

## Prostate Cancer

### Incidence:

According to Zisman, Belldegrun & Figlin, 2004 the incidence of prostate cancer has risen steadily for the past 20 years. In 1987, it crossed the line of 100 cases per 100,000. A peak incidence was seen in 1992 and then leveled off from 1995-1999. The rise in incidence is explained by improved detection capability, mainly PSA and transrectal ultrasound (TRUS). The risk for prostate cancer increases significantly with age.

### Etiology:

The cause of prostate cancer is unknown. Several factors are associated with an increased risk. (Zisman, Belldegrun & Figlin, 2004; Ellerhorn, Cullinane, Coia, & Alberts, 2007; Held-Warmkessel, 2005).

- Highest in Sweden, intermediate in the USA, lowest in Taiwan and Japan
- Blacks are afflicted 30% more often than whites
- Increased risk when there is a family history in a first degree relative. This risk declines if the diagnosis was made after the age of 70 years.
- Altered androgen and estrogen levels
- Increases in the intake of vitamin A, decreased intake of vitamin D, and occupational exposure to cadmium

Facts About Pathology and Natural History: (Held-Warmkessel, 2005; Zisman, Belldegrun & Figlin, 2004; Ellerhorn et al., 2007)

- almost all prostate cancers are **adenocarcinomas**
- the prostate may be the **site of metastases** from bladder, colon, or lung cancer or from melanomas, lymphomas, or other malignancies
- tend to be **multifocal** and frequently **arise from the peripheral zone** of the prostate making surgical removal with curative intent difficult
- the biology of adenocarcinomas of the prostate are **strongly influenced** by **tumor grade**
- **low-grade** tumors may remain **localized for long periods** of time
- the disease locally **invades along nerve sheaths** and metastasizes through **lymphatic chains**
- Distant metastases are nearly always present when lymph nodes are involved
- **Bone** is the most common site of prostate cancer metastases, producing dense **osteoblastic metastatic lesions**. Occasionally they may have uncharacteristic osteolytic lesions

- **Liver involvement is common**
- Metastases to the brain, lung, and other soft tissues are rare
- **Paraneoplastic syndromes**; systemic fibrinolysis, neuromuscular abnormalities

For an overview of the GU anatomy of the male click on the following link:

<http://www.nlm.nih.gov/medlineplus/ency/imagepages/1113.htm>

<http://www.nlm.nih.gov/medlineplus/ency/imagepages/9785.htm>

### Signs and Symptoms:

Early prostate cancer is **usually asymptomatic** and can be detected by digital rectal exam (DRE) and serum PSA or during TURP (transurethral resection of the prostate) (Held-Warmkessel, 2005). The **presence of symptoms** usually indicates **advanced disease** (Held-Warmkessel, 2005). The most common symptoms include; **hesitancy**, **urgency**, **nocturia**, **poor urine stream**, **dribbling**, and **hematuria**. A sudden onset and rapid progression of symptoms of urinary tract obstruction in men of advanced age is likely caused by prostate cancer. **Pain** in the back, pelvis, or over multiple bony sites is the most common presenting complaint in the presence of distant metastases. A sudden onset of **neurological deficiencies**, such as paraplegia and incontinence resulting from **spinal metastases** which may be the presenting feature or it may develop during the course of the disease (Held-Warmkessel, 2005; Zisman, Belldegrun & Figlin, 2004; Ellerhorn et al., 2007).

### Diagnostic Studies:

- Urinalysis
- CBC
- Renal function tests
- LFT's
- Alkaline phosphatase
- Calcium
- CXR
- PSA (false positive results in 15% of patients)
- TRUS guided or true-cut biopsy  
<http://www.emedicine.com/med/images/Large/357478TRUS-02.jpg>
- Bone scans  
[http://www.emedicine.com/med/images/Large/357578bone\\_scan-03.jpg](http://www.emedicine.com/med/images/Large/357578bone_scan-03.jpg)
- CT and MRI

**Note:** PSA may be **falsely positive** with prostatic inflammation, surgery, or endoscopy but **susicious findings** on rectal examination along with an elevated PSA warrants a biopsy.

