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Case Report

Cutaneous metastatic seeding as a sequela of nephrostomy catheter placement ☆,☆☆

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ABSTRACT

Urothelial carcinoma and nephrolithiasis are a common cause of obstructive uropathy which can be relieved by percutaneous nephrostomy catheter placement. A rare, but known complication of this procedure is iatrogenic seeding of tumor cells along the nephrostomy tract. We describe a case of 68-year-old-female with cutaneous metastasis of high-grade urothelial carcinoma with seeding of tumor cells along the percutaneous nephrostomy catheter tract 8 months after the removal of the catheter. Given its severity, interventional radiologists should be mindful of the number of percutaneous access attempts, exchanges, and catheter manipulations in patients with urothelial carcinoma due to the risk of metastatic seeding along the percutaneous tract or to nearby tissues.

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Introduction

Urothelial tumors of the renal pelvis and ureters are relatively rare with an estimated annual incidence in Western countries approximately 2 per 100,000 [1]. Greater than 90% of all tumors in the renal pelvis and ureter are urothelial in origin [2] Similar to primary bladder urothelial carcinoma, risk factors for urothelial carcinoma of the upper urinary tract include smoking, recurrent bladder calculi, chronic infections, arsenic ingestion from contaminated drinking water, iatrogenic agents (radiation therapy, cyclophosphamide, some analgesics, and thiazolidinediones), and occupational carcinogens, such as beta-naphthylamines exposure [3–7].

Cutaneous metastases occur in approximately 1%-2% of all urologic malignancies. Furthermore, the development of cutaneous metastasis from upper urinary tract malignancies during urologic procedures and device manipulation are

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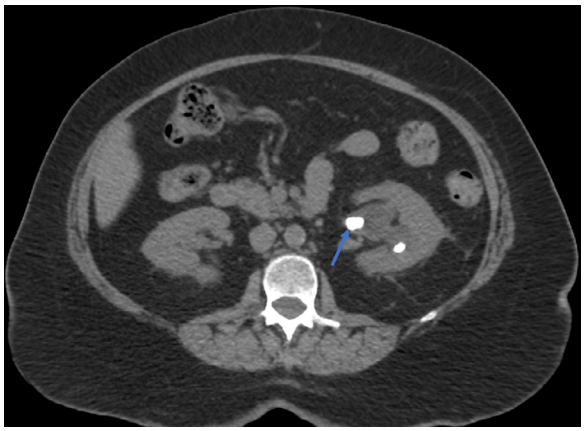

Fig. 1 – Axial CT of the abdomen, without intravenous or oral contrast, demonstrates an obstructive calculus (blue arrow) at the left ureteropelvic junction causing moderate hydronephrosis. (Color version of figure is available online.)

exceedingly rare [8–10]. We describe an unusual case of cutaneous metastasis of high-grade urothelial carcinoma of the ureter secondary to percutaneous nephrostomy catheter placement with seeding of tumor cells along the percutaneous nephrostomy catheter tract.

Case report

A 68-year-old-female presented to the urology clinic with asymptomatic bacteriuria. The patient denied any complaints of hematuria, dysuria, polyuria, back or abdominal pain, and incontinence. Initial cross-sectional imaging with computed tomography (CT) was significant for a 2-cm obstructing left ureteropelvic junction (UPJ) calculus causing moderate hydronephrosis (Fig. 1). To relieve the obstruction and hydronephrosis, an 8.5 French (Fr) nephrostomy tube (NT) was placed in the posterior mid-pole calyx of the left kidney via a posterolateral approach by interventional radiology (Fig. 2a). After 1 week, two 5 Fr nephroureteral catheters were introduced in the left kidney through the lower pole calyx (Fig. 2b and c), with the previously identified calculus as the target, to gain access for a planned percutaneous nephrolithotomy (PCNL). PCNL successfully removed the entire UPJ calculus and a 24 Fr Malecot catheter was placed in the left kidney.

