan between the median age of diagnosis (66 years) and the median age of death (80 years) suggests that, even among cases that directly cause death, the cancer tends to be a slowly progressing disease that takes more than 10 years to become fatal.

**ANATOMY, PHYSIOLOGY, AND GROWTH OF THE PROSTATE GLAND**

The prostate gland is the largest accessory gland of the male reproductive system. Its function is to secrete a thin, slightly alkaline fluid that forms a portion of the seminal fluid. The prostate is a dense, muscular, secretory organ the size and shape of a horse chestnut (about 1.5 inches) that lies behind the pubic symphysis and in front of the rectum.

**Anatomy**

The prostate surrounds the first segment of the urethra and sits between the base of the bladder and the urogenital diaphragm of the pelvic floor. The portion of the prostate against the bladder is called the **base**. The other end is called the **apex**, and this end follows the urethra, tapering toward the pelvic floor.
Functionally, the prostate lies along the line of travel for sperm, which leave the testes, pass through the deferens ducts, and are ejected through the urethra of the penis. Each deferens duct enters the base of the prostate laterally near the bladder. Before entering the prostate, the ducts of the neighboring seminal vesicles merge with the deferens ducts to form the ejaculatory ducts. These combined ducts open into the prostatic urethra as longitudinal slits on either side of the midline.

More distally, although still inside the prostatic segment of the urethra, a number of smaller ducts empty into the urethra and carry the secretions from the glands that are a part of the prostate.

The bulk of the prostate is found behind and on both sides of the urethra. The prostate consists of approximately 70% glandular tissue and 30% fibromuscular stroma. The front, or anterior, segment of the prostate is filled with transverse muscle forming a meshwork that supports the glandular tissue. The muscle is continuous with the urethral sphincter underneath. The back, or posterior, surface of the prostate is just in front of the rectum. This surface has two lateral bulges separated by a furrow, and these external landmarks and the consistency of the prostate can be palpated through the anterior wall of the rectum on digital rectal exam.

The prostate gland is enclosed by a capsule composed of collagen, elastin, and large amounts of smooth muscle (Muruve, 2017).
INTERNAL DIVISIONS

The prostate is divided into four regions:

- Central zone (CZ): 5%–8%
- Transition (or transitional) zone (TZ): 20%
- Peripheral zone (PZ): 75%
- Anterior fibromuscular stroma

Most prostate cancers are multifocal, with synchronous involvement of multiple zones of the prostate (Chodak, 2018).

Central Zone

The middle tissue of the prostate is called the central zone. This zone is shaped like an indented cone. The central zone surrounds the ejaculatory ducts as they run behind the transitional zone and empty into the urethra. Normally, the central zone makes up 25% of the prostate. Very few prostate cancers begin here (less than 5%), and these are thought to be more aggressive and more likely to invade the seminal vesicles.

Transition Zone

The innermost core of prostate tissue is called the transition zone. This small, spherical region surrounds the urethra as it enters the prostate gland just proximal to the entry of the ejaculatory ducts. The gland is small in young adults but grows throughout life, taking up a bigger percentage of the gland. The transition zone normally accounts for up to 10% of the prostatic glandular tissue. In benign prostatic hypertrophy (BPH) (see below under “Growth of the Prostate”), the transition zone expands and often impinges on the urethra or the base of the bladder. Approximately 20% of prostate cancers begin in the transition zone (Muruve, 2017).
**Peripheral Zone**

The outermost tissue of the prostate, called the *peripheral zone*, constitutes the majority of prostatic glandular tissue (70%). The largest area of the peripheral zone is at the back of the gland, closest to the rectal wall, and encloses the transition and central zones. It can be palpated on digital rectal exam. The peripheral zone tapers along the urethra and ends by merging with the surface of the external urethral sphincter. Seventy to 80% of all prostate cancers begin in the peripheral zone (Muruve, 2017).

**Anterior Fibromuscular Stroma**

The anterior fibromuscular stroma is a thickened area of tissue that surrounds the apex of the prostate. It is made of smooth muscle fibers as well as fibroblasts, blood vessels, nerves, and immune components. This area of the prostate does not contain any glands. Prostate cancer is rarely found in this part of the prostate.

**BLOOD VESSELS AND NERVES**

Blood is supplied to the prostate mainly from a branch of the internal iliac artery. Most of the lymph nodes that drain the prostate are found along the internal iliac blood vessels and the neighboring obturator muscles.

The prostate is innervated by both sympathetic and parasympathetic autonomic axons. These axons come from the prostatic plexus, a collection of autonomic nerves and neurons that are trunks of the superior hypogastric plexus, a meshwork of nerves that lies anterior to the bifurcation of the aorta. The smooth muscle of the prostate gland is innervated by sympathetic fibers.

The prostate is flanked by the two neurovascular bundles that travel through the pelvic floor toward the penis, supplying it with nerve fibers and blood vessels for the corpora cavernosa, and their integrity is crucial for normal erection to occur.

The prostatic glands are packed in a fibrous mesh that contains a significant amount of smooth muscle. Approximately one third of the prostate is muscle, and during ejaculation the prostate contracts, squeezing its glandular secretions into the urethra. During urination, the central zone muscles close the ejaculatory ducts so that urine cannot enter, and during ejaculation the prostate muscles and the bladder’s sphincter muscle close the urethra to prevent semen from entering the bladder (Muruve, 2017).

**A “TABOO” TOPIC**

Sexuality, like death, is often a taboo subject, hidden from everyday social exchange because it involves complicated questions of morality and generates feelings of discomfort. Because of barriers to open discussion, most men and the public in general have limited knowledge of the anatomy and physiology of the male reproductive system, the prostate gland itself, and the diseases that can develop.
Physiology

The prostate’s main function is secretory. In the prostate, clusters of secretory cells produce a thin, milky fluid rich in citric acid and acid phosphatase. Approximately 30% of the seminal fluid consists of this prostatic secretion, which is added to the seminal fluid at the time of ejaculation through ducts that open into the urethra. Ejaculation is the process by which the spermatozoa mixed with the seminal fluid are ejected from the penile urethra (Gunasekaran & Pandiyan, 2017).

PRODUCTION OF SEMINAL FLUID

Seminal fluid is produced in a number of glands along the male reproductive tract and is composed of citrate (citric acid), enzymes, and zinc. The seminal vesicles contribute a fluid that makes the semen slightly basic (pH greater than 7). The bulbourethral (Cowper’s) glands secrete a thick, salty fluid that helps neutralize the acidity of the urine residue and lubricates the tip of the penis in preparation for coitus. The prostate secretion contains citric acid, the enzyme fibrinolysin (liquefies the semen), acid phosphatase, and a number of other enzymes and lipids.

Prostate-specific antigen (PSA) is a protease enzyme made in the prostate’s epithelial cells. PSA is added to seminal fluid, where it helps to liquefy the ejaculate, which on its own would form a gel. In the process of producing seminal fluid, some prostate proteins, including PSA, leak into the blood stream. The amount of PSA leaking into the blood rises with increased prostatic growth, either benign or malignant, and with injury to the prostate (Hill, 2018).

GROWTH OF THE PROSTATE

The prepubertal prostate begins to change into the adult phenotype with the beginning of puberty. During puberty, the prostate grows rapidly. When it reaches its adult size of approximately 20 grams (by age 25 to 30), the normal prostate then maintains a balance of cell growth and cell death, in which the scales are tipped slightly in favor of growth.

Over the years, most men have a gradual increase in their total number of prostate cells. This increase is a condition known as benign prostatic hyperplasia (BPH) or hypertrophy. Eventually, as men reach their 60s, the slowly enlarging prostate often impinges sufficiently on the urethra and the bladder to give urinary symptoms.

The single most significant stimulant for prostate growth, differentiation, and maintenance is the sex hormone dihydrotestosterone (DHT), an androgen that the prostate produces from testosterone that has been circulating in the bloodstream. Testosterone is made by the Leydig cells in the testes, and the signals to make testosterone come from the pituitary. Requests to manufacture more testosterone are relayed from the pituitary by the luteinizing hormone.

Dihydrotestosterone is the quintessential male hormone. It plays a critical role in prostate growth and is the key stimulant of the growth of facial hair, acne, and male pattern baldness. To produce dihydrotestosterone, testosterone is modified by an intracellular enzyme called 5-alpha reductase, found mainly in the prostate, skin, and liver (Berman et al., 2016).
PATHOGENESIS OF PROSTATE CANCER

Cancer is caused by mutations that “turn on” genes that help cells grow and divide (oncogenes) or “turn off” genes that slow down cell division or cause cells to die at the right time (tumor suppressor genes). These DNA changes can be either inherited from a parent or can be acquired during the person’s lifetime. Prostate cancer is caused by such changes in the DNA of a prostatic cell.

The normal cells of the prostate gland accumulate zinc and produce citrate. One of zinc’s important roles is to change the metabolism of the cell in order to produce citrate, an important part of the seminal fluid. The process of accumulating zinc and producing citrate is energy inefficient, and prostate cells sacrifice large amounts of energy in order to do so. Prostate cancer cells, however, are generally devoid of zinc. This allows these cancer cells to save energy by not making citrate, and this new abundance of energy is used to grow and spread. The absence of zinc in these cancer cells is believed to occur through silencing of the gene that produces a transporter protein known as IP1. The cause of this epigenetic silencing is unknown.

In addition, runt-related transcription factor 2 (RUNX2), a bone-specific transcriptional regulator, is abnormally expressed in some prostate cancer cells and prevents the cancer cells from undergoing apoptosis (programmed cell death), thus contributing to the progressive development of prostate cancer.

Alterations in function of the androgen receptors also help prostate cancer cells to survive, and the protein prostate-specific membrane antigen (PSMA) stimulates the development of prostate cancer by increasing folate levels for cancer cells to use to survive and grow.

Prostate cancer is classified as an adenocarcinoma (glandular cancer) that begins when normal prostate gland cells mutate into cancer cells. It is the most predominant malignant lesion of the prostate gland, comprising over 95% of prostate malignancies. Prostate adenocarcinoma develops quietly, and by the time it is discovered, it usually can be found at more than one site in the prostate.

Prostate Cancer Metastasis

Initially, prostate cancer cells remain confined to the prostate gland, but over time these cancer cells begin to multiply and spread to the surrounding prostatic tissue, forming a tumor. Eventually the tumor may grow big enough to invade nearby structures such as the seminal vesicles or the rectum (Mustafa et al., 2016).

Cancer cells then may break away from the original tumor and move through the walls of nearby lymph or blood vessels, where they may be transported through the body. The cells reach capillaries at some distant location, invade the blood vessel walls, and move into the surrounding tissue. Here they multiply and grow new blood vessels to bring nutrients to the new tumor. This process is referred to as metastasis.
Prostate cancer prefers to grow in specific areas. Metastasis of prostate cancer usually shows up first in the lymph nodes, most commonly in the true pelvis, which is below and behind the pelvic brim. Other preferred metastatic sites are the lumbar spine, hips, pelvis, and ribs. It is also common for prostate cancer to spread to the liver and lungs, but it is rare for it to move to other organs, such as the brain.

It has been found that 79% of prostate cancer cases are localized; in 12%, the cancer has spread to regional lymph nodes; and 5% have distant metastasis. Ninety percent of patients with distant metastasis have bone involvement and 26% have lung metastasis. Almost all cases with lung metastasis have bone involvement as well (Terris, 2018; Martin, 2017; Seikkula, 2017).

**Comparing Prostate Cancer and Benign Prostatic Hyperplasia (BPH)**

The most common condition from which prostate cancer must be distinguished is benign prostatic hyperplasia. Both BPH and prostate cancer are prostatic diseases of the older male. Although the two conditions are distinct, it is important to remember that men diagnosed with BPH can also have prostate cancer and men diagnosed with prostate cancer often have BPH (Smith, 2018a).

BPH (also called nodular prostatic hyperplasia, benign prostatic hypertrophy, and enlarged prostate) is a slowly progressing, noncancerous condition that causes enlargement of the prostate. BPH begins to develop before age 30 with almost 10% of men having histologic evidence of it by 40 years of age and 50% of men showing evidence by age 60. Overall, nearly 80% of men will develop BPH and as many as 30% will receive treatment for it (AUA, 2018a).

BPH develops primarily in the transitional zone of the prostate, with a fourfold increase in stromal tissue and a twofold increase in glandular components.

Although testosterone, dihydrotestosterone, and estrogen may be involved, these hormones alone are not sufficient to cause BPH. It has also been suggested that BPH occurs as a result of prostatic tissue reverting to an embryonic-like state in which it is unusually sensitive to various growth factors. At this time, the pathogenesis of BPH remains incompletely understood (Cunningham & Kadmon, 2018).
Benign prostatic hyperplasia (BPH). (Source: National Cancer Institute.)

BPH can cause obstructive and irritative lower urinary tract problems, such as:

- Frequent or urgent need to urinate
- Nocturia
- Difficulty starting urination
- Weak, interrupted, or hesitant stream of urine
- Dribbling or leaking of urine
- Incomplete emptying of the bladder
- Urinary tract infections
- Urinary retention
- Hematuria
  (Mayo Clinic, 2018a)

**Early Prostate Abnormalities**

One early abnormality seen in the prostate is a new growth called *prostatic intraepithelial neoplasia (PIN)*. In PIN, the prostatic glands have normal architecture but the cells appear abnormal. PIN can occur in various areas of the prostate but is most often found in the peripheral zone, where cancer is prone to develop. Mild or low-grade PIN does not seem to foreshadow cancer. The possible link between low-grade PIN and prostate cancer remains unclear. On the other hand, severe or high-grade PIN is considered a precancerous condition.

There are no diagnostic tests specific for PIN. There is, however, a strong association between the presence of high-grade PIN on prostate biopsy and the presence of prostate adenocarcinoma. It is usually found following biopsy for suspected prostate cancer (Yang, 2017; Samadi, 2016).
Another abnormality seen in the prostate is **proliferative inflammatory atrophy (PIA)**. Recent studies have identified an association between inflammation and the development of prostate cancer. Changes have been reported in the morphology of epithelial cells associated with chronic inflammation. These cells appear smaller than normal, exhibit an imbalance between proliferation and apoptosis, and show signs of oxidative stress. PIA is commonly seen in close proximity to premalignant and malignant tissue, suggesting that PIA may represent a precursor to prostate cancer. Further studies are to be done to investigate the possible targeting of these cells to prevent the initiation and progression of aggressive prostate cancer (Crowell & Goldstein, 2017).

**Atypical small acinar proliferation (ASAP)** is a descriptive diagnostic term used for the finding on prostate biopsy of a small focus of atypical glands (most often two to three glands, sometimes more) that are suspicious for adenocarcinoma but for which there is an absence of sufficient histological evidence to make a definite diagnosis (Yang, 2017).

### Types of Prostate Cancers

Prostate cancers are identified by the types of cells from which they originate. Prostate cancers occasionally originate from cell types other than secretory and in prostatic zones other than the peripheral.

- **Acinar adenocarcinoma** (glandular) develops in the gland cells that line the prostate gland. It is the most common prostate cancer, and nearly everyone with prostate cancer has this type.

- **Prostatic ductal adenocarcinoma (PDA)** starts in the cells that line the ducts (tubes) of the prostate gland. These cancers tend to grow and spread more quickly than acinar adenocarcinomas. PDA is rare and mainly occurs in older men between 63 and 74, however, PDA is also found among men whose age ranges from 41 to 89 years. The tumors are predominantly located in the periurethral zone of the prostate but can also be found in the peripheral zone. PDA is less likely to be identified by digital rectal examination or PSA testing, which may result in a delayed or missed diagnosis.

- **Transitional cell (or urothelial) cancer** starts in the cells that line the urethra. This type of cancer usually starts in the bladder and spreads into the prostate. Rarely, it starts in the prostate and spreads into the bladder entrance and nearby tissues. This type of prostate cancer is associated with a poor prognosis.

- **Squamous cell carcinoma** develops from flat cells that cover the prostate. It is a unique and rare form of prostate cancer accounting for less than 0.5% to 1% of all prostate cancers. It is considered quite aggressive, with an average survival of 14 months. These cancers tend to grow and spread more quickly than adenocarcinoma of the prostate.

- **Small cell prostate cancer** is a high-grade malignancy made up of small, round cells with neuroendocrine differentiation. This type of cancer is rare, and like squamous cell carcinoma, accounts for fewer than 1% of all prostate cancers. The prognosis of prostatic small cell carcinoma is poor, with a median survival of less than one year.

(Liu et al., 2016; Biswas et al., 2015; Wagner, 2017)
RISK FACTORS AND PREVENTION

Because the detailed progression from initial trigger to clinical disease appears to involve a varying number of factors, the potential contributing agents are often called risk factors rather than causes. For some of these factors, the link to prostate cancer is not yet clear.

Risk Factors

AGE

The greatest risk factor for developing prostate cancer is age. The older a man is, the higher the chance of being diagnosed with prostate cancer. Prostate cancer is rare in men under age 40 but rapidly increases after age 40 in black men and men who have a close relative with prostate cancer and after age 50 in white men who have no family history of the disease. About 6 in 10 cases are diagnosed in men over the age of 65. The older the man, especially those over 70 years of age, the less aggressive the disease usually behaves (ACS, 2018a).

RACE/ETHNICITY

Prostate cancer occurs more often in African American men and in Caribbean men of African ancestry than in men of other races. When African American men are diagnosed with prostate cancer, it is more likely to be advanced, and they are more than twice as likely to die from it as white men. The cancer occurs less often in Asian American and Hispanic/Latino men than in non-Hispanic whites. However, Japanese and African males living in their native countries have a low incidence of prostate cancer. Rates for these groups increase sharply when they immigrate into the United States. The reason for this is not yet known (ACS, 2018a; Robinson, 2017).

FAMILY HISTORY

Most prostate cancers occur in men without a family history of it; however, having a father or brother with the disease more than doubles the risk. Having a brother with prostate cancer is a higher risk than having a father with the disease. The rate is higher for men who have several affected relatives, particularly if they were young when diagnosed. It is estimated that the hereditary form of prostate cancer accounts for just 5% to 10% of all cases (ACS, 2018a; Robinson, 2017).

GENE CHANGES

There are several inherited DNA changes in some genes that appear to increase the risk for prostate cancer, but they account for only a small number of cases overall (5% to 10%).

- Inherited mutations of the BRCA1 or BRCA2 genes raise the risk of breast and ovarian cancer in some families. Mutations in these genes may also increase prostate cancer risk in some men.
• Men with Lynch syndrome (hereditary nonpolyposis colorectal cancer [HNPCC], a condition caused by inherited gene changes) have increased risk for a number of other cancers, including prostate.

Some genes increase mutational rates and others may predispose a man to infection or viral infections that can lead to prostate cancer (ACS, 2018a).

**GEOGRAPHY**

Prostate cancer is most common in North America, northwestern Europe, Australia, and the Caribbean Islands. It is less common in Asia, Africa, Central America, and South America. More intensive screening in some developed countries probably accounts for at least part of this difference, but other factors such as lifestyle differences are likely to be important (ACS, 2018a).

**OXIDANT DAMAGE**

Oxidants are chemicals that injure DNA and cause mutations. Recent evidence suggests that oxidative stress can play a role in the pathogenesis and progression of prostate cancer. Oxidative stress occurs when the balance between the production of pro-oxidant molecules, as reactive oxygen species (ROS), and their neutralization by detoxifying systems is lost.

Normally, the body defends against damage from oxidants through a collection of mechanisms. The protective mechanisms include antioxidant enzymes, DNA repair enzymes, and the triggered suicide (apoptosis) of cells with excessively damaged DNA. Genetic or acquired defects in these protective mechanisms are likely to be risk factors for prostate cancer (Ruscica et al., 2018).

