


Case Report

Simultaneous robot-assisted nephroureterectomy and radical cystectomy

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Abbreviations & Acronyms

CT = computed tomography
 RANU = robot-assisted radical nephroureterectomy
 RARC = robot-assisted radical cystectomy
 RC = radical cystectomy
 RNU = radical nephroureterectomy
 UC = urothelial carcinoma
 UTUC = urinary tract urothelial carcinoma
 UUT = upper urinary tract

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Introduction: We present a case of simultaneous robot-assisted radical nephroureterectomy (RANU) and robot-assisted radical cystectomy (RARC) for muscle-invasive bladder cancer with concomitant upper urinary tract urothelial carcinoma.

Case presentation: A 59-year-old Japanese man was diagnosed with right ureteral cancer and muscle-invasive bladder cancer. We performed RANU and RARC simultaneously; three of the ports used for RANU were diverted to RARC. Console times for RANU and RARC were 66 and 207 minutes, respectively. Total operative time was 386 minutes. The intraoperative blood loss was estimated 255 ml. The patient was discharged on postoperative day 18 without complications.

Conclusion: We reported our experience with simultaneous RANU and RARC for muscle-invasive bladder cancer with concomitant right ureteral cancer. To the best of our knowledge, this is the first report of its kind in Japan.

Key words: Bladder cancer, Radical cystectomy, Radical nephroureterectomy, Robotic surgery, Urothelial carcinoma.

Keynote message

We report a case in which robot-assisted radical nephroureterectomy and radical cystectomy were performed simultaneously. Total operative time was 386 minutes and intraoperative blood loss was 255 ml: these results were acceptable compared to previous reports. In this present approach, three of the ports used for robot-assisted radical nephroureterectomy were diverted to cystectomy.

Introduction

Urothelial carcinoma (UC) is one of the common malignancies.¹ They can be located not only in the urinary bladder but also in the upper urinary tract (UUT), although the rate is lower (5–10%).² Renal-sparing surgery for low-risk upper urinary tract UC (UTUC) is the preferred approach because survival rates are comparable to those after radical nephroureterectomy (RNU).³ However, for high-risk UTUC, RNU is the standard treatment, and it must be performed according to oncological principles to prevent tumor seeding.⁴ It is estimated that 17% of UTUC cases have concurrent bladder cancer,² and in high-risk cases of UTUC with bladder cancer requiring radical cystectomy (RC), simultaneous RC and RNU would be the oncologically selected principle.^{2,5}

It appears that the first case of simultaneous RC and RNU was reported in 2002.⁶ Afterward, several case series were published, and we also reported on a technique for simultaneous laparoscopic RNU and robot-assisted RC (RARC).⁷ In April 2022, robot-assisted RNU (RANU) was covered by the Japanese National Health Insurance system. To the best of our knowledge, there has been no published series of simultaneous RANU and RARC in Japan to date.

Herein, we report a case of simultaneous RANU and RARC for muscle-invasive bladder cancer with concomitant UTUC.

Case

The patient, a 59-year-old Japanese man with a 28-pack-year smoking history, presented to the referring hospital with asymptomatic gross hematuria. He had been diagnosed with type 2 diabetes mellitus but had no other complications and no previous history of abdominal surgery. Cystoscopy revealed a widespread bladder tumor, and a bladder biopsy revealed the diagnosis of muscle-invasive, high-grade UC. Computed tomography (CT) of the chest and abdomen showed no evidence of systemic metastasis, but there were findings suspicious of right ureteral cancer (Fig. 1a). The patient was referred to our hospital and was started on cisplatin-based neoadjuvant chemotherapy. At the end of the second course, a CT scan showed the appearance of right hydronephrosis and progression of the right ureteral cancer (Fig. 1b). Therefore, we decided to terminate the planned total of four courses of chemotherapy and bring forward the surgery.

The procedure of simultaneous RANU and RARC with left cutaneous ureterostomy was performed by a highly skilled and experienced urologist using a Da Vinci Xi surgical system (Intuitive Surgical Inc., Sunnyvale, CA, USA). First, we placed the patient in a flank position for RANU. The first 12-mm trocar was placed in an open technique at umbilical level lateral to the ipsilateral rectus muscle. An additional 8-mm

robotic port was inserted into this 12-mm port to serve as the camera port. The remaining three robotic ports were placed in a straight line in a para-rectal line. A 5-mm port was placed just below the xiphoid process of sternum for liver retraction and a 12-mm assistant port was placed just above the umbilicus. Figure 2a shows the trocar arrangement for RANU.