### **Biopsy Techniques:**

- **TRUS-guided true-cut biopsy:** standard method to diagnose prostate cancer. Classically there is a **six-core set taken** by sampling the **base, apex,** and **mid gland** on **each side** of the gland. Currently more than **twelve-cores** are routinely sampled to increase the yield. Most cancers have a hypoechoic appearance in TRUS but up to 30% may be isoechoic (Zisman, Belldegrun & Figlin, 2004).
- **TURP:** Prostate cancer may be found in **5-10%** of TURPs performed for benign hyperplasia (Held-Warmkessel, 2005; Zisman, Belldegrun & Figlin, 2004; Ellerhorn et al., 2007).

For imaging and a detailed overview of the TURP procedure click on the following links:

[http://www.nlm.nih.gov/medlineplus/ency/presentations/100046\\_1.htm](http://www.nlm.nih.gov/medlineplus/ency/presentations/100046_1.htm)

[http://www.nlm.nih.gov/medlineplus/ency/presentations/100047\\_1.htm](http://www.nlm.nih.gov/medlineplus/ency/presentations/100047_1.htm)

<http://www.nlm.nih.gov/medlineplus/ency/article/002996.htm#Definition>

**Facts:** (Zisman, Belldegrun & Figlin, 2004; Ellerhorn et al., 2007).

- Evidence suggests that the probability of a **positive bone scan** is extremely **low** when the PSA is **less than 10ng/ml** or **symptoms are absent**
- **CT and MRI** scans **are insensitive** methods to assess tumor spread into lymph nodes or the pelvis. These scans are **saved for high-risk** patients such as those with tumor palpated near the pelvic side of the wall on DRE, or a high Gleason's score or PSA greater than 20 ng/ml

### **Staging:**

The **TNM classification** will be discussed in preceding modules. It is important to note the various prognostic factors associated with prostate cancer.

For prostate cancer staging information click on the following links:

[http://www.nccn.org/professionals/physician\\_gls/default.asp](http://www.nccn.org/professionals/physician_gls/default.asp)

[http://en.wikipedia.org/wiki/Prostate\\_cancer\\_staging](http://en.wikipedia.org/wiki/Prostate_cancer_staging)

### Prognostic Factors:

- Tumor **grade** (strongly affects prognosis)
- **Gleason's** scoring system (most commonly used)
- Involvement of **seminal vesicles** (poor prognosis)

### Gleason's Score:

This system is founded on the **glandular appearance** and **architecture** at relatively low-powered magnification. Two **scores of 1 to 5 points** are given for a primary (predominant) site and a secondary (second most prevalent) site. The Gleason's score can **sum from 2 to 10 points**. Those who have a Gleason's score of **7 or above have a worse prognosis** than those with lower scores (Held-Warmkessel, 2005; Zisman, Belldegrun & Figlin, 2004; Ellerhorn et al., 2007).

For additional information on Gleason scoring click on the following link:

<http://pathology2.jhu.edu/gleason/patterns.cfm>

### Management:

The management of all stages of prostate cancer is **sometimes highly controversial**. This disease often has a **long natural history**. As a result, a large number of patients survive 15 years or more after diagnosis. Because the disease occurs in older men, a large number of patients die from other conditions before they suffer symptoms or die from prostate cancer (Held-Warmkessel, 2005; Zisman, Belldegrun & Figlin, 2004; Ellerhorn et al., 2007).

**No data show a clear cut advantage for radical retropubic prostatectomy (RRP) over XRT or vice versa** (Zisman, Belldegrun & Figlin, 2004; Ellerhorn et al., 2007).

Watchful waiting is another option that should be considered.

