

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 the case of a 72-year old man with a tumor involving the right renal pelvis and the middle and lower calyces in a solitary kidney which was successfully treated by percutaneous nephroscopic resection using monopolar electrocautery.

Keywords: Percutaneous nephroscopic resection; Renal pelvis; Transitional cell carcinoma

Introduction

Nephroureterectomy with the excision of the ipsilateral ureteral orifice and bladder cuff has been considered the standard treatment of the urinary upper transitional cell carcinoma. However, due to the morbidity associated with open nephroureterectomies, conservative management may be appropriate for poor surgical candidates, especially in 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 the case of an upper tract urothelial carcinoma in the renal pelvis resected with monopolar electrocautery through percutaneous access.

Case Report

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 was removed due to left renal pelvic carcinoma before 7 years. A computed tomography of urinary tract (CTU) demonstrated an intraluminal filling defect, measuring 3×2cm, with hydrocalycosis in middle and lower calyces (Figure 1 and Figure 2). There was no evidence of metastases. Urine cytology was positive for

urothelial carcinoma for three times, so retrograde ureteroscopy was not performed.

Based on a background of a solitary kidney, the options were discussed with the patient and a tumor resection with monopolar electrocautery through percutaneous access was carried out. With the patient under general anesthesia and in the prone position, the percutaneous nephrostomy puncture of the right kidney was performed under both C-arm fluoroscopic and ultrasonic guidance. The dilated middle calyces was chosen for puncture, and the tract was dilated to 30 F, then an Amplatz sheath was inserted. A 24 Fr resectoscope (R.Wolf resectoscope) using monopolar cautery was used to resect the tumor



Figure 1: CTU showed an intraluminal filling defect, measuring 3×2cm, with hydrocalycosis in middle and lower calyces.

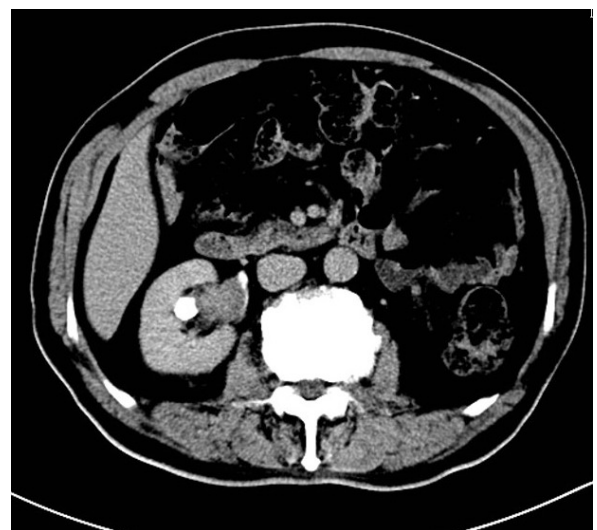


Figure 2: CTU showed an intraluminal filling defect, measuring 3×2cm, with hydrocalycosis in middle and lower calyces.

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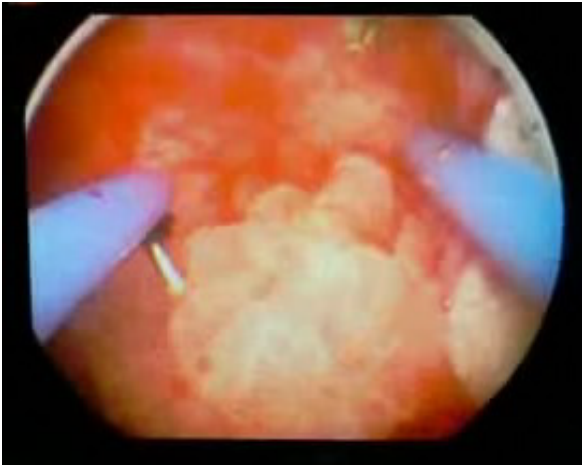


Figure 3: A sessile cauliflower-like lesion seen through the resectoscope with the guide wire traversing the Amplatz sheath.

