

Bilateral laparoscopic nephroureterectomy with open cystoprostatectomy for simultaneous upper urinary tract carcinoma

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KEY WORDS

bilateral upper urinary tract carcinoma
 ▶ laparoscopic nephroureterectomy ▶ cystectomy

ABSTRACT

Synchronous bilateral urothelial tumors of the upper urinary tract are extremely rare and their treatment constitutes a real challenge for urologists. Whereas low grade superficial tumors can be treated using endoscopic procedures, in the case of high grade, invasive or large volume tumors bilateral radical nephroureterectomy with cystectomy is considered the standard of care. The authors present the case of large volume high grade tumors of the renal pelvices in a patient with a history of superficial bladder cancer treated by one-stage bilateral laparoscopic nephroureterectomy and open cystoprostatectomy. The aim of the study is not only to present the operative technique but also to show that the combined procedure is safe, effective and no more invasive than the operation exclusively performed laparoscopically.

INTRODUCTION

Tumors of the upper urinary tract occur in 2-4% of patients with bladder cancer [1, 2]. Bilateral tumors, whether synchronous or metachronous, are very rare. Holmaeng and Johansson found about 30 such cases in the reviewed literature and they observed 15 such patients for 27 years [3]. Whereas low-grade and low-stage bilateral tumors may be treated with endoscopic procedures, in the case of high-grade, invasive or large volume tumors bilateral radical nephroureterectomy with cystectomy or cystoprostatectomy is considered the standard of care [4, 5]. The aim of our study is not only to present the operative technique but also to show that in the case of large volume upper tract tumors the combination of laparoscopy with open surgery seems reasonable as the combined procedure is safe, effective and no more invasive than the operation performed exclusively laparoscopically. A few articles have been published so far on bilateral laparoscopic nephrectomy and cystectomy. In all the described cases, however, nephroureterectomy was performed in patients with bladder tumors and dialysis-dependent end-stage renal disease (ESRD) [5, 6, 7]. To the best of our knowledge, the following report is the first to

describe bilateral laparoscopic nephroureterectomy and retroperitoneal lymphadenectomy combined with cystectomy performed because of bilateral tumors of the renal pelvices.

MATERIAL AND METHODS

Patient

A 74-year-old man with a history of transurethral resection (TUR) and intravesical immunotherapy (BCG maintenance scheme) because of bladder tumor, which was determined to be transitional cell carcinoma (TCC), pT1 grade 3 presented with gross hematuria in May 2008. Intravesical immunotherapy had been completed in 2003 and since then the patient had not turned up for follow-up. Cystoscopy with mapping biopsy performed at presentation did not reveal any tumor in the bladder. The diagnostic evaluation, i.e. ultrasound and CT revealed large volume bilateral renal pelvis tumors (Fig. 1). Urine cytology indicated cancer cells in all three samples. CT and chest X-ray were negative for metastatic disease. Bilateral ureterorenoscopy confirmed large volume tumors in both pelvices. The biopsy carried out during ureterorenoscopy supported the diagnosis: TCC, High Grade (G2). The patient was then qualified for surgical treatment, i.e. laparoscopic bilateral nephroureterectomy and retroperitoneal lymphadenectomy combined with open cystoprostatectomy.

Operative techniques

The patient was placed in a right 45° flank position. The procedure started on the right side using a transperitoneal approach. To create a pneumoperitoneum a Hasson 3 cm minilaparotomy was used. The first 10 mm umbilical trocar was inserted and the pneumoperitoneum was achieved in a standard manner. Three additional trocars (2 x 5 mm, 1 x 12 mm) were inserted under direct vision with a 5 mm trocar halfway between the umbilicus and xiphoid at the edge of the rectus muscle, 12 mm trocar below the umbilicus laterally to the rectus muscle and the fourth, 5 mm trocar in the midclavicular line below the costal margin. The colon was mobilized medially and the ureter, as well as vena cava were localized. A surgical clip was put on the ureter to avoid the passage of urine to the bladder and to ensure that the bladder was empty at the end of the procedure during transection of the urethra. After the lower pole of the kidney was freed, the kidney covered by the perirenal fat and Gerota's fascia was moved laterally and the renal vessels were identified. Once freely dissected, the renal artery was clipped and transected using titanium clips (TFX Medical Ltd., High Wycombe, UK). The renal vein was secured by means of an Endo-GIA (Tyco Healthcare Group LP, Norwalk, Connecticut, USA) stapling device. Using the Liga-Sure device (Tyco Healthcare UK Ltd., Gosport, UK) the upper pole of the kidney was fully mobilized. The lateral attachments were dissected to completely free up the kidney. The