For the most current practice guidelines for evaluation, follow-up and treatment options click on the following link:

[http://www.nccn.org/professionals/physician\\_gls/default.asp](http://www.nccn.org/professionals/physician_gls/default.asp)

## Comparison of RRP with lymphadenectomy to XRT for early disease;

RRP with Lymphadenectomy	XRT
<ul style="list-style-type: none"><li>• Minor incontinence (10-40%)</li><li>• Severe incontinence (1-3%)</li><li>• Potency can often be preserved in younger patients (60-70%) when they undergo nerve-sparing radical prostatectomy</li></ul>	<ul style="list-style-type: none"><li>• Impotence (50%)</li><li>• Radiation proctitis with diarrhea, blood-streaked stools, and rectal urgency (&lt; 5%)</li><li>• Perineal fistulas (&lt;1%)</li><li>• Fecal and urinary incontinence (1-2%)</li><li>• Urethral stricture (1-5%)</li><li>• Persistent tumor or recurrent disease (10-40% depending on stage, Gleason score and pre-treatment PSA)</li></ul>

(Held-Warmkessel, 2005; Zisman, Belldegrun & Figlin, 2004; Ellerhorn et al., 2007; NCCN Practice Guidelines in Oncology, 2007).

### **Brachytherapy and Cryotherapy:**

These modalities are intended for cure. Sufficient follow-up data is not available to determine their inferiority or superiority to conventional radiation therapy (Ellerhorn et al., 2007; Zisman, Belldegrun & Figlin, 2004).

To review detailed information on the procedure of brachytherapy (seed implants) click on the following link:

[http://www.prostate-cancer.org/education/localdis/seed\\_implantation.html](http://www.prostate-cancer.org/education/localdis/seed_implantation.html)

To review cryotherapy for the management of prostate cancer click on the following links:

<http://www.emedicine.com/med/topic3539.htm>

<http://www.wmfurology.com/pcacryo.htm>

### **Advanced Disease:**

TURP may be used to relieve bladder outlet obstruction even in the presence of advanced disease. Orchiectomy alone is usually effective. Radiation is useful in treating the following problems;

- Isolated, painful bony metastases despite endocrine therapy
- Pelvic pain syndromes
- Urinary tract obstruction
- Gross hematuria
- Metastases to the retroperitoneal lymph nodes that produce back pain or scrotal and lower extremity edema

- Spinal cord compression from vertebral and extradural metastases is common and rapidly progressive complication. Cord compression is an emergency.

(Ellerhorn et al., 2007; Held-Warmkessel, 2005; Zisman, Belldegrun & Figlin, 2004).

### Endocrine Therapy:

Available Treatments:

- **Orchiectomy**: produces a rapid decline in testosterone level. It is effective but irreversible. Advisable as primary treatment for advanced disease and particularly for those who are noncompliant with androgen blockade or who require emergency blockade for spinal cord compression (Held-Warmkessel, 2005; Zisman, Belldegrun & Figlin, 2004; Ellerhorn et al., 2007).

To review the procedure of an orchiectomy click on the following link:

<http://www.surgeryencyclopedia.com/La-Pa/Orchiectomy.html>

- **Luteinizing hormone-releasing agonists (LHRH)**: Examples of these drugs are leuprolide (Lupron), and goserelin (Zoladex). They appear to be as effective as orchiectomy. These drugs are given every 3-4 months. Eligard is LHRH agonist that is given every 6 months. They may also be given monthly along with antiandrogens. The combination of LHRH and antiandrogens are believed to be superior in efficacy (Held-Warmkessel, 2005; Zisman, Belldegrun & Figlin, 2004; Ellerhorn et al., 2007).

To review additional information on LHRH analog therapy click on the following link:

<http://www.prostate-cancer.com/hormone-therapy/cancer-treatments/therapy-lhrh-antagonist.html>

- **Antiandrogens**: Examples of this group of drugs are flutamide (Eulexin) or bicalutamide (Casodex)

These treatments produce symptomatic relief in 80% of patients (Zisman, Belldegrun & Figlin, 2004; Ellerhorn et al., 2007).