**OBESITY**

Obesity is a factor that is less clearly linked to prostate cancer. Some studies have found obese men to have a lower risk of developing low-grade or a less dangerous form of prostate cancer but a higher risk of developing more aggressive cancer. The reasons for this are unclear, but it is known that obesity affects epigenetic processes, one of which is chromatin remodeling, a major mechanism involving gene expression regulation. Obese men may also have a relatively lower PSA level than nonobese men due to dilution of the PSA in a larger blood volume (ASC, 2018a).

**DIET**

A recent study completed in animals has revealed a molecular link between a high-fat diet and the growth and spread of prostate cancer. This study is significant because it details specific molecular changes that are induced by a high-fat diet and shows the impact on prostate cancer metastasis. It is well known that the disease is more common in countries where meat and dairy products are dietary staples compared to countries where the basic diet consists of rice, soybean products, and vegetables (Robinson, 2017; NCI, 2018b).
Prevention

Prostate cancer is a disease of older men, and it appears that the disease typically takes decades to develop. At this date, there is no sure way to prevent prostate cancer. Many studies that have been conducted conflict with one another, and most studies are not designed to provide definitive proof that something prevents prostate cancer.

Because many studies are still underway, however, there are some lifestyle factors to consider that are known to have overall health benefits. These may include:

- Low-fat (especially low-animal-fat) diet
- Diet high in vegetables (especially broccoli-family vegetables), fruits, and legumes
- Not smoking. (While smoking has not been linked to low-risk prostate cancer, it affects prostate cancer cells directly, resulting in aggressive tumor behavior.)
- Being physically active
  (ACS, 2018a)

Currently, no study has proven that diet and nutrition can directly cause or prevent the development of prostate cancers. However, a recent study has found that following a Mediterranean dietary pattern is associated with a lower risk of aggressive prostate cancer (Castelló et al., 2018).

Some medications have been studied to see if they may help to reduce prostate cancer risk. Chemoprevention with the 5-alpha reductase inhibitors finasteride (Proscar) and dutasteride (Advodart) have been found to reduce the incidence of prostate cancer, but evidence is not adequate for determining whether they reduce mortality from prostate cancer (NCI, 2018c).

Another study, the Selenium and Vitamin E Cancer Prevention Trial, compared four groups—a placebo group, a vitamin E group, a selenium plus vitamin E group, and a selenium group. The study showed no reduction in prostate cancer prevalence, but compared with the placebo group, there was a statistically significant increase in prostate cancer only in men who were in the vitamin E group. The increase in prostate cancer risk with vitamin E alone was 17% (NCI, 2018c).

MASCULINITY AND HEALTHCARE SEEKING

Many men tend to seek healthcare only when they are in crisis situations. They often see themselves as strong and healthy and doctor visits as a waste of time and money. Several studies confirm that men, compared to women, often fail to secure a primary source of care, obtain preventive screenings, and get timely medical interventions. This includes both physical and emotional issues. Experts say this is learned behavior and that barriers to men’s health help-seeking are socially determined.
Masculinity norms or shared cultural expectations about male behavior have a profound influence on men’s identities and delays in seeking healthcare. These norms, according to theory, encourage men to avoid seeking help, to display emotional stoicism or toughness, to be able to cope autonomously, and to maintain a high sense of control even when faced with negative life experiences. The primary reason for such avoidance is that events, symptoms, or external cues signaling healthcare needs threaten masculine identity, diminish the sense of control, and increase a man’s need to engage in behavior that is designed to restore control (Powell et al., 2016).

Studies examining the role of masculinity in exacerbating poor health and encumbering doctor-patient communication have found that:

- Masculinity and gender bias independently influence preference for male providers. Men who score high in measures of masculinity prefer male doctors, partly because they believe male doctors are more competent than female doctors.

- Masculinity encumbers the reporting of symptoms to male providers. In a study men who had a male provider reported health symptoms at a lower rate than those who reported symptoms to female providers; however, men still underreported the frequency of their symptoms, but to a lesser extent.

- Men endorsing masculinity beliefs tend to delay preventative care, and when they do go to the doctor, they prefer males even though they may feel more comfortable with females.

Such care avoidance and poor doctor-provider communication can negatively impact a man’s health. If they are not open with their providers about their symptoms, men may not receive adequate treatment. If they do not seek preventive care, they can miss early indications of serious health problems (Himmelstein & Sanchez, 2016).

Although there are many healthcare facilities geared toward women and children, there are few that are directed toward men. While men give multiple reasons for avoiding healthcare visits, one important barrier is that they are uncomfortable in healthcare settings. Attempts to overcome this barrier can be made by creating environments where men can feel comfortable. To aid in this process, some facilities are utilizing interior designers to create more masculine milieus.

**SIGNS AND SYMPTOMS OF PROSTATE CANCER**

There are no warning signs or symptoms of early prostate cancer, and not everyone experiences symptoms of prostate cancer. Most adenocarcinomas develop in the peripheral zone of the prostate, where they initially cause no symptoms. Many times, signs of prostate cancer are first detected by a primary care provider on rectal exam during routine check-up or following PSA screening.
The growth of the cancer and infiltration into local areas are directly responsible for most symptoms of prostate cancer, including:

- Difficulty starting urination
- A urine stream that starts and stops
- A weak urine stream
- The need to urinate frequently, especially at night
- Obstruction of ureters, leading to renal failure
- Blood in the semen due to local growth in and around the ejaculatory ducts
- Impotence resulting from local spread to nearby neurovascular bundles
- Pain or burning during urination
- Painful ejaculation

As the cancer begins to metastasize, a man may experience:

- Dull, incessant deep pain or stiffness in the pelvis, lower back, ribs, upper thighs, shoulders, or other bones
- Edema in the legs or feet
- Loss of weight and appetite
- Pain in the abdomen
- Discomfort or pain when sitting related to enlarged prostate
- Fatigue
- Nausea or vomiting
- Change in bowel habits
- Weakness or paralysis in the lower limbs

(ASCO, 2018a)

**CASE**

George Murray is 64 years old and has been retired for two years. He and his wife have been married for 32 years and have three grown children. George has been in excellent health all his life and has avoided seeing a physician for anything other than acute conditions despite the urging of his wife and family for him to have yearly check-ups.

For the past three years, George has had problems with frequent urination during the night and has noted difficulty starting his stream. He has heard about the changes in the prostate as you
age and attributes his problem to the condition he says “every man gets when they’re old.” Over the next year, he notes a problem maintaining an erection and attributes that likewise to the “old man’s problem.”

Several months ago, when he and his wife engaged in sexual intercourse, he experienced pain when he ejaculated. This, too, he attributed to the “old man’s problem,” and so he didn’t become too concerned or mention it to his wife. He continued to experience pain on the few subsequent occasions in which he engaged in sexual activity.

Two months ago, when he went to the bathroom, his urine appeared rusty colored and he had some discomfort voiding. He told his wife he probably had a bladder infection and would go to the walk-in clinic that afternoon for treatment. But when he voided the next time, there was no discomfort and no blood, and he never made it to the clinic, dismissing the incident as well as several others that occurred thereafter.

George did not seek medical attention until he began having pain in his right hip that was unrelieved by OTC analgesics. He made an appointment to see a physician for the complaint of “arthritis in my hip.” He was ultimately diagnosed with advanced metastatic prostate cancer.

SCREENING FOR PROSTATE CANCER

Screening is done to detect potential disease indicators; however, there is controversy about the effectiveness of screening methods. The two most common methods for prostate cancer screening are the digital rectal examination (DRE) and prostate-specific antigen (PSA) test.

Digital Rectal Examination

In the past, approximately one third of prostate cancers were found with metastases, one third due to advanced clinical stage, and only one third locally confined. Today, most patients are asymptomatic at time of diagnosis and do not have a palpable tumor on digital rectal exam (Naji et al, 2018).

In urology, the DRE is recognized as an imperfect clinical tool with poor reliability regardless of the practitioner’s experience. This may be due partly to the lack of a universal definition for an abnormal DRE. It has been stipulated that screening tests should be supported by scientific evidence and that benefits outweigh harms; the DRE does not meet these criteria. Although DRE has long been used, no controlled studies have been done to show a reduction in morbidity or mortality of prostate cancer when detected by DRE at any age. Evidence does suggest, however, that DRE may result in a high number of false positives that lead to unnecessary invasive diagnostics often resulting in significantly poor outcomes.

Data currently indicates that the DRE should be abandoned in common clinical practice, and the American Urological Association states that there is no evidence that DRE is beneficial and that it should not be used in primary screening. However, it may potentially be useful for secondary
testing in men referred for an elevated PSA (Naji et al, 2018; Cui et al, 2016; Hoffman, 2018; AUA, 2018b).

The limitations of DRE include the fact that, while it can detect palpable abnormalities such as nodules, asymmetry, or induration (hardening) in the posterior and lateral aspects of the prostate where most prostate cancers arise, other areas of the prostate where cancer occurs cannot be reached by finger examination. In addition, the majority of cancers detected by DRE alone are clinically or pathologically advanced. The earliest-stage prostate cancers are nonpalpable and cannot be seen with imaging (Hoffman, 2018).

In men with a normal PSA level, the DRE rarely is of benefit in diagnosing clinically significant prostate cancer. It is an invasive, uncomfortable examination, and studies have shown that men fear physical discomfort and embarrassment. Such fear is believed to create an atmosphere of humiliation and vulnerability and has been found to predict the frequency of DRE performance (Lowry 2016; Cui, 2016).

Ultimately, experts state that it is important for men to talk over potential risks and benefits of prostate screening, including DRE, with their provider before making a decision.

**DIGITAL RECTAL EXAM TECHNIQUE**

For men who elect to undergo DRE screening, it is important prior to the exam that an explanation of the procedure be given, as it can be a very traumatic experience for some.

The patient can be in a lithotomy position, a knee-chest position, a left lateral prone position, or standing and bent prone over an exam table. The forefinger of the examiner’s gloved hand is lubricated, and the pad of the lubricated finger is placed on the anal opening and pressed forward gently until the anal sphincter relaxes.

![Digital rectal examination (DRE). (Source: National Cancer Institute.)](image)
The finger is eased into the anal canal, facing forward. The posterior surface of the prostate can be palpated past the anal canal. It is firm and rounded. Usually, there is a lateral bulge on either side of a midline, top-to-bottom furrow. During the exam, the patient will feel a pressure from the finger against the gland and a sensation of needing to urinate. The exam may be painful if the gland is swollen or irritated.

Prostate-Specific Antigen (PSA) Test

PSA is a substance made by prostate cells and released into the semen following ejaculation. Most of the PSA produced by the prostate gland leaves the body in the semen, but a very small amount escapes into the bloodstream and is normally found in low amounts in the blood. PSA can exist in the blood by itself (free PSA) or it can be found bound to other substances. Total PSA is the sum of the free and bound forms. The total PSA is what is measured with the standard PSA test.

The normal serum PSA concentration has not been established, but for most laboratory readings it should be less than 4.0 nanograms per milliliter (ng/mL). What is considered normal also depends on the individual’s ethnicity and family history of prostate cancer. The use of age-specific PSA ranges for the detection of prostate cancer is helpful due to the age-related normal growth of the prostate, thus avoiding unnecessary investigations in older males with larger prostates.

| AGE- AND ETHNICITY-SPECIFIC REFERENCE RANGES FOR SERUM PSA (measured in ng/mL) |
|-------------------------------|-------------------|-------------------|-------------------|
| Age Range (years) | 40–49 | 50–59 | 60–69 | 70–79 |
| Asian | 0–2.0 | 0–3.0 | 0–4.0 | 0–5.0 |
| Black | 0–2.0 | 0–4.0 | 0–4.5 | 0–5.5 |
| White | 0–2.5 | 0–3.5 | 0–4.5 | 0–6.5 |

Because the PSA test is specific to prostate tissue and not to cancer, PSA can be elevated in the presence of any prostate or urinary diseases, injuries, or normal functioning. These can include:

- Benign prostatic hyperplasia
- Prostatitis
- Urinary tract infection
- Ejaculation up to two days prior to the test
- Digital rectal examination
- Medical instrumentation such as cystoscopy
• Urinary retention
• Foley catheter placement
• Prostate biopsy
• Vigorous exercise including bicycle riding

Several factors can also cause the PSA to go down even if cancer is present:

• 5-alpha reductase inhibitors used to treated BPH or urinary symptoms
  o Proscar or Propecia (finasteride)
  o Avodart (dutasteride)
• Herbal mixtures (but not saw palmetto)
• Obesity
• Aspirin taken regularly (may be greater in nonsmokers)
• Statins
  o Lipitor (atorvastatin)
  o Crestor (rosuvastatin)
  o Zocor (simvastatin)
• Thiazide diuretics taken for years
  o Hydrochlorothiazide (HCTZ)
(ACS, 2016a)

Advances in PSA testing have been explored that may help in the interpretation of an elevated PSA level and the decision-making process for determining the need for prostate biopsy. However, in clinical practice the use of these techniques is not consistent and remains debated. These include:

• PSA density
• PSA velocity
• Free versus complex or bound PSA
(Freedland, 2017)

The IsoPSA assay is a blood test based on the fact that proteins produced by cancer cells have different 3D structures or isoforms than the same proteins produced by normal cells. The IsoPSA measures all the different molecular isoforms in serum PSA. This test has been proven more accurate in predicting overall risk of prostate cancer than standard PSA testing. Study results show that more than 40% of biopsies could have been avoided, suggesting that the use of IsoPSA
may substantially reduce the need for biopsy and may therefore lower the likelihood of over-detection and overtreatment of nonlethal prostate cancer (Cleveland Clinic, 2018).

**PSA SCREENING CONTROVERSY**

Controversy regarding PSA screening has led to a review of the available evidence on the use of PSA testing to screen for cancer. This review found that 17.8% of patients received a false-positive result. Complications that required hospitalization occurred in 0.5% to 1.6% of men who underwent biopsy after an abnormal screening result. It was calculated that, overall, from 20.7% to 50.4% of screen-detected cancers were overdiagnosed. In addition, treatment was associated with an increased risk for complications, such as erectile dysfunction, urinary incontinence, and bowel symptoms when compared to conservative management.

It was found, however, that there was “adequate evidence” that in men between 55 and 69 years of age, PSA-based screening may prevent 1.3 deaths from prostate cancer for 1,000 men screened over approximately 13 years. Additionally, it was estimated that PSA screening may prevent approximately three metastatic prostate cancer cases per 1,000 men screened (Davenport, 2018).

**PSA SCREENING RECOMMENDATIONS**

In 2018 the United States Preventive Services Task Force (USPSTF) made the following recommendations for screening using PSA testing:

For men aged 55 to 69 years, the decision to undergo periodic prostate-specific antigen (PSA)–based screening for prostate cancer should be an individual one. Before deciding whether to be screened, men should have an opportunity to discuss the potential benefits and harms of screening with their clinician and to incorporate their values and preferences in the decision. Screening offers a small potential benefit of reducing the chance of death from prostate cancer in some men. However, many men will experience potential harms of screening, including false-positive results that require additional testing and possible prostate biopsy; overdiagnosis and overtreatment; and treatment complications, such as incontinence and erectile dysfunction. In determining whether this service is appropriate in individual cases, patients and clinicians should consider the balance of benefits and harms on the basis of family history, race/ethnicity, comorbid medical conditions, patient values about the benefits and harms of screening and treatment-specific outcomes, and other health needs. Clinicians should not screen men who do not express a preference for screening.

The USPSTF recommends against PSA-based screening for prostate cancer in men 70 years and older.
Other organizations also have guidelines for prostate cancer screening:

- American Cancer Society
- National Comprehensive Cancer Network
- American Urological Association

All organizations’ guidelines agree that PSA-based prostate cancer screening requires an informed, shared decision-making process and that the decision should reflect the patient’s understanding of the possible benefits and risks (Jana, 2017).

### Other Types of Prostate Cancer Screening Tests

#### PCA3 URINE TEST

PCA3 is a urine screening test for detection of prostate cancer that is highly specific and more precise than all other available screening tests for prostate cancer. Urine is collected following a digital rectal examination in which the prostate is massaged, causing the gland to shed whole prostate cells into the urine. The test measures PCA3 mRNA (messenger RNA) as well as PSA mRNA and determines their ratio. High ratios have been shown to be an indication of prostate cancer.

The test is not 100% accurate, however. PCA3 may eventually play a role in reducing prostate biopsies, but more clinical outcome data are needed. The U.S. Food and Drug Administration has approved the test for helping in determining whether a repeat prostate biopsy should be done in men 50 years and older who have had one or more previous negative biopsies (Hoffman, 2018).

#### Mi-PROSTATE SCORE (MiPS) TEST

The MiPS is a validated early detection test for prostate cancer developed at the University of Michigan that has been commercially available since 2013. This test improves the accuracy of PSA testing by combining the amount of serum PSA with the amounts of two genes found in the urine. Gene fusion (TMPRSS2:ERG) is believed to cause cancer, and studies done on prostate tissue show that this RNA fragment always indicates the presence of cancer. The test measures the levels of this genetic fragment and another genetic marker (PCA3) in urine that are detectable at high levels in men who have prostate cancer.

The combination of urinary PCA3 and T2:ERG in a test panel for prostate cancer has been shown to reduce the use of prostate biopsy by 51% among men referred for prostate biopsy. The MiPS and MiPS HG (high grade) were closely correlated with the presence of any cancer and high-grade cancer, respectively. These findings support its use for determining prostate cancer risk and for guiding biopsy utilization (Russell et al., 2017).
PROSTATE CANCER DIAGNOSTIC STUDIES

Scanning Technologies

Imaging plays an important role in the noninvasive detection, localization, grading, and staging of prostate cancer and in performing biopsies.

TRANSRECTAL ULTRASOUND (TRUS)

TRUS utilizes an ultrasound probe put in the rectum directly against the posterior surface of the prostate to provide a picture of the prostate using sound waves. The images from TRUS accurately show the locations and relative densities of parts of the prostate. Two-dimensional TRUS is most often used for measuring prostate volume. Three-dimensional TRUS can provide additional information about the location and extent of the prostate cancer, but this type of imaging device is not widely available in an office setting.

Enhanced ultrasound techniques include contrast-enhanced Doppler ultrasound and elastosonography. Doppler imaging is used to identify areas of increased vascularity, which can be further augmented using contrast agents. Elastosonography has shown the ability to enhance the resolving power of ultrasounds, and several reports indicate it is capable of identifying foci of cancer, with improved sensitivity for higher-grade cancers.

Most nonpalpable prostate cancers do not show up distinctly in TRUS images. As a result, TRUS is mainly used to visualize the prostate and to aid in guided needle biopsy and is not recommended for routine screening (Benway & Andriole, 2018).

RADIONUCLIDE BONE SCAN

Technetium-99 radionuclide bone scanning is an imaging technology preferred for identifying bone metastases, the most common site of distant prostate cancer spread. It is only recommended for symptomatic patients and asymptomatic men considered to be at increased risk for hidden metastases. Cancer cells take up certain radioactive compounds more avidly than healthy tissues do. This test involves the injection of a radioactive tracer material that emits low levels of radioactivity, which is then detected by a gamma camera.

Men with a positive or questionable bone scan results are usually further evaluated by plain X-rays. If X-ray findings are inconclusive, an MRI or CT scan is performed. A positive radionuclide bone scan confirmed by X-rays or MRI indicates the presence of distance metastases.

An axial skeleton MRI may be more sensitive than radionuclide bone scanning for detecting hidden metastases, but experience is limited thus far and MRI has not replaced the bone scan in initial staging workup for patients with newly diagnosed prostate cancer (Peh, 2018).
POSITRON EMISSION TOMOGRAPHY/COMPUTED TOMOGRAPHY (PET/CT)

PET/CT has recently come out as a promising diagnostic imaging tool for both primary and recurrent prostate cancer. A PET/CT combines both a PET scan and a CT scan in one piece of equipment to reveal information about both the structure and function of cells and tissues in the body during a single imaging session.

During a PET/CT scan, the patient is injected with a glucose solution that contains a very small amount of a radioactive material (a tracer). The substance is absorbed by the particular organs or tissues being examined. PET/CT is useful for prostate cancer because the scan may reveal cancerous cells before any tumor or structural changes are present, which is important for early detection of the disease (Li et al, 2018).

