

Prostate Cancer Case Study 1

Medical Student Case-Based Learning



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The Case of Mr. Powers' Prostatic Nodule

The effervescent Mr. Powers is found by his primary care provider to have a prostatic nodule. You are expected to direct the evaluation, education, and management of this condition.



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Learning Objectives

1. Describe the physiologic role of the prostate – “what does the prostate do?”
2. List the signs & symptoms of prostate cancer
3. Describe when a patient with a prostatic nodule should be referred to a urologist
4. Describe the natural history and the common patterns of progression of prostate cancer
5. List the major components in the staging of prostate cancer
6. List and briefly describe the options for treatment of localized prostate cancer
7. Describe how surgery and radiation therapy can impact continence and erectile function



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Mr. Powers' Visit to His Primary Care Provider

Mr. Powers is a 64-year old Caucasian male who comes into the office of his primary care physician with the following request: "How's my wedding tackle doing?"

His past medical history is notable only for hypertension and gallstones. The examination reveals a 1 cm hard nodule palpated on the right side of his prostate.

His PSA was checked 2 months ago and was found to be 4.6ng/ml.

What are the next steps?



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Work-Up

The presence of a palpable nodule in the prostate generally mandates referral to a urologist for consideration of a prostate needle biopsy to rule out prostate cancer.



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PCP Office

The doctor reports the presence of the prostatic nodule to Mr. Powers and suggests that he see a urologist for consideration of a prostate needle biopsy.

Mr. Powers looks horrified and states “you want me to let them do what?!”

Once the doctor explains the procedure and reassures him, Mr. Powers asks, “what does that prostate actually do?”

What is the physiologic role of the prostate?



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Role of Prostate

Secretions from the prostate (0.5ml) as well as from the seminal vesicles (1.5-2.0 ml), epididymis, vas deferens, Cowper's glands and the glands of Littre all combine with the spermatozoa to form the seminal fluid. The average volume per ejaculate is 3 ml, with the sperm representing less than 5% of the total.

The prostate does NOT have a role in sperm development, motility or storage.

References: Walsh et al. 2002. Campbell's Urology (8th ed). New York: Elsevier Science.



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PCP Office

Mr. Powers tells the doctor that he cannot have prostate cancer because he feels just “fine” and has “great Mojo.”

What are the usual presenting symptoms of prostate cancer in the United States?



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Prostate Cancer Symptoms

Patients with prostate cancer that is locally-advanced (spread beyond the prostate gland) or metastatic are usually those who present with symptoms. These symptoms are primarily pain (bone pain mostly) and/or urinary symptoms.

Since the advent of PSA screening, 75% of prostate cancer diagnosed in the United States is localized (organ-confined) and asymptomatic. While the obstructive urinary symptoms may be present in patients with prostate cancer, they are not thought to be due to the prostate cancer itself in the vast majority of cases.

References: Walsh et al. 2002. Campbell's Urology (8th ed). New York: Elsevier Science.



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Mr. Powers at the Urology Office

Mr. Powers meets the urologist who repeats the prostate examination and concurs that there is a 1.0 cm nodule contained within the right side of his prostate. He recommends that he undergo a transrectal ultrasound (TRUS) guided prostate needle biopsy to determine if the nodule contains prostate cancer.

Three days later, the prostate needle biopsy is performed. The pathology results show that he has Gleason 3+3=6 prostate cancer in 5 of the 12 biopsy cores with all of the positive cores on the right side of the prostate. The question now facing the urologist is whether the cancer is localized in the prostate or has already spread.

What are the major component(s) of the staging of prostate cancer?

(HINT: remember there is both clinical and pathological staging for prostate cancer)



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Prostate Cancer Staging

PSA level, DRE findings, and prostate biopsy pathology form the core components in the clinical staging of prostate cancer.

Prostate cancer does not initially spread to the lungs, so chest radiography is of limited utility in the staging of the disease.

Bone scans, CT scans, and MRI scans do NOT play a standard role in prostate cancer staging. Only under special high-risk circumstances eg PSA greater than 10ng/dl, possible spread of the cancer to the seminal vesicles, or a poorly-differentiated (Gleason 8-10)cancer, would these studies be ordered.



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If Mr. Powers' cancer had in fact begun to spread from the prostate, to which organs would you expect the cancer to spread?



