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CASE REPORT

Primary ureteral stump carcinoma: a rare entity following nephrectomy for non-malignant indications

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Primary ureteral stump carcinoma is an uncommon entity, developing after nephrectomy for non-malignant indications, and can pose a diagnostic challenge. We report a case of a 67-year-old male who presented with painless gross haematuria and burning micturition. The patient also had a history of right-sided nephrectomy, done ten years prior for chronic pyelonephritis. A contrast-enhanced computed tomography (CECT) scan showed an infiltrative soft tissue lesion at the proximal end of the residual ureteric stump, growing along its length. Ureteroscopy-guided biopsy confirmed the diagnosis of urothelial carcinoma. Due to the advanced stage of the disease, the patient was managed with neoadjuvant chemotherapy.

Keywords: transitional cell carcinoma, pyelonephritis, haematuria, nephrectomy, computed tomography

Case report

A 67-year-old male presented to the urology outpatient department with complaints of painless, intermittent gross haematuria and burning micturition for three months. It was associated with lower abdominal pain and occasional fever. He was a chronic smoker, having approximately 30 pack-years.

The patient had a history of right-sided nephrectomy ten years prior for a benign indication, which revealed chronic pyelonephritis on postoperative specimen histopathology. He was referred to the radiology department to evaluate his current complaints further. His routine blood workup was within normal limits. Urine cytology examination showed scattered urothelial and squamous cells and a few atypical cells with mild anisokaryosis and hyperchromatic nuclei. Occasional tadpole-like cells were also seen. Based on this, urothelial carcinoma was highly suspected. Initial ultrasonography of the abdomen showed a dilated right distal ureter filled with hypoechoic soft tissue, which was showing flow on colour Doppler. Hence, the possibility of a neoplasm was suspected, and a contrast-enhanced computed tomography (CECT) scan was planned.

CECT of the abdomen revealed an infiltrative, heterogeneously enhancing soft tissue mass involving the residual proximal end of the ureteric stump on the right side. The mass showed a contiguous extension along the ureteral stump to the distal aspect up to the right vesicoureteric junction (VUJ). The distal inferior vena cava and aorta also appeared to be involved by the mass, causing luminal attenuation of these vessels. Focal soft tissue is also noted at the posterior wall of the bladder near the right VUJ.

In Figure 1 below, the yellow arrow shows the empty right renal fossa with a surgical clip, suggesting post-nephrectomy status. Also seen in the figure are irregular heterogeneously enhancing mass-like soft tissue involving the right ureteral stump reaching up to the right VUJ (blue arrows) with right psoas muscle infiltration (green arrow), and adjacent enlarged conglomerated right para-aortic metastatic lymph nodal mass.

Subsequent cystoscopy revealed a polypoidal mass at the posterior wall of the bladder at the right VUJ. There was no growth in the urinary bladder. The scope was not negotiable beyond the soft tissue area into the remaining ureteral stump.

A biopsy was taken, and histopathology showed that a few of the tumour fragments were lined by urothelium. The tumour cells were oval to elongated, displaying moderate to marked pleomorphism, high nuclear-cytoplasmic (N/C) ratio, hyperchromatic nuclei with inconspicuous nucleoli, and a moderate amount of cytoplasm

