

Metastatic Prostate Cancer with a Testicular Mass: Rare Metastasis or Unexpected Primary Germ Cell Tumor?

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Abstract

We describe the case of a 78-year-old man with metastatic hormone-sensitive prostate adenocarcinoma who was diagnosed with a metachronous right testicular seminoma during follow-up. He initially presented with low back pain, weight loss, and a PSA level of 909 ng/mL. Prostate biopsy revealed a Gleason 9 (4+5) adenocarcinoma with extensive osseous metastases and pelvic and interaortocaval nodal involvement. He initiated androgen deprivation therapy with leuporelin (preceded by bicalutamide) combined with apalutamide, achieving good biochemical and clinical response.

At 12 months, progression of the interaortocaval lymphadenopathy was observed, and he underwent palliative radiotherapy. At month 14, evaluation of right testicular enlargement revealed a mass subsequently confirmed as seminoma (pT1b, R0) following radical orchiectomy. Post-radiotherapy and post-orchiectomy computed tomography (CT) demonstrated significant regression of the retroperitoneal lymphadenopathy.

This case underscores the importance of considering second primary malignancies during prostate oncologic follow-up, particularly when new clinical findings are not fully explained by the underlying disease.

Keywords: Lymphatic Metastasis; Neoplasms, Second Primary; Prostatic Neoplasms; Testicular Neoplasms / secondary.

Introduction

Prostate cancer is the most common malignancy in men worldwide and a leading cause of cancer-related mortality.¹ Clinically detected testicular metastases are exceedingly rare, reported in fewer than 4% of autopsy series.² In contrast, primary testicular tumors are uncommon in older adults, in whom lymphoma represents the most frequent testicular malignancy.³ Although seminoma typically affects younger men, it may rarely occur in the elderly.⁴ Distinguishing metastatic involvement from a synchronous or metachronous primary testicular tumor is critical, as management strategies and prognosis differ substantially.

We report a rare case of metastatic hormone-sensitive prostate adenocarcinoma in a 78-year-old man who subsequently developed a right testicular mass diagnosed as a primary seminoma.

Case Report

A 78-year-old man was diagnosed in March 2024 with metastatic hormone-sensitive prostate adenocarcinoma. His symptoms had begun three months earlier and included unintentional weight loss of 20 kg and progressive low back pain. The initial PSA was 909 ng/mL, and multiparametric magnetic resonance imaging (MRI) demonstrated a peripheral right-sided PIRADS 5 lesion with extracapsular extension, bilateral pelvic lymphadenopathy, and bone metastases. Prostate biopsy revealed bilateral acinar adenocarcinoma, Gleason score 9 (4+5), International Society of Urological Pathology (ISUP) grade group 5, with perineural invasion. Staging computed tomography (CT) scan and bone scintigraphy confirmed extensive osseous dissemination and both pelvic and interaortocaval nodal disease (cT3a N1 M1b).

Following multidisciplinary tumor board discussion, the patient initiated androgen deprivation therapy with leuporelin (preceded by bicalutamide) in combination with apalutamide. A marked biochemical response was observed (PSA 0.13 ng/mL at 12 months), accompanied by significant clinical improvement in low back pain and weight recovery (from 81 kg to 88 kg at 12 months). Treatment-related adverse effects included maculopapular rash with mild pruritus, asthenia, and hot flashes, none requiring treatment discontinuation. The 12-month follow-up CT scan revealed progression (approximately 67%) of the retroperitoneal lymphadenopathy causing inferior vena cava compression, while bone metastases remained stable. Thus, the patient underwent palliative radiotherapy to the retroperitoneal nodal disease.

At the 14-month follow-up visit, he reported progressive enlargement of the right testicle, which he stated had been present for at least one year. Physical examination

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revealed an approximately 8 cm painless right testicular mass and scrotal ultrasound and magnetic resonance imaging (MRI) demonstrated atypical imaging features. In the current clinical context, secondary involvement from the known prostatic malignancy was initially considered the most likely diagnosis; however, alternative etiologies – including lymphoma and primary testicular neoplasm – could not be excluded. Serum tumor markers revealed elevated lactate dehydrogenase (LDH 322 U/L; reference range 135–225 U/L), elevated β -human chorionic gonadotropin (β -hCG 21 IU/L; reference <5 IU/L), and normal alpha-fetoprotein (AFP 1.1 ng/mL; reference <15 ng/mL), raising suspicion for seminoma. Right radical inguinal orchiectomy with placement of a testicular prosthesis was performed. Histopathology revealed a pure seminoma confined to the testis (pT1b, R0). Immunohistochemistry confirmed PLAP, CD117, and podoplanin positivity, consistent with classical seminoma. Postoperative tumor markers normalized.