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Prostate Cancer Spread

Prostate cancer typically disseminates in a step-wise fashion, moving from the prostate to the pelvic lymph nodes and then to the spine and pelvic bones.

In spite of the prostate's close location to the rectum, it is extremely rare for prostate cancer to invade this structure. This is thought to be due to the double layer of fascia (Denonvillier's fascia) which separates these structures.

Involvement of the bladder can occur from direct extension of the tumor from the prostate but is generally only seen in advanced disease.



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Urologist's Evaluation

The urologist explains to Mr. Powers that (1) his relatively low PSA of 4.6ng/dl, (2) his small localized nodule on prostate exam, and (3) the low volume Gleason 6 cancer on the biopsies together strongly suggest that his prostate cancer has not spread and is still confined to the prostate.

What are appropriate treatment options for localized prostate cancer?



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Mr. Powers' Treatment

Radiation therapy (external beam radiotherapy or brachytherapy), radical prostatectomy, and active surveillance are all options (some better than others).

While patient preference plays a large role in the treatment decision, some general guidelines can be highlighted:

- External beam radiotherapy can be used in most any patient, but may be the only viable therapy in patients who are older (>75 years old) and/or have major co-morbidities.
- Brachytherapy is generally reserved for patients with low-volume, moderately-differentiated tumors. This is not an appropriate option for very large glands.
- Radical prostatectomy is generally reserved for gentlemen <72-75 years old who are healthy (no major co-morbidities and have a >10 year life expectancy).
- Active surveillance may be appropriate for patients with low risk, low volume disease.



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Prostate Cancer Counseling

Always feeling the need to be prepared, Mr. Powers asks the urologist what might be the potential complications for radical prostatectomy, external beam radiation, and brachytherapy (radioactive seed placement). He learns that there is currently a great deal of controversy in this area.

While radiation oncologists and urologists may disagree about the relative rates of complications, two major categories of complications are found with any of the therapies mentioned above.

What are these two categories?



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Treatment Side Effects

Urinary incontinence and erectile dysfunction.

Anatomy is the key here. The nerves controlling erectile function run just posterior to the prostate and the sphincter controlling urinary continence rests at the distally located apex of the prostate. As a result, any injury near the prostate (such as trauma from surgery or inflammation from radiation) can injure these structures.

While the type of urinary incontinence differs, long-term data shows increased rates of stress urinary incontinence (surgery) and urge incontinence (radiation) in patients who undergo treatment.



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Mr. Powers' Course

Mr. Powers is shocked, just shocked, to learn that all of the therapies for localized prostate cancer have the potential to decrease his potency. "I must keep the Mojo going." He talks to his friends about these options and their possible complications. He also talks again with his urologist to express his concerns and discuss how best to proceed. Given his young age, his relative lack of co-morbidities, and his desire to "get that evil cancer out of my body," Mr. Powers decides to undergo a radical prostatectomy.

The operation goes well and Mr. Powers has an uneventful recovery. He is pleased to learn that the pathology report indicates that all of cancer was removed. His PSA level is checked 6 weeks after the surgery and is undetectable, consistent with complete excision of the prostate and the tumor. Mr. Powers does, though, report having occasional leakage of urine with coughing or straining. While he is still able to have sex, his erections are now noticeably less firm than prior to the surgery. He resorts to the use of the Swedish vacuum pump to help out.



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Mr. Powers' Course

Overall, he is pleased with his decision to undergo radical prostatectomy. The urinary leakage is minor and easily controlled with a thin pad. And luckily enough, his erections are getting better and better all the time.

To be continued...



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Take Home Messages

1. All prostate nodules should be referred to a urologist for consideration of a prostate needle biopsy.
2. In the United States, prostate cancer is now usually detected prior to the development of any symptoms from the disease.
3. Prostate cancer often disseminates in a step-wise fashion, moving from the prostate to the pelvic lymph nodes, and then to the spine and pelvic bones.
4. The three common components for staging prostate cancer are prostate-specific antigen (PSA) level, findings on digital rectal examination (DRE), and the pathology results from the prostate biopsy.
5. Treatment options for localized prostate cancer are radical prostatectomy, external beam radiation, brachytherapy, and active surveillance.
6. Transurethral resection of the prostate (TURP) is NOT a cancer operation.
7. Due to the anatomy of the structures around the prostate, urinary incontinence and erectile dysfunction are potential complications from both radical prostatectomy and radiation therapy (external beam and brachytherapy).



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