IMMUNOSCINTIGRAPHY

Immunoscintigraphy is a two-step procedure spanning four days that uses a radioactively labeled antibody (ProstaScint) designed specifically to travel throughout the body and bind itself to prostate cancer cells. It is used to detect extraprostatic disease (i.e., localized recurrent or lymphatic spread). A gamma camera is used to detect the antibodies’ locations. When there is a large concentration of antibodies in the same site in the body, it will show up as a “hot spot” of radioactivity.

Because ProstaScint scans often yield false-negative results, it has been combined with CT scanning or single-photon emission CT (SPECT) scanning to pinpoint more precisely where in the body these hot spots are located (Terris, 2018).

MAGNETIC RESONANCE IMAGING (MRI)

MRI increasingly allows visualization of potentially significant prostate cancer and is beneficial in selecting patients for biopsy and identifying lesions appropriate for biopsy. MRI also provides assistance in staging the tumor extent and in monitoring treatment response.

There have been major technical improvements in multiparametric magnetic resonance imaging (mpMRI), which has expanded the role of the MRI in prostate cancer management both prior to and following diagnosis. Biopsies based on mpMRI have detected an increased number of clinically significant prostate cancers and decreased the number of men undergoing biopsy.

The mpMRI provides better images of the prostate and is capable of distinguishing indolent (low-risk) from aggressive disease, allowing for more accurate biopsies. It is effective for identifying patients with low-risk prostate cancer who are appropriate for active surveillance and may also prevent patients with high-grade cancers from choosing active surveillance as well as reassure those who may be hesitant about active surveillance (Tempany et al., 2018). (See also “Active Surveillance” later in this course.)
MAGNETIC RESONANCE IMAGING/ULTRASOUND FUSION

MRI/ultrasound fusion blends real-time imaging from both MRI and ultrasound devices that allows a provider to more accurately direct biopsy needles that sample suspected prostate tumors. This technique detects cancers that can be missed by standard biopsy because it can guide physicians to tumors at normally overlooked regions of the prostate gland.

This technique is part of an approach that includes an MRI scan done initially for men with elevated PSA levels to determine who needs a prostate biopsy, and then use of the MRI/ultrasound fusion technique to obtain the most accurate biopsy possible in the most efficient manner (Benway & Andriole, 2018).

PROSTATE-SPECIFIC MEMBRANE ANTIGEN (PSMA)-PET

PSMA is a transmembrane glycoprotein that is overexpressed in prostate cancer. A potentially new diagnostic standard of reference has emerged for prostate cancer using radiolabeled small molecules that bind to the glycoprotein’s center. The PSMA-PET results in images with extraordinary tumor-to-background contrast. PSMA-PET is effective for imaging disease in the prostate gland, lymph nodes, soft tissue, and bone in a single examination.

PSMA-targeting molecules can show never-before-seen small bits of prostate cancer dispersed throughout the body. When attached to cancer-killing radiopharmaceutical drugs, they can be used to destroy these spots of metastatic cancer. PSMA-PET can pick up prostate cancer better than a bone scan and CT combined. In localized disease, the agent does not show up in all prostate cancer patients, but it does show up in men with higher-grade cancers. Combining PSMA-PET with MRI may also result in even more accurate and predictive scans.

PSMA-PET has not yet been approved by the U.S. FDA; however, it is currently being utilized in diagnostic clinical trials around the country (Hofman et al., 2018; Columbus, 2017).

Biopsies

A prostate biopsy is currently the only way to conclusively diagnose prostate cancer. A biopsy provides microscopic evidence of the presence of cancer in prostate tissue. A pathologist examines biopsy samples under a microscope for cell abnormalities that are a sign of cancer. If cancer cells are present, the pathologist grades them, estimates how aggressive they are, and determines the percentage of cancer in each of the core samples and whether the cancer is on one or both sides of the prostate.

A prostate biopsy is a procedure done by a physician or an advanced urologic nurse practitioner either in the office or in the hospital.

Prostate biopsies can be done via the transrectal or transperineal approach. The transrectal approach is more commonly used for biopsies because of its convenience. However, due to the increase in multidrug resistance of rectal flora, the transperineal approach is being used more often because of its lack of septic complications.
TRANSRECTAL BIOPSY

During an ultrasound-guided transrectal biopsy, an ultrasound probe is inserted into the rectum to obtain images of the prostate, and when the area that samples will be taken from is identified, the patient is given a local anesthetic to numb the area. A needle is then passed through the rectal wall, and samples are obtained using a spring-driven needle core biopsy device. Each sample requires a needle passing through the rectal wall. In most instances, 10 to 12 samples are taken and the procedure is completed in approximately 10 minutes. The patient usually goes home shortly afterward.

Transrectal ultrasound biopsies can also be done under MRI-guidance (see above). MRI-guided biopsies may require 2 to 14 samples, usually take 30 to 90 minutes, and are followed by 45 to 60 minutes of postprocedure monitoring.

TRANSPERINEAL BIOPSY

Transperineal prostate biopsy is more complex and can allow access to areas of the prostate that are more difficult to obtain samples from. Transperineal prostate needle biopsy can be done using ultrasound, CT, or MRI guidance and is usually performed under general anesthesia; however biopsy under local anesthesia has been reported. During transperineal biopsy, several dozen samples may be obtained. Patients who have a transperineal biopsy may need to stay in the hospital for 24 hours postprocedure (Grummet et al., 2017).
BIOPSY RISKS

Transrectal ultrasound-guided biopsy is normally well tolerated and uncomplicated, and the need for hospitalization is mainly due to infection. However, there is a higher complication rate among those patients undergoing transperineal biopsy. For both approaches, complications are directly correlated to the number of needle core samples:

- 12 cores: 31.5%
- 18 cores: 41.8%
- Over 24 cores: 57.4%

(Benway & Andriole, 2018)

Infection is one of the most common complications, including urinary tract infection, prostatitis, epididymitis, orchitis, bacteremia, and sepsis. Occasionally infection may be severe enough to require hospitalization and prolonged antibiotic therapy. The most common cause of infection is multidrug-resistant rectal flora—in particular, fluoroquinolone-resistant *Escherichia coli*. Acute postbiopsy prostatitis is a fairly uncommon but potentially life-threatening complication that demands immediate evaluation and intervention.

Bleeding—hematuria, rectal bleeding, and hematospermia—is common following transrectal biopsy and generally requires no intervention. Most patients experience self-limiting hematuria; however gross hematuria and urinary clot retention requiring catheterization and hospitalization can occur. Rectal bleeding is typically minor, and the risk of rectal bleeding increases with the increased number of core samples. Significant or massive rectal bleeding is uncommon but can potentially be life-threatening, requiring endoscopic or surgical intervention.

Urinary obstruction or retention is an uncommon complication occurring soon after transrectal biopsy that may be due to tissue trauma, acute prostatitis, or constipation resulting from narcotic pain medication. It may lead to hospitalization.

Erectile dysfunction can result, which may be caused by periprocedural anxiety, pain, apprehension about biopsy results, needle injury to nerves, effects of cancer, or local tissue edema related to hemorrhage or administration of nerve block.

Needle tract seeding is an extremely rare complication in which healthy tissue along the biopsy needle tract(s) is seeded with tumor cells. Transperineal biopsies account for 78% of such cases (Benway & Andriole, 2018; Hoffman, 2018; AUA, 2016).

CARING FOR THE PATIENT UNDERGOING BIOPSY

Prostate biopsies are most often done as an outpatient procedure in a physician’s office but can also be done in the hospital. In both instances, nurses care for the patient before and immediately after the procedure and prepare the patient and family for discharge.
Preparing the Patient Prior to Biopsy

- Take a patient urine sample to rule out the presence of a urinary tract infection. If results are positive, the biopsy is postponed until antibiotics have cleared the infection.

- Instruct the patient to stop taking any medications that can increase bleeding 7 days prior to the biopsy. These may include:
  - Anticoagulants such as warfarin (Coumadin)
  - Antiplatelets, including aspirin and ibuprofen (Advil, Motrin)
  - Certain herbal supplements such as evening primrose oil, garlic, ginkgo biloba, ginseng, grapeseed extract, omega 3 fatty acids, St. John’s wort, vitamins C and E (UWHealth, 2018)

- Instruct the patient to eat a light breakfast or lunch before arriving for the biopsy.

- Instruct the patient to do a cleansing enema at home prior to the biopsy appointment. Enema kits (Fleets) can be purchased over the counter.

- Instruct the patient to take prescribed antibiotics 30 to 60 minutes prior to biopsy for infection prevention.

- Assist with positioning and tending to patient needs during the biopsy procedure.

- Give the patient fluids to drink and have the patient provide a urine sample before being discharged.

Preparing the Patient for Discharge

The nurse provides both written and verbal instructions in nonmedical language so that the patient and family leave with a clear understanding of the discharge plan. Information provided to the patient includes the following:

- Any course of prescribed antibiotics should be fully completed in order to prevent infection.

- Activities should be restricted for the first 24 to 48 hours after biopsy. (Give specific do’s and don’t’s appropriate to the patient’s usual level of activity.) Strenuous exercise such as jogging, heavy lifting, golfing, and bike riding should be avoided for at least seven days.

- Drink at least six glasses of water a day for the first few days after surgery to keep urine flowing freely.

- There can be bleeding from the rectum after the biopsy and blood in the urine. There may be a bloody discharge in the underwear and on toilet tissue that could last for 2 to 3 days.
• Sexual activity can be resumed when the patient feels ready after 4 to 7 days.
• Blood in the semen can persist for 6 weeks or more.
• Rectal soreness can be alleviated with warm soaks or compresses to the area.
• Acetaminophen can be taken for pain relief if approved by the physician. Do not take aspirin or anti-inflammatory products for one week.
• A follow-up visit should be scheduled for approximately one week after discharge to discuss the biopsy results and to provide a urine sample to insure absence of infection.
• Notify the physician promptly in the case of:
  o Fever of 101 °F or greater, shaking, or chills
  o Heavy rectal bleeding, clots, or bleeding that continues longer than 2 to 3 days
  o Pure bloody stools
  o Increased urinary pain, frequency, or burning
  o Inability to urinate within 8 hours
  o Blood in the urine for longer than 2 to 3 days

(UU, 2018; RSNA, 2018; Mayo Clinic 2018b)

CASE

Jeffrey Gates is a 72-year-old retired accountant who had a prostate biopsy two days ago because of a moderate risk for prostate cancer and elevated PSA. Today he was with friends at the golf course clubhouse enjoying the day. The last thing he remembered was having a beer and heading for home.

Jeffrey’s wife had dinner ready, but he did not come home when expected. She tried calling his cellphone but got no answer. By late evening she became very worried and called the police. At 11 p.m. he was discovered by a passerby who found him sitting in his car at the side of the road completely disoriented. The person called 911, and Jeffrey was transported to the hospital.

In the emergency department, Jeffrey was found to have signs and symptoms of a fulminant infection. He was admitted to the ICU and started on antibiotics for a presumptive gram-negative infection. Blood cultures returned positive in one day for antibiotic-resistant *E. coli*, and his antibiotic was changed to one to which the organism was susceptible.

Jeffrey was intermittently disoriented for the next two days, experiencing chills, fever, and a low blood pressure. Finally, on the third day in ICU his kidneys failed, and he died on the fourth day. He was diagnosed with sepsis.
GRADING AND STAGING PROSTATE CANCER

Grading

Cancers are graded by a pathologist according to the degree of differentiation of the tumor cells. For prostatic adenocarcinomas, the **Gleason scoring system** is the most widely used for grading tumors, determining the aggressiveness of prostate cancer and helping decide on appropriate treatment options.

Since prostate tumors are often made up of cancerous cells with different grades, two grades are assigned for each patient. A primary grade is given to describe the cells making up the largest area of the tumor, and a secondary grade is given to cells of the next largest area. For example, a Gleason score written as 3+4=7 means that the majority of the tumor is grade 3, the next largest section is grade 4, and together, the total Gleason score is 7. When a cancer is almost entirely made up of cells with the same score, the grade for that area is counted twice to calculate the total Gleason score. Typically, Gleason scores range from 6 to 10, and the higher the Gleason score, the more likely it is that the cancer will grow and spread quickly.

A **new prostate grading system** is an extension of the Gleason grading scale and is considered simpler and more accurate. This new Gleason system focuses on better representing low-grade disease so as to reduce unnecessary treatment of indolent prostate cancer. The new grading system subdivides prostate cancer into five categories using pathological characteristics.

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<thead>
<tr>
<th>PROSTATE CANCER GRAADING SYSTEMS</th>
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<tbody>
<tr>
<td><strong>Traditional Gleason Score</strong></td>
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<tr>
<td>3+3=6</td>
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<tr>
<td>3+4=7</td>
</tr>
<tr>
<td>4+3=7</td>
</tr>
<tr>
<td>4+4=8</td>
</tr>
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<td>9–10</td>
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</tbody>
</table>

Staging: Tumor-Node-Metastasis (TNM)

The most widely used staging system for prostate cancer is the TNM system, which was updated in 2018. The **TNM staging system** is a way to describe where the cancer has spread, and if so, how far. The stage or extent of a cancer is important to know in order to choose the best treatment and to develop a prognosis. The stage is based on the results of the prostate biopsy Gleason grade, the PSA levels, and any other tests or exams done to determine how far the cancer has spread. Cancers are staged according to:

- The extent of the primary tumor (T)
  - Clinical T: The best estimate of the extent based on physical exam (including DRE), biopsy, and imaging
  - Pathologic T: What the pathologist finds following surgical removal of the prostate
- Whether it has spread to nearby lymph nodes (N)
- Whether it has metastasized (M) to other parts of the body

The main stages of prostate cancer range from 1 through 4. Some stages are further split into a, b, c, etc. Ordinarily, the lower the number, the less the cancer has spread. Within a stage, an earlier letter means a lower stage.

Each patient’s cancer experience is unique, but cancers with similar stages tend to have a similar prognosis and are often treated in the same manner (ACS, 2018b).

<table>
<thead>
<tr>
<th>TNM STAGING SYSTEM FOR PROSTATE CANCERS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinical Tumor (T)</strong></td>
</tr>
<tr>
<td>TX</td>
</tr>
<tr>
<td>T0</td>
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<tr>
<td>T1</td>
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<td>T1a</td>
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<td>T1b</td>
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<td>T1c</td>
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<td>T2</td>
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<td>T2a</td>
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<td>T2b</td>
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<td>T2c</td>
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<tr>
<td>T3</td>
</tr>
<tr>
<td>T3a</td>
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<tr>
<td>T3b</td>
</tr>
</tbody>
</table>
T4  Tumor fixed or invading adjacent structures other than seminal vesicles (e.g., bladder, levator muscles, and/or pelvic wall)

<table>
<thead>
<tr>
<th>Clinical Lymph Nodes (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NX</td>
</tr>
<tr>
<td>N0</td>
</tr>
<tr>
<td>N1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distant Metastasis (M)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>M0</td>
</tr>
<tr>
<td>M1</td>
</tr>
<tr>
<td>M1a</td>
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<tr>
<td>M1b</td>
</tr>
<tr>
<td>M1c</td>
</tr>
</tbody>
</table>

* If more than one site of metastasis is present, use the most advanced category.

Sources: Posielski, 2018; ACS 2018b.

For example, using the TNM nomenclature, a prostate cancer of stage T2N1M0 is a cancer in which:

- The tumor is confined within the prostate (stage T2).
- There is evidence of a tumor in one or more local lymph nodes (stage N1).
- There is no indication of any distant metastasis (stage M0).

Diagram showing stages T1, T2, and T3 prostate cancer tumors.  
(Source: Cancer Research UK/Wikimedia Commons.)
PROSTATE CANCER AND THE MULTIDISCIPLINARY HEALTHCARE TEAM

A multidisciplinary team approach to the management of patients with prostate cancer includes the following members:

- **Primary care physician or nurse practitioner** assists with treatment decisions and works in partnership with specialists in providing ongoing care; may monitor PSA levels and administer treatment.

- **Urologist**, a surgeon specializing in treating diseases of the urinary tract and the male reproductive system, plays a key role from diagnosis to treatment and performs biopsies and prostate surgery.

- **Radiation oncologist** treats the cancer by prescribing and coordinating a course of radiation therapy.

- **Medical oncologist** may prescribe chemotherapy, endocrine therapy, and other medications.

- **Endocrinologist** diagnoses, treats, and manages hormonal disorders.

- **Physical therapist** teaches pelvic floor exercises pre- and post-treatment to help strengthen the pelvic floor muscles and improve bladder and bowel control; helps restore or maintain strength, mobility, and function; and offsets physical side effects of treatment.

- **Occupational therapist** enables maximum functional performance, both physically and psychologically; relieves stress and anxiety; and helps with energy conservation and work simplification techniques.

- **Psychologist/counselor/sex therapist** assists with emotional response to diagnosis and treatment and provides assistance with issues affecting sexuality.

- **Nutritionist/dietitian** helps maintain overall health and strength to deal with side effects of treatment.

- **Social worker** provides a wide range of counseling services and support for patients and families.

- **Nurse** maintains continuity of care, administers drugs, provides education and support throughout the process of diagnosis, treatment, and post-treatment management; may include:
  - Office, clinic nurses
  - Urologic nurses
  - Oncology nurses
Clinical nurse specialists
- Surgical nurses
- Nurses specializing in male sexual medicine
- Home care nurses
- Geriatric and long-term care nurses
- Radiology nurses
- Palliative care nurses
- Hospice nurses

- **Radiologist** analyzes X-rays and scans; an interventional radiologist may also perform a biopsy under ultrasound or CT and deliver some treatments.

- **Pathologist** examines cells and tissue samples to determine the type and extent of the cancer.

  (ACS, 2015)

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**TREATMENTS, RISKS, AND SIDE EFFECTS**

Treatments for prostate cancer are effective in most men, but they can cause both short- and long-term side effects that may be difficult to accept. The patient, his partner, and the urologist should discuss treatment options in detail. A second opinion may be sought.

The patient should make sure he understands which treatments are available, how effective each is likely to be, and what side effects can be expected. In addition, the patient should understand the option of accepting no treatment based on statistical data and patient outcomes. All of the treatment choices should be weighed carefully before making a decision about which course to pursue.

All active treatments for prostate cancer have costs as well as benefits. Because the prostate is an integral part of the genitourinary tract, physical treatments tend to cause genitourinary problems. In addition, radiation will damage neighboring tissues, the most sensitive of which is the rectum, so radiation often gives bowel as well as genitourinary problems. In contrast, androgen deprivation therapy (antihormone) is a systemic treatment, and its side effects can be whole-body problems—metabolic, physiologic, or psychological.

For patients who have been diagnosed with prostate cancer that is confined to the prostate gland, standard management choices include radical prostatectomy (surgery), radiation therapy, hormone therapy, and for some patients with very low-risk disease who are carefully selected, conservative management.
Conservative Management for Localized Prostate Cancer

Some prostate cancers prove to be so small, low-grade, and noninvasive that they appear to pose little risk to a person’s life. Since active treatments may produce a variety of discomforts and side effects, some people with low-risk prostate cancer instead elect conservative management. Factors to be considered with selecting treatment options for the man with low-risk cancer include:

- Risk or chance of recurrence or metastasis post-treatment
- Patient’s age
- Life expectancy
- Presence and number of significant comorbid conditions
- Patient preference

(Chodak, 2018)

Conservative management ranges from “watchful waiting” to active surveillance.

WATCHFUL WAITING

At one end of the spectrum of conservative therapies is watchful waiting. Here, the goal is to avoid any treatments that might degrade the patient’s quality of life and, if the cancer progresses, to choose treatments that maintain the patient’s quality of life even when those treatments are only palliative.