**Other agents** may also be helpful. These agents include the following;

- **Progestins**: megestrol acetate
- **Corticosteroids**: Prednisone and dexamethasone produce symptomatic results and may be associated with reductions in PSA levels
- **Zoledronic acid** (Zometa): widely used for the reduction of bone pain. Used for the prevention of skeletal related events ( fractures and other complications of bone metastases) (Zisman, Belldegrun & Figlin, 2004; Ellerhorn et al., 2007).
- **Strontium 89 Infusion**: The beta emission of 89 Sr is used in selected hormone refractory patients to **relieve skeletal pain**. Response to therapy **last approximately 6 months**. Hematologic toxicity is anticipated in the first 2 weeks after administration (Zisman, Belldegrun & Figlin, 2004; Ellerhorn et al., 2007).

[http://www.medscape.com/medline/abstract/7537665?src=emed\\_ckb\\_ref\\_0](http://www.medscape.com/medline/abstract/7537665?src=emed_ckb_ref_0)

**Quadramet** is a newer radiopharmaceutical agent to treat bone pain. Click on the following link for more details

<http://www.cytogen.com/professional/quadramet/pi.php>

### **The Role of Chemotherapy in Prostate Cancer:**

Chemotherapy provides symptomatic relief in 20-30% of patients with prostate cancer (Ellerhorn et al., 2007; Held-Warmkessel, 2005; Zisman, Belldegrun & Figlin, 2004; NCCN Practice Guidelines in Oncology, 2007). The most common agents that have been used are;

- Estramustine
- Cisplatin
- 5-fluorouracil
- vinorelbine
- gemcitabine
- **Taxanes** (docetaxol (**Taxotere**) is the most common 1<sup>st</sup> line therapy for metastatic prostate cancer)
- mitoxantrone

Various regimens are currently being used, but there is no evidence that **combination** chemotherapy is superior to **single-agent** treatment for this disease (Zisman, Belldegrun & Figlin, 2004).

For an Additional overview of prostate cancer click on the following link  
<http://www.emedicine.com/med/topic3537.htm>

### Special Considerations:

#### Cytopenias:

- usually part of the end-stage process caused by extensive tumor involvement of the bone marrow or by XRT to major marrow-bearing sites
- The anemia is usually normochromic and normocytic (normal size and color)

#### Obstructive Uropathy (<http://en.wikipedia.org/wiki/Uropathy>) and Uremia (<http://en.wikipedia.org/wiki/Uremia>):

- May be a fatal complication of prostate cancer
- Orchiectomy or XRT followed by endocrine therapy may relieve the obstruction
- Some patients may benefit from surgical intervention
- If the patient is without pelvic pain syndromes, and low-grade cancers, they should be considered for urethral by-pass by stent catheters or percutaneous nephrostomy.

(Zisman, Beldegrun & Figlin, 2004).

#### Extraosseous (outside the bone) extension:

- This is a common condition
- Extension of the skull or vertebral lesions can produce neurological deficits
- Extension of rib lesions can produce subcutaneous or pleuropulmonary masses
- Retro-orbital and cavernous sinus masses can result in visual loss
- Extraosseous extension of bony lesions often requires XRT

(Zisman, Beldegrun & Figlin, 2004; Held-Warmkessel, 2005; Ellerhorn et al., 2007)

#### Systemic Fibrinolysis (<http://en.wikipedia.org/wiki/Fibrinolysis>):

- Activators of the fibrinolytic enzyme, plasmin, abound in prostatic tissue

Prostate cancer, especially carcinoma of the prostate is among the few medical conditions that can produce both significant **systemic fibrinolysis** and **disseminated intravascular coagulation** (Zisman, Beldegrun & Figlin, 2004; Ellerhorn et al., 2007)

