Physical Examination Discovered Prostate Cancer Metastasis to the Testis: A Case Report

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Patient: Male, 79-year-old
Final Diagnosis: Metastatic prostate cancer
Symptoms: None
Medication: —
Clinical Procedure: Orchiectomy
Specialty: Urology

Objective: Unusual clinical course
Background: Prostate cancer is the most common non-cutaneous cancer in men. While approximately three-quarters of all cases present as localized disease, the rate of metastatic disease has been increasing. Common sites of metastatic prostate cancer include regional lymph nodes, bones, and lungs. In this case report, we discuss a man with a history of low-risk prostate cancer who developed a testicular mass, which was ultimately diagnosed as a solitary testicular metastasis.

Case Report: An abnormal nodule on the left apex area was identified on a digital rectal exam of an otherwise healthy 67-year-old man in February 2008. The patient underwent an ultrasound-guided transrectal biopsy of the prostate gland in April 2008. The biopsy demonstrated adenocarcinoma of the prostate, Gleason 6 (3+3), with tumor present in 3 out of 12 submitted cores in up to 20% of biopsy specimens. Following treatment, his prostate cancer remained quiescent for several years. He was also found to have a urethral bulbar stricture that required dilation; during the procedure, a nurse detected an abnormality in the right testicle while prepping the patient. A follow-up testicular ultrasound in September 2020 identified an abnormal heterogeneous area with calcifications within the right testicle. Following radical right orchiectomy, pathology revealed metastatic prostatic adenocarcinoma, acinar type, with lymphovascular invasion present at the spermatic cord margin.

Conclusions: Surveillance for prostate cancer following treatment, even for low-risk disease, should always be continued. Although rare, recurrence and metastasis can occur in patients with low and even absent post-treatment prostate-specific antigen levels.

Keywords: Prostatic Neoplasms • Testicular Neoplasms • Testis • Prostate-Specific Antigen • Physical Examination

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Background

The testis is seldom the site of metastatic carcinoma, representing 1.6% of all testicular neoplasms in surgical specimens [1]. Prostatic adenocarcinoma is among the most likely origins for secondary testicular carcinomas, representing almost half of all cases. Other reported sites include renal cell and urothelial cell carcinoma [2]. Notably, primary non-Hodgkin lymphoma of the testis is the most common testicular tumor for men over 60 [3].

Of all non-cutaneous cancers, prostate cancer is the most common in men. While metastatic prostate cancer is uncommon, with approximately three-quarters of all prostate cancer cases presenting as localized disease, prostatic adenocarcinoma metastases are most likely to occur in the lymph nodes, bones, and lungs, and the rate of metastatic disease has been increasing [4]. In this case report, we discuss a man with a history of low-risk prostate cancer who developed a testicular mass, which was ultimately diagnosed as a solitary testicular metastasis.

Case Report

The patient is an otherwise healthy 67-year-old man that was found to have clinically localized prostate cancer in 2008. At the time, yearly PSA testing and digital rectal examination (DRE) were recommended for men 50-70 years old that opted for prostate cancer screening, the evidence for which was later outlined by the American Urologic Association in 2009 [5]. His serum prostate-specific antigen (PSA) level was 3.3 ng/mL at the time of diagnosis, but DRE revealed a left-sided firm 1 cm nodule at the base. His biopsy showed 3 cores of Gleason score 3+3 disease, for which he was treated with proton therapy 3 months later. From 2008 to 2019, his annual PSA check remained less than 0.2 ng/mL. No images were obtained at the time of diagnosis in 2009 due to his low-risk disease. During this time, he developed radiation cystitis, urethral stricture, and low-grade non-invasive urothelial carcinoma of the bladder. While he was being prepped by the operating room nurse for a cystoscopic dilation of his urethral stricture in 2020, a right testicular mass was detected. Scrotal ultrasound (see Figure 1) was performed thereafter, showing a 5.5×3.5×2.5 cm heterogeneous testis mass with internal calcifications. Testicular tumor markers were negative. He underwent radical orchiectomy, and pathology showed prostatic adenocarcinoma, acinar type, with lymphovascular invasion.
present at the spermatic cord margin (see Figures 2-4). PSA was 0.34 ng/mL, and a fluciclovine PET/CT scan showed no other areas of disease. The patient is healthy with more than a 10-year life expectancy. He elected for the most efficacious treatment for his metastatic castration-naïve prostate cancer. The best long-term results are seen combining androgen deprivation therapy (Leuprolide 45 mg intramuscularly every 6 months) and androgen signaling inhibitor treatment (apalutamide 240 mg orally daily). This treatment will continue as long as his PSA continues to respond appropriately. His most recent PSA was <0.014 ng/dL in October 2021, and he continues to do well.

