CASE REPORT

Ureteral intramural metastatic deposit of prostate cancer with ureteric obstruction

Claire Pascoe,^{1,2,3} Todd G Manning,^{1,2} David Wetherell,^{1,2} Nathan Lawrentschuk^{1,3}

¹Department of Urology, Austin Health, Melbourne, Victoria, Australia

²Young Urology Researchers Organisation (YURO), Melbourne, Victoria, Australia

³Department of Cancer Surgery, Peter MacCallum Cancer Centre, Melbourne, Victoria, Australia

Correspondence to
Dr Claire Pascoe,
cea.pascoe@gmail.com

Accepted 20 December 2017

SUMMARY

True metastatic ureteric lesions are exceptionally rare when sourced from any primary tumour. Primary prostatic cancer metastasis to the ureter is understandably even more atypical with very few cases reported in current literature. True intramural ureteric metastatic disease deposited from prostate cancer is an even rarer occurrence. We present a case of a man in his mid-60s with left-sided hydronephrosis in the setting of biochemical recurrence of Gleason 9 prostate cancer. Initially misdiagnosed as obstruction secondary to mass effect from a large trigonal lesion, subsequent investigation revealed solid intramural metastatic deposit of prostate primary tumour in the distal ureter. We detail current hypotheses regarding the subsequent pathophysiology of the disease and its common clinical presentations. Our case highlights that prostatic metastasis should be considered as a differential in coexisting prostate cancer and ureteric obstruction despite its low incidence.

BACKGROUND

Urothelial carcinoma, or transitional cell carcinoma, is the most common source of ureteric malignancy but despite this, represents less than 10% of all urothelial malignancies.¹ Metastatic ureteric lesions are considerably rare and limited reports exist of ureteric metastatic deposits from any source.^{2,3}

The common metastatic pathways of prostate cancer include lymph, bone, lung as well as liver, and have been well described. However, prostate carcinoma as a primary source for ureteric metastatic disease is exceptionally rare and the literature is limited to a small number of case reports. We present the case of unilateral ureteric obstruction resulting from a metastatic deposit of primary prostate cancer confirmed on subsequent

histopathological analysis. To our knowledge our case is the first reported of its kind to be clearly demonstrated on ureteroscopy (figure 1) and contributes to the limited existing literature for this specific disease entity. We also provide an updated review of the current evidence surrounding this unusual pathological entity.

CASE PRESENTATION

A male patient in his mid-60s with a history of high-risk, bony metastatic, Gleason 5+4=9 prostate cancer, initially treated with androgen deprivation therapy (Zoladex 3 monthly and zoledronic acid monthly for 3.5 years) and radiation therapy to spinal metastasis (20 Gy in five fractions), presented with biochemical recurrence during post-treatment surveillance. The total PSA had increased to 6.3, from 2.2 a year prior. Subsequent imaging with abdominopelvic CT scanning revealed pelvic lymphadenopathy and the presence of left-sided hydronephrosis, reported to be secondary to a large trigonal lesion and subsequent mass effect (figure 2), rather than to any intramural cause in the distal ureter. The patient was found to be symptomatic at the time of investigation with voiding difficulty and flank pain. Macroscopic haematuria was not present. Multidisciplinary review noted that the patient would likely experience lower urinary tract symptom progression due to the already significant local cancer burden. After discussion with the patient, the decision was made to proceed with salvage cystoprostatectomy and formation of ileal conduit.

INVESTIGATIONS

Cystoscopy was performed as a separate procedure prior to cystoprostatectomy to evaluate the extent of involvement of the left ureteric orifice

Figure 1 Photographs taken of obstructing intramural lesion on left-sided ureteroscopy.

CrossMark

To cite: Pascoe C, Manning TG, Wetherell D, et al. *BMJ Case Rep* Published Online First: [please include Day Month Year]. doi:10.1136/bcr-2017-222480

Figure 2 Preoperative CT scan (multiple views) demonstrating trigonal mass, left-sided hydronephrosis and possible filling defect in distal ureter separate from ureteric orifice (as indicated by red arrow).

(UO) and distal left ureter; however on examination, the left UO did not appear obstructed. Ureterscopy was performed and an obstructing intramural lesion was identified ([figure 1](#)).

TREATMENT

The patient was consequently planned to proceed for cystoprostatectomy with additional resection of the left distal ureter to ensure oncological margin clearance and removal of the identified lesion. The patient underwent a routine operation without complication and a successful ileal conduit was fashioned.

OUTCOME AND FOLLOW-UP

Investigation with ultrasound in the postoperative period displayed subsequent resolution of the left-sided hydronephrosis. The patient's perioperative period was uneventful and his loin pain resolved over the ensuing few weeks.

Gross histopathological analysis ([figure 3](#)) revealed a solid, congested tumour 32×24 mm in the posterior and left bladder wall which was macroscopically invading the perivesical fat. The prostate was also congested in appearance and ulcerated at the base but otherwise unremarkable. Microscopic sections revealed extensive bilateral prostate adenocarcinoma largely replacing the gland from the apex to base, predominantly in the posterior peripheral zones, with Gleason grade 5+4=9 carcinoma and intraductal carcinoma. Additionally, there was bilateral extra-prostatic extension and seminal vesical invasion as well as multifocal perineural and lymphovascular invasion. Tumour tissue also extended through perivesical fat and through the bladder wall at the level of the trigone. Two of four right-sided pelvic

Figure 3 Gross histological specimen from resection.

lymph nodes were involved by tumour and one of two left-sided pelvic nodes was involved, pathological stage pT4 N3 M1.