One day after PCNL, the patient was scheduled for exchange of the urology placed Malecot catheter (Fig. 2d) for a NT. During the exchange, looping of the 10 Fr NT within the renal pelvis proved technically difficult. The NT catheter became kinked and a 0.035-inch wire became entrapped within the catheter. Multiple attempts to remove the wire alone were unsuccessful, and so both the NT catheter and the trapped Amplatz wire were removed together. Regaining access through the microcatheter tract with a 5-Fr Kumpe catheter (Angiodynamics, Inc, Queensbury, NY) and Glidewire

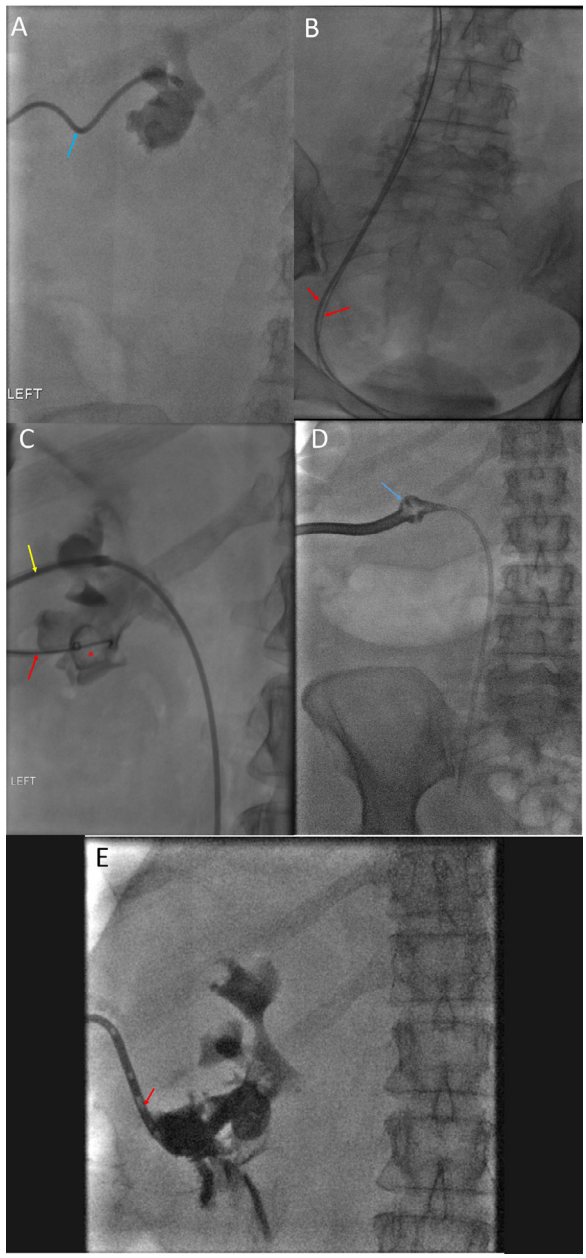

Fig. 2 – An 8.5 Fr NT (a; blue arrow) placed in the posterior mid-pole calyx of the left kidney via a posterolateral approach. B) Two 5 Fr nephroureteral catheters (b; red arrows) were introduced in the left kidney through the lower pole calyx (c; red arrow) with the previously identified calculus (c; red asterisk) as the target to gain access for a planned PCNL. Also seen is left nephrostomy tube (c; yellow arrow) which was placed 1 week prior in the posterior mid-pole calyx of the left kidney. A Malecot catheter placed by urology (d; blue arrow). A new 10 Fr nephrostomy catheter was placed in the left kidney (e; red arrow) via the posterior mid-pole calyx tract created originally to relieve the patient's hydronephrosis. (Color version of figure is available online.)

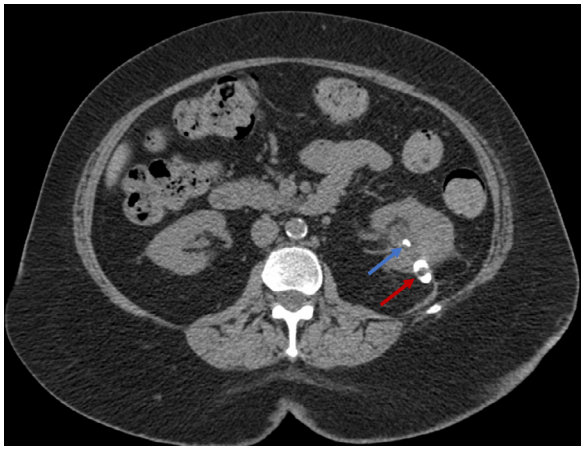

Fig. 3 – Axial CT of the abdomen, without intravenous or oral contrast, demonstrates a dislodged left nephrostomy catheter (red arrow) and mild left-sided hydronephrosis. A small calcific focus at the left renal pelvis likely represents a residual calculus (blue arrow). (Color version of figure is available online.)