Watchful waiting or observation does not imply that nothing is being done. It describes less intense follow-up with fewer tests and relies on changes in symptoms to determine if treatment is needed. During watchful waiting patients have regular appointments, blood tests, and examinations but are less likely to have a regular prostate biopsy. A bone scan may be done, and PSA testing is done at least every year. Symptomatic treatment consisting of medications is often used to reduce urinary tract problems for these patients.

Watchful waiting is most often chosen by patients who are older than 70 years or who have a life expectancy of less than 10 to 15 years, but it is also chosen by men who are younger and want to avoid serious side effects for as long as they can. One study found that those who choose watchful waiting for localized cancer instead of definitive treatment have the same cancer mortality rate as those who chose surgery (Chodak, 2018).

ACTIVE SURVEILLANCE

Another form of conservative therapy is active surveillance or active monitoring used for localized cancer that may never need treatment. It is the postponement of definitive therapy and is appropriate for patients whose cancers are small, have a low Gleason grade, and are thought to be at low-risk of progression (TNM prognostics group I), as well as for those with a life expectancy of less than 20 years. Here, the goal is to avoid active intervention until a tumor has “revealed” its aggressiveness.
Cancers are watched carefully, and once they begin to progress, treatments are chosen with the aim of curing the disease. Disease progression may be indicated by increased tumor volume or changes in the Gleason grade. Active surveillance takes into account PSA test results, the Gleason grade, the size of the prostate gland, and the patient’s view about treatment.

Monitoring typically involves PSA testing every 6 months and repeat biopsy at 12- to 24-month intervals. Repeat biopsies, however, are not recommended for patients with a life expectancy of less than 10 years. The biopsy is the most important determinant for pursuing treatment, but a rapid PSA rise as well as patient choice can also influence the decision to proceed with treatment.

Active surveillance avoids treatment-related side effects. But it also causes concern and anxiety, and many men who begin active surveillance decide on definitive treatment within 1 or 2 years even though there is an absence of progression (Klotz, 2018; Chodak, 2018).

**CARING FOR THE PATIENT UNDERGOING CONSERVATIVE MANAGEMENT**

Those patients who elect conservative treatment may be cared for in clinics, nursing homes, hospitals, and in the community. In these settings, the role of healthcare providers is to address three primary areas:

- To provide education about male anatomy and physiology, the disease process, and the signs and symptoms to watch for and report to their provider
- To help patients and families work through the emotional stress of learning of the diagnosis and finding effective methods of coping with the disease process
- To work with the patient, partner, and family in dealing with the physical effects of the disease process, including urinary problems and alterations in sexual functioning.

Patients who choose watchful waiting or active surveillance may also opt to include intensive lifestyle changes that may affect the progression of early low-grade prostate cancer. Recommendations for such patients may include:

- Have vitamin D level checked. A low level is associated with more aggressive prostate cancer.
- Eat a completely or mostly plant-based diet, avoid all processed foods, and limit sugar intake, which fuels cancer growth. Studies show that excess fat, primarily red meat and high-fat dairy, stimulates prostate cancer growth.
- Avoid trans fatty acids, which are known to promote cancer growth; these are high in margarines and fried and baked foods.
- Exercise to maintain overall health and weight. Being overweight or obese is a factor in prostate cancer development and progression.
• Manage stress, which can jeopardize the immune system and promote cancer progression, perhaps by interfering with neuroendocrine mechanisms involved in control of reproduction.

• Avoid environmental exposure to household and personal care products. (Schmidt, 2018; Barnard, 2018; Flores et al., 2017)

CONSERVATIVE MANAGEMENT IS NOT “DOING NOTHING”

Observation is not an intuitive course for most men who instinctively believe cancer should be treated and cured as soon as possible. Although some men understand the rationale of watchful waiting and active surveillance as alternatives to an aggressive treatment with all the potential side effects, they still consider it too risky and fear treatment choices may be limited if the cancer progresses. Overall, studies have shown that most men consider watchful waiting or active surveillance a risk they are not willing to take.

It is important that discussions about treatment options involve language that does not imply that watchful waiting and active surveillance mean “doing nothing.”

Aggressive Treatment Modalities for Localized Prostate Cancer

Treatment modalities for prostate cancer include:

• Surgery (radical prostatectomy)
• Radiation therapy
• Cryotherapy (cryosurgery)
• Hormone therapy
• Chemotherapy
• Vaccine treatment

SURGERY

The most common choice to attempt to cure prostate cancer that has not spread outside the prostate gland is surgery to remove the prostate gland. A radical prostatectomy is the main type of surgery. Radical prostatectomy removes the entire prostate gland along with some tissue surrounding it, including the seminal vesicles. The procedure is done using an open or laparoscopic approach. The open approaches include retropubic and perineal prostatectomies.

Surgery Procedure

Radical retropubic prostatectomy is done through an incision in the lower abdomen from navel to pubic bone. During the procedure, some lymph nodes may also be removed by biopsy. If cancer cells are found in the nodes on intra-operative frozen section, the
surgery will be discontinued, as the cancer is unlikely to be cured with surgery. Removing the prostate at this point could result in unnecessary serious side effects.

**Radical perineal prostatectomy** is done through an incision between the anus and scrotum. This approach is taken less often due to the possible side effect of erectile dysfunction and because lymph nodes are not accessible for biopsy. This approach takes less time and may result in easier recovery.

Performing a radical prostatectomy while sparing (preserving) the adjacent erectile nerve bundles and the external urinary sphincter is a difficult operation. Surgeons will not know until the time of the procedure if nerve sparing is possible, as it will depend on whether the cancer has invaded the nerves. This procedure offers the best chance to preserve long-term erectile function.

Open approaches for radical prostatectomy.
(Source: National Cancer Institute. © 2005, Teresa Winslow.)

Radical prostatectomies can also be done **laparoscopically**, directly or by remote control.

When using the direct method, several small incisions are made and surgical instruments are inserted into them. A small video camera is also inserted to allow for visualization. Recovery of bladder control may be delayed slightly with this approach.

The remote method is known as a **robotic prostatectomy**. It is a minimally invasive surgery in which two cameras are inserted through six small incisions in order to guide the use of miniaturized surgical instruments operated by the surgeon using foot pedals. The cameras provide a three-dimensional, enhanced color view of the prostate gland displayed on a monitor for the surgeon. The success of this approach depends on the surgeon’s skill and experience.
The advantages of robotic prostatectomy over the open approach are less pain, less blood loss, and shorter recovery time. Postoperative catheterization time is reduced from the two or more weeks for open prostatectomy to five to seven days for robotic prostatectomy. In terms of the side effects of urinary or erection problems, however, there does not appear to be any difference between robotic and open prostatectomy. The usage of robotic surgery has increased rapidly and now constitutes the majority of radical prostatectomies (ACS, 2017; Klein, 2018).

**Risks and Side Effects of Prostatectomy**

There are risks for any type of surgery, including risks from anesthesia, heart attack, stroke, damage to nearby organs, thromboses in the legs, pulmonary embolism, and infection at the surgical site. If lymph nodes are removed, a lymphocele can form and would need to be drained. Bleeding during and after surgery may require blood transfusions, which carry a small risk for allergic reactions, bloodborne infections, and immune hemolytic reactions. Inadvertent damage to the intestines can lead to infection in the abdomen, requiring more surgery. Such damage occurs more commonly in laparoscopic and robotic procedures.

Side effects of the procedure may include:

- **Urinary incontinence**, with stress incontinence the most common. Continuous incontinence rarely occurs. Normal bladder control usually returns slowly within several weeks or months.

- **Erectile dysfunction** occurs if the cancer has grown into or very close to the nerves, requiring them to be surgically removed. If nerves on both sides are removed, the patient will be unable to have spontaneous erections. If nerves on only one side are removed, spontaneous erections may still be possible. If neither nerve bundle is removed, normal erections may begin to be possible at some point postsurgery. This occurs slowly and can take from a few months up to two years.

- **Changes in orgasm** can occur, in which the sensation remains the same but there is no ejaculation of semen. The orgasm is “dry” as a result of loss of fluid from the prostate gland and seminal vesicles. Some men may have reduced intensity of orgasms, and less often, men report pain with orgasm.

- **Infertility** results because radical prostatectomy involves cutting the vas deferens, the pathways for sperm to travel from the testicles to the urethra. Men who wish to father children in the future may elect to bank their sperm.

- **Lymphedema** is a rare side effect resulting from the removal of lymph nodes around the prostate. When nodes are removed, fluid can collect in the legs or genital area over time, causing swelling and pain.

- **Penis length change** may be the result of shortening of the urethra when a portion of it is removed along with the prostate.
• **Inguinal hernia** risk increases in the future following prostatectomy.  
(ACS, 2017; NCI, 2018d)

**Caring for the Patient Undergoing Surgery**

During the preoperative period, patients and their partners and family have a need for information that will enable them to make informed decisions regarding treatment. The time between diagnosis of prostate cancer and surgery is a very stressful time. It is essential that caregivers recognize the influence of stress on hearing and learning.

It is important to assess a patient’s values before surgery. Once this is completed, information on the risks and benefits of various treatment options can be presented in light of the patient’s values. The healthcare provider is able to take the necessary time to provide detailed explanations to patients and their partners and families. Written information on surgery and other treatment options and their potential effects is reviewed with patients to assist them in decision making.

**Preoperative nursing interventions** for patients who are admitted for prostate surgery include:

- Reduce anxiety. Clarify expected outcomes and allow verbalization of feelings.
- Relieve discomfort if present preoperatively. Offer pain relief measures, assist with voiding. Insert catheter if ordered.
- Provide preoperative teaching, including:
  - **Sensory information**: What the patient will see, hear, smell, and feel during the surgery
  - **Procedure information**: Physical preparations, pain control, fluid and food restrictions
  - **Process information**: Specific details about the flow of the procedure
- Prepare the patient for surgery, which may include application of antiembolic stockings, administering an enema, and prophylactic antibiotics.

**Intraoperatively**, the nurse’s role and responsibilities include the following:

- Act as the patient’s advocate.
- Prioritize the needs of patients undergoing the surgical procedure.
- Keep a watchful eye on aseptic techniques and procedures to create a secure environment that will promote wound healing, recovery, and well-being.
- Apply principles of sterile technique.
- Ensure the presence of a safe environment in the OR.
**Postoperatively**, the role of the nurse is to:

- Maintain fluid balance and document intake and output, including fluid used to irrigate the catheter.
- Assess for electrolyte imbalance.
- Monitor vital signs.
- Observe for signs of confusion or respiratory distress.
- Relieve pain by administering analgesics as ordered and evaluating effectiveness.
- Increase mobility, beginning with early ambulation.
- Assess for bladder spasms.
- Monitor wound drainage and provide wound care as ordered.
- Provide meticulous catheter and tube care.
- Offer prune juice and stool softeners to avoid constipation and straining.
- Provide reassurance and explanations of care to patient and significant others.
- Maintain nutritional status by monitoring intake and encouraging protein- and calorie-rich foods.
- Observe for potential complications, including:
  - Hemorrhage
  - Infection
  - DVT
  - Pulmonary embolism
  - Catheter obstruction
  - Emotional distress and/or depression
- Assess for emotional or psychological problems in patient, partner, and family.
- Educate patient and significant others regarding discharge and self-care.

(Lewis et al., 2017)

(See also “Prostate Cancer Rehabilitation” later in this course.)

**RADIATION FOR LOCALIZED PROSTATE CANCER**

Radiation therapy is another option for treatment of localized prostate cancer. Radiation treatment uses high-energy X-rays or other types of radiation to slow or kill cancer cells. Radiation kills
cells mainly by damaging their DNA, and cells are most sensitive to radiation damage when they are preparing to divide or while they are dividing.

The goal of radiation therapy for men with localized prostate cancer is to deliver a therapeutic dose of radiation to the tumor while minimizing radiation damage to normal tissues in the area. The disease control with radiation therapy is similar to that of radical prostatectomy.

Radiation can be delivered either with external beams from a machine outside the patient or continuously from radioactive materials implanted directly into the prostate (brachytherapy), both of which are widely used as a single modality for localized low-risk prostate cancer.

**External Beam Radiation**

External beam radiation includes three types of particles:

- **Photons.** These beams can reach tumors that are deep in the body. These types do not stop when they reach the tumor but continue past it into normal tissue, scattering radiation along the path.

- **Protons.** These are positively charged particles that can also reach deep into the body; however, they do not scatter radiation on their path and they stop once they reach the tumor.

- **Electrons.** These negatively charged particles cannot travel very far through body tissue and their use is limited to tumors near or on the surface of the body.

There are several types of external beam radiation therapy, all of which deliver the highest dose of radiation to the tumor while sparing normal tissue. Each is dependent on a computer to deliver the most precise dose and calculate the treatment path. Each type of treatment is typically given once a day, Monday through Friday, and the number of treatments varies depending on the cancer type, stage, size, and location of the tumor. Types of external beam radiation therapy include:

- **3D-conformal radiation therapy (3D-CRT)** uses images from CT, MRI, and PET scans to plan treatment by precisely shaping the radiation beams to conform to the shape of the tumor.

- **Intensity-modulated radiation therapy (IMRT)** is an advanced form of 3D-CRT that uses smaller beams, the strength of which can be changed to give higher doses to different parts of the tumor.

- **Image-guided radiation therapy (IGRT)** is a type of IMRT that uses two- or three-dimensional imaging scans prior to each treatment as well as during the radiation therapy session to precisely locate the tumor and surrounding organs. This repeated imaging improves accuracy and helps spare normal tissue.
Tomotherapy is a type of IMRT that uses a machine that combines a CT scanner and external beam radiation machine and images the tumor right before treatment sessions to precisely target the tumor and spare normal tissues. (ACS, 2018d; DiBiase & Roach, 2018)

External Beam Radiation Therapy Side Effects

There are both short- and long-term side effects to this form of therapy. Short-term effects include:

- **Skin reactions.** Skin in the treatment area may become red, irritated, dry or sensitive.
- **Fatigue.** This is a very common side effect that begins a few weeks into therapy and typically resolves slowly over the weeks and months following radiation therapy treatment.
- **Bowel symptoms.** Rectal tissue is sensitive to radiation, and 5% to 30% of patients develop proctitis or enteritis. Symptoms include diarrhea, painful bowel movements, rectal bleeding, and rectal leaking. Following completion of radiation therapy, acute symptoms usually resolve within 3 to 8 weeks.
- **Urinary symptoms.** Approximately one half of patients experience urinary frequency, dysuria, or urgency due to cystitis, urethritis, or both. Symptoms commonly resolve within several weeks following completion of therapy. Late side effects are uncommon.
- **Loss of hair in the pelvic area.** Hair commonly begins to regrow a month or so after treatment. Hair loss for some may be permanent.
- **Reduced blood counts.** Neutropenia, anemia, or thrombocytopenia (low platelet count) may be a short-term effect of radiation therapy.

Months or even years after external radiation, a variety of long-term side effects may develop. These are the result of destructive changes in the small vessels of the irradiated tissues, resulting in chronic hypoxia, mucosal thinning, and the growth of aberrant blood vessels. The risks vary depending on the areas included in the field of radiation and the radiation techniques that were used. Some of the long-term side effects include:

- **Erectile dysfunction.** Impotence may occur following radiation therapy months after treatment ends. Thirty percent to 45% of men who are potent prior to radiation therapy become impotent after therapy, with the frequency increasing over time. More sophisticated forms of radiation delivery, such as IMRT, may limit the dose to the penile bulb and corporal bodies compared to 3D-CRT.
• **Genitourinary.** Long-term genitourinary side effects can include urethral strictures, cystitis, hematuria, and bladder contracture.

• **Insufficiency fractures.** Such fractures are a subtype of stress fracture resulting from physiologic stress to weakened bone. They are uncommon following external radiation therapy for prostate cancer and are thought to be due to radiation injury to the microcirculation in bone.

• **Secondary malignancies.** Radiation therapy seems to be associated with a small increase in incidence of bladder and rectal cancer, but the risk of dying from a secondary malignancy at 10 to 15 years is very small. (DiBiase & Roach, 2018)

**Brachytherapy**

Brachytherapy is mainly used to treat small, low-risk prostate cancers. The treatment involves implanting radioactive sources called *seeds* into the prostate to deliver treatment directly to the cancer without the need to pass through surrounding tissues first. Brachytherapy has proven to be very effective and safe, providing a good alternative to radical prostatectomy while reducing the risk of long-term side effects.

Permanent **low-dose brachytherapy** involves placing between 75 and 125 rice-sized seeds that emit radiation into the prostate. The seeds gradually lose their radioactivity over time and are not removed. Within one year, they will have released around 98% of the radiation.

Low-dose brachytherapy is usually an outpatient procedure done under spinal anesthesia and that takes about one hour. During the implant procedure, an ultrasound probe is placed into the rectum for visualization and the seeds are then implanted into the prostate through very thin needles inserted through the perineum.

Radioactive seeds. (Source: Nuclear Regulatory Commission, 2012.)
Temporary **high-dose brachytherapy** is done in the hospital and involves a minor surgical procedure to implant catheters through the perineum into the prostate. The catheters are connected to a machine that feeds wires containing radiation into the prostate. The radioactive wires are left in place for a set amount of time, commonly several minutes. Then they are removed. The catheters are left in place so that the patient may undergo several treatments. Usually one to four treatments are done over a period of 24 to 40 hours. Once treatments are completed, the catheters are removed.

High-dose brachytherapy is often used in conjunction with other treatments such as androgen deprivation or external beam radiation therapy.

**Brachytherapy Side Effects and Complications**

- **Acute effects** may include perineal pain and swelling, sometimes accompanied by bruising and hematuria.

- Acute worsening of **urinary symptoms** due to radiation toxicity may include:
  - Increased frequency
  - Nocturia
  - Hesitancy
  - Urgency
  - Weak urinary stream

  These acute symptoms gradually resolve. Acute urinary retention is uncommon.

- **Urinary symptom flare** is a transient worsening of urinary symptoms observed following the resolution of the acute urinary symptoms; it usually takes six months to resolve. The interval between treatment and development of symptom flare can be 30 months and in some cases five years.

- **Late urethral strictures** are an uncommon complication.

- **Radiation proctitis** with some rectal bleeding is common, but more serious complications are rare.

- **Rectal fistula** is a serious but rare complication.

- **Sexual dysfunction** incidence varies, and the onset is gradual. About one third of patients experience sexual dysfunction as a moderate or major problem.

- **Bowel symptoms** include urgency, frequency, pain, fecal incontinence, and bleeding.

- **Second malignancies** of the bladder or rectum are associated with a small risk, and risk of dying from a second malignancy at 10 to 15 years is very small.
• **Seed migration** to the lungs may occur in up to 55% of patients, but clinical implications are unclear. There have been reports of migration to the heart, lungs, and other organs, with some patients experiencing clinical consequences.

• There is a small risk for **incontinence or impotence** in patients over the age of 70. (Roach & DiBiase, 2017; Cheuck, 2017)

**Caring for the Patient Receiving Radiation Therapy**

Patients receiving radiation therapy are instructed to continue with regular activities but to be aware that they will experience fatigue and may need to adjust their activities because of it.

Men and significant others should be given instructions to call the physician in the case of a temperature over 100 °F, burning or difficulty with urination, excessive bleeding or clots in the urine, or rectal bleeding.

For patients receiving external beam radiation therapy, the following instruction in **skin care** is provided:

• Erythema may initially occur but progresses as treatment continues. Gently cleanse the skin in the treatment field daily using a mild soap such as Ivory or Dove, tepid water, a soft cloth, and a gentle patting motion. Rinse thoroughly and pat dry.

• Apply nonmedicated, nonperfumed moisturizing lotion or cream such as calendula ointment, aloe gel, Aquaphor, or Biafine cream to alleviate dry skin. Some substances must be gently cleansed from the treatment field before each treatment and reapplied. Over-the-counter 1% hydrocortisone cream may reduce itching.

• Erythema may be followed by dry skin cell sloughing, which can eventually expose the dermis with weeping of serous fluid. Rinse the area with saline solution and expose the area to air as often as possible. If copious drainage occurs, use astringent compresses and nonadhesive absorbent dressings. Change as soon as they become wet. Observe the area daily for signs of infection.