ureter was dissected as distally as possible, the renal specimen was entrapped in an Endocatch bag (Tyco Healthcare UK Ltd., Gosport, UK) and left in the peritoneal cavity. The paracaval and retrocaval lymphadenectomy was performed distally to the right iliac vein. The lymphatic tissue was bagged and removed. The trocars were also removed except for the first 10mm umbilical trocar, and the ports were closed. The 5-mm closed suction drain was left in the right retroperitoneal space; it was inserted through the port left by the lateral 5 mm trocar and clamped to prevent CO₂ escaping from the peritoneal cavity during left nephroureterectomy. The patient was repositioned in a left 45° flank position. Three trocars were inserted (2 x 5 mm, 1 x 12 mm) symmetrically to the ones used in the right nephroureterectomy. Again the dissection of the white line of Told was carried out and the splenic flexure was mobilized. The ureter was clipped and dissected to above the iliac vessels. The left ureter and the lower pole of the kidney were retracted laterally to facilitate access to the renal hilum. The renal artery and vein were secured, as previously described for the right nephroureterectomy. The specimen was entrapped in the Endocatch bag and left in the peritoneal cavity. A left paraaortic and retroaortic lymphadenectomy was performed distally to the left iliac vessels. At the end of the procedure a 5-mm closed suction drain was inserted through the port left by the lateral 5 mm trocar and positioned in the left retroperitoneal space.

For the cystoprostatectomy the patient was repositioned in a low lithotomy position. The surgical field was prepared and re-draped. The abdominal wall was opened with a median lower incision. The bladder and prostate were separated from the anterior wall of the abdomen and dissected anteriorly up to the prostatic apex. The endopelvic fascia was incised on both sides. The lower parts of both ureters were dissected. Subsequently the lateral peritoneal wings with vas deferens were transected using Liga-Sure device. The Denonvilliers fascia was transected and the vesicoprostatic segment was separated from the anterior wall of the rectum. The operation proceeded with the transection of superior and inferior bladder pedicles using a Liga-Sure device. This device was also used to secure the veins of the Santorini plexus at the end of the procedure. Before transecting the prostatic apex the urethra was ligated to prevent urine spillage. After removing the intact specimen a 5-mm closed suction drain was left in the pelvis.

We did not performed pelvic lymphadenectomy because preoperative cystoscopy and mapping biopsy did not reveal a tumor in the bladder.

Fig. 2 shows tumors in the removed kidneys.

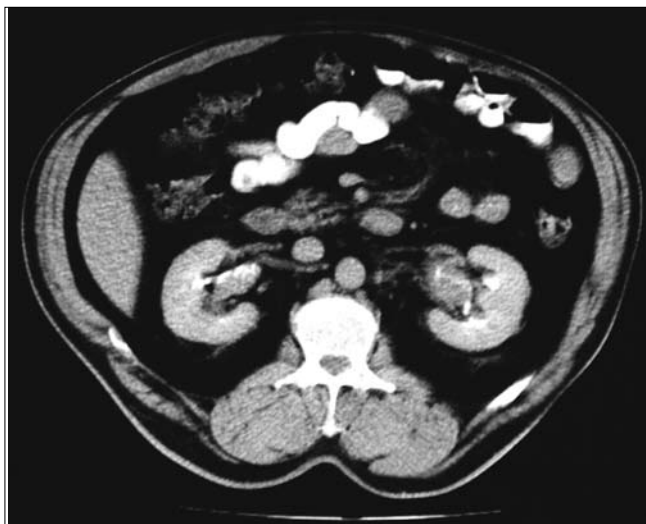


Fig. 1. CT scan demonstrating large volume bilateral renal pelvis tumors.

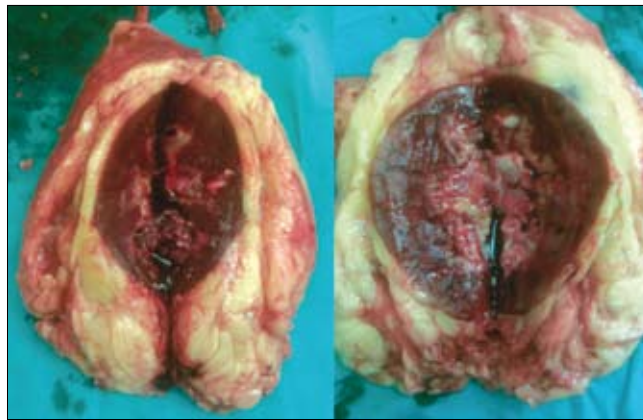


Fig. 2. Large volume tumors in removed kidneys.

The blood lost was 450 ml, the operative time of the whole procedure was 9 hours. There were no intraoperative complications.

Postoperative course

Blood transfusion was needed neither intra- nor postoperatively. Since the 2-nd postoperative day the patient started hemodialysis. No temperature rise was noted postoperatively. The time to resume oral intake was 2 days. Two of three drains left after the surgery (from the right retroperitoneal space and from the pelvis) were removed on the 3rd and 4th day after the surgery. The patient was discharged from the hospital on the ninth day after the operation. The third drain was removed on the 24th day after the surgery due to persistent lymphorrhea.