Post-treatment CT scan (2 months after radiotherapy and 1 month after orchiectomy) demonstrated approximately 70% regression of the interaortocaval lymph node. Six months later, follow-up CT scan showed stable residual interaortocaval lymphadenopathy without inferior vena cava compression and no new pathologically enlarged lymph nodes. Also, osseous disease remained stable. Meanwhile, two years after the initial prostate cancer diagnosis, the patient remains in good general condition. He weighs 93 kg and reports stable fatigue with moderate exertion, without additional treatment-related adverse effects. PSA is 0.03 ng/mL.

Discussion

Testicular metastases from prostate cancer are rare, typically occurring in advanced disseminated disease and most often identified incidentally at orchiectomy or autopsy.⁵ Recent advances in prostate-specific membrane antigen positron emission tomography (PSMA PET) imaging have improved detection of atypical metastatic sites, including testicular involvement.^{6–9}

When a testicular mass arises in a patient with known metastatic prostate cancer, metastatic spread is frequently presumed, which may delay recognition of a second primary malignancy. Although seminoma predominantly affects younger men, it has been described in elderly patients.⁴ Therefore, age alone should not exclude germ cell tumor from the differential diagnosis. In the present case, mild elevation of β -hCG and classical histopathological features strongly supported a primary seminoma rather than metastatic disease. Although there are some case reports of patients with prostate cancer diagnosed with testicular metastases,^{10–14} as far as we know, this is the first case describing a testicular mass in a patient with metastatic

prostate cancer that was ultimately found to be a germ cell tumor, highlighting the importance of differential diagnosis in this clinical context.

On the other hand, retroperitoneal nodal disease posed an additional diagnostic challenge. The interaortocaval region corresponds to the primary lymphatic drainage pathway of the testis.¹⁵ Actually, the patient reported progressive testicular enlargement for at least one year before orchiectomy, temporally consistent with the presence of retroperitoneal lymphadenopathy at the time of prostate cancer diagnosis. Furthermore, after one year of appropriate therapy for prostate cancer – with both biochemical and clinical response – an increase in the size of the interaortocaval lymphadenopathy was observed. Finally, a reduction in nodal size occurred following orchiectomy. Taken together, these findings favor a testicular origin of the retroperitoneal nodal disease. Conversely, prostate cancer may also spread to retroperitoneal lymph nodes following initial involvement of the pelvic nodal chains¹⁶; therefore, progression of prostatic disease cannot be excluded. With regard to response to radiotherapy, both prostate cancer-related lymphadenopathy and testicular cancer lymphadenopathy are radiosensitive; however, testicular origin is generally associated with faster and more complete responses.

Unfortunately, no imaging studies were performed between radiotherapy and orchiectomy, limiting interpretation of the subsequent reduction in nodal size and precluding definitive determination of its origin (testicular versus prostatic).

This case illustrates the anatomical and oncological complexity of synchronous/metachronous neoplasms and underscores the importance of obtaining a correct and timely diagnosis, as management implications differ substantially. Accurate histological confirmation is essential to avoid over- or undertreatment, although it is not always feasible, as in the present case regarding the retroperitoneal mass.

Finally, this case reinforces key oncologic principles: new findings during cancer follow-up should not automatically be attributed to known disease; comprehensive evaluation, including physical examination, tumor markers, and histopathological confirmation, is mandatory and multidisciplinary collaboration is fundamental in complex diagnostic scenarios.^{17–18}

Conclusion

The coexistence of metastatic prostate adenocarcinoma and primary testicular seminoma in an elderly patient is exceptionally rare. This case highlights the need for continued diagnostic vigilance during oncologic surveillance and emphasizes that second primary malignancies must remain in the differential diagnosis,

even in advanced disease. Multidisciplinary evaluation is essential to ensure accurate diagnosis and optimal management.

Ethical Disclosure

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Contributorship Statement

All authors contributed to this work, approved the final version of the manuscript for publication, and agree to be accountable for all aspects of the work, ensuring the accuracy and integrity of the data presented.

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