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Ureteric obstruction secondary to unusual metastasis of prostate cancer

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ABSTRACT

A case of ureteric metastasis secondary to prostate cancer. A 70-year-old man presented with a rising PSA five years post radical prostatectomy and salvage radiotherapy.

Conventional staging (CT/bone scan) was negative but a ^{68}Ga-PSMA-PET/CT scan and ureteroscopy later confirmed a ureteric metastasis. This was treated with robotic-assisted radical nephroureterectomy.

Introduction

The ureter is an uncommon location for metastasis of any primary tumour. Furthermore, metastasis to this location from prostate cancer (PCa) is exceptionally rare with only a few cases documented in the literature. The most common sites of metastasis for PCa are lymph, bone, lung and liver. Ureteric obstruction in patients with PCa is most commonly due to extraluminal compression by pathological lymph nodes or secondary to direct subtrigonal invasion of tumour. This article describes an unusual finding of unilateral ureteric obstruction secondary to metastatic spread of PCa within the ureter.

Case

A 70-year-old famer presented five years ago with a PSA of 5.2 ng/mL, a 25-cc prostate and an abnormal digital rectal exam (T2b). Prostate biopsies showed 7 out of 14 cores positive for PCa (4 + 3 = 7; 60% high grade). The right side of the prostate was extensively involved, with the majority of disease at the right base. Staging CT and bone scan were both negative. The patient underwent a robot-assisted radical prostatectomy with bilateral lymph node dissection. The left neurovascular bundle was preserved but the right was dissected widely. Histopathology showed Gleason score 4 + 3 = 7, with involvement of both seminal vesicles (pT3b) and extraprostatic extension (11 mm). He subsequently underwent salvage radiotherapy.

He was later referred to his medical oncologist with a rising PSA five years post treatment. His PSA had risen from 1.7 ng/mL to 4.4 ng/mL in 18 months. Conventional staging with CT and bone scan was negative for metastatic disease. A^{68}Ga-PSMA-PET/CT was then arranged which showed no evidence of locoregional recurrence in the prostatic fossa but increased thickening of the right ureteric wall with increased PSMA avidity at the same level. It also showed new hydronephrosis which was concerning for ureteric involvement (Figs. 1 and 2). Importantly, there was no evidence of extrinsic compression from involved lymph nodes. No other sites of metastatic disease were demonstrated. His creatinine was 75 micromol/L.

A right retrograde pyelogram demonstrated a narrow distal ureter with interval dilatation and mild stricture formation above the pelvic brim and moderate hydronephrosis. Ureteroscopy showed a narrowed ureter with malignant submucosal nodules. A 6F ureteric stent was placed. The patient then underwent a robot assisted laparoscopic right nephroureterectomy. Histopathology confirmed prostatic adenocarcinoma within the ureteric wall extending into the kidney and hilum with a positive margin at the renal vein (Fig. 3). He made a successful recovery and at 6 weeks his PSA had fallen to 1.27 ng/mL.

Discussion

Ureteric metastasis from prostatic cancer is a remarkably rare occurrence with less than 50 cases reported. The pathophysiology of the metastatic process is unknown however it is hypothesised to occur secondary to either implantation by instrumentation, venous or arterial spread or most likely from retrograde lymphatic dissemination.[1]

Hydronephrosis associated with prostate cancer may occur secondary to direct invasion of the ureter by the primary tumour or due to metastatic lymph nodes causing external compression of the ureter (2). However, neither of these were present in this case. Furthermore, conventional staging did not demonstrate the location of the metastatic disease despite his rising PSA post treatment. The use of ^{68}Ga-PSMA-PET/CT in this man was valuable as it demonstrated increased

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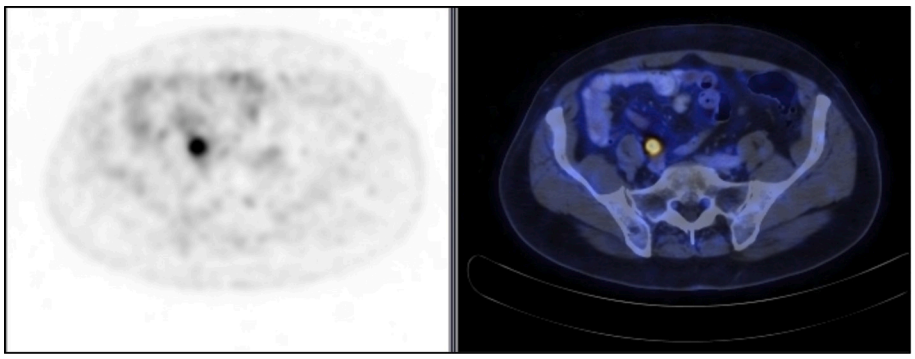

Fig. 1. Axial slice of ^{68}Ga-PSMA-PET/CT imaging showing thickening of the right ureteric wall in conjunction with increased PSMA avidity (SUV_{max} 7.6).