Pathological stage

Pathological findings are listed below:
 right kidney – TCC, pT3, High Grade (G2)
 left kidney – TCC, pT3, High Grade (G2)
 bladder – Carcinoma *in situ* (Cis), small foci
 prostate – no tumor found
 No. of nodes – 5
 No. of positive nodes – 0

DISCUSSION

The renal replacement therapies of dialysis made radical surgical intervention for bilateral upper tract tumors possible. A combined procedure involving bilateral open nephroureterectomy and cystectomy has already been described as efficient and safe [4, 8]. Recently there have appeared reports on bilateral laparoscopic nephroureterectomy combined with cystectomy. But this complex operation was performed in patients with bladder cancer and ESRD [5, 6].

The laparoscopic technique in patients selected for nephroureterectomy results in the reduction of blood loss, hospital stay, analgesic requirements and convalescence. Cancer cure rates of the procedure are comparable to those achieved for open surgery [9]. It seems that in the case of a bilateral operation the beneficial effect of the procedure is even more conspicuous. Unlike laparoscopic nephrectomy, which is now performed in numerous urological centers, laparoscopic cystectomy is limited to selected institutions with experience in advanced laparoscopic techniques. However, it seems to us that laparoscopic cystectomy is not of any potential benefit for the patient with simultaneous upper tract tumors. Most centers lack experience in performing laparoscopic cystectomy. It is quite likely then that the long time of the operation may be lengthened further. When two kidneys with surrounding perirenal fat and

bladder are to be removed, the linings have to be opened when cystectomy, open or laparoscopic, is being carried out. Thus open cystectomy seems no more invasive than laparoscopic cystectomy. In the case described, the skin incision was 10 cm long.

Although the survival benefit of lymphadenectomy during nephroureterectomy is controversial, we decided to perform lymph node dissection keeping in mind the report by Miyake et al., in which the authors state that tumors of higher stage and grade are at increased risk of metastasis [10]. The procedure does seem safe and effective, nevertheless in the case of our patient it caused persistent lymphorrhea.

The technique we used for laparoscopic nephroureterectomy does not considerably differ from methods applied by others [5, 11]. Two aspects seem noteworthy. Firstly, it is important to remove the entire *en bloc* specimen in order to prevent any urinary spillage during the operation. Secondly, dissection of the upper poles of the kidneys should be performed very carefully to prevent injury to both adrenal glands and thus to avoid steroid insufficiency.

We did not decide to carry out urethrectomy or pelvic lymphadenectomy, because preoperative cystoscopy, as well as mapping biopsy had not revealed a tumor in the bladder. Yet, carcinoma *in situ* found in pathological examination after cystectomy makes it necessary to carefully observe the patient and to carry out urethral washings.

CONCLUSIONS

One-stage bilateral laparoscopic nephroureterectomy with lymphadenectomy and open cystoprostatectomy is a safe and effective procedure in the treatment of simultaneous high stage and high grade upper urinary tract tumors. In our opinion, open cystectomy shortens the time of the operation and does not expose the patient to trauma larger than it is typical of a laparoscopic procedure.

REFERENCES

1. Oldbring J, Glifberg I, Mikulowski P, Hellsten S: *Carcinoma of the renal pelvis and ureter following bladder carcinoma: frequency, risk factors and clinicopathological findings*. J Urol 1989; 141: 1311-1313.
2. Palou J, Rodrigues-Rubio F, Hugué J et al: *Multivariate analysis of clinical parameters of synchronous primary superficial bladder cancer and upper urinary tract tumor*. J Urol 2005; 174: 859-861.
3. Holmaeng S, Johansson SL: *Synchronous bilateral ureteral and renal pelvic carcinomas*. Cancer 2004; 101 (4): 741-747.
4. Holton MR, Van Zijl PS, Oberle WT, Jacobs SC, Sklar GN. *Complete urinary tract extirpation: The University of Maryland experience*. Urology 2006; 68 (1): 65-69.
5. Barros R, Frota R, Stein RJ et al: *Simultaneous laparoscopic nephroureterectomy and cystectomy: a preliminary report*. Int Braz J Urol 2008; 34 (4): 413-421.
6. Berglund RK, Matin SF, Desai M et al: *Laparoscopic radical cystoprostatectomy with bilateral nephroureterectomy: initial report*. BJU Int 2006; 97 (1): 37-41.
7. Yuan LH, Chung HJ, Chen KK: *Laparoscopic radical cystectomy combined with bilateral nephroureterectomy and specimen extraction through the vagina*. J Chin Med Assoc 2007; 70 (6): 260-261.
8. Wu CF, Shee JJ, Ho DR et al: *Different treatment strategies for end stage renal disease in patients with transitional cell carcinoma*. J Urol 2004; 171 (1): 126-129.
9. Gill IS, Sung GT, Hobart MG et al: *Laparoscopic radical nephroureterectomy for upper tract transitional cell carcinoma: The Cleveland Clinic experience*. J Urol 2000; 164: 1513-1522.
10. Miyake H, Hara I, Gohji K et al: *The significance of lymphadenectomy in transitional cell carcinoma of the upper urinary tract*. Br J Urol 1998; 82: 494-498.
11. Guzzo TJ, Schaeffer EM, Allaf ME: *Laparoscopic radical nephroureterectomy with en-bloc distal ureteral and bladder cuff excision using a single position pneumovesicum method*. Urology 2008; 72: 850-852.

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