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Case Report **Oncology**

Small-Cell Neuroendocrine Carcinoma of the Prostate with Atypical PSA Kinetics: Clinical Course and Management

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Abstract

Background: Small-cell neuroendocrine carcinoma of the prostate (SCPC) is a rare and aggressive malignancy, accounting for less than 2% of prostate cancers. It is typically characterized by low prostate-specific antigen (PSA) levels, rapid progression, and poor response to hormonal therapy. ***Case Presentation:*** We report the case of a 71-year-old male with multiple comorbidities, who presented with lower urinary tract symptoms. Imaging revealed a large pelvic mass, extensive lymphadenopathy, and innumerable pulmonary nodules, while PSA was 1.4 ng/ml. Pathology review confirmed small-cell neuroendocrine carcinoma of the prostate (SCPC). The patient underwent systemic chemotherapy with six cycles of carboplatin and etoposide, achieving an eight-month disease-free interval. Surveillance imaging revealed significant locoregional progression with recurrent hydronephrosis, retroperitoneal lymphadenopathy and new liver metastases. Immediate rechallenge with carboplatin and etoposide. ***Conclusion:*** This case highlights the aggressive course of smallcell carcinoma of the prostate, characterized by atypical PSA kinetics, early visceral metastasis, and rapid progression despite systemic therapy.

Keywords: Small-cell neuroendocrine carcinoma of the prostate (SCPC), rare, aggressive, malignancy, Atypical PSA, case report.

INTRODUCTION

Prostate cancer is the second most common malignancy among men worldwide and represents a major public health burden. The majority of prostate cancers are adenocarcinomas, which typically demonstrate androgen dependence, slow progression, and predictable behavior with prostate-specific antigen (PSA). However, small-cell neuroendocrine carcinoma of the prostate (SCPC) is an aggressive and uncommon entity, accounting for less than 2% of all prostate malignancies. Shares morphological and biological features with small-cell carcinoma of the lung, characterized by poorly differentiated neuroendocrine cells, rapid proliferation, and early metastatic potential. Diagnosis requires histopathological confirmation, with immunohistochemistry. Treatment strategies are largely extrapolated from the small-cell lung cancer literature. Platinum-based chemotherapy, particularly the combination of carboplatin or cisplatin with etoposide, remains the backbone of systemic therapy.

CASE REPORT

Patient Information and Initial Presentation

A 71-year-old male, with a past medical history significant for hypertension, ischemic heart disease with prior coronary stent placement, presented initially with chronic constipation, reduced oral intake and lower urinary tract symptoms.

On initial evaluation, the patient was found to harbour a large pelvic mass with associated lymphadenopathy. A baseline prostate-specific antigen (PSA) level was obtained and measured at only 1.4 ng/mL, an unexpectedly low.

Computed tomography (CT) imaging performed showed a bulky locally advanced prostatic

mass, extensive pelvic nodal involvement, and innumerable pulmonary nodules consistent with disseminated malignancy. A tissue biopsy confirmed small-cell neuroendocrine carcinoma of the prostate.

Diagnostic Workup and MDT Review

A CT scan performed on October 2, 2024, demonstrated moderate right hydronephrosis with proximal and mid-ureteric dilatation measuring up to 1.8 cm. There was a new perinephric right iliac nodal disease causing ureteri obstruction.

