CASE REPORT

Case Report: A rare case of renal-type clear cell carcinoma of the prostate [version 1; peer review: 1 approved with reservations]

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Abstract

Renal-type clear cell carcinoma (RTCCC) of the prostate is a rare form of kidney cancer that is infrequently reported in the literature. Here we describe the case of an 81-year-old male patient with a hard, immovable mass on his enlarged prostate, which was discovered through a digital rectal examination. His prostate-specific antigen (PSA) level was 23.01 ng/ml, and bone multi-slice computed tomography scans revealed several osteoblastic lesions on the inferior ramus of his bilateral pubic bone. Tissue recovered during the trans urethral resection of the prostate was indicative of RTCCC with typical prostatic adenocarcinoma (Gleason score 3 + 4 = 7). Concerning treatment course, bilateral subcapsular orchiectomy was chosen over medical hormonal therapy. Upon follow-up 12 months post-surgery, his lower urinary tract symptoms were nearly resolved and his serum PSA level had decreased to 3.2 ng/ml. Accurate RTCCC diagnosis remains a pressing concern that warrants further investigation to optimize treatment selection and patient outcome.

Keywords

Renal-type clear cell carcinoma; prostate; transurethral resection; PSA levels; prostate adenocarcinoma; Gleason score.

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1

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1. **Prahara Yuri** , Division of Urology, Department of Surgery, Faculty of Medicine, Universitas Gadjah Mada/Dr. Sardjito Hospital, Yogyakarta, Indonesia

Any reports and responses or comments on the article can be found at the end of the article.

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Introduction

Renal-type clear cell carcinoma (RTCCC) of the prostate was first described by Singh *et al.* in 2003,^{1,2} and, therefore, the literature describing this new, rare form of kidney cancer is very limited.³ Differential diagnosis of clear cell lesions in the prostate is challenging due to the multitude of conditions that could potentially underly the presenting symptoms. This includes clear cell variants of the more common adenocarcinoma of the prostate and urothelial carcinoma, along with rare clear cell carcinoma of Mullerian origin, metastatic renal cell carcinoma, and clear cell carcinoma of the prostate.⁴ We report a very rare case of a male with RTCCC of the prostate, in line with the updated consensus-based surgical case report (CARE) guidelines.⁵

Case report

An 81-year-old Buginese man who already underwent a cystostomy due to urine retention two weeks prior, was referred to our institution. The patient is a retired civil servant. His medical history included lower urinary tract symptoms and a trans urethral resection of the prostate (TURP) performed around eight months prior at a separate institution. Histopathological analysis indicated hyperplasia of the prostate and a digital rectal examination revealed that his enlarged prostate was hard in consistency and compressing the rectal wall. His serum markers and other biochemical parameters were all within the normal limits. Most importantly, his serum prostate-specific antigen (PSA) level was 23.01 ng/ml (normal value < 4 ng/ml). A hypoechoic lesion was found upon ultrasound examination, while both kidneys appeared healthy. Bone scans identified several osteoblast lesions on the inferior ramus of his bilateral pubic bone.

The patient underwent a urethrocystoscopy to evaluate his urethra and bladder followed by TURP. The resected tissue was histopathologically characterized as clear cell carcinoma and typical prostatic adenocarcinoma (Gleason score 3 + 4 = 7; **Figure 1A**). Immunohistochemistry showed areas immunoreactive to vimentin (VIM) (**Figure 1B**), epithelium membrane antigen (EMA) (**Figure 1C**), and membrane metalloendopeptidase, also known as cluster of differentiation 10 (CD-10) (**Figure 1D**).

Figure 1. Microphotograph of the prostate lesion. A. Clear cell adenocarcinoma of the prostate. Cuboidal/hobnail cells, enlarged nuclei with mild pleomorphism (black arrow) (hematoxylin and eosin stain, 400× magnification). B. Positive immunostaining for vimentin (IHC, 400×). C. Positive immunostaining for EMA (epithelial membrane antigen) (IHC, 400×). D. Positive immunostaining for CD10 (IHC, 400×).

