Case Report

Metastatic Prostate Adenocarcinoma Posing as Urothelial Carcinoma of the Right Ureter: A Case Report and Literature Review

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This is a case report of a 67-year-old patient with distant metastasis of prostate cancer to the right ureter which caused hydronephrosis. At the beginning, both of the cytology of the morning urine and imaging findings were consistent with urothelial carcinoma. Nephroureterectomy was subsequently performed. Interestingly, the pathological examination of the excised ureter revealed that the malignancy was derived from the prostate. No skeletal metastasis was detected. However, after four months of follow-up, several abnormal signal shadows were reported in skeletal scintigraphy and the prostate specific antigen (PSA) was gradually increasing. We present such a case for its unique presentation. A review of the literature is also provided.

1. Introduction

Prostate cancer is the second most frequently diagnosed cancer and the sixth leading cause of cancer death in men worldwide. About twenty percent of these patients suffer from metastatic disease [1], but ureter involvement is extremely rare. Hydronephrosis, one of the most frequent clinical presentations caused by ureter factors, is mainly due to local extension and external compression by enlarged lymph nodes among patients with cancer. We reported such a rare case presenting with hydronephrosis secondary to ureteral discrete metastasis of prostate adenocarcinoma.

Besides, we searched the Medline database to identify relevant case reports, using the following key words: “prostate” and “cancer or tumor or carcinoma or neoplasm” and “ureteral or ureter” and “metastasis or metastatic” and “case report or review.” In addition, the reference lists of every case report and reviews were also manually searched. As a result, 45 cases of prostate cancer with ureteral metastasis were reported worldwide so far.

2. Case Presentation

A 67-year-old man presented with lower urinary tract symptoms and right flank pain for three months. The serum prostate specific antigen (PSA) and free PSA (fPSA) values were 13.07 ng/mL and 0.22 ng/mL, respectively. Digital rectal examination revealed a harder prostate gland. Computed tomography urography (CTU) demonstrated right hydronephrosis secondary to thickening of the distal ureter (Figure 1), mass of the right lateral bladder wall, and benign prostatic hyperplasia (BPH). Enhanced CT scan was conducted subsequently and showed thickening of distal ureter on the right side, with about 6 cm length.

Transrectal ultrasound guided biopsy was conducted firstly and pathological reports showed prostate adenocarcinoma with Gleason score $4 + 5 = 9$. Ureteroscopy was performed shortly after mass of bladder was excised and pathologic examination revealed metastases of prostate adenocarcinoma. Immunohistochemical staining of the tumor
that the PSA and P504s were positive (shown in Figure 2), immunohistochemical staining of the tumor tissue revealed.

Finally, nephroureterectomy was carried out. To our surprise, in accordance with urine cytology, revealing ureteral TCC. The urine cytology and imaging findings, ureteral TCC was thought to be most likely. Ureteral surgical exploration was then conducted and the report of the intraoperative frozen section was consistent with ureteral carcinoma. We finally chose to carry out the nephroureterectomy.

Combining with imaging findings and pathologic report of the bladder masses, a distal ureteral transitional cell carcinoma (TCC) was thought to be most likely. Considering its higher degree of malignancy, nephroureterectomy was recommended.

Before removal of the kidney, intraoperative frozen section was submitted and the histology result was in accordance with urine cytology, revealing ureteral TCC. Finally, nephroureterectomy was carried out. To our surprise, immunohistochemical staining of the tumor tissue revealed that the PSA and P504s+ were positive (shown in Figure 2), all of which indicated that the urothelial carcinoma of the ureter turned out to be metastasis of prostate cancer.

The patient reported a significant improvement of lower urinary tract symptoms and right flank pain. Both PSA level and biopsy of the prostate revealed prostate adenocarcinoma. CTU before hospitalization showed a hydronephrosis secondary to ureterostenosis. The biopsy of the thickened ureter is important in the selection of therapeutic measures, but it was hard to be obtained due to the distal obstruction of the ureter.

Pathologic examination of bladder masses revealed metastases of prostate adenocarcinoma, which might rule out the possibility of idiopathic bladder cancer. Combined with the urine cytology and imaging findings, ureteral TCC was thought to be most likely. Ureteral surgical exploration was then conducted and the report of the intraoperative frozen section was consistent with ureteral carcinoma. We finally chose to carry out the nephroureterectomy.

