Case Report

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Simultaneous Robot-Assisted Laparoendoscopic Single-Site Partial Nephrectomy and Standard Radical Prostatectomy

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Recently, patients with urologic malignancies are treated with robot-assisted surgery and the expanded role of robot-assisted surgery includes even those patients with two concomitant primary urologic malignancies. In an effort to further reduce port site-related morbidity, robot-assisted laparoendoscopic single-site surgery (RLESS) has been developed. Therefore, we present herein our early experience and feasibility of simultaneous RLESS partial nephrectomy and standard robotrobot-assisted laparoendoscopic radical prostatectomy (RALP) on 3 patients with synchronous renal masses and prostate cancer.

Key Words: Robot, prostate carcinoma, radical prostatectomy, renal cell carcinoma, nephron-sparing surgery

INTRODUCTION

In the era of prostate specific antigen (PSA) screening, the incidence of prostate cancer has been increasing in the past decade. Similar to prostate cancer, renal masses are also detected more and more on routine health examination with wide use of abdominal ultrasonography and computed tomography (CT) scan.[1-5]

With a technological advancement, patients with urologic malignancies have been treated with robot-assisted surgery, and the expanded role of robot-assisted surgery includes even those patients with two concomitant primary urologic malignancies.[1,2] In addition, with an effort to reduce the invasiveness, robot-assisted laparoendoscopic single-site surgery (RLESS) has been developed.[6]

Therefore, we report our early experience and feasibility of simultaneous RLESS partial nephrectomy (RLESS PN) and standard robotrobot-assisted laparoendoscopic radical prostatectomy (RALP).

CASE REPORT

From August 2009 to July 2010, we performed simultaneous RLESS PN and standard RALP on 3 patients with synchronous renal masses and prostate cancer. The renal masses were found incidentally during contrast enhanced CT as preoperative workup for prostate cancer. One patient underwent a radiotherapy and androgen deprivation therapy before surgery.

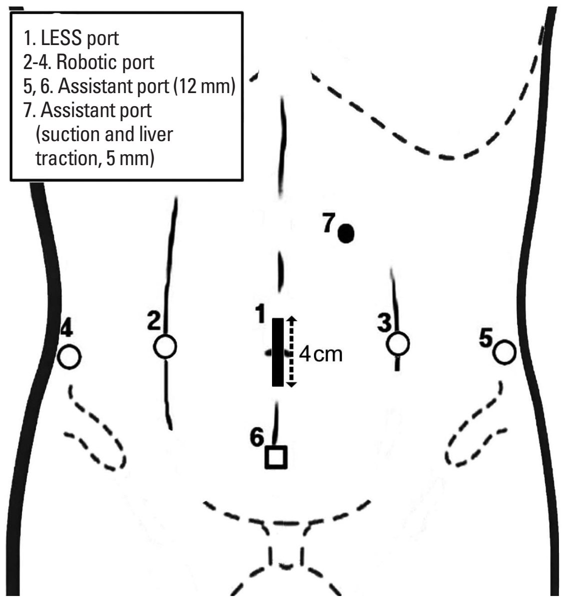

Fig. 1. Schematic port placements during prostatectomy (circles) and additional nephrectomy port (squares). Laparoendoscopic single-site surgery (LESS) port strategy. LESS port (bold line) and assistant port for liver traction during RAPN (solid circles) reused as a camera port and suction port during RALP.

Position, port placement, and surgical techniques (Fig. 1). The patient was placed in conventional flanked kidney position with the ipsilateral side elevated during RLESS PN or Trendelenburg position during RALP. In initial cases (1 and 2), we performed RALP first and then 4 cm long incision was made for prostate specimen removal and RLESS PN. In the last case (3), we carried out RLESS PN first. Finishing one procedure, we re-prepared the patient properly according to the next procedure. Port placement strategy and surgical techniques of RLESS PN and RALP were have been described previously.[3,6]

Results

The characteristics of the 3 patients are listed in Table 1. The median age of the patients was 61 years, and the median body mass index was 24 kg/m^2. The median renal tumor size was 2.7 cm, and preoperative creatinine levels of all patients were normal. For prostate cancer, the median preoperative PSA was 7.42 ng/mL and Gleason scores were higher than 7 in all patients. These prostate cancers were clinically advanced, and salvage RALP was performed in one patient. The median operation time was 342 minutes, and the median console time was 200 minutes. The median

Table 1. Preoperative Patients Characteristics

	Age	BMI	Cormorbidity	Prostate			Kidney	
				PSA (ng/mL)	Gleason score	Clinical stage	Creatinine (mg/dL)	Tumor size (cm)
1	72	28	-	0.30	8 (5+3)	Salvage	1.1	5.3
2	55	24	HTN, DM	7.42	8 (4+4)	T3a	1.0	2.7
3	61	23	HTN	61.21	7 (3+4)	T3b	1.0	1.6

BMI, body mass index; PSA, prostate specific antigen; HTN, hypertension; DM, diabetes mellitus.