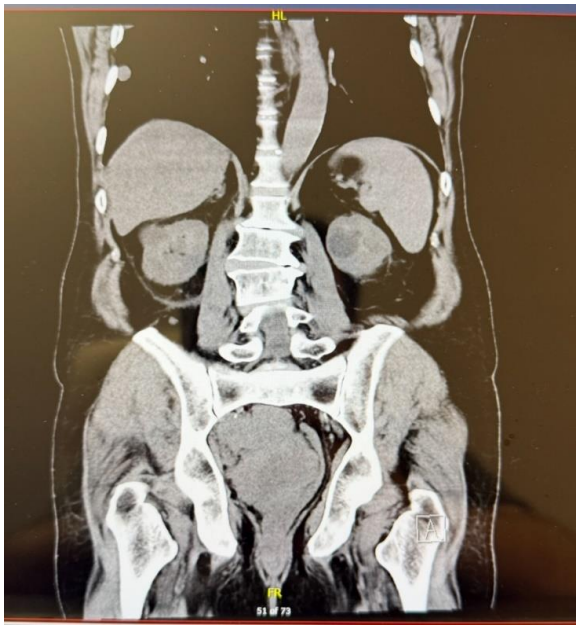

Fig. 1: October 2, 2024 Prostate Mass about 10.8 cm with moderate Rt hydronephrosis

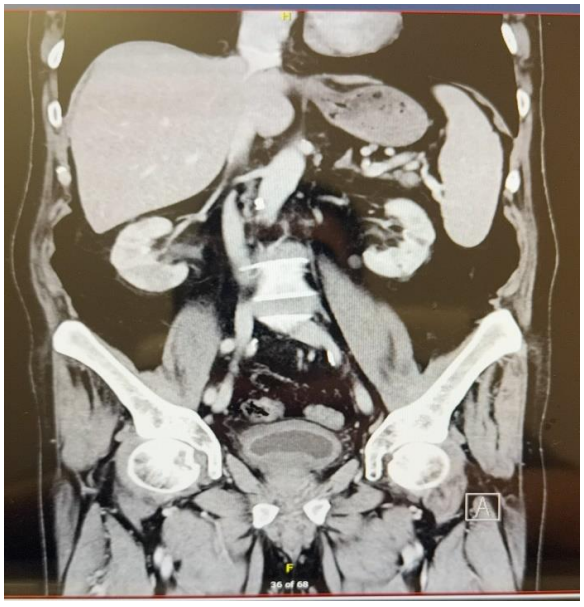

Fig. 2: Jan 2, 2025 Prostate Mass resolved after completed 6 cycles of ChT, with mild hydronephrosis still remaining

The case was reviewed at the MDT on October 6, 2024. Pathology was a small-cell neuroendocrine carcinoma of the prostate (SCPC). Germline and somatic testing for homologous recombination repair (HRR) gene mutations and BRCA1/2 were Negative. Initiation of platinum-based chemotherapy was recommended. Patient has completed six cycles. His course was complicated by recurrent urinary tract infections, managed with antibiotics. Following chemotherapy, the hydronephrosis improved.

Disease Progression and Recurrence

The patient achieved a disease-free interval of eight months before evidence of progression. Surveillance CT scan of the abdomen revealed recurrent right uretero-hydronephrosis secondary to a soft tissue

mass obstructing the ureterovesical junction, along with significant enlargement of the pelvic mass and a new metastatic hepatic lesion. Then the patient was counselled extensively regarding the findings of disease recurrence and hepatic metastases. Accordingly, the plan was to rechallenge with carboplatin and etoposide.