A separate tumour deposit 33 mm in size containing high-grade adenocarcinoma was identified inside the lumen of the distal left ureter 22 mm from its termination consistent with prostate cancer metastasis. Given the extensive disease demonstrated by specimen pathology and discussion with the patient, a palliative treatment regimen was followed.

The patient remains relatively well under the care of a medical oncologist and palliative care team in the Greater Melbourne region.

DISCUSSION

Although uncommon, metastatic deposits to the ureter have previously been reported from primary breast, stomach and bladder neoplasms and atypical sources such as cervix and colon. Particularly, non-urinary tract metastatic ureteric malignancies are extraordinarily rare. A compelling series by Maclean and Fowler in the 1950s reviewed 10233 autopsies of which 7 (0.07%) had metastatic ureteric lesions which were identified as arising from sources outside the urinary tract.⁴ Given this, prostatic metastasis as a subset of primary metastatic source to the ureter is rare and literature on the topic is subsequently scarce. A formal Preferred Reporting Items for Systematic Reviews and Meta-Analyses review of contemporary literature was undertaken using Embase, Web of Science and PubMed regarding metastatic deposits to ureter and rare pathways of metastatic prostate cancer. Apart from a comprehensive review by Haddad *et al* in 1999,³ the body of literature on this topic is limited to case reports which is less than 50 at the time of this review.

Learning points

- ▶ Given the underlying rarity of truly metastatic ureteric lesions from any primary source, lesions from a prostatic primary represent an increasingly atypical series. Our case adds to the limited existing literature of approximately 50 previously reported cases.
- ▶ Despite how uncommon these lesions are, urologists must always consider the possibility of a metastatic aetiology in ureteric mass, including from primary prostate cancer.
- ▶ Conversely in high-grade prostate cancer with coexisting hydronephrosis clinicians should also carefully consider the possibility of a sinister metastatic mass causing obstruction.
- ▶ Investigation of the cause of hydronephrosis with cystoscopic evaluation of the ureteric orifices should be performed to rule out distal ureteric involvement by primary or secondary lesions.

Pathophysiology of the metastatic process is relatively unclear, with some suggesting that the mechanisms of prostate cancer metastasis to the urethra may be not dissimilar to those involved in ureteric metastasis.⁵ This includes implantation by instrumentation, arterial tumour emboli, direct invasion and retrograde venous or lymphatic dissemination.^{5,6} Clinical presentation of such cases is also varied, but commonly patients experience unilateral hydronephrosis clearly visible on imaging^{7–10} often without identification of a ureteric mass or filling defect. Fitch and Robinson attempted to elucidate the foundation of the obstructive uropathy in such cases and found that obstructive ureteric metastasis fall under two distinct categories. First, metastatic involvement from extensive retroperitoneal tumour involvement or 'bulk metastasis', which they suggest is a more generalised metastatic process commonly eliciting mass effect and/or local infiltration of the ureter. Other lesions were characterised by single, isolated and localised metastatic deposits, which are less common. These single island deposits have the ability to obstruct from within the lumen, as was the presentation of our reported case.

It is of value to note that hydronephrosis and obstructive uropathy in the setting of known aggressive prostate cancer can be a concerning sign of significant disease progression. The considerations in defining the aetiology of this obstruction usually fall to localised disease progression but must also take into account the possibility of metastatic deposits. Despite the factors of low incidence and atypical presentation of metastatic disease to the ureter, its presence significantly alters the clinical course for such patients.

Contributors CP and TGM: conception or design of the work, data collection and drafting the article; CP: data analysis and interpretation; DW and NL: critical revision of the article.

Competing interests None declared.

Patient consent Detail has been removed from this case description. The editors and reviewers have seen the detailed information available and are satisfied that the information backs up the case the authors are making.

Provenance and peer review Not commissioned; externally peer reviewed.

© BMJ Publishing Group Ltd (unless otherwise stated in the text of the article) 2018. All rights reserved. No commercial use is permitted unless otherwise expressly granted.

REFERENCES

- 1 Green DA, Rink M, Xylinas E, *et al.* Urothelial carcinoma of the bladder and the upper tract: disparate twins. *J Urol* 2013;189:1214–21.
- 2 Otta RJ, Gordillo C, Fernández I. Ureteral metastasis of a prostatic adenocarcinoma. *Can Urol Assoc J* 2015;9(3-4):153–5.
- 3 Haddad FS. Metastases to the ureter. Review of the world literature, and three new case reports. *J Med Liban* 1999;47:265–71.
- 4 Maclean JT, Fowler VB. Pathology of tumors of the renal pelvis and ureter. *J Urol* 1956;75:384–415.
- 5 Campbell JE, Aldis HW. Lymphangitic ureteral metastases from prostatic carcinoma. *J Can Assoc Radiol* 1980;31:158–62.
- 6 Singh G, Tiong HY, Kalbit T, *et al.* Urothelial metastasis in prostate adenocarcinoma. *Ann Acad Med Singapore* 2009;38:170–1.
- 7 Zhang D, Li H, Gan W. Hydronephrosis associated with ureteral metastasis of prostate cancer: a rare case report. *Mol Clin Oncol* 2016;4:597–8.
- 8 Morales I, Bassa C, Pavlovic A, *et al.* Ureteral metastasis secondary to prostate cancer: a case report. *Urol Case Rep* 2016;5:4–5.
- 9 Schallier D, Rappe B, Carpieux M, *et al.* Ureteral metastasis: uncommon manifestation in prostate cancer. *Anticancer Res* 2015;35:6317–20.
- 10 Deng F, Liu X, Li Y, *et al.* Ureteral obstruction by prostate cancer leads to spontaneous ureteric rupture: a case report. *Int J Clin Exp Med* 2015;8:16842–4.

Copyright 2017 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow