

Laparoscopic Nephroureterectomy with Concomitant Open Bladder Cuff Excision

A Single Center Experience

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Purpose: To evaluate the efficacy of laparoscopic nephroureterectomy and open bladder cuff excision for management of upper urinary tract urothelial carcinoma.

Materials and Methods: Twenty-two patients with upper urinary tract urothelial carcinoma, who had undergone laparoscopic nephroureterectomy and open bladder cuff excision between September 2004 and October 2010, were studied retrospectively. Operation time, blood loss, analgesic dose, and complications were recorded. Local and port site recurrence, distant metastasis, and survival rate were also evaluated.

Results: Patients consisted of 18 men and 4 women, with the mean age of 64.1 years (range, 52 to 83 years). Right upper urinary tract was the involved site in 12 patients and left in 10 patients. Mean operation time was 216 minutes (range, 145 to 395 minutes) and mean hospital stay was 4.3 days. Mean follow-up period was 36.57 months (range, 6 to 65 months). No trocar site recurrence occurred. Three-year overall survival and metastasis-free survival were 95% and 90%, respectively.

Conclusion: Laparoscopic nephroureterectomy along with open bladder cuff excision harbors an advantage of laparoscopy concomitant with simplicity and safety of open excision of distal ureter and bladder cuff through the same inevitable incision that is needed for specimen retrieval, without adding any more morbidity to the patient, a win-win radical surgery.

Keywords: laparoscopy, transitional cell carcinoma, kidney pelvis, neoplasm invasiveness

INTRODUCTION

P primary upper urinary tract urothelial carcinoma (UC) constitutes about 5% of all urothelial malignancies.

⁽¹⁾ Although relatively uncommon, the incidence of upper urinary tract UC appears to increase gradually.⁽²⁻⁴⁾ Traditional treatment for upper urinary tract UC is open radical nephroureterectomy with bladder cuff excision.⁽⁵⁾

In 1991, Washington University Group reported the first laparoscopic nephroureterectomy (LNU). They reported reduced peri-operative morbidity, shorter hospital stay, and lower blood transfusion rate compared to open nephroureterectomy (ONU).⁽⁶⁻⁸⁾ Despite initial concerns about oncological outcomes, LNU and ONU had similar oncological effectiveness.⁽⁹⁾

Different approaches, such as open, laparoscopic (transperitoneal and retroperitoneal), hand-assisted, and endoscopic techniques have been used for distal ureterectomy. While each approach has own advantages and disadvantages, the gold standard technique for distal ureterectomy has not yet been identified.^(10,11)

In our center, we perform LNU and open bladder cuff excision through a pfannenstiel incision for patients with upper urinary tract UC, who are candidate for laparoscopic radical surgery. Here, we present results of the procedure in a retrospective study. This method adds no morbidity to the patients because the incision, which is inevitably required for specimen retrieval, is also used for bladder cuff excision.

MATERIALS AND METHODS

Twenty-two patients with upper urinary tract UC who had undergone LNU and open bladder cuff excision at Shahid Labbafinejad Medical Center between September 2004 and October 2010 were studied retrospectively.

Pre-operative evaluations included laboratory examinations and computed tomography of the abdomen and pelvis. All operations were performed by two expert laparoscopic surgeons. After induction of general anesthesia, patients were positioned in a modified lateral position. First, a 12-mm trocar was inserted at the umbilicus using the open technique. Then, a 10-mm pararectal and two 5-mm epigastric ports were introduced for instruments. Laparoscopic transperitoneal nephrectomy was performed classically, and then, the

ureter was dissected down up to the level of the pelvic brim, but not divided. Then, patient's position was changed to supine, and a pfannenstiel incision was made. Retzius space was developed, the bladder was opened, and the ipsilateral ureteral orifice was catheterized by a 5F ureteral catheter. Distal ureter with a 1-cm margin of the bladder cuff adjacent to the ureteral orifice was dissected off the bladder. The ureter was released completely from the bladder wall transperitoneally. The specimen, including the kidney and ureter attached to the bladder cuff, was removed intact and en bloc from the pfannenstiel incision. Bladder wall was repaired in 2 layers using absorbable sutures. After insertion of a drain, wound was closed anatomically.

All the patients were ambulated on the 1st postoperative day. Foley catheter was removed on the 5th to 7th postoperative day if drain discharge was not too much. Wound drain was removed when drain discharge was less than 30 cc in 24 hours. Intra-operative and postoperative features were also reviewed.

RESULTS

Patients consisted of 18 men and 4 women, with the mean age of 64.1 years (range, 52 to 83 years). Demographic data of the patients are shown in Table. Mean operation time was 216 minutes (range, 150 to 400 minutes). Mean intra-operative blood loss was 314 cc (range, 150 to 1500 cc). One patient needed blood transfusion intra-operatively.

Mean hospital stay was 4.3 days. Postoperative blood transfusion was required for two patients. None of the patients had significant creatinine rise requiring intervention. The mean postoperative analgesic dose requirement was morphine sulfate 12 mg.

Pathologic reports of all the patients were UC, with stage Ta, T1, T2, T3, and T4 seen in 3, 9, 7, 2, and 1 patients, respectively. Tumor was high grade in 4 patients (one T1, two T3, and one T4), and low grade in 18.

Mean follow-up period was 36.57 months (range, 6 to 65 months). One patient with high-grade T4 tumor died because of tumor recurrence in the bladder and distant metastasis at 1 year after the operation. One patient with high-grade T3 tumor developed the bowel and liver metastasis at 1 year after the operation, and received chemotherapy. Bladder recur-

rence was seen in 3 patients. All the bladder recurrences were Ta according to transurethral resection of the bladder tumor pathology reports. No trocar site tumor recurrence was seen. In this study, overall 3-year survival and metastasis-free survival were 95% and 90%, respectively.