(Terumo, Somerset, NJ) were unsuccessful. No other option remained other than to reaccess to the left kidney via the posterior mid-pole calyx tract created originally to relieve the patient's hydronephrosis (Fig. 2e). A new 10 Fr nephrostomy catheter was inserted and looped within the renal pelvis.

One month later, the patient reported minimal output from the left NT and CT of the abdomen revealed a dislodged NT catheter with mild left-sided hydronephrosis (Fig. 3). A small calcific density present at the left UPJ was thought to correspond to a residual calculus. The dislodged catheter was removed. The patient then underwent cystoscopy followed by left ureteroscopy with laser lithotripsy to reduce the size of the calculus. Since the calculus was still not able to pass, basket stone extraction of the stone was required.

Surveillance follow-up imaging obtained 8 months later revealed moderate proximal hydroureteronephrosis, with a transition point in the proximal portion of the ureter and an ill-defined 2 × 2 cm soft tissue density at the level of transition, worrisome for a neoplasm (Fig. 4). Additionally, there were multiple nonobstructive renal calculi bilaterally. Transurethral biopsy of the bladder and left ureter masses was performed. Cytological evaluation of the masses revealed high-grade papillary urothelial carcinoma. CT of the abdomen and pelvis revealed 2 nodular soft-tissue densities in the left posterior abdominal wall subcutaneous tissue measuring 2.1 and 1.3 cm in greatest dimensions, respectively. These lesions were noted to be in the region of the prior NT catheter tract (Fig. 4). Lastly, there was also an ill-defined nodularity surrounding the ureteral stent at the mid-L4 level with surrounding periureteral fat-stranding and edema (Fig. 4). The urinary bladder appeared collapsed on cross-sectional imaging. However, dedicated imaging was not performed to evaluate the bladder. Ultrasound-guided biopsy of the superficial and deep left flank subcutaneous nodules (Fig. 5) was performed by interventional radiology. Pathology for both nodules revealed metastatic carcinoma consistent with bladder primary neoplasm as the source (Fig. 6). Shortly after confirmed diagnosis of the cutaneous nodules, the patient began chemotherapy at an outside facility. Unfortunately, the patient died several months later with progressive metastatic disease to the brain.

Discussion

Pathologically, noninvasive urothelial lesions can be categorized into flat or papillary lesions. Papillary lesions can be further classified into low-grade and high-grade. High-grade papillary urothelial carcinoma can metastasize to the liver, lung, mediastinum, bone, and very rarely cutaneous. In fact, cutaneous metastasis accounts for only 1.1%-2.5% of all urologic metastatic disease [11,12]. Cutaneous metastasis is generally a sign of a late manifestation of systemic disease [13].

In our case, we present a patient had high-grade papillary urothelial carcinoma with cutaneous metastasis likely from seeding along the nephrostomy catheter tract. We hypothesize that multiple unsuccessful attempts to regain access to the kidney required insertion of nephrostomy catheter through the previously created mid-pole calyx tract could be a potential cause and contributing factor to the cutaneous seeding. Another reason for cutaneous metastatic disease in our patient can be simply from the re-exchange of the nephrostomy catheters. Furthermore, in the presented case specifically, a dislodged nephrostomy catheter may have further contributed to seeding of tumor cells along the nephrostomy tract into the subcutaneous soft tissues. We believe that the seeding could have occurred either from the ureteral metastasis or directly from the bladder primary (as the patient did get nephroureteral catheters placed through ureter to bladder for planned PCNL). Gememder et al presented a similar case where multiple access maneuvers required conversion of the nephrostomy catheter to a nephroureterostomy catheter, which they assumed was a potential contributing factor to seeding of tumor cells [10]. They also proposed that in cases of obstructive uropathy secondary to lower urinary tract malignancy, isolated antegrade PCN or isolated retrograde "double J" ureteral stent is preferred to antegrade percutaneous nephroureteral stent [10]. Similarly, a case presented by Sorokin et al described urothelial carcinoma of renal pelvis with skin seeding along the nephrostomy catheter tract. However, in their case, the percutaneous nephrostomy catheter was in place for 5 months without dislodgement and there was incomplete tumor resection; these could be additional attributable factors for seeding of disease [8]. Cutaneous metastasis of urothelial especially bladder cancer is a rare entity and it carries a poor prognosis. Few cases of iatrogenic seeding have been reported even in low-grade urothelial carcinomas from procedures like cystotomy and laparotomy. Additionally, reports of renal cell carcinoma seeding with cryoablation and along diagnostic biopsy tracts have been made [14].

