Kidney Sparing Surgery for Urothelial Carcinoma of the Pyelocalyceal System: Is There a Role for Open Techniques? Results from a Small Series

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Purpose: To evaluate individually tailored open nephron-sparing surgical techniques for urothelial carcinoma of the pyelocalyceal system (UCPCS).

Materials and Methods: Four patients underwent nephron-sparing surgery for UCPCS including, open partial resection of the pyelon with peritoneal reconstruction, partial nephrectomy, open partial resection of the pyelon with kidney autotransplantation, combined open resection and calicoscopic laser coagulation.

Results: Recurrence-free survival was 24 months without any impairment of kidney function in all patients.

Conclusion: Open nephron-sparing surgery for UCPCS should be taken into consideration for selected cases.

Keywords: carcinoma; transitional cell; urothelium; organ sparing treatments; treatment outcome; neoplasm recurrence; pelvic neoplasms.

INTRODUCTION

Radical nephroureterectomy (RNU) with excision of a bladder cuff is considered as standard treatment for urothelial carcinoma of the pyelocalyceal system for best survival.[1] According to the risk of potential overtreatment especially in low grade tumors less invasive kidney-sparing strategies have been introduced successfully for selected cases.[2] Both percutaneous and ureteroscopic treatment could show efficient cancer control but relevant risk of recurrence and progression. As a consequence, Cutress and colleagues concluded from a systematic review that endoscopic kidney sparing treatment should be limited to imperative indications in the context of the patient's overall life expectancy and competing comorbidity.[3] In contrast, in patients with distal ureteric urothelial carcinoma RNU has been completely replaced by segmental ureteric resection followed by ureteroneocystostomy. Here excellent results comparable to RNU are provided independent of tumor stage and grade.[4] We report on a small series of selected patients with urothelial carcinoma of the pyelocalyceal system and imperative indications for kidney sparing surgery who underwent open surgery with individually adjusted techniques.

MATERIALS AND METHODS

Case 1

A 55 years old female patient presented with a papillary lesion of the right renal pelvis as metachronous manifestation of UCPCS. Five years before, invasive urothelial carcinoma of the left kidney was diagnosed and treated with RNU. Preoperative serum creatinine was 1.0 mg/dL. For technical reasons ureteroscopic laser coagulation was only partially feasible. We performed an open resection of the tumor bearing renal pelvis (classified as low grade urothelial carcinoma pTa in the final specimen) including a right sided complete ureterectomy followed by an autotransplantation of the right kidney in the left iliac fossa. Urinary drainage was achieved by direct pyelovesicostomy. A 14 French (F) stent was placed in the pyelovesicostomy intraoperatively and could be removed on the 12th day after surgery. Clinical course was uneventful. In 2012 there is no evidence of recurrence. Routine follow-up is performed by cystoscopy easily passing the pyelovesicostomy into each renal calyx with a flexible cystoscope (Figure 1).

Case 2

After gross hematuria transitional cell carcinoma (TCC) of the upper urinary tract was diagnosed in a 60 years old male patient with a single kidney 40 years after left sided nephrectomy for nephrolithiasis. Ureteroscopy gave evidence of a TCC with a diameter of 3 centimeters located in the renal pelvis. In contrast to its large volume, the tumor was considered most probably as superficial. Preoperative serum creatinine was 1.3 mg/dL. Therefore we performed open partial pyelonic resection followed by free peritoneal flap reconstruction supported by greater omentum. A urinary leak demanded percutaneous drainage combined with ureteric stenting for 8 weeks postoperatively. Pathologists diagnosed a low grade urothelial carcinoma pTa in the final specimen. In 2012 the patient is recurrence-free without any functional impairment of the kidney (Figure 2).

Case 3

The main reason for initial clinical presentation in a 61 years old man was gross hematuria caused by bladder cancer. Complete transurethral resection was carried out and as a high grade pT1 urothelial carcinoma was found, a second resection was planned after 6 weeks. Surprisingly, multifocal tumor recurrence was detected, including urethra and upper urinary tract on both sides (Figure 3). Preoperative creatinine was 1.1 mg/dL. Thus radical cystectomy including urethrectomy was carried out. To prevent the patient from hemodialysis therapy (and on his strong demand), right-sided nephroureterectomy combined with left sided urethrectomy was performed. Multifocal urothelial carcinoma of the left pyelocalyceal system was treated with combined open resection and intraoperative open pyeloscopic laser coagulation. An ileal conduit was sutured to the left renal pelvis for retrograde pyeloscopic follow-up (Figure 4). A 14 F stent placed in the pyeloileal anastomosis intraoperatively which was removed after 12 days. Postoperative course was uneventful. In the final specimen low grade pTa urothelial carcinoma of the renal pelvis and urethra were diagnosed, respectively. In the bladder pathologists found a low grade urothelial carcinoma pT1, lymph node negative. After routine 3-monthly retrograde pyeloscopy for 2 years a lesion of the lower calyx suspicious for carcinoma in situ was detected. For technical reasons a biopsy was not possible, but barbotage cytology gave evidence of high grade TCC. A weekly bacillus calmette-guerin (BCG) installation via ureteric stent was started, followed by