Table 2. Intraoperative Parameters

	Initial procedure	OP time (mins)		Console time (mins)		Warm ischemic time (mins)	EBL (mL) (nephrectomy/ prostatectomy)
		Nephrectomy	Prostatectomy	Nephrectomy	Prostatectpmy		
1	Prostatectomy	136	206	78	110	33	150 (50/150)
2	Prostatectomy	123	144	89	111	24	800 (150/650)
3	Nephrectomy	150	330	103	272	35	700 (50/650)

EBL, estimated blood loss; OP, operation.

Table 3. Postoperative Results

	Creatinine (mg/dL)	Length of stay (days)	Prostate			Kidney	Morbidity/ motality
			Gleason score	PSM	Pathologic stage	Pathology/stage	
1	1.3	7	0	N	T0N0M0	Clear cell type, grade2/T1	-
2	1.1	7	8 (3+5)	N	T2bN0M0	Clear cell type, grade3/T1	-
3	1.4	13	8 (3+5)	Y	T4aN0M0	Clear cell type, grade2/T1	Ureteral injury

PSM, positive surgical margin.

estimated blood loss was 700 mL (Table 2). There was no blood transfusion and no patient required conversion to open surgery. Postoperative results are shown in Table 3. The median length of stay was 7 days. In salvage RALP, pathological T0 disease was noted due to the influence of hormonal therapy and radiotherapy. Positive surgical margin was shown in one patient. There was one case of ureteral injury during RALP, and consequently, ureteroneocystostomy was performed immediately and no further complications developed. The median follow-up was 18 months. As for the kidney tumor, one case was Fuhrman grade 3 renal cell carcinoma, and two cases were grade 2 and all cases were T1 renal cell carcinoma.

DISCUSSION

Robot-assisted surgery has moved into the mainstream of surgical advance.[3-5] Since being described in 2001 by several centers, RALP is going far beyond the numbers performed by open and laparoscopic prostatectomy. Currently, literatures show that RALP is a safe procedure with favorable oncologic and functional outcomes.[1,3] In contrast with RALP, however, initial RAPN failed to prove a considerable benefit over traditional open and laparoscopic partial nephrectomy. The surgeon needs highly developed skills over a steep learning curve to perform RAPN because precise dissection of tumor from normal renal parenchyma, repair of the collecting system and hemostasis must be done under a minimal warm ischemia time.[4] Nevertheless, the robot-assisted renal surgery is gradually becoming more common, as safety and feasibility have been reported.[4,6]

Since Kaouk, et al.[7,8] reported initial experience of partial nephrectomy and radical prostatectomy with LESS, LESS has been used for urologic procedure to reduce morbidity, decrease blood loss, and minimize hospital stay and pain. However, conventional LESS is not ergonomic and triangulation between laparoscopic instruments is limited, but robot-assisted LESS enhanced intraoperative maneuvering.[6] Additionally, LESS port can be useful for specimen retrieval and it is unnecessary to reposition the port based on the laterality of renal tumor compared to standard RAPN.[6] Furthermore, recent report demonstrated that intraoperative frozen section of prostate reduced positive margin rate during radical prostatectomy.[9] We think that intraoperative prostate frozen section can be easily performed via already made LESS port. However, our technique is not strictly single-port due to additional ports for RALP despite of LESS technique. We should investigate further port placement strategy and special robotic instruments.

Concurrent surgery has many potential benefits because it avoids 2 separate procedures. Because patient does not have multiple induction of anesthesia, overall hospitalization, costs, and the number of port placement are minimized, and morbidity associated with anesthesia is reduced.[1,2] Despite the benefits of concurrent surgery, they have a potential disadvantages, including increased total surgical and anesthesia time as well as prolonged pneumoperitoneum.[1,2] Although creatinine levels of all patients were eventually decreased within normal range, a postoperative elevation of creatinine levels may be related to prolonged pneumoperitoneum. However, several studies of laparoscopic complications reported that duration of pneumoperitoneum seems to be a significant factor in pulmonary mechanics, but it does not affect overall hemodynamic parameters.[1,10] In view of the sequence of the procedure, performing RALP prior to RLESS PN may be reasonable because of vulnerability of home-made single port in the process of repositioning of patient. However, surgeons need to consider the level of surgical difficulty for making an order of priority on concurrent surgery. In the present study, we decided to complete RLESS PN first for the last case who needed wide excision and extended lymphadenectomy.

In our series, patients with large renal tumor and advanced prostate cancer were included. RAPN for large renal tumor have shown outcomes comparable to smaller tumors, and RALP in advanced prostate cancer might have benefits for accurate pathological staging, durable local control and long term cancer specific survival.[11,12] In particular, recent robot assisted salvage prostatectomy was performed as alternative treatment after radiation therapy, similar to the present case study.[13] However, ureteral injury occurred during wide excision to ensure a negative surgical margin in patients with advanced prostate cancer (case 3).

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