In conclusion, cutaneous and body wall metastasis of high-grade urothelial carcinoma is an increasingly rare entity.

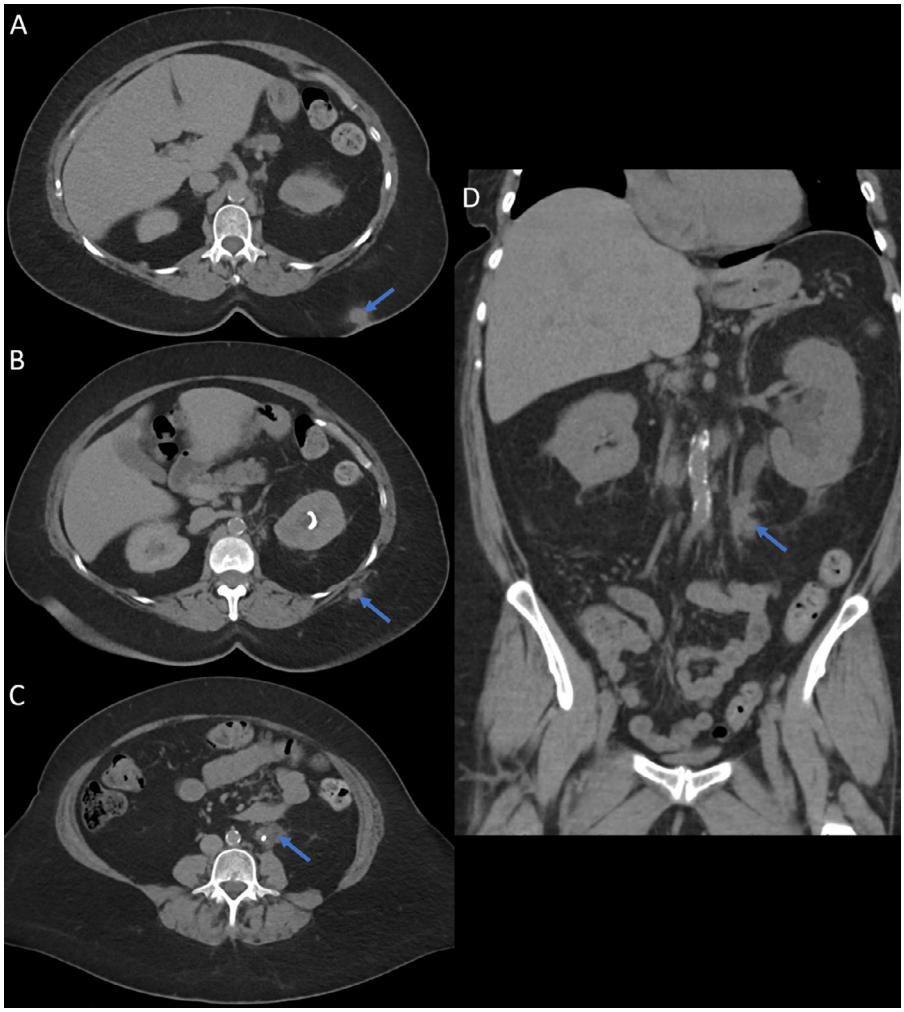

Fig. 4 – Axial CT images of abdomen and pelvis, without intravenous or oral contrast, demonstrate nodular soft-tissue densities in the left posterior abdominal wall subcutaneous tissue, measuring 2.1 cm (a) and 1.3 cm (b) in greatest dimensions, respectively. These nodularities were noted to be in the region of the prior NT catheter tract. Axial (c) and coronal (d) CT images of abdomen and pelvis, without intravenous or oral contrast, demonstrate an ill-defined nodularity surrounding the left ureteral stent at the mid-L4 level, with surrounding periureteral fat-stranding and inflammatory changes. Coronal images (d) further demonstrate moderate left-sided hydroureteronephrosis, with a transition point in the proximal portion of the ureter with an associated ill-defined 2 × 2 cm soft tissue density.