Discussion

Serum prostate-specific antigen (PSA) level has been a powerful metric for the diagnosis and prognosis of prostate cancer since the 1980s [6], but it should be considered among other factors. Typically, recurrence for prostate cancer would be detected by a rising PSA. In a report on patients with biochemical progression after radical prostatectomy, the average PSA level of those with positive bone scans was 61.3 ng/mL (range, 1.3 ng/mL to 123 ng/mL) [7]. A multicenter prospective study of 213 patients with biochemical recurrence (BCR) found the diagnostic capacity of fluciclovine PET/CT for prostate cancer recurrence to be broadly proportional to prescan PSA, with a 31% detection rate in patients with PSA levels between 0 and 0.5 ng/mL and a 79% detection rate in patients with PSA greater than 1.0 ng/mL [8]. In other words, the higher the PSA, the easier it is to detect prostate cancer recurrence through PET. As such, physical examination was vital to the detection of recurrence in the present case.

Testicular metastasis from primary prostate cancer is very rare—out of 1539 autopsies on men older than 40 years with prostate carcinoma, 35% reported hematogenous metastases, with only 0.5% of all observed metastases to the testis [9]. Although rare, metastasis can occur in the setting of very low or even undetectable PSA. Out of 4091 prostate cancer patients treated at the M. D. Anderson Cancer Center between 1999 and 2004, only 46 patients presented with metastatic cancer despite PSA levels less than 2 ng/mL [7]; of those, 22% had undetectable PSA. The most common sites for metastasis were bone, liver, and retroperitoneal lymph nodes. Interestingly, most of these patients were asymptomatic, similar to the reported patient. Risk factors in the study mentioned above, however, were absent in the current patient. These included a Gleason score greater than 7, atypical histologic variants, particularly small cell and ductal cancers, and locally advanced tumors. Metastatic prostate cancer, absent these risk factors, not to mention metastasis to the testicle, is extremely rare. The capacity of regular physical examination without specific indications to identify what would have been a life-threatening disease underscores its importance in clinical practice.

According to a recent meta-analysis, there are no other reported cases of prostatic adenocarcinoma with a Gleason score of 6 and PSA level <1 at diagnosis of testicular metastasis [10]. Prostate cancer recurrence despite low concomitant PSA levels may be explained by a clonal shift in the original tumor, which could lead to the proliferation of dedifferentiated prostate cancer cell lines that have lost the ability to produce PSA.

The occurrence of prostate cancer metastasis to the testicle is limited to case reports, with fewer than 200 described in the literature [11]. As mentioned, the testicular abnormality was not noted by the patient; it was detected serendipitously during the prep for urethral stricture dilation. Due to the current patient’s low-risk cancer at the time of treatment and low PSA following treatment, the literature suggested that imaging and physical examination were unnecessary because disease progression was not found to increase in the absence of increasing PSA [12]. Moreover, guidelines suggest cancer diagnosis of testicular masses should be based on imaging or biochemical markers rather than biopsy [13]. Our current case is a reminder that there are always exceptions. Physical exams can detect abnormalities even in what is considered a low-risk prostate cancer patient.

PSA velocity, or the change of PSA level over a given time interval, is widely considered during the identification of prostate cancer. It is strongly associated with the diagnosis of prostate cancer [14] as well as recurrence after treatment [15,16]. Aside from the abnormal exam, the current patient did have 1 additional, albeit subtle, abnormality—although his PSA level remained very low, the most recent value prior to metastatic disease had started to increase from 0.110 to 0.341 ng/dL. This change was the most significant increase between post-treatment PSA values.

Conclusions

Nonroutine examination detected a case of metastatic prostate cancer that would not have been detected by conventional biochemical monitoring. Surveillance for prostate cancer following treatment, even for low-risk diseases, should always be continued. Although rare, recurrence and metastasis can occur in patients with low and even absent post-treatment PSA.

Declaration of Figures’ Authenticity

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