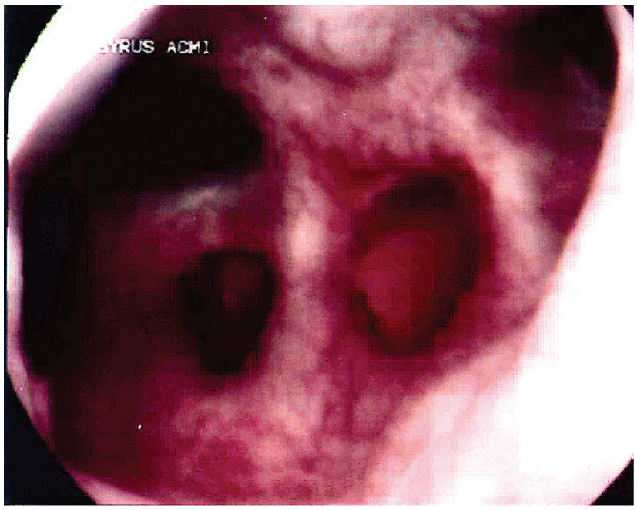

Figure 1. Cystoscope passing pyelovesicostomy (edge in foreground) facing the renal pelvis and calyxes after autotransplantation.

BCG maintenance therapy which is now ongoing.

Case 4

In a 60 years old woman localized urothelial carcinoma in the upper calyx of the right kidney was diagnosed (Figure 5). Due to a scheduled chemotherapy for metastatic breast cancer, preservation of renal function was mandatory. Preoperative serum creatinine was 1.3 mg/dL. For technical reasons

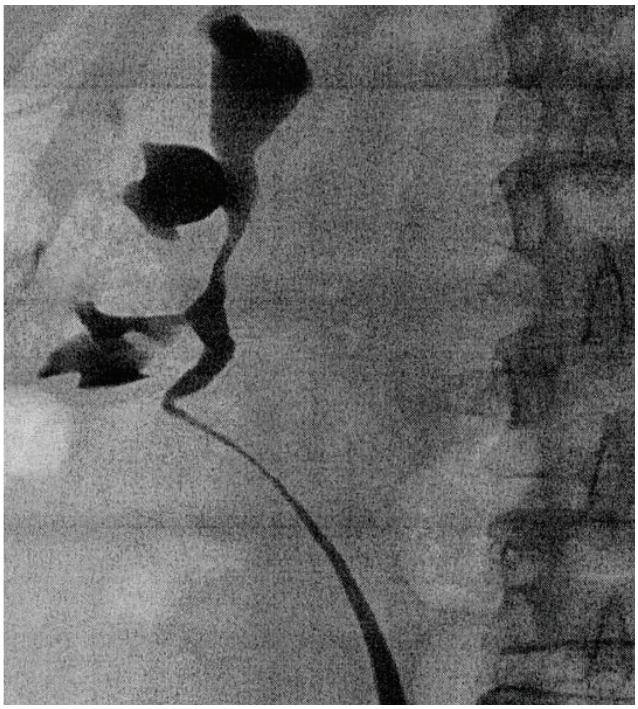

Figure 2. Retrograde uretreopyelography after partial resection of the renal pelvis and reconstruction with a peritoneal flap.

ureteroscopic laser coagulation was impossible. Therefore, an upper pole resection of the kidney was performed (patho-

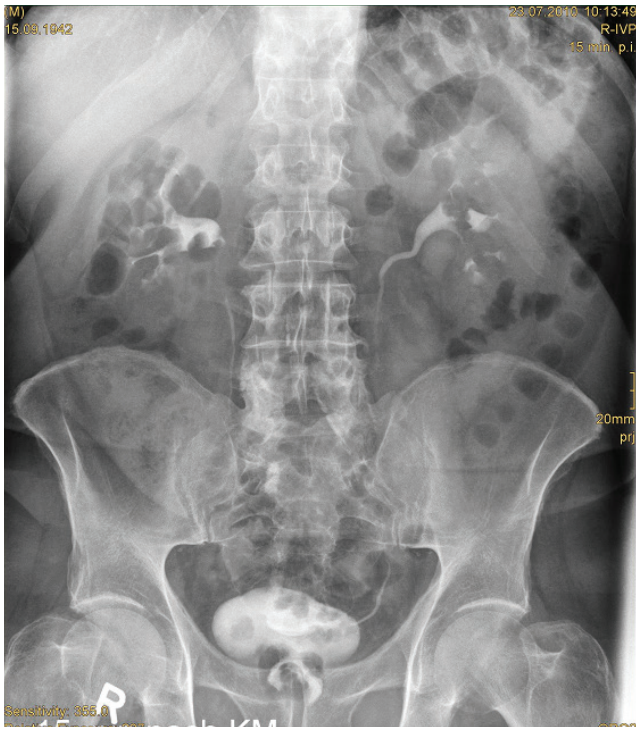

Figure 3. Intravenous urography with panurothelial transitional cell carcinoma.