DISCUSSION

Although UC of the upper urinary tract is much less common than the bladder UC, it usually presents at a higher grade and stage compared to the bladder UC. Low-grade and high-grade UCs represent 18% to 59% and 41% to 47% of the upper urinary tract UCs, respectively.^(12,13) Regarding the correlation between grade and stage of these tumors, it is not surprising that almost 50% of the patients present with stage T2 tumors at diagnosis.⁽¹⁰⁾ Low-grade and low-stage tumors could be managed by various strategies other than nephroureterectomy; however, standard treatment with nephroureterectomy and bladder cuff excision is required in a large percentage of the patients.

In parallel with technical and instrumental advances, laparoscopy is increasingly used in uro-oncology surgeries. Clayman and colleagues first described a case of LNU in 1991.⁽⁶⁾ Later, several authors reported case series of LNU and compared its peri-operative results with ONU.^(14,15) There were some concerns about the oncological efficacy of LNU. A review by Stewart and associates showed that long-term oncological outcome of LNU is similar to ONU.⁽⁹⁾ In another review, Berger and Fergany confirmed that intermediate and long-term oncological outcomes of LNU are not different from ONU.⁽¹⁰⁾

A point of controversy still debated is the management of the distal ureter and bladder cuff. While various minimally-invasive techniques have been described, it is not yet clarified which one could have the best results.⁽¹⁶⁾ The main used techniques include transurethral resection of the ureteral orifice (pluck) technique, intussusceptions technique, transvesical laparoscopic detachment and ligation technique, laparoscopic stapling of the distal ureter and bladder cuff, and open technique.

Each technique offers certain advantages and disadvantages.⁽¹⁷⁾ Pluck technique involves aggressive transurethral resection of the ureteral orifice and intramural ureter deep

Demographic data of the patients.

Variable	n
Side	
Right	12
Left	10
Chief complaint	
Gross hematuria	17
Flank pain	2
Irritative LUTS*	3
Tumor location	
Renal pelvis	19
Calyx	1
Ureter	2
Urine cytology	
Positive	12
Negative	10

*LUTS indicates lower urinary tract symptoms

into the perivesical fat. Although it is a rapid and easy technique, there are two main drawbacks. There is a risk for incomplete removal of the ureter and potential for leakage of urine containing malignant cells into the retroperitoneal space.⁽¹¹⁾ These risks are associated with potential for local tumor recurrence and tumor implantation, as reported by several authors.^(18,19)

Intussusception technique, which is a transurethral procedure, was initially used in ONU, and its long-term results in LNU are not reported. This approach is technically difficult, contraindicated in any ureteral tumor, and does not guarantee complete removal of the intramural ureter and bladder cuff. Furthermore, the bladder and urethral mucosa are exposed to the ureteral mucosa.⁽⁵⁾

Transvesical laparoscopic detachment and ligation technique, first reported by Gill and coworkers, is performed through transvesical laparoscopic ports. It adheres to the oncological principles of intact, en bloc, confirmed complete removal of the distal ureter. Gill and colleagues compared the oncological outcomes of LNU using this technique with ONU, and reported no significant difference.⁽¹⁴⁾ Drawbacks include need for repositioning the patient, adding 60 to 90 minutes to the operation time, risk of tumor spillage from the bladder ports,

and technical difficulties.⁽¹⁷⁾

Laparoscopic stapling of the distal ureter and bladder cuff offers the advantage of maintaining the urinary system closed and reducing the operation time of LNU. However, the main concern is related to the likelihood for remaining viable urothelial tissue in the staple line. This viable tissue, which could be a source for local recurrence, may not be evaluated endoscopically.⁽²⁰⁾ Matin and Gill compared the results of LNU using various techniques for distal ureter management, and reported higher frequency of positive surgical margin and also poorer recurrence-free survival following stapling technique.⁽²¹⁾ Similar findings are also described by other authors.⁽²²⁾

Open technique is the standard approach for distal ureter management and the most reliable method from the oncological viewpoint. Regarding the need for an incision for specimen retrieval after LNU, the same incision could be used for the distal ureter and bladder cuff excision with no added morbidity. It is a simple and easy to learn technique, which guarantees the best adherence to oncological principles with the ability to visually confirm the adequate excision of the distal ureter and bladder cuff. Furthermore, secure repair of the bladder incision in a watertight manner prevents urine extravasation and later exposure of the retroperitoneal and pelvic space to urothelial cells, an important source for local tumor recurrence.^(9,16) Waldert and associates reported the results of LNU using the open technique for distal ureter management, and showed that the procedure is as oncologically effective as ONU.⁽²³⁾

We started to perform LNU with open bladder cuff excision in 2004. Twenty-two patients underwent the procedure without any significant peri-operative morbidity. Distal ureter and bladder cuff excision was performed using a pfannenstiel incision, which was inevitably needed for intact specimen removal. It is noteworthy that none of the patients with low-grade tumor had metastasis during the follow-up period, but 2 of 4 patients with high-grade tumor experienced metastasis. The small sample size is a limitation of our study. This technique seems to be an acceptable option for management of the upper urinary tract UC providing the advantages of a minimally-invasive procedure along with the oncological precision of an open technique.

CONCLUSION

Laparoscopic nephroureterectomy along with open bladder cuff excision provides acceptable efficacy and safety.

CONFLICT OF INTEREST

None declared.

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