We present a case of an unusual presentation of seeding along nephrostomy catheter tract 8 months after the removal of the NT catheter. We, as well as the growing number of reports, argue that interventionalists should keep the phenomenon of seeding in mind while attempting access maneuvers or even while performing catheter exchanges in patients with urothelial carcinoma. Minimizing the number of percutaneous access attempts, exchanges, and devices may reduce the incidence, as well as the need for close follow-up with both clinical and radiologic exams in high-risk patients.

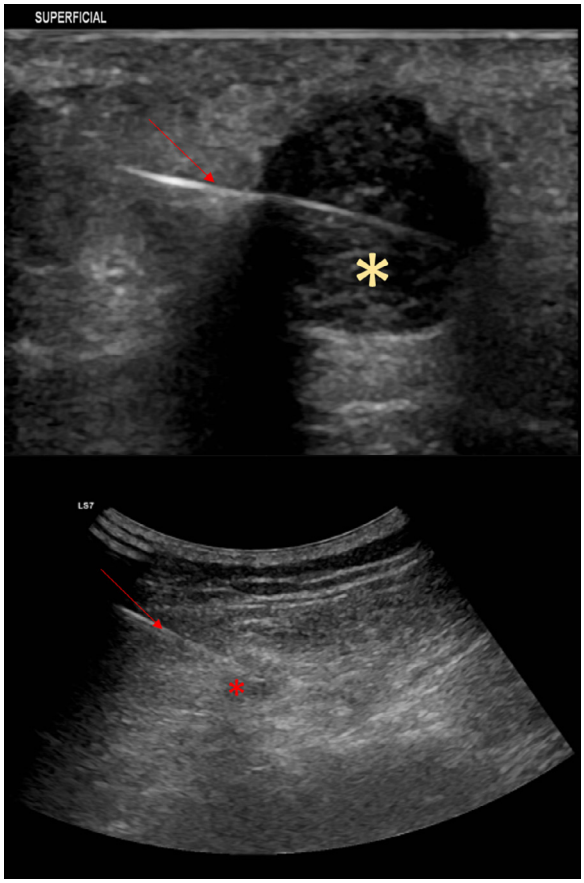

Fig. 5 – Ultrasound-guided needle (red arrow) biopsy of the superficial (yellow asterisk) and deep (red asterisk) left flank subcutaneous nodules performed by interventional radiology. (Color version of figure is available online.)

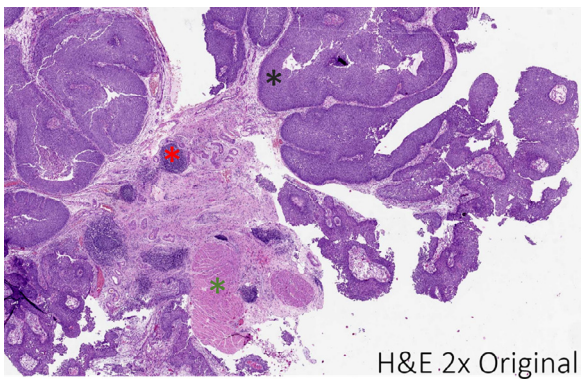

Fig. 6 – Hematoxylin and eosin-stained pathology image demonstrates areas of inflammation (red asterisk), normal muscularis propria (green asterisk), and metastatic carcinoma (black asterisk), consistent with primary bladder primary neoplasm. (Color version of figure is available online.)

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