• Most radiation oncology facilities will use a marking pen for the initial treatment setup. Instruct the patient not to remove the dark ink markings that outline the radiation field, if present. However, when the field has been defined, tattoos may be placed in the corners of the field to make sure that the field is as accurate as possible.

• Wear soft, nonrestrictive cotton clothing directly over the treatment area.

• Skin in the treatment area should be protected from sunlight and extreme cold.

• Use gentle detergents such as Dreft or Ivory Snow to wash clothing that will come in contact with the treatment area.
• Avoid swimming in saltwater or in chlorinated pools during the time of treatment. (Lewis et al., 2017)

If the patient is receiving **high-dose temporary brachytherapy**, he may be required to remain in the hospital for a few days.

• Assign the patient to a private room. Post appropriate notices about radiation safety precautions.
• Staff members should wear dosimeter badges.
• Prohibit visits by children and pregnant women.
• Limit visits from others to 30 minutes daily.
• Ensure visitors maintain a six-foot distance from the radiation source. (Belleza, 2017)

Men who receive **permanent low-dose brachytherapy** may be hospitalized for as long as the radiation source is considered a danger to persons around them. Principles of time, distance, and shielding are implemented. Care must be taken so that seeds do not become dislodged. Dressings and bed linens are checked by the radiation therapy department before these items are removed from the patient’s room.

Nurses and radiation therapists instruct the patient as follows:

• Observe for lost seeds in linens.
• Do not use fingers to pick up the seeds. Use tweezers or tongs to pick them up and place the lost seeds in a container of water or wrap them tightly in aluminum foil.
• Take any found seeds to the radiation oncology department at the hospital.

Recommendations for the first two months after seed implantation generally include:

• Avoid sexual intercourse for the first two weeks.
• After the first two weeks, use a condom during sexual intercourse in case a seed is passed during ejaculation.
• Limit close contact with children and pregnant women.
• Do not allow children to sit on the lap for extended periods.
• Low-level of radiation can be picked up by detection systems at airports, international borders, etc. Traveling within 3 to 4 months after implantation may require specific documentation. (Castle, 2017; Cheuck, 2017)

(See also “Patient Rehabilitation” later in this course.)
ABLATION TECHNIQUES

Cryotherapy, also known as cryosurgery and cryoablation, can be an alternative to radical prostatectomy. It is a minimally invasive procedure that freezes tissue, causing cancer cells to die. Cryotherapy is most often used for early-stage prostate cancer, but it may also be used to treat recurrent disease.

There are two types of cryotherapy, both of which can be done under general or local anesthesia and take about one to two hours:

- **Whole cryotherapy** freezes the entire prostate gland, including healthy tissue, and may include damage to the nerve bundles.
- **Focal cryotherapy** freezes only the areas where cancer has been located. This allows for preservation of other regions of the prostate, in particular, erectile nerves and the urinary sphincter. A major advance in this procedure is the application of high-precision transrectal ultrasound imaging to enable freezing to be precisely controlled.

The cryotherapy procedure involves placement of a catheter into the bladder to maintain urine drainage due to postprocedure swelling as well as to be used for the circulation of a warm liquid that protects the urethra from freezing. Cryoprobe (needles) are inserted into preselected areas between the scrotum and the anus, and a liquid cooling agent (commonly argon) is placed into them. This freezes the entire gland or focal areas of the gland. The frozen tissue is allowed to remain frozen for only a few minutes and then is thawed by inserting helium through the probes. This cycle may be repeated once more (Pisters & Spiess, 2018).

**Advantages of Cryotherapy**

The advantages of cryotherapy are significant:

- It is a single treatment performed on an outpatient basis or requiring a one-night hospital stay.
- The short hospital stay reduces the risk for hospital-acquired infection.
- The procedure requires only a short (less than one week) recovery time.
- There is minimal or no pain and less swelling than from radical prostatectomy.
- It requires a shorter length of time for the catheter to remain in place.
- It lowers the risk for incontinence more than any other therapy.
- “Salvage cryotherapy” can be used when other treatments have failed to cure prostate cancer.
- There is a low risk of rectal damage or irritation.
- Most men who have focal cryotherapy remain potent.

(ACS, 2016b; Mayo Clinic, 2018c)
HIGH INTENSITY FOCUSED ULTRASOUND (HIFU)

High-intensity focused ultrasound ablation uses externally generated sonic waves to create a sharply delineated area of thermal energy that destroys targeted cancer cells. At this time HIFU has not been compared with standard treatment in trials, nor is it included in guidelines for initial management. However, the FDA has approved HIFU as a minimally invasive treatment approach to ablate prostate tissue (Pisters & Spiess, 2018).

Cryotherapy Risks and Side Effects

Although cryotherapy has many advantages, there still are risks and side effects.

- Swelling of the penis and scrotum
- Soreness of the perineum
- Injury to the urethra and bladder
- Serious infections as a result of injury
- Urethral stricture
- Temporary (2 to 3 months) penile numbness due to dorsal nerve injury
- Urinary frequency and dysuria
- Bladder, pelvic, and rectal pain or burning sensations
- Obstruction or blockage of urethra
- Rarely (0% to 3%), development of a fistula between the rectum and the urethra that may require surgical repair
- Risk of urinary incontinence, rarely; more common if the patient has already had radiation therapy
- Small bowel obstruction due to ice-ball extension into the peritoneal cul-de-sac
- Risk of impotence
- Sometimes, failure to kill all of the cancer cells, increasing the chance the cancer will return (Cooperberg, 2016)

Caring for the Patient Receiving Cryotherapy

Patients receiving cryotherapy are cared for in an outpatient setting or in the hospital overnight. Routine recovery monitoring, including vital signs, is carried out, and discomfort is relieved with pain medications.
When stabilized, patient’s ambulation ability is assessed, and when the patient is ready for discharge, instructions include:

- Caring for the catheter and tubing:
  - Cleaning urethra meatus with soap and water daily
  - Maintaining a high fluid intake
  - Keeping the catheter bag lower than the bladder
  - Securing the catheter to inner thigh or abdomen
- Reporting signs of bladder infection
- Caring for the needle insertion sites; keeping the areas clean and dry
- Specific bathing instructions according to the provider’s protocol
- Notifying the healthcare provider if the patient experiences:
  - Fever and/or chills
  - Redness, swelling, bleeding, or other drainage from any needle insertion sites
  - Increase in pain around the insertion sites
- Activity restrictions per healthcare provider

Appointment for follow-up and catheter removal, typically in one week or less, should be made prior to discharge (Lewis et al., 2017).

**Treatments for Metastasized Prostate Cancer**

**ANDROGEN DEPRIVATION THERAPY (ADT)**

The androgens testosterone and dihydrotestosterone are necessary for the normal growth and function of the prostate, but androgens also stimulate prostate cancer cells to grow. ADT, also known as *androgen suppression therapy*, reduces levels of male hormones (androgens) in the body or stops them from affecting prostate cells. Lowering androgen levels or stopping their action on prostate cancer cells often makes the tumor shrink or grow more slowly for a time, but it does not cure prostate cancer.

Most androgens are produced by the testicles, but the adrenal glands also make a small amount. Early in their development, prostate cancers require fairly high levels of androgens to grow. Such prostate cancers are referred to as *androgen dependent* or *androgen sensitive*, since treatments that lower androgen levels or block androgen activity can slow their growth. Most prostate cancers eventually become “castration resistant.” This means they can continue to grow even though androgen levels are extremely low or even undetectable.
Androgen deprivation therapy is used in different ways:

- **Adjuvant therapy** is therapy given after other primary treatments to lower the risk that the cancer will return. Men who have adjuvant hormone therapy after prostatectomy live longer without a recurrence than men who have prostatectomy alone, but they do not live longer overall. Men who have adjuvant hormone therapy after external beam radiation therapy live longer, both overall and without having a recurrence, than men who are treated with radiation therapy only.

- **Neoadjuvant hormone therapy** is given before or during radiation therapy as well as after radiation therapy. Men who have hormone therapy in combination with radiation therapy live longer overall than men who receive radiation therapy alone.

- **Hormone therapy alone** is given for palliation or prevention of local symptoms in men with localized prostate cancer who are not candidates for surgery or radiation therapy. This may include those with advanced local tumor stage or those with serious comorbidities. It is also standard treatment for men who have a prostate cancer recurrence after treatment with radiation therapy or prostatectomy. Hormone therapy may also be recommended for men with a rapid rise in PSA level within fewer than 12 months. Hormone therapy alone is also a standard treatment for those who have metastatic disease when first diagnosed with prostate cancer.

Length of treatment depends on risk of recurrence and is generally given for 4 to 6 months for men with intermediate-risk cancer and for 2 to 3 years for men with high-risk cancer (ACS, 2018c; NCI, 2018f).

**Types of ADT**

**Orchiectomy**, the “gold standard” for androgen deprivation therapy, is an outpatient surgical procedure in which both testicles are removed. A type of orchiectomy called *subcapsular* removes only the tissue in the testicles that produces androgens, rather than the entire testicle. Orchiectomy has a severe psychological impact due to disfigurement and the permanence of the surgery. Patients do have the option of having artificial testicles that look much like normal ones inserted into the scrotum (Tidy, 2017; ACS, 2018c).

**Luteinizing hormone-releasing hormone (LHRH) agonists** prevent the testicles from producing testosterone. LHRH agonists are injected or implanted under the skin and, depending on the drug used, given anywhere from once a month up to once a year. Drugs include:

- Leuprorelin (Lupron, Eligard)
- Goserelin (Zoladex)
- Triptorelin (Trelstar)
- Histrelin (Vantas)
These drugs initially boost androgen production, referred to as tumor flare, which lasts up to 10 days before falling to very low levels and shutting down testosterone production. Tumor flare can cause ureter or bladder outlet obstruction and bone pain in those whose cancer has spread to the bones. If it has spread to the spine, even this short-term increase in tumor growth could press on the spinal cord and cause pain or paralysis. Castrate levels of testosterone are reached within four weeks.

**Luteinizing hormone-releasing hormone (LHRH) antagonists** work like agonists, but they reduce testosterone levels more quickly and do not cause tumor flare like the agonists do. Degarelix (Firmagon) is used to treat advanced prostate cancer and is given as a monthly subcutaneous injection. The most common side effects of this medication are pain, redness, and swelling at the injection site and increased liver enzyme levels.

**CPY17 inhibitor.** Although LHRH drugs can stop androgen production, other cells in the body, including the adrenal glands, can still make small amounts. Abiraterone (Zytiga) blocks CPY17 enzymes and stops these cells from making androgens. Abiraterone also blocks other hormones, and so prednisone is ordered during such treatment to avoid specific side effects. This drug is taken orally every day.

The antifungal drug ketoconazole (Nizoral) acts similarly to abiraterone by blocking production of androgens from the adrenal glands. It is used to treat men newly diagnosed with advanced prostate cancer who have numerous metastases. Ketoconazole lowers testosterone levels quickly and, like abiraterone, blocks other hormones. This drug can also be prescribed when other forms of hormone therapy are no longer effective.

**Anti-androgens** block the action of androgens. Examples are:

- Flutamide (Eulexin)
- Nilutamide (Niandron)
- Bicalutamide (Casodex)

These oral drugs taken daily are most often combined with orchiectomy or an LHRH agonist as first-line therapy (combined androgen blockade [CAB]). Serious liver toxicity is a possible side effect of taking anti-androgens.

In some men, if an anti-androgen is no longer working, stopping the anti-androgen can cause the cancer to stop growing for a short time. This is referred to as the anti-androgen withdrawal effect.

Newer types of anti-androgens block male hormones from signaling to the cancer cells to grow. These oral medications are helpful in men whose cancer is no longer responding to other forms of hormone therapy and include:

- Enzalutamide (Xtandi)
- Apalutamide (Erleada)
Enzalutamide can be given for either metastatic cancer or nonmetastatic cancer, while apalutamide is typically used for nonmetastatic cancer (Tidy, 2017; ACS, 2018c; NCI, 2018f).

**Hormone Therapy Risks and Side Effects**

Because surgical or medical castration greatly reduces the amount of androgens produced by the body, and because androgens are used by many other organs besides the prostate, it can cause a wide range of side effects.

**Orchiectomy and LHRH** agonists and antagonists can all cause similar side effects, including:

- Decreased libido
- Erectile dysfunction
- Shrinkage of the testicles and penis
- Hot flashes, which may get better or go away with time
- Osteoporosis, which can lead to fractures
- Anemia
- Decreased mental sharpness
- Loss of muscle mass and physical strength
- Insulin resistance
- Changes in blood lipids
- Weight gain
- Mood swings and depression
- Fatigue
- Gynecomastia and mastodynia (breast tenderness)

**Anti-androgens** have similar side effects in addition to the following; however, sexual side effects are fewer.

- Diarrhea (the major side effect)
- Nausea
- Liver damage

The newer anti-androgens ezalutamide and apalutamide can cause worsening of hot flashes. They can also cause some nervous system side effects, including dizziness and, rarely, seizures. Men taking one of these drugs are more at risk for falls and their resulting injuries.
The **CPY17 inhibitor** abiraterone can cause:

- Diarrhea
- Itching and rashes
- Fatigue
- Joint or muscle pain
- Hypertension
- Edema
- Nausea

Having adjuvant hormone therapy after radiation therapy worsens some adverse effects of radiotherapy, particularly the sexual side effects and loss of energy. Many of the side effects of ongoing hormone therapy become stronger the longer they are taken (NCI, 2018f; ACS, 2018c).

**Caring for the Patient Receiving ADT**

Caregivers must be aware of and be able to discuss the reasons for and ways to deal with the multiple side effects of androgen deprivation therapy.

**Hot flashes.** The majority of men who receive ADT experience hot flashes. Standard treatment for hot flashes is medroxyprogesterone, and tentative study results indicate acupuncture to the ear lobe may be of benefit (Smith, 2018b). Other helpful measures for hot flashes include:

- Avoiding alcohol and caffeine
- Avoiding nicotine
- Avoiding spicy foods
- Avoiding eating large meals
- Exercising regularly (may lower the number of hot flashes and how long they last)
- Using a fan
- Wearing cotton clothes
- Taking warm baths or showers instead of hot
- Managing stress to reduce serotonin, which can trigger hot flashes
- Hypnosis
  (NCI, 2018f)

**Gynecomastia/mastodynia.** For the man with gynecomastia and mastodynia, the nurse may provide support during prophylactic breast irradiation, which is an effective physical technique for preventing breast problems. Medical therapy for gynecomastia and
mastodynia can include tamoxifen. Both approaches, however, have limited benefit once gynecomastia is established. Breast reduction surgery may be considered (Smith, 2018b).

**Osteoporosis.** A discussion with the patient regarding lifestyle modifications to help prevent the problems associated with osteoporosis might include:

- Smoking cessation
- Decreased alcohol intake
- Resistance exercises
- Supplementation with calcium and vitamin D
- Bisphosphonates such as alendronate (Fosamax) to increase bone mineral density or reduce loss

The newer drug denosumab (XGEVA, Prolia) increases bone mass through a different mechanism. This drug, however, may cause a rare but serious side effect known as osteonecrosis (areas of dead bone) of the jaw, which is very painful and difficult to heal (NCI, 2018f).

**Muscle mass loss, weight gain, fatigue, insulin resistance.** Exercise, weight loss, and diet changes can be discussed. Because these lifestyle changes are difficult, it is helpful to discuss ways to develop and maintain motivation.

**Sexual side effects.** The sexual side effects of hormone therapy for prostate cancer can be some of the most difficult and can be managed by using intermittent ADT, shorter courses, or use of anti-androgen monotherapy, as well as reducing the duration of therapy. Erectile dysfunction drugs such as sildenafil citrate (Viagra) do not usually work for men undergoing hormone therapy because these drugs do not affect the loss of sexual desire (libido) (NCI, 2018f).

**Castration** is a very devastating effect of orchiectomy treatment, and emotional side effects require extensive preparation and counseling both before and after the procedure. It is difficult to accept the fact of being infertile. Psychologically, for some men, being able to impregnate a female is a very important part of their image of themselves as men. This should be discussed by the patient and his partner. Some men may elect to bank their sperm for use in the future if they believe they will want children later in life. For most men, however, because of age, the latter is not a great concern.

**CHEMOTHERAPY FOR METASTATIC PROSTATE CANCER**

Chemotherapy may be recommended as a treatment for hormone-resistant prostate cancer in:

- Men who have fast-rising PSA levels (i.e., doubling or tripling so quickly that hormone treatment cannot control it)
• Men developing symptoms such as weight loss, pallor, or physical distress
• Men with quickly growing metastatic cancer (i.e., to reduce the need for radiation, which can reduce red blood cells in bone marrow and lead to anemia)

In most instances, one chemotherapy drug is given, rather than multiple drugs in combination. Some of the drugs used are:

• Docetaxel (Taxotere)
• Cabazitaxel (Jevtana)
• Mitoxantrone (Novantrone)
• Estramustine (Emcyt)

The first chemotherapy drug given in most cases is docetaxel combined with prednisone. If this fails or stops to work, other options may be tried.

Another pharmaceutical used for treatment men with metastatic prostate cancer is radium Ra 223 dichloride (Xofigo), a drug that contains a small amount of radiation and is injected into the bloodstream. The radiation seeks out prostate cancer cells that have spread to bone.

Chemotherapy is given in cycles, each cycle typically lasting a few weeks, followed by a period of rest to allow for recovery. Chemotherapy is FDA-approved for men with cancer that has spread to bones but not to other organs and has not responded to other treatments (Cancercare, 2018).

Chemotherapy Risks and Side Effects

Chemotherapy is used for patients with advanced cancer, and the side effects depend on the type and dose of drugs given and the length of time they are used. Common side effects include:

• Nausea
• Vomiting
• Diarrhea
• Hair loss
• Easy bruising or bleeding
• Changes in memory or thinking
• Peripheral neuropathy
• Sores in the mouth
• Constipation
• Infertility
• Fatigue
• Metallic taste in the mouth

In addition, patients receiving chemotherapy are at risk for infections, since chemotherapy agents damage the immune system, reducing the body’s infection-fighting ability (Mayo Clinic, 2017; Cancercare, 2018).

Caring for the Patient Receiving Chemotherapy

Men who are receiving chemotherapy have recurrent or advanced cancer. They receive chemotherapy on an outpatient basis administered by nurses who provide support for the patient and significant others.

At each contact, the nurse assesses the patient for nausea and vomiting, loss of appetite, hair loss, mouth sores, diarrhea, evidence of infection, pain, psychological state, and quality of life. Nurses provide education regarding management of side effects that may include:

Mouth sores

• Use agents that coat the lining of the mouth, form a film to protect sores, and minimize pain.
• Apply topical painkillers directly to the sores if needed.
• Use a straw to keep fluid away from the sores.
• Over-the-counter treatment may be of benefit, including rinsing the mouth with baking soda, salt water, or “magic mouthwash” (a solution containing three of the following: an antibiotic, an antihistamine or local anesthetic, an antifungal, a corticosteroid, and/or an antacid).

Nausea and vomiting

• Avoid foods with strong odors as well as overly sweet, greasy, fried, or highly seasoned foods.
• Eat meals cold or at room temperature.
• Nibble on dry crackers or toast.
• Have something in the stomach when taking medication.

Diarrhea

• Drink plenty of water.
• Use drinks such as Gatorade to provide electrolytes.
• Take over-the-counter medications such as loperamide (Imodium A-D and others) or prescription drugs if required.
• Avoid sweetened foods and alcohol.
• Eat fiber-dense foods such as whole grains, fruits, and vegetables.

Loss of appetite

• Eat small meals throughout the day.
• Avoid liquids with meals or take only small sips; drink most fluids between meals.
• Be physically active to increase hunger.
• Keep high-calorie, high-protein snacks available.
• Eat favorite foods at any time of day.

