Case Report

Percutaneous nephroscopic resection of pyelocaliceal transitional cell carcinoma in solitary kidney

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Abstract Percutaneous approaches to upper tract urothelial cancers have been performed in patients unsuitable for radical nephroureterectomy. We present two cases of transitional cell carcinoma involving the renal pelvis in either functional or anatomical solitary kidney, which were successfully treated by percutaneous nephroscopic resection using monopolar electrocautery.

Key Words: Percutaneous nephroscopic resection, renal pelvis, transitional cell carcinoma

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INTRODUCTION

Nephroureterectomy with the excision of the ipsilateral ureteral orifice and bladder cuff has been considered the standard treatment for urinary upper transitional cell carcinoma (TCC). However, due to the morbidity associated with open nephroureterectomies, conservative management may be appropriate for poor surgical candidates, especially for those with impaired renal function or a solitary kidney.

With the development of equipment and techniques for percutaneous access, percutaneous nephroscopic surgery can be used for treating upper urinary tract urothelial malignancies.

We report two cases of upper tract urothelial carcinoma in the renal pelvis resected with monopolar electrocautery through percutaneous access.

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CASE REPORTS

Case 1

An 82-year-old female was admitted because of painless gross hematuria for 3 months. Ultrasound and CT scan showed an atrophic left kidney and a soft-tissue-like lesion measuring 3 × 2 cm in right renal pelvis which obstructed the ureter-pelvic junction. The serum creatinine was 276 umol/l.

Case 2

A 72-year-old male presented with intermittent right flank pain and microscopic hematuria for 4 weeks. His left kidney, ipsilateral ureter, and bladder cuff had been removed due to left renal pelvic carcinoma 7 years before. A computed tomography of urinary tract (CTU) demonstrated an intraluminal filling defect, measuring 2 × 2 cm, with hydrocalycosis in middle and lower calyces [Figure 1a and b].

There was no evidence of metastases. Since urine cytology was positive for urothelial carcinoma for three times, retrograde ureteroscopy was not performed.

Given the chronic renal insufficiency and a solitary kidney, tumor resection with monopolar electrocautery through percutaneous access was carried out after various options were discussed with the patients. With the patients under

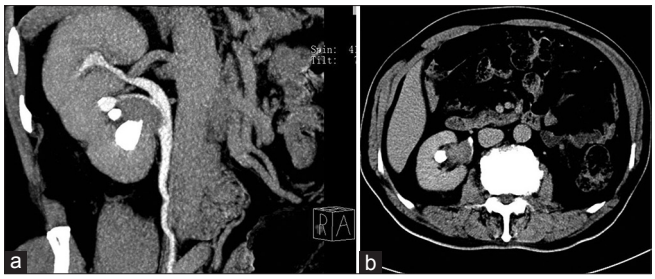

Figure 1: An intraluminal filling defect, measuring 2 × 2 cm, with hydrocalycosis in middle and lower calyces

general anesthesia and in the prone position, the percutaneous nephrostomy puncture of the affected kidney was performed under both C-arm fluoroscopic and ultrasonic guidance. The dilated middle calyces were chosen for puncture. The tract was dilated to 30 Fr before an Amplatz sheath was inserted. A 24 Fr resectoscope (R. Wolf resectoscope) with monopolar electrocautery was used to resect the tumor (settings: Cut, 120; coagulation, 60) through the Amplatz sheath. A sessile cauliflower-like lesion was seen through the resectoscope. In case 1, CT scan of the abdomen on the 4th postoperative day revealed a tumor-like lesion measuring 1 × 1 cm in the middle of the pelvis. A second look was therefore performed for complete removal of the residual tumor 2 weeks after initial resection.

In both cases, the ureteropelvic junction (UPJ) appeared to be non-obstructed with a normal contour after the resection. A 22 Fr nephrostomy tube and 6 Fr double J stent were inserted for indwelling drainage.

The postoperative courses of the patients were uneventful. The renal function turned to be normal after 3 months in case 1. The serum creatinine increased to 175 umol/l transiently in case 2; so, the patient was discharged 5 days after the surgery. The nephrostomy tube was removed on the 4th postoperative day when CT scan showed no residual cancer in the renal pelvis. Pathologic study confirmed a TCC of T_1G_1.

In an effort to reduce the risk of tumour recurrence and progression, 80 mg of Bacillus Calmette-Guérin (BCG) in 100 ml of diluents was administered weekly via intravesical instillation for topical therapy. Both patients were followed up at 3 months with negative cytology and CTU which suggested free of any filling defects in collecting system. At 6 and 9 months, the patients remained free of recurrence in both collecting system and bladder, and maintained stable renal function. In addition, there was no evidence of metastatic disease.

