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Hand-Assisted Retroperitoneoscopic Nephroureterectomy without Hand-assisted Device

Various laparoscopic nephroureterectomy techniques for urothelial carcinoma of the upper urinary tract have been developed to minimize postoperative discomfort and the necessity for a lengthy convalescence. We performed hand-assisted retroperitoneoscopic nephroureterectomy without hand-assisted device in 3 male patients with urothelial carcinoma of the distal ureter. Average operative time and estimated blood loss were 251 min (range 235 to 280) and 250 mL (range 200 to 300), respectively. Complication did not occur and conversion to open surgery was not necessary in all cases. Postoperative analgesic requirements were moderate and the time to regular diet intake averaged 3 days (range 2 to 4). None of the patients had a positive margin on the final pathologic specimen. At the average follow-up of 8.1 months, no regional recurrence, port-site metastasis, bladder recurrence, or distant metastasis were noted in any patient. We described our initial experience with the described technique, which obviates the need for midprocedural patient repositioning.

Key Words : *Ureteral Neoplasms; Retroperitoneal Space; Laparoscopy*

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INTRODUCTION

The traditional treatment for upper tract urothelial tumors is total nephroureterectomy with excision of bladder cuff (1, 2). This procedure involves one or two long abdominal incisions that causes significant postoperative discomfort and requires lengthy convalescence (3). Recently, laparoscopic nephroureterectomy has emerged as an alternative treatment, due to its minimal invasiveness. However, despite its obvious advantages, this technique has certain inherent technical limitations, including a certain diminution of tactile feedback, long operative times and steep learning curves (4, 5). Hand assisted laparoscopy can overcome these disadvantages, without sacrificing the associated improvements in patient convalescence, which are the benefits of minimally invasive procedures (6, 7). However, the Korean health insurance system is different from those in other countries. For example, although most cost is covered by public or corporate health insurance, the hand assisted device is not covered by Korean health insurance.

Thus, we developed a modified approach to hand-assisted retroperitoneoscopic nephroureterectomy without consumption of hand-assisted device, for both direct resection of the distal ureter and bladder cuff, and nephroureterectomy without repositioning the patient.

CASE REPORT

The patient is placed in the standard 70° flank position and maintained this posture throughout the entire procedure. The operating table can be rotated from side to side to facilitate exposure during the different steps of the procedure. A 7 cm ipsilateral lower pararectal skin incision is made (Fig. 1). The anterior and posterior fasciae of the rectus muscle are incised, but the peritoneum is left intact. The retroperitoneal working space is entered by blunt finger dissection. The left hand of the surgeon (in left retroperitoneoscopic nephroureterectomy) or of the assistant (in right retroperitoneoscopic nephroureterectomy) is inserted into the retroperitoneal space (Fig. 2). Balloon dissection can be performed through the pararectal incision if more space is required. The first 10-mm port for the 30° laparoscope is inserted in the mid-axillary line at umbilicus level under the guidance of the left index finger. The pararectal incision is closed in watertight manner with a running 1-0 Vicryl suture. A 10-mm and a 5-mm trocar are placed in the anterior and posterior axillary lines at the umbilicus level under direct laparoscopic vision. Initially, distal ureter and bladder cuff are identified, dissected from the fatty tissue and clipped at the level of the pelvic brim to prevent possible seeding of tumor cells. Then the kidney and Gerota's fascia are dissected en bloc. The kidney is identified and the peritoneal attachments are resected. The ipsi-

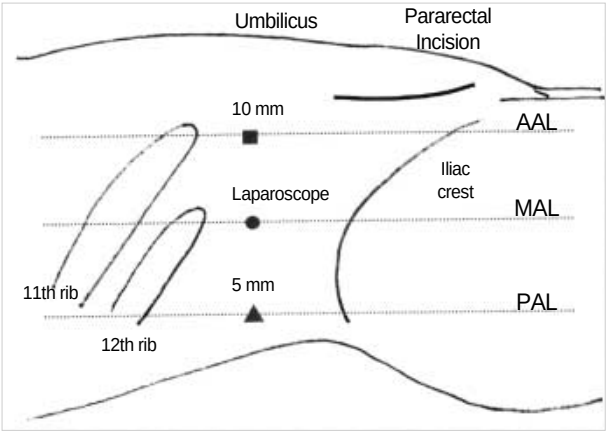

Fig. 1. Port configuration for right hand-assisted retroperitoneoscopic nephroureterectomy. Heavy line indicates lower pararectal incision for hand insertion. AAL, Anterior axillary line; MAL, Mid-axillary line; PAL, Posterior axillary line.