**Nursing Management:** (Held-Warmkessel, 2005)

1. Recommendation of **routine screening** (DRE and PSA) for all men over the age of 40 years (younger if a history of one-two first degree relatives with a history of prostate cancer at an early age)
2. Educate the patient about the **major treatments** for prostate cancer (surgery, radiotherapy, cytotoxic chemotherapy)
3. Discuss **potential side effects** related to therapies; loss of libido, impotence, loss of fertility, or urinary incontinence, osteoporosis
4. Prepare spouse for the potential **loss of sexual function** after cancer treatment
5. Discuss common **surgical approaches** and their related side effects; retropubic, perineal, and transurethral approaches
6. Reinforce routine **pre-operative instructions** (bowel prep, deep breathing and coughing, , leg exercises and early ambulation post-op)
7. Maintain optimal fluid and nutritional status pre and post-op
8. due to the age of patient at diagnosis consider other **comorbid conditions** that may complicate post-op recovery (CHD, COPD, HTN, DM, polypharmacy)
9. **Post radical prostatectomy:**
  - Usually returns with a **3-way indwelling foley** catheter
  - Monitor the type and amount of output
  - Maintain **patency** of the catheter
  - **Hematuria** is common for the first 3-4 days post-op
  - Be alert for signs and symptoms of hemorrhage or shock
  - Compare all VS findings to baseline data
  - **Bladder irrigation** is common
  - Irrigation may be continuous or intermittent
  - The purpose of irrigation is to avoid clot formation
  - Be alert for **catheter obstruction**; kinked tubing, mucus plug, blood clots
  - Treat **bladder spasm** per MD orders
  - Be alert for *signs and symptoms* of infection, bladder spasms
  - Note that **antispasmodics** can increase HR, and increase intraocular pressure therefore caution should be used in a patient with a history of HTN or glaucoma
  - Stool softeners should be used concurrently with antispasmodics to avoid constipation
  - The urinary catheter usually stays in place for 2-3 weeks after radical prostatectomy
  - Post catheter removal the urine may be cloudy for several weeks
  - Presence of dribbling and urgency will last for several weeks

- **Incontinence** is common (15%) of patients will experience
  - Teach pelvic floor muscle exercises (5 times per hour, 15 sets of exercise per day)
  - Anticholinergic, antispasmodics, or alpha blockers may be prescribed for incontinence
  - **Wound care** depends on the approach used; perineal incisions are prone to infections because of their location. Clean all incisions meticulously and change dressings as ordered or prn
10. Explain the procedure for **external beam radiotherapy**
  11. Educate the patient regarding the **potential complications** associated with external beam RT; cystitis, proctitis, skin reactions
  12. Teach proper **skin care during radiation** therapy (avoid commercial skin lotions (metal bases), keep affected area clean and dry, avoid exposure of the area to the sun, avoid extreme temperatures, use water based lotions (Aquaphor)
  13. Report any changes in skin integrity to the physician
  14. Review the procedure of **internal radiotherapy (brachytherapy)** with the patient and family
  15. Nursing care of the individual who is receiving **hormone therapy**;
    - **Side effects** r/t DES are sodium retention, therefore the use of diuretics may be necessary
    - **Hypercalcemia** may occur during the initial period of therapy
    - Patients may also **experience**; nausea, hypertension, feminization, gynecomastia, loss of libido, and impotency
    - Patients on DES are at a higher risk for **thromboembolic complications** (PE and stroke)
    - Consider the **premature risks** associated with hormone therapy for men; osteoporosis, CVD, and hot flashes
  16. Review **side effects of chemotherapy** and educate the patient and family regarding the prevention and reporting of these effects if they occur
  17. Consider that early stage prostate cancer patients are usually treated by the **urologist**. The patient is often referred to the oncologist when he has relapsed or demonstrates metastatic disease progression
  18. educate patients to **report immediately** any loss of sensory or motor ability accompanied with sudden onset of back pain, lower limb weakness, urinary retention or incontinence