DISCUSSION

Renal pelvic tumors are relatively uncommon, and most of them are malignant. Nephroureterectomy with bladder cuff excision has been considered the "gold standard" for upper-tract TCC. In upper-tract TCC, endoscopic surgery could be applied to patients with a solitary kidney, bilateral disease, high surgical risk, or chronic renal insufficiency with incidental discovery of the tumor.[1,2] In our cases, the percutaneous surgery was taken into consideration because of the risk of dialysis and the non-invasive nature of tumor (TCC of T_1G_1) in collecting system revealed by CT scan.

Endoscopic surgery (ureteroscopy and percutaneous nephroscopy) has been used in the treatment of upper-tract tumors since the 1980s. Although ureteroscopy has the theoretical benefit of preserving a closed urinary system, percutaneous access may be necessary when tumors are not accessible via a retrograde route or for larger tumors.

It is commonly accepted that patient should receive ureteroscopy to verify the diagnosis, size, and location of the tumor. In our cases, the positive result of cytology study with the suspicious diagnosis of a malignant lesion and the background of a solitary kidney led to the decision of nephron-sparing procedure without preoperative retrograde ureteroscopy.

A large number of case reports published in the literature have confirmed the safety and efficacy of percutaneous treatment in selected patients with upper-tract TCC of low grade and early stage.[3] The advantages of the percutaneous approach are the use of larger instruments, better vision, complete resection of large tumors, deeper biopsies, and better staging.[1,4] Also, the percutaneous tract makes it easy to do a second look procedure and adjuvant topical therapy.

Complications of the percutaneous approach include blood transfusion in <20% and less commonly, UPJ obstruction from stricture, adjacent organ injury, and pleural injury.[5] However, the complication rates are low. Potential disadvantages include the increased morbidity and the theoretical concern over tract seeding. However, percutaneous tract seeding is rare in patients with upper-tract TCC.

The holmium:YAG and neodymium:YAG lasers have been used successfully to cauterize and ablate upper-tract urothelial tumors. But both ureteroscopy and percutaneous laser ablation may be tedious due to tumor size and location. Therefore, electrocautery was introduced in the percutaneous management. Electrocautery is traditionally used for transurethral resection of lower urinary tract lesions. When administered in endoscopic procedure the treatment technique is similar to bladder therapies with the caveat that the upper urinary tract is composed of thinner walled structures overlying large vascular structures. Endoscopic resection similar to

transurethral resection of bladder tumor (TURBT) should not be performed percutaneously in the intrarenal collecting system.[6] For practical purposes, the cut and coagulation levels should be set as low as possible to obtain the desired tissue effect.

In our experience, with a setting of lower watts and cautious manipulation, monopolar electrocautery is as safe as bipolar electrocautery. And, with a big percutaneous channel and cutting loop, the resection was more efficient and cost saving.

Percutaneous approaches showed recurrence rates and disease-specific survival in the patients with low-grade tumors (Grades 1-2) of 26% to 28% and 96% to 100%, respectively.[1] Rouprêt *et al*.[7] compared patients undergoing nephroureterectomy with those who received ureteroscopic or percutaneous management for upper urinary tract TCC and noted no statistically significant differences in 5-year disease-specific survival rate in any treatment group (84%, 80.7%, and 80%, respectively).

Typically, a second look procedure is performed within several days after the initial procedure. Any remaining tumor is treated. Intracavitary adjuvant therapy (BCG or mitomycin) can be administered 2 weeks after the resection, assuming a nephrostogram is normal.[8]

The aim of instilling chemo- or immunotherapeutic agents after the resection is to reduce tumor recurrence. The instilled agents can be administered via a percutaneous nephrostomy after percutaneous management, or via a ureteric catheter following ureteroscopic treatment. Essentially, the agents used to treat the upper tract are same as that have been used in the bladder, namely mitomycin C, thiotepa, and BCG. But, a recently published large series of treating 133 renal units over a 20-year period demonstrated no benefit in reducing recurrence or progression with adjuvant BCG following percutaneous resection of upper-tract TCC.[9]

CONCLUSION

Endoscopic management, once considered a therapy of last resort, is reserved for those with a solitary kidney, renal insufficiency, or severe medical comorbidities.

Percutaneous treatment of upper-tract urothelial tumors provides a promising alternative to nephroureterectomy for some patients. And, electrocautery may be a safe and feasible resection modality in percutaneous approach. As a palliative procedure, long-term surveillance is required as progression can occur postoperatively.

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