Pain

• Take over-the-counter and prescription medications as needed.
• Radiation therapy is sometimes used to lessen the pain of prostate cancer that has spread to the bone.
• Physical therapy, acupuncture, and massage may be of benefit.

Fatigue

• Take several short naps or breaks during the day.
• Take short walks or do light exercise if possible.
• Try easier or shorter versions of enjoyed activities.
• Save energy for the most important activities.
• Request assistance for tasks that are difficult or tiring.

(Mayo Clinic, 2017; Cancercare, 2018)

Nurses, physical therapists, and occupational therapists prepare and assist the patient and partner/family with various aspects of self-care and activities of daily living at home. The patient is taught how to maintain optimum nutrition, get adequate rest, manage compromised mobility, maintain central lines, and perform good oral hygiene. They are instructed in signs of infection or subtle signs of illness. Above all, they are taught excellent handwashing and how to avoid infectious agents at home and in public.
It is extremely important to assess for emotional and spiritual issues as well, since recurrent and advanced cancers bring end-of-life issues to the fore. The patient, partner, and family can be referred for counseling and/or pastoral care.

IMMUNOTHERAPY

Immunotherapy uses the patient’s own immune system to fight cancer. Sipuleucel-T (Provenge) is a vaccine designed to use the body’s own specialized white blood cells to destroy prostate cancer cells. This vaccine is given as a series of three infusions into a vein, with about two weeks between each infusion.

A few days before each treatment, some of the patient’s white blood cells are removed from the blood and exposed to a protein that trains them to target and destroy prostate tumor cells. These newly trained white blood cells become a personalized dose of sipuleucel-T, which is then returned to the patient’s bloodstream.

Sipuleucel-T therapeutic vaccine is an appropriate treatment option in asymptomatic or minimally symptomatic men with metastatic castration-resistant prostate cancer. Its use is restricted to patients with slowly progressive disease where a rapid response to treatment is not required (Dawson, 2018).

TREATMENT UNDER STUDY

Photodynamic therapy, laser prostatectomy or laser ablation is a new procedure that can be performed on prostate glands that are larger. A laser releases concentrated light energy bursts of 30 to 60 seconds in length that cut through tissue with a minimum of blood loss. It can dissect away lobes on each side of the prostate, and any tissue that remains behind dissolves and passes out through the urine. It appears to be safe and effective, but its disadvantages include the requirement of a trained physician or medical staff, a relatively long postoperative recovery over several weeks before urinary symptoms improve, and the fact that dead tissue cannot be examined for signs of cancer cells. Photodynamic therapy is currently experimental in the United States and Europe outside of a formal clinical trial setting (Pisters & Spiess, 2018).

Addressing Metastatic Cancer Issues

After the cancer has become unresponsive to androgen deprivation therapy, prostate cancer will usually have produced metastases. Bone pain and symptoms from spinal cord compression are two common problems resulting from metastases and that often must be addressed in patients with prostate cancer.

BONE PAIN

Pain in the lower back, hips, or other location is typically the first symptom of prostate cancer bone metastasis. Other symptoms include fractures and elevated blood levels of calcium due to the cancerous tumors’ breakdown of the structure of the bones.
A new approach to relieving the pain of bone metastases is **MR-guided focused ultrasound (MRgFUS)**, a noninvasive treatment that ablates bone lesions by applying intense heat. Following MRI identification of the location and extent of a bone lesion, the high-resolution images are used to plan a precise ablation of the bone metastases.

MRI guidance allows for the targeted delivery of ultrasound to the lesion. These beams of ultrasound are aimed at the tumor from several directions, and each one passes harmlessly through skin and other tissues. When the beams converge, they generate a short blast of lethal heat at the point where they meet. This heat destroys the lesion at that time and deadens the nerves that send pain signals to the brain. The MRI also uses thermography to monitor the temperature and boundaries of the focused ultrasound.

Within 3 to 7 days, most patients have significant pain reduction, and in many cases, almost no pain remains. The advantages of this method of bone pain control include:

- Noninvasive procedure
- Outpatient procedure
- No risk of infection
- No exposure to radiation
- Pain control results in a week or less
- Comparable or better results when compared with surgery and radiation
- Significant pain relief that is as durable, if not more so, than radiation (Dababou et al., 2018; Barile et al., 2017; FUF, 2018)

**CORD COMPRESSION**

Along with many others in the oncology population, patients with prostate cancer are at high risk for the development of spinal cord compression by metastatic tumor protrusion into the spinal canal. Spinal cord compression causes edema, inflammation, and mechanical compression, leading to neural injury to the cord as well as damaging vasculature and impairing oxygenation. Lumbar cord compression can cause leg weakness, sensory loss, or a decrease in bowel or bladder control.

For the patient with spinal cord pain and/or neurologic symptoms, a baseline neurological examination is done and bed rest with no walking is recommended. If cervical spine lesions are suspected, the patient is placed in a Philadelphia collar. An MRI is performed of the entire spine and high-dose dexamethasone IV is given, followed by oral medication tapering over two weeks. After the symptoms have been reduced, radiation or neurosurgery may be recommended (MD Anderson, 2017).
EMS RESPONSE TO SUSPECTED SPINAL CORD COMPRESSION

Prehospital care of a patient with a suspected spinal cord compression includes assessment and symptom management. The patient with a history of cancer may present with:

- New onset of pain localized to the spine or with radicular pain
- Pain that worsens with movement, lying down, coughing, sneezing, or straining
- Sensory impairment such as numbness, tingling, or pins and needles
- Limb heaviness or loss of balance
- Altered bowel and bladder function
- Perianal numbness with cauda equina compression

The pain that patients with spinal cord compression experience is not relieved by common analgesics. Lying in a recumbent position will most often make it worse. Nonpharmacologic pain management includes placing the patient in a position of comfort, therapeutic calming, and emotional support (Ropper & Ropper, 2017).

PALLIATIVE/SUPPORTIVE TREATMENT

Metastatic prostate cancer usually progresses to a point where further cancer treatments only offer increased problems and discomfort. At this point, palliative care begins. Palliative treatment is not giving up on patient care; it is only shifting the care goals and tasks to relieving symptoms and avoiding side effects.

In palliative care, physical, emotional, and spiritual comfort become the healthcare team’s goals, and completing unfinished tasks and resolving uncompleted relationship problems become the patient’s goals. Healthcare professionals are involved in the provision of palliative care and end-of-life care either in the patient’s home, a nursing home, or an inpatient hospice unit.

Early involvement with a palliative care team has been shown to help prevent some symptoms of prostate cancer, leading to better quality of life (ASCO, 2018b).

THE NURSE AS EDUCATOR

At every step of a patient’s interaction with the medical system, nurses are central navigators ensuring that the patient receives comprehensive care. In order for nurses to meet the educational needs of the prostate cancer patient and significant others, it is necessary for them to be well versed in the following:

- The psychological impact of the diagnosis of prostate cancer
- Male genitourinary anatomy and physiology
• Epidemiology of prostate cancer and its risk factors
• Methods used in diagnosing the cancer
• How the cancer is treated and what to expect with each treatment option
• Side effects of treatment and how they will be dealt with
• Physical and psychological issues concerning impotence
• Urinary and bowel incontinence issues
• Palliative care
• Hospice care

Education of male patients begins with each contact the nurse has with them, whether in clinics, hospitals, nursing homes, client homes, or in conversation with family members and friends. When a patient, friend, or family member is faced with the possible diagnosis of prostate cancer, the nurse is there to provide accurate information. Once a diagnosis of prostate cancer is made, the nurse is also in a unique position to offer navigational assistance for the patient, significant others, and family through the medical system and to provide necessary education regarding treatment options, outcomes, and quality of life issues.

It is important for nurses in all settings and locations to perform a complete assessment initially to determine the patient’s:

• Knowledge about the male anatomy and physiology
• Level of understanding of the disease
• Fears and concerns about diagnosis, treatment, and prognosis
• Past experience with cancer either for self or others
• Psychological reactions to the diagnosis as well as his partner’s
• Support systems and coping methods

Education should be provided using simple terms regarding diagnostic tests and treatments, how they are performed, how long they will take, and what the patient will experience during the process and afterward. It is important to allow adequate time for questions.

The goal of the nurse is to increase knowledge, decrease anxiety, and assist the patient and his partner to openly communicate their concerns. When the patient is emotionally stressed, this increases negative effects. A patient who is not anxious is able to focus on what is occurring, what is being said, and is better able to understand the instructions he should follow after leaving the office.
CASE

Larry has received the news that he may have prostate cancer and will need a biopsy to confirm the diagnosis. His physician gave him a brief clinical description of the biopsy and a three-day course of antibiotics to prevent infection that could be caused by the biopsy needles passing from the rectum into the prostate.

Larry is uneasy about getting a biopsy, so he shared his situation with two men at work. One of the men has had a prostate biopsy and told him it was a very painful procedure.

When Larry arrived at the urologist’s office, a nurse led him to an exam room, checked his vital signs, and completed a questionnaire about his medical history.

Larry was very anxious about this procedure. He had not slept the night before and hadn’t eaten anything that morning. His blood pressure, pulse, and respirations were elevated, and he was perspiring. He was relieved when the nurse asked him if he understood the biopsy procedure. He admitted he had very little knowledge about anything concerning his internal anatomy and only a limited awareness of the procedure he was going to have and what to expect afterward. All he knew was that the doctor was going to “put needles up my butt and stick them in my prostate.”

The nurse was concerned that Larry had not eaten anything and provided him with orange juice and crackers while she proceeded to educate him. She described male anatomy and physiology using a laminated diagram and provided detailed information about how the procedure would be performed. She told him that he may experience pain and discomfort, but with local anesthetic, most men experience very little pain during the actual procedure. Larry felt very relieved to know what was about to happen.

After Larry undressed and put on a patient gown, he was taken to the biopsy room, and the nurse helped him sit on the table, then lie down and turn onto his left side. She instructed him to pull his knees up toward his chest and positioned pillows to help him lie on his side.

The urologist entered, and he and the nurse verified Larry’s identity, allergies, and the proposed procedure. Before going further, the urologist asked Larry if he had any questions. Larry replied that the nurse had explained everything to him, and the biopsy began. Larry experienced a pinching sensation with each of the prostate samples taken but described it as only a “little uncomfortable.” When the biopsy was finished, the nurse helped him get up slowly and walk back to the exam room. There she provided materials for cleansing the rectal area and allowed him to get dressed.

When he was dressed, the nurse returned and sat down with Larry to review with him the instructions he should follow after he left the office. Larry left with his copy of home care instructions and an appointment for a follow-up.

The next day, the nurse called to see how Larry was doing. He told her that he had taken some acetaminophen for discomfort and had decided to work from home that day. He was very grateful for her teaching and reassurance and was debating sharing his positive experience with his coworkers.
SPECIAL CONCERNS OF THE PROSTATE CANCER PATIENT

Sexual Dysfunction

Cancer treatments often hinder a patient’s libido and ability to have an erection. In addition, the patient’s sexual desire can be damped down by feelings of inadequacy and fear of being unable to complete sexual intercourse. Prostate cancer and its treatment therefore disrupt the relationship between a patient and his sexual partner. Male sexuality is a complex interplay between physical, interpersonal, and psychological issues.

PHYSICAL AND PSYCHOLOGICAL ISSUES

Because many men and their partners often do not understand how the male reproductive system works, caregivers should provide detailed descriptions of the physical and psychological processes involved in obtaining an erection and ejaculation. It is important to stress that the mind is a major component of the process and can dampen the success of sexual function through anxiety and fear of failure to perform.

It is common for men to experience change in sexual desire after diagnosis and during treatment. If they are anxious, they may have less interest in sex. Others may experience tiredness and lack of energy.

Changes after hormone therapy, such as weight gain or breast swelling, may affect how a man feels about his body or appearance. If he has had an orchiectomy, he may be worried about how his body looks. Other types of hormone therapy may also change the way his testicles look. All of these factors can result in a decreased libido.

Hormone therapy can also cause ejaculation disorder, reducing the amount of semen produced. With ejaculation, the man may feel the sensations of an orgasm but not release any semen from the penis. This is sometimes called a dry orgasm. Occasionally, some men will find that a small amount of liquid comes out from the tip of the penis during orgasm. Many men also have altered experience of orgasm, with a lack of pleasure, decreased intensity, or delayed orgasm.

Men deal with changes to their sexual function in different ways. Some men find that because they no longer have a desire for sex, it is easier for them to come to terms with problems getting an erection. For some men, the ability to have sex or get an erection is an extremely important part of how they view themselves as men. Sexual activity may be a way of relaxing, working through difficult emotions, coping with difficult times, or boosting self-esteem. Thus, losing the ability to have sex or get an erection can be very hard to come to terms with for some men (Dizon & Katz, 2018).

INTERPERSONAL ISSUES

Changes in the relationship, such as changed roles, may also affect how the person and his partner feel about sex. Some men feel like they have lost their role within the family structure. This may lower a man’s self-esteem and confidence.
The loss of sex in a relationship, changes in the way a couple have sex, or starting sex again after prostate cancer treatment can all affect a relationship, and loss of libido may result in relationship conflict due to lack of emotional intimacy (Dizon & Katz, 2018).

**ADDRESSING THE ISSUES OF SEXUAL DYSFUNCTION**

In general, treating male sexual dysfunction requires a multidisciplinary approach that consists of medical and psychological support offered to both the patient and his partner. Encouraging alternate forms of intimacy, facilitating open communication between partners, and discussing erectile dysfunction treatments will help to alleviate many fears and concerns.

**Intimacy**

It must be stressed that losing interest in sex does not need to result in the loss of a loving and supportive relationship. It is helpful to talk with men and their partners about how to remain physically intimate without having sexual intercourse. Many couples manage to find new ways of being together, which can include hugging and kissing, snuggling, and having physical contact with each other. This maintains intimacy and provides support for each other. It is not uncommon for men to become closer to their partner through developing new forms of intimacy after starting treatment.

Some men will struggle to come to terms with changes in their body image or their ability to perform sexually. This can result in avoiding intimate situations where they may feel under pressure to have sex. Some men may distance themselves from close relationships, but this does not mean that they no longer care for their partner or loved ones.

**Communication**

It is important to encourage men to communicate openly with their partner about any changes that are occurring so that both of them can come to terms with the changes. Talking about problems may help reduce a patient’s worry about what his partner thinks and may help the partner understand the physical or emotional changes being experienced.

It is helpful to counsel the partner of a man with prostate cancer about how treatment affects the man’s sexual function. Partners can practice patience and avoid applying pressure to perform. This will help the man feel supported.

If a patient and his partner have problems talking about sex, it may help to recommend that they seek psychosexual counseling. Talking about sex can be difficult, even for partners who have known each other for a long time.

It may seem strange, but couples occasionally worry that cancer can be passed on when they have sexual intercourse. Caregivers should stress that this is not possible and that having sexual intercourse will not affect the cancer or the success of the treatment.
The nurse also needs to understand that some men try to cope with their feelings on their own because they may be too embarrassed to talk about it or are afraid of worrying their partner or loved ones. Despite the prevalence of erectile dysfunction in prostate cancer patients, most men are reluctant to seek treatment. In addition, the expectations of success the patient has often are not realized, and this may, in turn, lead to nonadherence with therapeutic suggestions (Dizon & Katz, 2018).

**Erectile Dysfunction Treatments**

Along with the patient’s primary provider, a nurse can discuss what options are available to enhance sexual function. First-line therapy is a **phosphodiesterase-5 inhibitor**:

- Sildenafil (Viagra)
- Tadalafil (Cialis)
- Vardenafil (Levitra, Staxyn)
- Avanafil (Stendra)

All appear to be equally effective, but tadalafil has a longer duration of action, and avanafil has a more rapid onset.

The **vasodilators** alprostadil (Cavajet, Edex and Prostin VR) and papaverine are injected into the corpus cavernosum of the penis and have a success rate of 80%. This same medication can be given in pellet form, smaller than a grain of rice, which is inserted into the urethra. This is known as the Medicated Urethral System for Erections (MUSE). Erection occurs in five to ten minutes and lasts for 30 to 60 minutes. With this method, the patient does not need to be sexually stimulated in order to get an erection. The MUSE is not as effective as injections, however, producing erections in about 30% to 40% of men with ED.

A **vacuum constriction device** consists of an acrylic cylinder placed over the penis. A lubricant is used to create a good seal between the body and the cylinder, and a pump mechanism is used to create a vacuum inside the cylinder, allowing the patient to achieve an adequate erection. If an erection is achieved, a band or ring is placed over the base of the penis to help maintain the erection.

**Penile implants or prostheses** show a high degree of patient satisfaction. Patients in which nonsurgical therapies fail or who find other options unacceptable may be candidates for a penile prosthesis. A penile implant is a medical device surgically inserted into the penis that helps the patient achieve a mechanical erection.

Improving penile sensation for men who have difficulty with orgasm can include the use of a **vibrator** at the base of the penis or on the scrotum and **pelvic floor physical therapy**, because laxity of these muscles can be associated with weaker or absent sensation of orgasm.
Low libido is psychological and may improve with sexual counseling and encouragement to explore nonpenetrative activities (Dizon & Katz, 2018).

(See also “Patient Rehabilitation” later in this course.)

### CASE

Jack was diagnosed with prostate cancer last winter. He and his wife, Julie, met with his doctor and discussed treatment options. Because of their fear about the diagnosis, they decided that Jack would undergo a nerve-sparing radical prostatectomy to get rid of the cancer. A laparoscopic radical prostatectomy was done.

Julie and Jack had always had a “fantastic” sex life and were aware of the risk of impotence following the surgery. They did not, however, openly discuss their concerns about how this might affect their relationship after the surgery.

Six weeks after the surgery, and when they felt ready, they attempted sexual intercourse. Jack had only a partial erection, but they were hopeful things would improve. Over the next few months, his erections were still not strong enough to penetrate, and maintaining an erection was difficult. Julie and Jack tried to share intimacy in other ways, but neither felt these were satisfactory. Finally, Julie told Jack that she was unhappy with the situation and talked him into making an appointment to ask his doctor for some help.

In the office, the nurse admitted Jack and took his vital signs. She asked him how things were going, and he told her why he made the appointment. The nurse encouraged him to talk, and he expressed how terrible he felt that he was unable to satisfy his wife. He said he was afraid she would eventually leave him. Part of his fear, he said, was that Julie was much younger than he and that he was feeling “like a useless old man.”

The nurse told Jack that it was normal to have such feelings and suggested he sit down with Julie and tell her what his fears and concerns were. He agreed that he should do this. The nurse also offered to meet with them as a couple to help them with their communication. She told Jack about some of the methods used to help treat erectile dysfunction, how they work, and their effectiveness. She told him to discuss each one thoroughly with the physician.

When the physician talked with Jack, he described the various methods available and recommended medications. Jack was not eager to use the methods that required surgery or removed spontaneity and required preplanning. He finally elected to try Viagra.

Jack went home and discussed his visit with Julie. He told her how he had been feeling and how afraid he was of losing her. She reassured him that she had not considered leaving him. He told her about the Viagra the doctor gave him, and they made a date to have dinner and stay in a nice hotel for the weekend.

The next visit with the physician, Jack reported that the Viagra worked wonderfully and that he and Julie were back on track toward a fantastic sex life.
Urinary Incontinence

Transient urinary incontinence is common in men who have had surgery or radiation for prostate cancer. Incontinence has serious physical, psychological, and social consequences.

Removal of the prostate through surgery or destroying it with radiation disrupts how the urinary tract functions. Radiation can reduce the capacity of the bladder and cause spasms that force urine out. Surgery can damage the nerves and sphincters that help control bladder function and the ability to control urine flow.

Men may experience different types of urinary incontinence with different degrees of severity. Some men only dribble urine, while others may experience total loss of control. Stress incontinence can occur with any physical activity, such as coughing, sneezing, laughing, and lifting. Urge incontinence can give little to no time to reach the restroom.