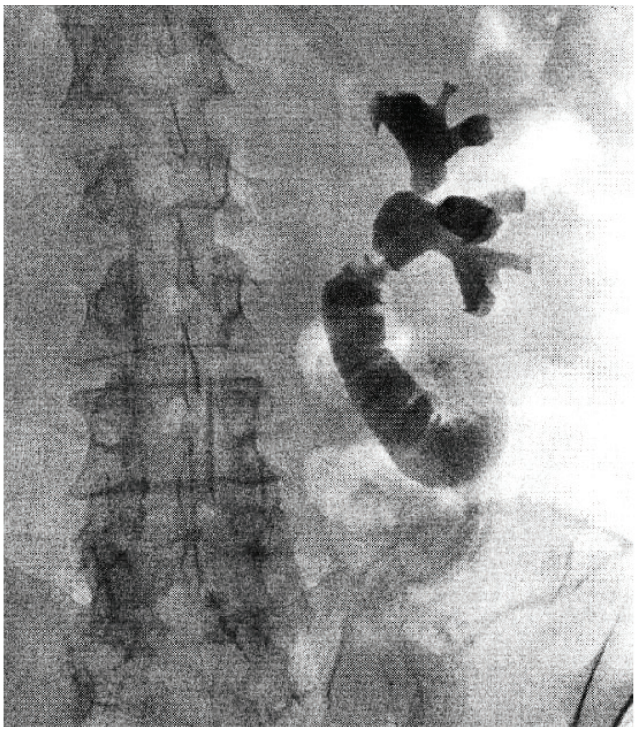

Figure 4. Retrograde contrast filling of ileal conduit connected to the left renal pelvis.

Figure 5. Transitional cell carcinoma of the right upper renal calyx in magnetic resonance imaging.

logical diagnosis in the specimen was low grade urothelial carcinoma pTa). Besides a prolonged urinary extravasation treated with ureteric stenting for 4 weeks, clinical course was uneventful. In 2012 there was no evidence of upper urinary tract urothelial carcinoma recurrence but a low grade superficial bladder cancer was diagnosed and treated with transurethral resection.

RESULTS

In all patients kidney sparing surgery for upper urinary tract TCC was technically feasible and could be carried out without severe complications. No patient received any application of intracavitary drugs like mitomycin in the early postoperative period. For kidney sparing strategy in all patients intraoperative frozen section with evidence of superficial low grade TCC was present. Low grade superficial TCC was confirmed in all patients later in embedded specimen. Mean recurrence-free follow-up was 24 months (range 15-60). In 3 single-kidney patients mean serum creatinine value was 1.2 mg/dL (range 0.9-1.4) one year postoperatively. No obstructions of the upper urinary tract or symptomatic urinary tract infections were reported.

DISCUSSION

Endoscopic treatment of upper urinary tract TCC has disadvantages, especially in lower calyx tumors technical limitations (e.g. maximum endoscope bending with laser probe) are met. Follow-up is difficult as sensitivity of both intravenous urography and computed tomography is low in small lesions.[5] In case of suspicious results of imaging, ureteral instrumentation like diagnostic pyeloscopy is necessary. Our main aim in two patients with single kidney was to create an easy access to the upper urinary tract both to follow-up and for occasional endoscopic treatment in case of tumor recurrence. In these patients the aim has been reached by autotransplantation with pyelovesicostomy or anastomosis of an ileal conduit to the renal pelvis, respectively. As a major advantage, during the follow-up period, easy endoscopic access to the renal pelvis or calyces was possible as an outpatient procedure without general anesthesia. Discussing oncological results of nephron-sparing surgery, the idea of tumor cell seeding has to be taken into account. In transurethral resection, this historical (and theoretical) hypothesis is accused for tumor recurrence and may be transferred to endoscopic ablation of UCPCS.[6] In open or laparoscopic surgery for urothelial carcinoma tumor cell seeding is a frequently discussed issue. Although worldwide surgeons are afraid of this phenomenon, there is only little evidence. Available data are restricted to case histories describing extravesical tumor implantation or port-site metastasis after surgery for urothelial carcinoma.[7-9] Therefore the clinical relevance of the `seeding-theory` remains unclear. Although our study is limited by the small number of patients we would like to encourage urological surgeons considering open surgery for TCC of the upper urinary tract in selected cases.

CONCLUSION

Transitional cell carcinoma of the upper urinary tract is a rare entity, but if diagnosed, usually treated with nephroureterectomy. In selected cases nephron sparing surgery is possible. All 4 patients reported, underwent various tailored open operations with excellent cancer control and functional results keeping adequate renal function.

CONFLICT OF INTEREST

None declared.

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