Bilateral subcapsular orchiectomy was chosen over medical hormonal therapy as the best suited treatment course for this patient. At the 12-month post-surgery follow-up, he reported that his lower urinary tract symptoms were nearly resolved and his serum PSA level was within the normal range (3.2 ng/ml).

Discussion

RTCCC is associated with specific cytological morphologies, including atypical, enlarged, protruding nuclei, as well as classic structural features, like tubules, solid nests, or sheets in vascular-rich stroma with interstitial inflammatory infiltration.¹ The most likely differential diagnosis is metastatic renal cell carcinoma to the prostate, for which, to the best of our knowledge, only two cases have been described in the literature.⁴

In the case described here, ultrasound examination found no abnormalities in both kidneys. Therefore, we concluded that the primary possible RTCCC lesion comes from the prostate. The immunohistochemical expression profile indicated that positive expressions of vimentin, EMA, and CD10 and significantly elevated serum levels of PSA indicated prostate malignancy. A mere seven reports have been published describing cases of prostate RTCCC. Collectively, the patients included in these studies were 42 to 73 years old, had PSA levels between 0.18 and 82 ng/mL, and Gleason scores above 6. The immunohistochemical results include positive expression of vimentin, EMA, CD10, low-molecular-weight cytokeratin, pan-cytokeratin, cytokeratin 7, paired box 8 (PAX8), prostatic specific acid phosphatase, periodic acid-Schiff, and alpha-methylacyl-coA racemase. Of the seven patients described in published case-reports of RTCCC of the prostate, five underwent radical prostatectomy and the remaining two received TURP. Local recurrence in the pelvis was apparent 24 months after radical cystoprostatectomy in one patient and two patients died due to multi-organ failure (6 months after TURP and 29 months after radical cystoprostatectomy).^{3,4,6}

The treatment of RTCCC of the prostate is similar to that used to combat the more common forms of prostate cancer.^{1–4,6} In the present case, bone scans revealed skeletal metastases at the inferior ramus of his bilateral pubic bone. After explaining the advantages and disadvantages of bilateral subcapsular orchiectomy and medical hormonal therapy, the patient chose the former, since the latter would require frequent trips to the outpatient department, which was problematic given how far he lives from the hospital and his limited access to transportation.

Conclusion

This case study of a patient with RTCCC of the prostate supports that this new, rare pathological entity is characterized by histological and immunohistochemical profiles similar to renal clear cell carcinoma. Accurate differential diagnosis, e.g., distinguishing RTCCC from clear cell urothelial carcinoma and metastatic clear cell renal cell carcinoma, remains a pressing concern that warrants further investigation to optimize treatment selection and patient outcome.

Data availability

All data underlying the results are available as part of the article and no additional source data are required.

Consent

Written informed consent for publication of their clinical details and/or clinical images was obtained from the patient.

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Prahara Yuri

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This is a very nice manuscript. We read this with interest however we struggle to find new knowledge being presented here. This case was a rare case about Renal-type clear cell carcinoma (RTCCC) of the prostate and the suitable IHC examinations was performed to proof RTCCC.

Sounds precise and searchable.

Structured abstract; summarizes the paper

My question are :

1. Why you choose surgical hormonal therapy either medical hormonal therapy in this patient?
2. Would you perform radical cystoprostatectomy? When would you do it?
3. If you found any differences in your case compared to other cases. This would be a valuable addition at discussion.

Is the background of the case's history and progression described in sufficient detail?

Yes

Are enough details provided of any physical examination and diagnostic tests, treatment given and outcomes?

Yes

Is sufficient discussion included of the importance of the findings and their relevance to future understanding of disease processes, diagnosis or treatment?

Yes

Is the case presented with sufficient detail to be useful for other practitioners?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Urology; pediatric urology, endourology, basic research, laparoscopy.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 17 Nov 2021

Muhammad Asykar Palinrungi

Dear reviewer,

Thank you for your valuable comment. Our replies to the reviewer's inquiries and revised points are as follows.

Reply to comment 1:

Although the patient has been explained before, they still prefer surgery due to the long distance of his home from the closest health facility.

Reply to comment 2:

I will perform the procedure if the patient meets the criteria.

Reply to comment 3:

Thank you for your suggestions

Competing Interests: The authors declare that they have no conflict of interest.

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