The return of control over urination usually occurs within a few months. Age is a factor in recovery time, as is a history of urinary problems prior to treatment. Recovery is gradual over time until only leaks or dribbling is present, and then ultimately full control may be regained.

It is important that patients, partners, and families understand that incontinence is a possibility after treatment, and clinicians should make every effort to impart this information beforehand. Since there can be a disparity between what surgeons tell patients about their postoperative course and what patients hear, it is always helpful to provide information in writing, especially about the risk of incontinence.

APPROACHES TO ASSIST WITH URINARY INCONTINENCE

Problems with incontinence begin after a catheter has been removed. Clinicians must recognize both the physical and emotional problems associated with urinary incontinence.

Behavior Modifications

It is important to provide supportive care for urinary incontinence and instructions on behavior modifications, such as:

Lifestyle modifications

- Smoking cessation (causes overactivity of the bladder)
- Reduced intake of bladder irritants such as caffeine, aspartame and artificial sweeteners, citrus juices
- Maintaining a good bowel regimen
- Fluid modifications for those with urge incontinence
Scheduled voiding regimens

- Urinating every 2 to 3 hours during walking hours and when feeling full
- Bladder retraining and urge suppression strategies such as relaxation and distraction techniques, self-monitoring, reinforcement techniques, and other strategies such as conscious contraction of the pelvic floor muscles

Pelvic floor muscle rehabilitation

- Performing pelvic floor (Kegel) exercises (see box below)
- Biofeedback complementary therapy

Incontinence Management Strategies

Clinicians also provide guidance on urinary incontinence management strategies, such as:

Anti-incontinence devices

- Intraurethral occlusive device (plug) (a single-use device worn in the urethra to provide mechanical obstruction to prevent urine leakage; removed for voiding)
- Incontinence clamps (penile compression devices) applied to the penis to prevent flow or leakage via the urethra and released to void

Containment devices

- External collection devices (condom catheter) and drainage bag
- Absorbent products (pads and undergarment systems)
- Protective plastic sheet for the bed and a plastic chair pad

(Lewis et al., 2017)

PELVIC FLOOR (KEGEL) EXERCISES

The most effective way for men to regain control of urination is by performing pelvic floor exercises, also known as Kegel exercises. Physical therapists, occupational therapists, and nurses may instruct and follow up with these exercises, which are done to help strengthen the muscles that support the bladder and are involved with sexual function. It is recommended that these exercises be taught preoperatively, as they are easier to learn before rather than after surgery.

The first step in performing Kegel exercises is to ensure that the right muscles are being exercised. This can be done in one of two ways: 1) the man can sit on the toilet and try to stop and start the flow of urine several times while urinating, or 2) the man can contract
his rectum as if trying to prevent the passage of gas or pinching off stool, without tensing up any other muscles (buttocks, abdomen, or legs). These sensations tell him he is exercising the correct muscles.

If the patient has trouble locating these muscles, biofeedback may be recommended to ensure that the correct area is being contracted and strengthening the pelvic floor is effectively achieved.

Once the correct muscles are identified, the next step is to squeeze these muscles, hold them for 3 to 5 seconds, and then relax for 3 to 5 seconds. Repeat this a few times until it can be repeated easily 10 to 20 times. When first learning these exercises, it is often easiest to perform them while lying down in bed. Later on, they can be done while sitting, standing, and even walking.

It may take up to six weeks before there is any noticeable change and several months to achieve the desired results (Simon Foundation, 2018).

PATIENT REHABILITATION

Physical therapy and occupational therapy specialists may be involved in the care of prostate cancer patient from the beginning of treatment to the end of a patient’s life. They provide inpatient care, outpatient follow-up and education, and services in home care, skilled nursing, and hospice care settings.

Oncology rehabilitation encompasses a wide range of therapies designed to build strength and endurance, maintain energy for activities of daily living, reduce stress, and especially reduce the effects of cancer treatment.

Fatigue

Fatigue is one of the most common side effects of cancer treatments such as chemotherapy and radiation therapy. Fatigue is a feeling of excessive exhaustion not relieved by rest or sleep. Physical therapy and exercise are the only evidence-based treatments for cancer-related fatigue.

Physical and occupational therapists evaluate patients and develop individualized exercise regimens that increase strength, mobility, endurance, and balance as well as teach the patient energy conservation techniques.

Other rehabilitation measures to manage fatigue can include:

- **Nutrition counseling.** Many patients lose weight and are unable to eat due to treatment-related nausea, vomiting, and anorexia. A nutrition counselor can help ensure the patient is getting enough calories, fluids, protein and other nutrients to help prevent fatigue and increase energy.
- **Psychosocial measures.** Reducing stress, anxiety and depression can have a beneficial effect on fatigue. The patient may undergo counseling, join a support group, or learn stress management techniques, which may strengthen the ability to cope, improve mood, and restore energy.

- **Rest.** Conserving energy is important, and patients can be advised to undertake only the most important activities when having the most energy. Encouraging the patient to be realistic about limitations and accept help from others can be of benefit.

- **Distraction.** It is helpful to “escape” into relaxing activities such as reading, being with friends, or watching a movie. Some hospitals implement humor therapy for patients with cancer and other chronic illnesses.

- **Relaxation therapy.** Learning relaxation techniques, massage therapy, yoga, and mindfulness exercises may be helpful.

- **Renewal through nature.** Simple outdoor activities such as gardening, bird watching, and sitting beside a pond, river, or lake have been found to restore attention and decrease fatigue.

- **Medications.** Antidepressants or erythropoietin for anemia may be helpful in combating fatigue. (NCCN, 2018)

### Incontinence

Both physical and occupational therapists may provide education in behavior modification for coping with incontinence. Pelvic floor muscle training (PFMT) with or without biofeedback taught prior to surgery and performed postoperatively decreases the duration and degree of urinary incontinence after prostatectomy. The purpose of PFMT is to retrain the pelvic muscles by improving strength in order to overcome the insufficiency of injured sphincters.

Biofeedback involves employing electrodes to measure pelvic-floor muscle activity to help the patient become more aware of the correct way to use pelvic floor muscles. Muscle strengthening exercises to stretch and strengthen other important muscles that help support bladder function can be taught to the patient, and electrical stimulation may be applied to help improve awareness of muscle function and retrain the pelvic floor muscles (APTA, 2017).

A new form of therapy has been found to improve post-prostatectomy stress incontinence. It involves a supervised program with outpatient active pelvic floor training and a new form of synchronic high-intensity whole body vibration therapy on a treatment bed (Evocell) (Crevenna, et al., 2017).

(See also “Urinary Incontinence” earlier in this course.)
CASE

Harold recently underwent a radical prostatectomy for prostate cancer. He lives in a group home for individuals with cognitive disabilities, and he has had a home care nurse visit him on a daily basis to provide wound and catheter care since his return home from the hospital. She has provided the staff with information regarding potential incontinence and told them to contact her if there are any problems.

The staff at the home has been able to assist Harold with his activities of daily living, but after his catheter was removed two days ago, Harold has been incontinent and unable to avoid soiling himself and the furniture. His caregivers requested assistance from the nurse.

The nurse assessed Harold and determined he was continually dribbling urine and was able to urinate when going to the bathroom. He was unaware that he was dribbling until others noticed it. The nurse recommended that Harold be placed in incontinence undergarments until he regained control of his urine again. She also recommended the staff purchase protective pads for his bed and his favorite chair.

The nurse then referred Harold to a physical therapist, who came to the group home to complete an evaluation and determine the best treatment approach. Because of Harold’s mental limitations, teaching pelvic floor exercises would be difficult, so the therapist elected to begin treatment using electrical stimulation and biofeedback to teach Harold how to coordinate his muscle contractions. The stimulation increased awareness of the pelvic floor muscles and allowed Harold to recognize the sensation of tightening these muscles. By concentrating and joining in, he learned how to contract the pelvic floor muscles and eventually could do them without the stimulation. The therapist also offered Harold and the staff members suggestions to avoid certain foods and drinks that are known bladder irritants, such as caffeine.

The physical therapist next met with staff members to provide education about the pelvic floor exercises and to explain when and how often they should encourage Harold to practice them. They were instructed to tell Harold to tighten and hold his pelvic floor muscle for five seconds and then relax them. He should be encouraged to do this 10 to 20 times three to four times each day.

Over the weeks that followed, the staff helped Harold to perform his exercises. Eventually he demonstrated the ability to stop and start his urine stream by squeezing the correct muscles.

Harold also required their assistance changing his habit of drinking four cups of coffee a day, and he gradually accepted herbal teas instead. He was able to avoid drinking liquids prior to bedtime, but it was difficult, as he did not grasp why he could not drink, and he suffered from dry mouth as a side effect of his psychiatric medications. To address this, he was often given ice chips to suck on when he was thirsty. Staff members also reminded Harold every two hours to go to the bathroom, and they checked to make sure his undergarment was changed when it became wet.
Both the physical therapist and nurse provided follow-up care. The therapist met with Harold regularly over a four-week period of time to ensure that the exercises were being performed correctly and to monitor their effectiveness. The nurse visited Harold on a weekly basis to make certain he was receiving good skin care due to incontinence.

The staff remained diligent in toleting him and working with his exercises. Within six months Harold remained dry for most of the day, with only occasional incontinence when distracted or after drinking a lot of liquids.

**Loss of Bone Mineral Density and Muscle Strength**

Physical therapy can help improve bone density and muscle strength, which may be lost as a result of androgen deprivation therapy. Wolff’s Law states that bone grows and remodels in response to the forces that are placed upon it. Modalities that are based on this law include modified strength training and weight-bearing exercises.

Strength training (resistance exercise) may include the use of weights or bands, push-ups, or pull-ups. These exercises increase muscle mass and help improve bone density and balance, which can also prevent falls.

Weight-bearing exercises such as walking, aerobics, dancing, or anything that gets the person up and moving also maintain or improve bone density. Walking, in particular, helps improve bone density in the spine and hips (SCCA, 2018).

Physical therapy intervention may also improve bone density and muscle strength through the use of whole-body vibration exercises performed on an oscillating platform, which transmits energy to the body, forcing muscles to contract and relax and inducing stress within the musculoskeletal system, causing subsequent adaptation (McMillan et al., 2017).

**Lymphedema**

Lymphedema (swelling) can occur in the prostate cancer patient following removal of lymph nodes during surgery or as a result of total pelvic area radiation damage to the lymph nodes and/or the lymph system. When this occurs, the body is no longer able to rid itself of excess fluid, which then collects in the lower extremities. Symptoms of lymphedema include:

- Swelling or tenderness of the limb(s)
- Tightness of clothing
- Localized pain, numbness/tingling or discomfort
- Areas that feel full, heavy, or fatigued
- Decreased movement of the limb(s)
- Skin over the area that feels tight or hard
Determining the presence and extent of lymphedema is done by obtaining clinical history, physical examination of tissue quality, symptomatology, and/or the presence of increased limb volume.

**MEASURING LIMB VOLUME**

Different approaches to measuring limb volume include:

- **Optoelectronic volumetry (perometry).** This approach uses parallel-acting infrared light beams to estimate the volume of a limb. Light transmitters are located on two sides of the perometer frame and project light toward photosensors on the opposite two sides. When the limb is placed inside the frame, the light transmitters are activated and the limb blocks the transmission of light from one side of the frame to the other. This creates an electronic image. As the frame is moved along the limb, images are recorded every 0.5 centimeter, creating a highly accurate measurement of limb size and volume.

- **Water displacement method (water plethysmography).** Considered the “gold standard” for measuring limb volume and the only reliable method available to assess edema of hands and feet, it involves submerging the limb in a tank of water and measuring the water that is displaced.

- **Circumferential measurement.** Measuring the circumference of the limb at predetermined points along the limb using a flexible measuring tape is the most widely used method and is reliable when standard protocol is adhered to. Measuring circumferences of the leg can also be done using a device that takes into account the height at which the circumference has been measured. This device consists of a tape measure fixed to a stand attached to a small board on which the patient stands. The height of the tape measure from the floor is always the same.

- **Bioimpedance.** Water is a good conductor of electrical current. The bioimpedance analyzer uses electrodes similar to EKG pads, which are applied to one hand and one foot when the patient is lying supine. The bioimpedance analyzer passes an imperceptible electrical current through the electrodes to measure resistance to the flow of electrical current. This resistance can be used to calculate body composition.

- **Truncated cone formula.** Using this technique, upper or lower limb measurements are performed at 4 cm intervals beginning at the wrist or ankle. The measurements are then converted to volume using a truncated cone formula.
  
  (Mehrara, 2018)

**CLASSIFYING SEVERITY OF LYMPHEDEMA**

When lymphedema is diagnosed, there are several classification methods used to determine severity. The **Society of Lymphology (ISL)** uses three stages based on severity using two criteria: the softness or firmness of the limb and the outcome after elevation:
• Stage 0: Subclinical or latent condition where swelling is not evident despite impaired lymphatic transport. Stage 0 may exist for months or years before overt lymphedema occurs.

• Stage I: Lymphedema is spontaneously reversible with limb elevation usually within 24 hours. Pitting edema and increased extremity girth are present.

• Stage II: Does not resolve with limb elevation alone. Characterized by a spongy consistency of tissue with no signs of pitting edema. Tissue fibrosis causes limbs to harden and increase in size.

• Stage III: Also called lymphostatic elephantiasis, the most advanced stage. Pitting can be absent and skin may have fat deposits, acanthosis (thickening of the skin), and wart overgrowths.

The National Cancer Institute Common Terminology Criteria for Adverse Events (CTCAE) categorizes lymphedema severity based on examination and functional impairment:

• Grade 1: Trace thickening or faint discoloration
• Grade 2: Marked discoloration, leathery skin texture, papillary formation; limits instrumental activities of daily living
• Grade 3: Severe symptoms limiting self-care and activities of daily living

The American Physical Therapy Association (APTA) uses girth as an anthropometric measurement to classify lymphedema. The maximum girth difference between the affected and unaffected limb is used to determine the class of lymphedema:

• Mild lymphedema: Maximum girth difference <3 cm
• Moderate lymphedema: Girth difference 3 to 5 cm
• Severe lymphedema: Girth difference >5 cm
(Mehrara, 2017)

Measurement of limb volume is not particularly useful when both limbs are affected; however, measurements can be used to assess the effectiveness of treatment being given.

LYMPHEDEMA MANAGEMENT

In the early stages when swelling is minimal, lymphedema is generally well managed using custom-fitted compression garments, exercise, and/or elevation to improve lymph flow. Compression garments are worn continuously throughout the day and removed at night. They are reapplied as soon as the patient awakens in the morning.

Both occupational and physical therapists may determine what combination of compression therapy and manual techniques would be most effective for an individual patient. Pneumatic
pump compression may be used on an outpatient basis or in the home. This treatment provides sequential, active compression that “milks” excess lymph from the extremity.

With more severe edema, complete decongestive therapy is employed, which includes:

- **Manual lymphatic drainage (MLD):** A light skin-stretching technique that stimulates the lymphatic system. Manual massage engages collateral lymph vessels, allowing accumulated lymph to be drained into nearby regions where the lymphatics are functioning normally. MLD involves circular movements or continuous spiral-type strokes to the skin, resulting in the skin being moved over the subcutaneous tissue in the direction of lymph flow. Pressure is increased and then reduced. This constant change in pressure generates a pumping effect. This technique also reduces the susceptibility for infection, softens tissue, and improves the appearance and functional use of the extremity.

- **Compression:** Layered bandaging with foam or specially fitted garments that support the swollen area. Short stretch bandages are used to prevent the reaccumulation of evacuated lymph fluid and to break up deposits of accumulated scar and connective tissue. During the active phase of treatment, the bandages stay in place until the next manual lymph drainage session begins. During the maintenance phase of therapy, the patient is encouraged to wear the bandages while sleeping.

- **Exercises:** Specific exercises that help to pump lymph out of the swollen area. These exercises are normally done in the supine position and may include:
  
  - Ankle pumps: Flexion and extension of feet at ankles while lying supine with legs elevated
  - Pelvic tilt: Squeezing the gluteus maximus muscles
  - Single knee to chest: Bringing alternate knees to the chest
  - Clamshells or leg falls: Abducting and adducting the knees with ankles together either at the same time or alternately
  - Leg slides: Alternately sliding each leg out to the side and return to the center
  - Bridges: Lifting the hips with the knees bent and feet flat on surface
  - Ankle inversion/eversion: Moving the foot from side to side
  - Toe curls/toe splays: Curling the toes and then spreading them apart
  - Trunk rotations: Rotating the trunk side to side with knees bent and feet on the surface

- **Skin care:** Keeping the skin clean and moisturized to help prevent infection

- **Self-care** management and training to manage lymphedema at home  
  (Branas, 2018; OSUMC, 2018)
Erectile Dysfunction

Sexuality is an activity of daily living that is addressed by both occupational and physical therapists. Occupational therapists may work with patients to allow them to express fears and concerns and offer education assistance with problem solving. Physical therapists may work with patients on physical and/or positional adaptations for sexual activity, and encourage experimentation to find resolutions, especially in cases where certain sexual positions are limited or impossible due to pain, fatigue, or positioning issues (AOTA, 2018).

Physical therapy evaluation may include both an internal and external examination of muscles looking for myofascial restrictions and/or muscle trigger points. The ischiocavernosus and bulbospongiosus muscles are palpated externally to look for reproduction of pain and/or tightness. The internal portion of the examination is a rectal exam to palpate the deeper layer of muscle, the levator ani group. The tone and motor control will also be assessed.

Treatment will be determined by the findings, but typically may include pelvic floor exercises, or relaxation-based exercises to relax and release the relevant muscles, or a combination of the two. Exercises for muscles indirectly related, such as the abdominal and gluteal muscles, may also be included. Exercises, such as stretching, foam rolling, and mindfulness-based exercises and/or
strengthening may be prescribed to do at home that can help make the physical therapy more effective (Mueller, 2017).

(See also “Erectile Dysfunction Treatments” earlier in this course.)

**Peripheral Neuropathy**

Along with fatigue, one of the most difficult side effects of chemotherapy is peripheral neuropathy—a tingling, burning, or shooting pain sensation in the hands and feet due to nerve damage. The patient may also experience loss of feeling, have trouble using fingers, or exhibit balance problems, tripping, and/or decreased reflexes.

Rehabilitation therapy can help to improve balance and gait, fine motor skills, dexterity, and coordination. A primary goal of treatment is to reduce the risk of falls and injuries that can result from neuropathy. Physical therapy may help maintain strength, mobility, and function via range-of-motion exercises, muscle-strengthening exercises, and balance training to promote stability and to prevent falls. Occupational therapy may offer aerobic and flexibility exercises (stretching) to keep joints flexible and reduce chances of injury during other activities (FNP, 2016).

**Scar Tissue Management**

Surgery and radiation therapy can create scar tissue that may become painful, decrease flexibility, or entrap nerves. Physical therapists may perform manual scar mobilization in order to help with remodeling. Myofascial release is often used to manage scar tissue and the adhesions that may accompany it. Another method to help remodel scar tissue includes specific stretching and flexibility exercises that may help elongate injured tissues and improve their mobility. Treatment to remodel scar tissue takes at least 6 to 8 weeks (Sears, 2018).

A newer technique used in physical therapy is called *instrument-assisted soft tissue mobilization (IASTM)*, which involves using special stainless-steel instruments of various shapes and sizes to massage and mobilize tissue. Because of the potential intensity of this intervention, IASTM should be performed by a clinician with appropriate additional training and/or certification.

**Stress Management**

Occupational therapists offer ways to help men acknowledge, express, accept, and use problem-solving techniques to address the changes that result from prostate cancer treatment. Effective stress management can include relaxation training, education, a supportive environment, and social support. Such interventions relieve treatment-related symptoms, reduce the physiological accompaniments of stress, and improve mood. Men who participate in such rehabilitation are shown to have improved mental health by feeling more in control and experiencing reduced interpersonal conflict and distress related to cancer-related intrusive thinking (Huri et al., 2015).
Palliative Care

Palliative care is care given to improve the quality of life of patients who have a serious or life-threatening disease such as cancer. Palliative care is an approach to care that addresses the person as a whole, not just their disease. The goal is to prevent or treat, as early as possible, the symptoms and side effects of the disease and its treatment, in addition to any related psychological, social, and spiritual problems. Palliative care is also called comfort care, supportive care, and symptom management.