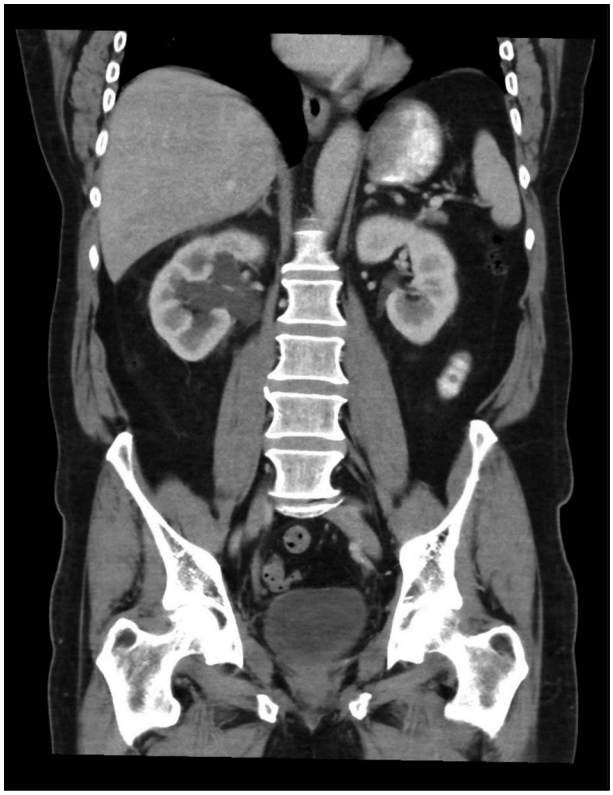

Fig. 2. Coronal slice of CT scan showing right-sided moderate hydronephrosis secondary to ureteric obstruction.

thickening and PSMA avidity of the right ureteric wall concerning for ureteric involvement (Fig. 1). This was confirmed on histopathology (Fig. 3). This was the first case in the literature to demonstrate ureteric metastasis from prostate cancer on ^{68}Ga-PSMA-PET/CT.

While many patients are asymptomatic, the clinical presentation of ureteric metastases can be variable including, haematuria, flank pain and acute urinary retention. Chalasani and colleagues described a case of a 68-year-old man presenting with right flank pain, right hydronephrosis and a PSA of 96 ng/L. This patient had a right nephroureterectomy which showed metastatic PCa throughout the entire ureter (Gleason 4 + 3 = 7).[2] Schneider et al. described a similar case, although this patient had further metastatic disease.[3] A more recent report from Pascoe et al., described a case of a man in his mid-60s with left sided hydronephrosis in the setting of biochemical recurrence of Gleason 4 + 5 = 9 PCa. This was initially misdiagnosed as an obstruction secondary mass effect from a large trigonal lesion, when in fact it was a solid intramural metastatic deposit of primary PCa in the distal ureter.[4]

This demonstrates that while ureteric metastasis from primary PCa is uncommon, urologists must consider the possibility of metastatic aetiology in patients with hydronephrosis post treatment, especially in high-risk disease. Suspicion of ureteric metastasis from PCa should be investigated endoscopically and a ^{68}Ga-PSMA-PET/CT be considered if conventional staging is negative.

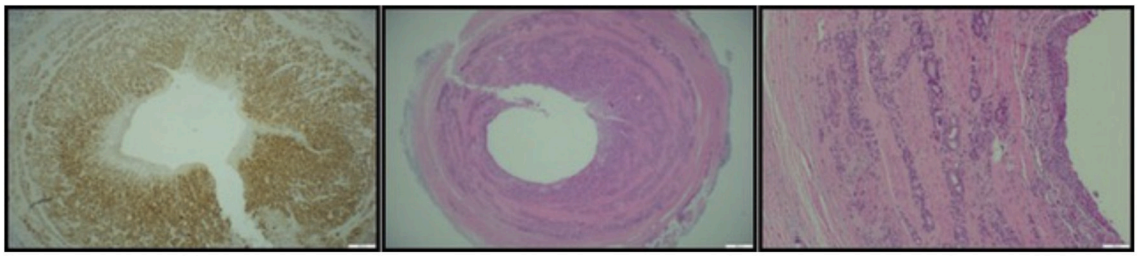

Fig. 3. A - transverse section of ureter shows strong immunoperoxidase stain positive with PSA (20X magnification) B - H&E stain showing tumour involving the entire thickness of the wall into the muscle fibres and lamina propria with tumour seen abutting the lining epithelium (20X magnification) C - 100x magnification showing tumour throughout the ureteric wall.

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