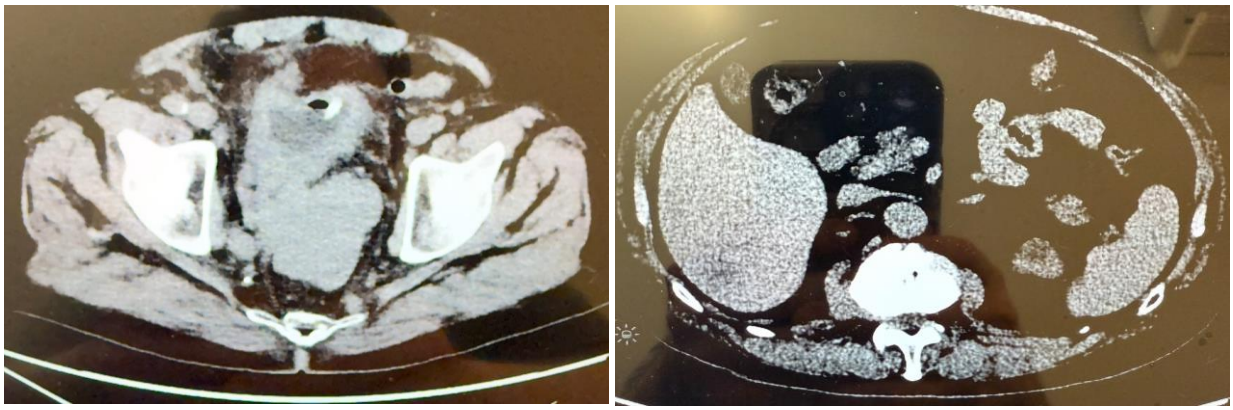

Fig. 3: Sep 3, 2025 significant enlargement of the pelvic mass with a new metastatic hepatic lesion

DISCUSSION

Small-cell neuroendocrine carcinoma of the prostate (SCPC) is an uncommon and highly aggressive malignancy. It accounts for less than 2% of all prostate cancers. It has an aggressive biological behavior, atypical presentation, and limited responsiveness to conventional therapies used in prostate adenocarcinoma. Histopathological confirmation is essential for accurate diagnosis. Common immunohistochemical markers for SCPC include synaptophysin, chromogranin A, and CD56, while expression of androgen receptor and PSA is often absent. Radiologically, disease progression was rapid and widespread, involving pulmonary, nodal, hepatic, and peritoneal sites. While bone metastases are uncommon.

The therapeutic landscape for SCPC is Platinum-based regimens systemic chemotherapy, particularly combinations of etoposide with either cisplatin or carboplatin, are considered the standard of care, extrapolated largely from the management of small-cell lung carcinoma. The prognosis of small-cell carcinoma of the prostate remains poor despite aggressive multimodality treatment. Reported median overall survival ranges from 12 to 18 months, with less than 20% of patients surviving beyond two years. The rapid progression observed in this case, despite appropriate chemotherapy, is reflective of the typical clinical course.

CONCLUSION

Small-cell neuroendocrine carcinoma of the prostate is a rare but highly aggressive malignancy with distinct clinical and biological characteristics compared to conventional adenocarcinoma. Our patient's course highlights the rapid progression, visceral metastatic pattern, and limited therapeutic options associated with this disease. While platinum-based chemotherapy offers temporary disease control, relapse is almost inevitable. Supportive measures play a critical role in maintaining organ function and quality of life.

REFERENCES

1. Bergengren O, Pekala KR, Matsoukas K, Mungovan SF, Bratt O, Bray F. 2022 update on prostate cancer epidemiology and risk factors—a systematic review. European urology. 2023 Aug 1;84(2):191-206.
2. Raychaudhuri R, Lin DW, Montgomery RB. Prostate cancer: a review. JAMA. 2025 Apr 22.
3. Wang Y, Wang Y, Ci X, Choi SY, Crea F, Lin D, Wang Y. Molecular events in neuroendocrine prostate cancer development. Nature Reviews Urology. 2021 Oct;18(10):581-96.
4. Kouroukli O, Bravou V, Giannitsas K, Tzelepi V. Tissue-Based Diagnostic Biomarkers of Aggressive Variant Prostate Cancer: A Narrative Review. Cancers. 2024 Feb 16;16(4):805.
5. Heimdörfer D, Artamonova N, Culig Z, Heidegger I. Unraveling molecular characteristics and tumor microenvironment dynamics of neuroendocrine prostate cancer. Journal of Cancer Research and Clinical Oncology. 2024 Oct 16;150(10):462.
6. Yi Z, Li H, Li M, Hu J, Cai Z, Liu Z, Zhang C, Cheng C, He Y, Chen J, Zu X. Androgen deprivation therapy, neoadjuvant androgen deprivation therapy, and adjuvant androgen deprivation therapy in patients with locally advanced prostate cancer: a multi-center real-world retrospective study. World Journal of Urology. 2024 Oct 17;42(1):581.
7. Berchuck JE, Viscuse PV, Beltran H, Aparicio A. Clinical considerations for the management of androgen indifferent prostate cancer. Prostate cancer and prostatic diseases. 2021 Sep;24(3):623-37.