(settings: cut, 120; coagulation, 60) through the Amplatz sheath. A sessile cauliflower-like lesion seen through the resectoscope is depicted in Figure 3. After the resection, the ureteropelvic junction appeared to be non-obstructed with a normal contour. Postoperatively, a 22 Fr nephrostomy tube and 6 Fr double J stent was inserted for indwelling drainage.

The postoperative course of the patient was uneventful except that the serum creatinine increased to 175 μ mol/L transiently, and he was discharged home 5 days after 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 transitional cell carcinoma of T₁G₁.

In an effort to reduce recurrence rate and progression, 80mg of BCG in 100ml of diluentis was administered via intravesical instillation for topical therapy weekly. At 3 months, the patient remains free of recurrent or metastatic disease with stable renal function.

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 transitional cell carcinoma (TCC). In upper-tract TCC, endoscopic surgery could be indicated in those patients with a solitary kidney, bilateral disease, high surgical risk, or chronic renal insufficiency and incidental discovery of the tumor [1,2].

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 tumours are not accessible via a retrograde route or for larger tumours.

It is commonly accepted that patient should receive ureteroscopy to confirm the diagnosis, size and location of the tumor. In our case, 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 retrograde ureteroscopy preoperatively.

A large number of cases published in the literature has confirmed the safety and efficacy of percutaneous treatment in selected patients with upper tract TCC of low grade and 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.

Complication rates with the percutaneous approach are low and include blood transfusion in <20% and less commonly, PUJ obstruction from stricture, adjacent organ injury, and pleural injury [5]. 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 tumours. But both ureteroscopy and percutaneous laser ablation would have been tedious due to tumor size and location. And although the safeness of the lasers has been proved, there still report of bleeding complication which subsequently developed an arteriovenous fistula [6]. So electrocautery was introduced in the ureteroscopic and 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 TURBT should not be performed percutaneously in the intrarenal collecting system [7]. For practical purposes the cut and coagulation levels should be set as low as possible to obtain the desired tissue effect.

In a study Kevin G et al. [8] demonstrated that bipolar electrocautery is a safe and feasible resection modality in percutaneously approached upper tract urothelial neoplasms in patients with cardiac pacemakers. Moreover, bipolar electrocautery has been shown to reduce the depth of thermal damage at the site of surgery, hence prevent excessive heat from penetrating deeply into parenchyma and resulting in AV fistula. For reason of lack of the equipment, we used monopolar electrocautery for resection. 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 show 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 M et al. [9] compared patients undergoing nephroureterectomy versus ureteroscopic and percutaneous management for upper urinary tract transitional cell carcinoma and noted no statistically significant differences in 5-year disease-specific survival rate for either treatment group (84%, 80.7%, and 80%, respectively).

Typically, a second look procedure is performed within several days of 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 [10].

The aim of instilling chemo- or immunotherapeutic agents post resection is to reduce tumor recurrence. Agents can be administered via a percutaneous nephrostomy after percutaneous management, or via

an ureteric catheter following ureteroscopic treatment. Essentially, the same agents have been used to treat the upper tract as have been used in the bladder, namely mitomycin C, thiotepa and Bacillus Calmette-Guérin (BCG). If adjuvant BCG is given, it is recommended that to avoid systemic absorption and possible sepsis, instillation of agents to the upper tract should be performed under low pressure (25 cm water) and in the absence of infection [11].

In one case report, the patient received intravesical BCG by keeping the double-J stent in place to permit reflux of the agent into the renal pelvis [6].

But some authors suggest that placing agents in the bladder and hoping they will reflux up an internal double pigtail stent is more wishful than practical [7]. And 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 [12].

Conclusion

Endoscopic management was once considered a therapy of last resort, reserved for those with a solitary kidney, renal insufficiency, or severe medical co-morbidities.

Percutaneous treatment of upper tract urothelial tumors provides a reasonable alternative to nephroureterectomy in select patients. And electrocautery is a safe and feasible resection modality in percutaneously approached upper tracturothelial neoplasms in patients. As a palliative procedure, long-term surveillance is required for progression can occur postoperatively.

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