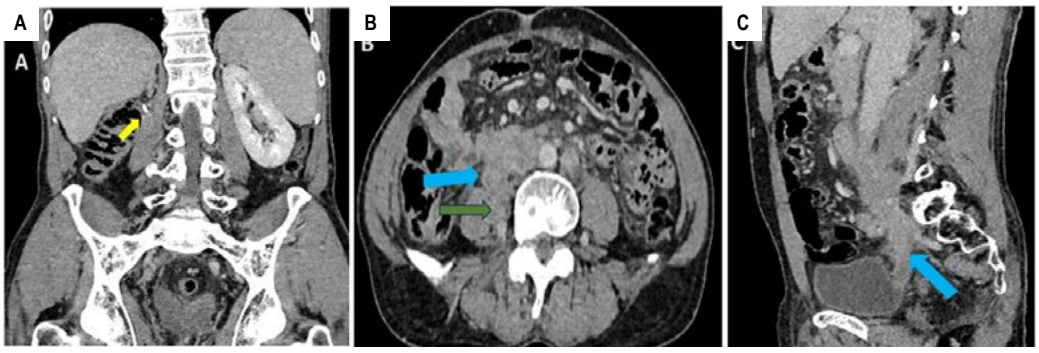

Figure 1: A, B, and C, coronal, axial, and sagittal CECT images, respectively

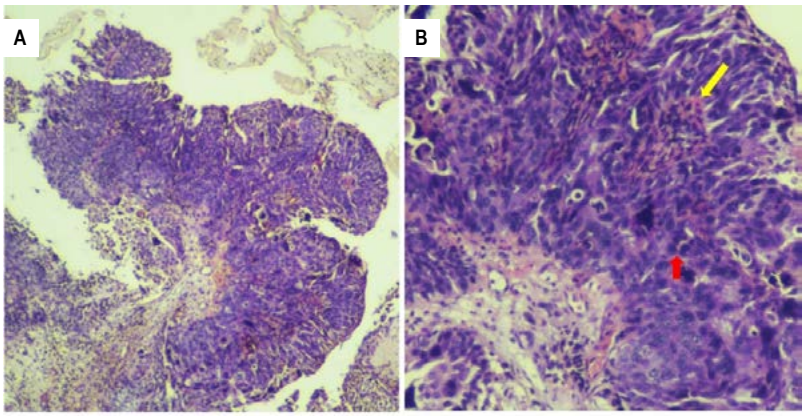

Figure 2: Histopathological evaluation, A shows tumour cells arranged in the papilla with the thin fibrovascular core; B shows tumour cells with marked nuclear pleomorphism (red arrow) and atypical mitotic figures (yellow arrow indicates the papilla)

(Figure 2). Few bizarre tumour cells with brisk mitotic activity were seen; hence, the final diagnosis of urothelial carcinoma was made.

Due to the advanced stage and inoperable disease, the patient was started on neoadjuvant chemotherapy with gemcitabine and cisplatin. He tolerated chemotherapy well and started showing symptomatic improvement after the first cycle. A follow-up CECT scan is planned after the completion of six cycles of therapy.

Discussion

The occurrence of primary urothelial carcinoma in the ureteral stump following nephrectomy for benign renal disease is extremely rare. To our knowledge, fewer than 50 cases have been reported in the literature.[1,2] It usually presents with haematuria and vague abdominal pain and rarely as systemic symptoms of metastatic disease. This report presents a case of urothelial carcinoma in a remnant ureter post-nephrectomy done ten years prior for chronic pyelonephritis.

Primary ureteral stump carcinoma is defined as a malignant tumour occurring in the remnant ureter following partial nephroureterectomy or nephrectomy in the absence of a tumour of the excised upper ureter, pelvis, and renal parenchyma.[1] Kim et al.[2] reported that 8 out of 318 patients who underwent a simple nephrectomy for benign renal disease, such as pyonephrosis due to staghorn calculi, renal tuberculosis, or renal organ donation, presented later with ureteral stump carcinoma. The incidence of primary ureteral stump tumours was 2.51%. The mean age group affected is the elderly, with a range of 49–76 years.

Why do malignant tumours develop in the closed ureteral stump? The aetiopathogenesis is still unclear. Bergman and Hotchkiss have proposed several possible aetiological factors for the development of ureteral stump tumours, such as malignant metamorphosis in an area of leukoplakia, hyperplastic and metaplastic changes from chronic irritation due to the presence of calculi or infection, and stimulation by an unrecognised carcinogenic agent.[3] In our case, the possible aetiological factor could be chronic irritation of the mucosa due to chronic pyelonephritis and a history of chronic smoking. The complex interplay between multiple aetiological factors, such as chronic mucosal irritation due to some pre-existing insults and accentuation by environmental or genetic factors, may explain the relative latency in the disease development.

Urine cytology plays an important role in screening urothelial carcinoma as the malignant cells are shed in the urine. However, it has a low sensitivity due to overlapping cellular areas, low cellularity, and a lack of urine secretion at the affected side. Identification of urinary markers/antigens such as NMP22 and BTA are also promising in the screening and early detection of urothelial carcinoma.[4]

Cross-sectional imaging using CECT or magnetic resonance imaging (MRI) is crucial in evaluating haematuria, early identification of tumours, and diagnosing urothelial cancer. Early imaging features may be focal thickening of the ureteric wall (eccentric or circumferential), expansile enhancing soft tissue mass replacing a segment of the ureter, or polypoidal soft tissue protruding into the ureteric lumen. A computed tomography urography protocol consisting of nephrographic and excretory phases is paramount, as the small polypoidal tumour may stand out as a filling defect in the contrast-distended ureter.[5]

Other roles of cross-sectional imaging are staging ureteral carcinoma, assessing the operability of the tumour by evaluating the invasion of neurovascular structures/adjacent viscera, evaluating lymph nodes and distant metastasis, and surveillance. The replacement of invasive cystoscopy by these non-invasive studies (supplemented by bladder sonography) for surveillance purposes is unlikely because cystoscopy is superior in evaluating bladder and urethral mucosa.

Conclusion

A primary ureteral stump tumour following nephrectomy for benign renal disease is considered a rare condition. However, ureteral stump cancer should be considered if a patient who has undergone nephrectomy develops haematuria. Thus, urologists should consider the ureteral stump as a possible site for the development of urothelial carcinoma and accordingly focus on that site during the follow-up period. The radiologists should also be familiar with the appearance of stump carcinomas on computed tomography and MRI, as they may encounter this during a routine follow-up imaging of any post-nephrectomy patient, and the overall prognosis of such cases depends on the degree of invasion, early diagnosis, and timely treatment.

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Conflict of interest

The authors declare no conflict of interest.

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Ethical approval

The authors declare that this submission follows the principles laid down by the Responsible Research Publication Position Statements as developed at the 2nd World Conference on Research Integrity in Singapore, 2010. The patient provided informed, written consent to be included in the study.

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