Patients may receive palliative care in the hospital, an outpatient clinic, a long-term care facility, or at home under the direction of a physician. Palliative care can begin at any point along the cancer care continuum, whereas hospice care begins when curative treatment is no longer the goal of care and the sole focus is quality of life. In palliative care, physical and occupational therapists contribute to the minimization of secondary symptom progression (Montagnini & Javier, 2017).

The role of the occupational therapist in palliative and hospice care is quite significant. Occupational therapists identify the roles and activities that are meaningful to the patient and address any barriers that exist that prevent performance of them. They consider both the physical and psychosocial/behavioral health needs and pay close attention to what is most important to the patient. Occupational therapists offer interventions in:

- Activities of daily living
- Instrumental activities of daily living
- Rest and sleep
- Leisure participation
- Psychosocial/behavioral health

Therapists look at available resources, the patient’s support system, and the environment in which the patient resides and participates. The central goal for occupational therapy is the improvement in quality of life as defined by the patient by maximizing remaining functional abilities (AOTA, 2015).

Physical therapists also have a prominent role in palliative care, with the goals of increasing comfort and independence within the patient’s functional abilities and maintaining and/or improving overall strength, range of motion, and endurance. Physical therapists may use heat, cold, positioning, adaptive equipment, and/or TENS therapy for pain relief; teach appropriate adaptations to activities of daily living; and design exercises that improve endurance and positioning regimens that help the patient maintain functional range-of-motion (Montagnini & Javier, 2017).
PHARMACOGENOMICS IN PALLIATIVE CARE

Less than optimal management of symptoms such as pain, neuropathy, depression, nausea and vomiting, and infection places a significant burden on patients with cancer and impairs their quality of life. The effect of genetic variations on drug response directly influences a patient’s response to medications, including antiemetics, opioids, neuromodulators, antidepressants, antifungals, etc.

Pharmacogenomics is the study of how genes affect an individual’s response to drugs. This is a fairly new field that combines pharmacology and genomics to develop effective, safe medications and doses tailored to an individual’s genetic makeup. There is currently a growing body of pharmacogenomic information that can guide clinicians in the selection of medications for a particular patient with cancer from the very start of treatment, resulting in personalized supportive care throughout the cancer care continuum (USDHHS, 2018; Patel et al, 2018).

QUESTIONS PATIENTS MAY ASK

Q. What is a prostate?
A. The prostate is a gland located just below the bladder in men. The urethra—the tube carrying urine from the bladder and out through the penis—runs through the prostate. The prostate’s job is to make some of the seminal fluid that mixes with the sperm when a man ejaculation.

Q. What is prostate cancer?
A. Prostate cancer is a disease in which new gland cells inside the prostate are made without a stop signal. The new cells are not normal, they crowd out the normal cells, and they block tubes and channels that should be open.

Sometimes these out-of-control cancer cells metastasize, which means that they break away from the prostate and spread into the body. Metastasizing cancer cells often settle in lymph nodes, where they continue to divide and crowd out the normal lymph node cells. Prostate metastases can also settle inside bones, where they cause pain and weaken the architecture, making a person prone to bone fractures.

Q. What does PSA mean?
A. PSA stands for “prostate-specific antigen,” a chemical that is made in the prostate. A small amount of PSA normally leaks into the bloodstream, and the blood level of PSA can be measured using a simple blood test.

A rise in the blood level of PSA is a sign that something unusual is happening to the prostate. More PSA leaks into the bloodstream when the prostate is injured, such as when it becomes damaged due to trauma or disease.
infected or when it is biopsied. More PSA also enters the bloodstream when the prostate is growing excessively, such as in benign prostatic hyperplasia (BPH) or in prostate cancer. Even small areas of prostate cancer will sometimes increase the blood level of PSA.

Q. What is a Gleason score (grade)?

A. **Gleason** is the name of a grading system used to determine the aggressiveness of prostate cancer. It is used to help determine appropriate treatment options. The higher the Gleason score (grade), the more likely it is that the cancer will grow and spread quickly. Gleason scores (grades) are given by a pathologist who has studied microscope slides of prostate tissues. Usually, the tissue has been obtained by a biopsy. Tissue can also be obtained from a prostate that has been surgically removed in a procedure called a prostatectomy.

Q. I have been diagnosed with prostate cancer. What should I do next?

A. A diagnosis of prostate cancer brings two major decisions. First, should the disease be treated immediately? Second, what form of treatment is best? At the moment, clinicians are not sure of the best answers to either of these questions. A critical part of the decision-making process is finding out what choices you feel are best under the circumstances. In the end, you—the patient—have to be able to say, “Of all my options, this is the one that is least worrisome.” It can take time to understand your options sufficiently to make peace with one of them.

Q. My primary care provider just told me that I have prostate cancer. Is this a “death sentence”? I want to know the truth: how soon am I going to die?

A. Being diagnosed with cancer is scary. It can cause you and your family to realize the fact that someday you are going to die. However, prostate cancer is rarely a “death sentence” because prostate cancers tend to grow slowly, and most men with prostate cancer end up dying from some other cause. Statistics indicate that only 1 in 39 men with prostate cancer will die from it.

It is not possible to predict how long a person will live after being diagnosed with prostate cancer. Details about your particular cancer can give you some clues, but your cancer may behave differently than the statistical averages. For a general perspective, here are some overall numbers:

- Current relative survival rates for all stages of prostate cancer:
  - 5 years, 99%
  - 10 years, 98%
  - 15 years, 96%

- Five-year survival rates based on stages of prostate cancer
  - Local (confined to the prostate only), nearly 100% when found at this early stage
  - Regional (cancer has spread from the prostate to nearby areas), nearly 100%
Distant (cancer has spread to distant lymph nodes, bones, or other organs), about 29%
(ACS, 2018a)

Q. My physician says I have BPH. What is that?

A. *BPH* stands for “benign prostatic hyperplasia (or hypertrophy).” A man’s prostate grows slowly throughout most of his life. By the time men are in their 60s, the continual enlargement often causes symptoms because the prostate begins to press on the bladder and the urethra. Symptoms of an enlarged prostate include having a hesitant, interrupted, or weak stream of urine; having to urinate more frequently, especially at night; and not having complete control so that urine leaks or dribbles.

BPH is a common, perhaps even normal, enlargement of the prostate in older men. It is not a form of cancer. In BPH, prostate cells do not spread (metastasize) or destroy other tissues, and BPH does not cause death.

**CONCLUSION**

Prostate cancer is a disease of the older male. In the United States, it is estimated that about 1 man in 7 will be diagnosed with prostate cancer during his lifetime, and 1 man in 39 will die of this disease. When the diagnosis of prostate cancer is made, it has a profound impact on both the patient and his significant others.

Most prostate cancers are discovered by noninvasive screening using a digital rectal exam and PSA levels. Early stages of prostate cancer usually produce no symptoms. On the other hand, late stages of prostate cancer can present with pelvic pain, urinary obstruction, or bone pain. The definitive diagnosis is made from a biopsy, and the cancers are categorized by grade and stage.

Treatment for localized prostate cancer includes conservative measures (such as watchful waiting and active surveillance) as well as curative attempts (such as surgery, cryotherapy, and radiation). When prostate cancer has spread to nearby tissues or metastasized to other areas in the body, treatment measures include androgen deprivation therapy, chemotherapy, and immunotherapy.

Early treatment of small prostate cancers brings the promise of a cure but also cause side effects that may reduce the patient’s quality of life. For example, surgery and radiation therapy are often followed by urinary problems, bowel problems, or impotence.

There remains some controversy about screening methods for early asymptomatic cancers. PSA levels and digital rectal examinations have resulted in more patients being treated unnecessarily. All organizations’ guidelines agree, however, that PSA-based prostate cancer screening requires an informed, shared decision-making process, and that the decision should reflect the patient’s understanding of the possible benefits and risk.
A multidisciplinary team approach is necessary in the management of prostate cancer, and nurses and therapists play a key role throughout the disease continuum, helping maintain the highest quality of life possible for each patient. Patients require supportive care and skilled nursing care from the initial process of making a diagnosis through the treatment decision-making, treatment, and post-treatment periods following diagnosis.

RESOURCES

Clinical practice guidelines (American Urological Association)
https://www.auanet.org/guidelines

Prostate cancer (American Cancer Society)
http://www.cancer.org/cancer/prostate-cancer

Prostate cancer (CDC)
http://www.cdc.gov/cancer/prostate

Prostate cancer (Mayo Clinic)

Prostate cancer (National Cancer Institute)
https://www.cancer.gov/types/prostate/hp

Prostate Cancer Foundation
http://www.pcf.org

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1. In the United States, prostate cancer is most common in which racial group?
   a. Asians
   b. Native Americans
   c. Whites
   d. Blacks

2. The 5-year survival rate for male patients with local and regional prostate cancers is nearly:
   a. 30%.
   b. 50%.
   c. 90%.
   d. 100%.

3. Which is a correct statement about the anatomy/physiology of the prostate gland?
   a. The portion of the prostate against the bladder is called the base.
   b. It is shaped like a small almond.
   c. It is the smallest accessory gland of the male reproductive system.
   d. It secretes a thick, slightly acidic fluid.

4. The highest percentage of prostate cancers begin to develop in which internal division of the gland?
   a. Transition zone
   b. Central zone
   c. Peripheral zone
   d. Capsule

5. The main function of the prostate gland is to:
   a. Assist in the production of sperm.
   b. Filter urine from the bladder.
   c. Secrete a portion of the seminal fluid.
   d. Filter the seminal fluid.
6. Which is a true statement about prostate-specific antigen (PSA)?
   a. PSA helps to thicken the ejaculated semen.
   b. PSA leaks into the bloodstream during seminal fluid production.
   c. PSA production by the prostate is an indicator of cancer.
   d. PSA levels decrease when the prostate gland enlarges or becomes malignant.

7. Which hormone plays a critical role in prostate growth?
   a. Dihydrotestosterone
   b. Estrogen
   c. 5-alpha reductase
   d. Luteinizing hormone

8. Prostate cancer is classified as a(an):
   a. Adenocarcinoma.
   b. Squamous cell carcinoma.
   c. Leiomyosarcoma.
   d. Prolactinoma.

9. Which is a true statement concerning benign prostatic hyperplasia (BPH)?
   a. Men with prostate cancer always have BPH.
   b. The pathogenesis of BPH is not completely understood.
   c. Men with BPH will require surgical intervention after age 50.
   d. BPH is a precancerous condition.

10. Which term refers to an early prostate abnormality consisting of a new growth of abnormal cells most often found in the peripheral zone of the gland?
    a. Atypical small acinar proliferation (ASAP)
    b. Benign prostatic hypertrophy (BPH)
    c. Proliferative inflammatory atrophy (PIA)
    d. Prostatic intraepithelial neoplasia (PIN)

11. The most common type of prostate cancer is:
    a. Prostatic ductal adenocarcinoma (PDA).
    b. Acinar adenocarcinoma (glandular).
    c. Transitional cell (urothelial) cancer.
    d. Small cell prostate cancer.
12. The greatest risk factor for prostate cancer is:
   b. Being an older male.
   c. Having a father or brother with prostate cancer.
   d. Living in Africa.

13. Which is a true statement about the prevention of prostate cancer?
   a. Specific changes to the diet will stop or slow prostate cancer.
   b. Taking multivitamins will slow prostate cancer growth.
   c. Taking 5-alpha reductase inhibitors prevents prostate cancer.
   d. Currently there is no sure way to prevent prostate cancer.

14. Research regarding masculinity and healthcare seeking has found that:
   a. Men are more likely to report health symptoms to male providers than female providers.
   b. Men are generally comfortable in healthcare settings.
   c. Barriers to men’s healthcare seeking are socially determined.
   d. Men are more likely to seek help for emotional issues than for physical issues.

15. Which is a true statement about the signs and symptoms of prostate cancer?
   a. Early prostate cancer cannot be detected until symptoms occur.
   b. Symptoms of early prostate cancer include loss of appetite and weight loss.
   c. There are no warning signs or symptoms of early prostate cancer.
   d. Signs and symptoms occur only after prostate cancer has metastasized to lymph nodes and bones.

16. Which is a true statement about PSA testing?
   a. PSA is not normally found in the blood.
   b. PSA testing measures only free PSA.
   c. Normal serum PSA concentration has been well established.
   d. The PSA level can be elevated following a digital rectal examination.

17. The current recommendations for PSA screening state:
   a. All men aged 55 to 69 years should undergo PSA screening.
   b. All men over the age of 70 should undergo PSA screening.
   c. PSA screening is no longer recommended for all age groups.
   d. PSA screening should be a personal decision for all men.
18. A scanning technology that allows a provider to more accurately direct biopsy needles to sample prostate tissue is:
   a. Magnetic resonance imaging (MRI)/ultrasound fusion.
   b. Computed tomography (CT) scan.
   c. Radionuclide bone scan.
   d. Immunoscintigraphy.

19. Which is a true statement about prostate biopsy?
   a. Transperineal biopsy causes more infections than transrectal biopsy.
   b. A prostate biopsy is a risk-free procedure.
   c. Infections can be caused by multidrug-resistant rectal flora.
   d. Bleeding is common and never requires intervention.

20. The clinician providing discharge instructions to a male patient who just had a prostate biopsy tells the patient he should notify his primary care provider right away if he:
   a. Notices any blood in his urine.
   b. Experiences a fever, chills, or shaking.
   c. Sees any evidence of bleeding from his rectum.
   d. Feels any pressure or spasms.

21. The nurse caring for a patient after prostate biopsy:
   a. Provides both written and verbal discharge instructions.
   b. Tells the patient to avoid sexual activity for at least 3 weeks after biopsy.
   c. Gives the patient a cold sitz bath to decrease bleeding.
   d. Instructs the patient to remain on bed rest for 3 days.

22. The Tumor-Node-Metastasis (TNM) staging system for prostate cancer indicates the:
   a. Extent of the spread of prostate cancer.
   b. Normalized volume of the prostate gland.
   c. Differentiation of the prostate cancer tumor cells.
   d. Normalized prostate-specific antigen (PSA) level.

23. Watchful waiting is a treatment option most often chosen:
   a. When a prostate tumor is grade 5.
   b. By patients with a life expectancy of more than 30 years.
   c. When a prostate cancer tumor has metastasized.
   d. By men who are older than 70.
24. For a patient undergoing conservative management for prostate cancer, healthcare providers recommend:
   a. Eliminating sexual activity.
   b. Reducing vitamin D intake.
   c. Adopting a completely or mostly plant-based diet.
   d. Avoiding making any lifestyle changes.

25. Which is not classified as an aggressive treatment modality for prostate cancer?
   a. Surgery
   b. Active surveillance
   c. Cryotherapy
   d. Vaccine treatment

26. Which is correct statement concerning surgery for prostate cancer?
   a. Radical prostatectomy can be done laparoscopically.
   b. A radical retropubic prostatectomy is done through an incision between the anus and scrotum.
   c. It is never possible to spare the erectile nerve bundles.
   d. Robotic prostatectomy causes more pain, more blood loss, and a longer recovery time.

27. Which is a known side effect of radical prostatectomy?
   a. Erectile dysfunction
   b. Cancer metastasis
   c. Bone pain
   d. Breast enlargement (gynecomastia)

28. Which is the nurse’s intraoperative role when the patient is undergoing surgery for prostate cancer?
   a. Reducing the patient’s anxiety
   b. Assessing the patient for electrolyte imbalance
   c. Acting as the patient’s advocate
   d. Administering prophylactic antibiotics to the patient
29. During external beam radiation, which type of particle reaches the tumor, passes through into normal tissue, and scatters radiation along its path?
   a. Proton
   b. Electron
   c. Photon
   d. Negatron

30. Radiation therapy for prostate cancer:
   a. Requires whole-body irradiation.
   b. Does not damage normal tissue surrounding the prostate.
   c. Kills tumors with heat, essentially “cooking” the cancerous cells.
   d. Can be delivered via internally placed radioactive seeds.

31. How long does it take for permanent low-dose brachytherapy seeds to lose 98% of their radiation?
   a. One month
   b. Six months
   c. One year
   d. Two years

32. Patients receiving brachytherapy are instructed to:
   a. Remove ink marking from the skin after treatment planning is completed.
   b. Observe for lost radioactive seeds in linens.
   c. Do not apply lotions or creams to dry skin in the treatment area.
   d. Dispose of radioactive seeds in a covered container placed in the trash.

33. Which is a true statement about the risks and side effects of cryotherapy?
   a. It lowers the risk for incontinence.
   b. It requires a long hospital stay.
   c. It raises the risk for impotence.
   d. It requires long-term urinary catheter placement.

34. The “gold standard” for androgen deprivation therapy is:
   a. Luteinizing hormone-releasing hormone agonists.
   b. The CPY17 inhibitor abiraterone.
   c. Orchiectomy.
   d. Anti-androgens.
35. Which is a possible side effect associated with orchiectomy?
   a. Type 1 diabetes
   b. Bone pain
   c. Gynecomastia
   d. Weight loss

36. Nursing education for patients experiencing loss of appetite due to the effects of chemotherapy includes the instruction to:
   a. Drink most fluids with meals.
   b. Eat small meals throughout the day.
   c. Eat meals cold or at room temperature.
   d. Use a straw to drink fluids.

37. Which form of treatment for metastatic prostate cancer involves the use of the vaccine Sipuleucel-T (Provenge)?
   a. Androgen deprivation therapy
   b. High-intensity focused ultrasound
   c. Chemotherapy
   d. Immunotherapy

38. In a physician’s office or clinic, a nurse’s initial encounter with the patient who has prostate cancer includes assessing the patient’s:
   a. Understanding about the roles of the surgeon and radiologist.
   b. Palliative care needs.
   c. Fears and concerns about diagnosis, treatment, and prognosis.
   d. Urinary incontinence issues.

39. A nurse is preparing to go over discharge instructions for a patient following a prostatectomy when the patient states how anxious he is about taking care of himself when he gets home. The discharge nurse’s best approach in responding to the patient is to:
   a. Tell him not to be concerned, just follow directions carefully and everything will be all right.
   b. Tell him to read the pamphlets she will be giving him.
   c. Tell him to call his doctor with any questions or concerns he has.
   d. Recognize that anxiety interferes with the ability to learn and encourage expression of his concerns.
40. Clinicians who are working with patients and their partners experiencing sexual dysfunction counsel them that:
   a. There is no need to worry, as sexual function will return in the future.
   b. No longer having an interest in sex does not mean the end of a loving relationship.
   c. It is necessary for the man to remain focused on his own needs at this time.
   d. Most methods of treatment for erectile dysfunction have very poor success rates.

41. A clinician working with a patient experiencing incontinence instructs the patient to:
   a. Urinate every 2 to 3 hours.
   b. Drink coffee only in the morning.
   c. Wait until the bladder is full before attempting to void.
   d. Decrease fluid intake to avoid the frequent need to void.

42. The most effective treatment to regain urinary control is:
   a. Surgery.
   b. Intermittent catheterization.
   c. Pelvic floor exercises.
   d. Behavior modification.

43. The “gold standard” for measuring limb volume for assessment of lymphedema is:
   a. Water displacement method.
   b. Optoelectronic volumetry.
   c. Bioimpedance.
   d. Truncated cone formula.

44. Which is not an exercise to help pump lymph from a swollen lower limb?
   a. Ankle pumps
   b. Sit-ups
   c. Single knee to chest
   d. Bridges

45. Occupational and physical therapists manage which side effect of chemotherapy that results from nerve damage?
   a. Painful scar tissue
   b. Peripheral neuropathy
   c. Lymphedema
   d. Loss of bone mineral density