It is well known that PSA can be used as the specific marker for prostate cancer. Besides, Molinie et al. demonstrated the ability of P504s to support a diagnosis of prostate cancer, especially, combined with negative staining for a basal cell marker, such as P63 [10]. In addition, a clinical study performed by Liu WH showed that the probability of prostate cancer is 86.36%, when all of the CK7, CK20, and villin were negative. In this case, immunohistochemical staining of tumor tissue from ureter revealed that PSA and P504s were positive, while CK7, CK20, and villin were negative. Combining these kinds of cytological markers, metastatic prostate adenocarcinoma was thought to be most likely.

Hydronephrosis secondary to ureteral stricture might be found early when metastatic prostate carcinoma is involving the ureter. When it comes to this situation, conservative treatment like transcutaneous nephrostomy or double J stent insertion may be selected in emergency. We may take benign lesion like stone, BPH, and congenital stricture ureter into account firstly, especially when there was no evidence initially suggesting prostatic disease as the cause. But from this case, we should consider the possibility of metastatic prostate.

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Table 1: Characteristics of relevant case reports published from January 2000 to November 2013.

| Author | Year | Country | Age | Chief complaint | Hydronephrosis | PSA | DRE | Ureter metastasis | Treatment | Follow-up |
|--------|------|---------|-----|-----------------|----------------|-----|-----|-------------------|-----------|----------|
| Jallad S | 2012 | UK      | 76  | Right loin pain | Right (CT)     | Nor | Nor | Histology of right NU GS grade (5 + 5) | Initial: right ureteroscopy Secondary: open exploration and frozen section Third: right NU | GnRH analogue injection |
| Schneider S | 2012 | Germany | 74  | Right flank pain and LUTS | Right (ultrasound and intravenous pyelography) | 52  | NG  | Ureterorenoscopy with biopsy GS grade (3 + 4) | Initial: LHRH-analogues Secondary: ureterorenoscopy with biopsy Third: nephrostomy Fourth: LHRH analogues + zoledronic acid infusions once a month Fifth: LHRH-analogues and antiandrogene | Died in ALF, which was due to liver metastasis with highly progressive disease |
| Chalasani V | 2010 | Canada  | 68  | Right upper quadrant pain | Right (CT)     | 96  |     | Enlarged, hard prostate Histology of right NU GS grade (4 + 3) | Initial: ADT Secondary: NU | NG |
| Singh G | 2009 | Singapore | 70  | Episode of urinary retention | Bilateral (CT) | 30  | NG  | Histology of tumor masses obstructing the ureteric orifices GS grade (4 + 4) | Initial: TURP + bilateral orchidectomy Secondary: insertion of bilateral double J stents (successful at last) | Obstruction relieved and PSA decreased to 0.16 ug/L |
| Marzi M* | 2007 | Italy   | 64  | 12-hour enuresis | No | / | / | Histology of whitish tissue in ureter | Initial: ADT Secondary: urgent right nephrostomy | / |
| Siddiqui E† | 2004 | Japan   | 69  | / | / | 396 | / | Histology | Chemoendocrine therapy | NG |
| Jung JY | 2000 | Korea   | 64  | LUTS and gross hematuria | Right (excretory urography) | 40.9 | NG  | Histology of right NU | Initial: bilateral orchidectomy Secondary: TURP + right percutaneous nephrostomy Third: right NU | Three months later, PSA had decreased to 1.3 ng/mL |

*“Hydronephrosis” refers to “if there exists hydronephrosis? Which side? And which exam revealed?”.
**“Ureter metastasis” refers to “which examination indicates distant metastases of prostate adenocarcinoma to the ureter?”.
NU: nephroureterectomy, PSA: prostate specific antigen, DRE: digital rectal examination, Nor: normal, ALF: acute liver failure, LUTS: lower urinary tract symptoms, ADT: androgen deprivation therapy, TURP: transurethral resection of the prostate, CT: computed tomography, GS: Gleason grade, GnRH: gonadotropin-releasing hormone analogue, and NG: not given.
†Four weeks later, both alkaline phosphatase and bone scan revealed widespread bony metastasis, and GnRH analogue injection was used.
‡Only abstract available and only part of information displayed in the table.
cancer when any lesions in the ureter existing are believed to have a malignant origin.

4. Conclusion
The urologist should notice this atypical cause for hydronephrosis secondary to ureteral stricture which prevents passage of ureteroscopy, making it impossible to obtain biopsy result in a patient with carcinoma of the prostate. Besides, cytology of morning urine and intraoperative frozen section may be useful but can never replace pathology due to the existence of a certain degree of error.

Conflict of Interests
The authors declare that there is no conflict of interests regarding the publication of this paper.

Authors’ Contribution
Tian-bao Huang and Yang Yan contributed equally to this work.

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