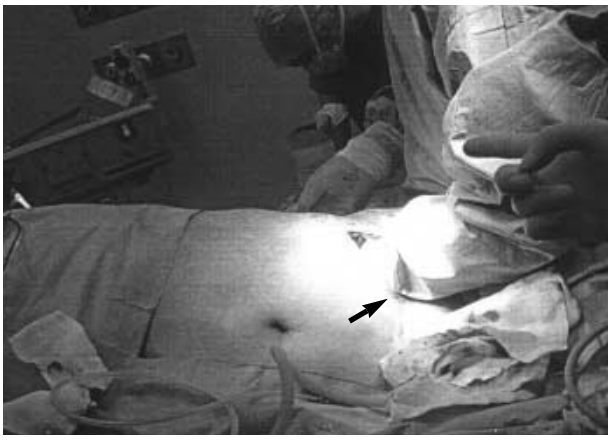

Fig. 2. Surgery for the left side. Surgeon's left hand inserted into the hand assisted incision (arrow).

lateral adrenal gland is conserved. After circumferentially mobilizing the kidney, except for the renal pedicle, the pararectal incision is reopened and the left hand of the surgeon or of the assistant is inserted into the retroperitoneal space without the use of a hand-assisted device. After renal pedicle is identified by arterial pulsation, renal artery and vein are isolated. The renal artery is circumferentially mobilized, clipped, and divided, with 2 clips on the vascular stump and 1 on the renal side. The renal vein is then secured and simultaneously transected with a vascular endo-gastrointestinal anastomosis device (United States Surgical Corp., Norwalk, CT, U.S.A.). Subsequently, the ureter is dissected as far as possible towards the pelvis with the aid of a manual blunt dissection to ensure that the cut edge of the distal ureter is removed. Without repositioning, the operating table is tilted towards the ipsilateral side, for make 30° flank position to provide a better view of the distal ureter. In this position, open distal ureterectomy and bladder cuff resection can be done in the usual manner. At the end of the laparoscopic procedure, the entire nephroureterectomy specimen is removed en bloc via the hand assistance incision without opening the urinary tract. The entire procedure is performed completely retroperitoneally, without transgressing the peritoneal cavity.

We performed retroperitoneoscopic nephroureterectomies by using the described technique in 3 male patients with urothelial carcinoma of the distal ureter. Mean patient age was 65 yr (range 63 to 67). The lesions were on the right side in 2 cases and on the left side in 1. Average operative time and estimated blood loss were 251 min (range 235 to 280) and 250 mL (range 200 to 300), respectively. Complication did not occur and conversion to open surgery was not necessary in all cases. Postoperative analgesic requirements were moderate and the time to regular diet intake averaged 3 days (range 2 to 4). Average hospital stay was 7.7 days (range 7 to 8). Two patients had transitional cell carcinoma, for which pathologic stage and grade of the tumors were pT2GIII and pT3GII, respectively. Another patient was diagnosed as squamous cell carcinoma confined to the ureter. None of the patients had a positive margin on the final pathologic specimen. At the average follow-up of 8.1 months, no regional recurrence, port-site metastasis, bladder recurrence, or distant metastasis were noted in any of the patients.

DISCUSSION

Laparoscopic nephroureterectomy is becoming the new standard for managing localized urothelial cell carcinomas of the upper urinary tract. Various laparoscopic nephroureterectomy techniques have been described in the urologic literature (8-11). Some require trocar placement into the urinary bladder (8, 11) and mid-procedural patient repositioning (8-11), while others entail utilization of the Endo-GIA Autosuture (Ethicon, Cincinnati, OH, U.S.A.) for excision of the distal ureter and bladder cuff (10). These techniques pose a risk of tumor cell seeding, need long operative time due to technical difficulties and require intraoperative repositioning while distal ureter and bladder cuff are retained (9). To date, there is no universal agreement as to which method of performing distal intravesical ureteral resection is the most safe and effective (5, 12-15).

Our method resembles retroperitoneoscopic nephroureterectomy in the sense that a small incision is made in the lower abdomen. However, our method has some merits in comparison with other laparoscopic nephroureterectomy techniques. First, our method is safe and easy. Because bladder cuff is identical to that obtained during open surgery. Thus, oncological principles can be kept during the operation. Second, the incision created at an early stage can create the working space required by blunt manual dissection, to guide safe insertion of the first 10 mm port in order to prevent peritoneal injuries or injuries to other organs, and to perform nephroureterec-

tomy without opening the urinary tract and with intact specimen removal. Third, our procedure is performed completely retroperitoneally. Although the working space is smaller and more skilled technique is required than with the transperitoneal approach, the retroperitoneal approach has the advantage of not manipulating the bowel, thus leading to minimal paralytic ileus, and possibly shorter hospital stay, as suggested by Gill et al. (14). Previous intra-abdominal operations may not negatively influence the retroperitoneal procedure. Moreover, the potential for intraperitoneal contamination with cancer cells is eliminated. Our technique provides a method of performing this procedure, while respecting oncological principles and offering the advantage of minimal invasiveness. Finally, our method is relatively inexpensive because no hand-assisted device has been consumed. Hand-assisted laparoscopic procedures have many benefits for both experienced and inexperienced surgeons in terms of expanding the indications for laparoscopic surgery due to technical simplicity. However, Korean urologists cannot try hand-assisted laparoscopic surgeries because hand-assisted device is too expensive and not covered by Korean health insurance. Our method can make the hand-assisted laparoscopic surgeries without hand-assisted device.

Our procedure may be challenging for a novice laparoscopist, since there is possibility of air leaking through the pararectal incision, maintaining the pneumoperitoneum during the entire operation is somehow difficult. However, if the size of the incision is designed to correspond to that of the surgeon's hand, air leakage is minimized, because redundant retroperitoneal fat helps to make the incision air-tight, and therefore maintaining the pneumoperitoneum for a short time during the hilar dissection becomes possible.

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