After the entire kidney was removed, RANU was terminated when the ureter was dissected to near the crossing point of the ureter and common iliac artery. After the completion of RANU, the robot was undocked, and we placed the patient in the lithotomy-Trendelenburg position. Then, the surgical field was re-prepared and re-draped for RARC with pelvic lymph node dissection. The second robotic port for the camera from the head side used for RANU was retained for RARC, and the 8-mm robot port was inserted into the 12-mm assistant port as a port in port. Two 8-mm robotic ports were inserted on the contralateral side of the umbilicus at the same level as the 12-mm port. Port holes not used in RARC were stitched with nylon sutures to prevent leakage of insufflation gas. Figure 2b shows the trocar arrangement for RARC. Intraoperative port placement is shown in Figure 3. At the time of RARC, pelvic lymph node dissection was first performed on the side where the ureter was dissected. The ureter had been dissected to its intersection with the common iliac artery at the time of RANU, and

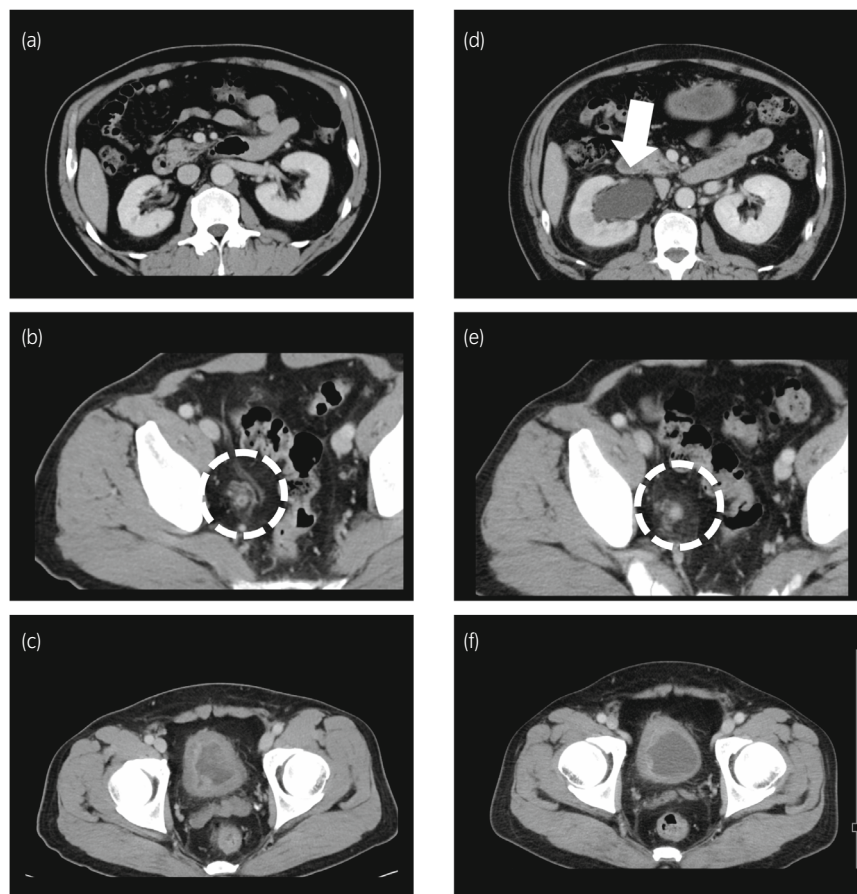


Fig. 1 Computed tomography images at the initial visit (a–c) and after two courses of neoadjuvant chemotherapy (d–f). After neoadjuvant chemotherapy, the right ureteral cancer progressed (b, e; white broken circle) and a right hydronephrosis appeared (d; white arrow).

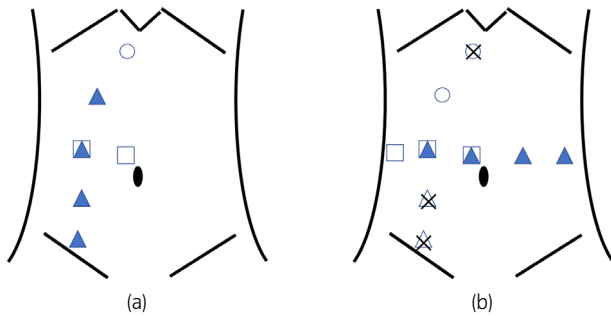


Fig. 2 Port placement for RANU (a) and RARC (b). The squares indicate 12-mm ports. The circles indicate 5-mm assistant ports. The triangles indicate the robotic ports (8-mm). Cross marks indicate port holes that were not used in RARC. The combination of squares and triangles indicate port-in-port (8-mm robotic port in 12-mm port).

this site was further dissected pelvically, with a wide peritoneum incision in this process. After dissecting the ureter to the bladder, we moved on to pelvic lymph node dissection and ureteral dissection on the opposite side and performed RARC. The urethra was pulled out as far as possible from the pelvic side, ligated distally, and resected. En-bloc resection of the kidney, ureter, bladder, and prostate was performed and all specimens were placed in two 12-mm INZII® bags (Applied Medical, Rancho Santa Margarita, CA, USA): the kidney and surrounding tissue were placed in the first bag and the bladder and prostate in the second bag, with the two bags connected by the ureter. Great care was taken to avoid tearing the specimens during this procedure. The specimens were removed through a 12-mm port with skin incisions extended to about 5 cm, and three silicone drains were placed (Fig. 4).

Console times for RANU and RARC were 66 and 207 minutes, respectively. The total operative time was 386 minutes, and the blood loss during surgery was estimated 255 ml. The patient was discharged on postoperative day 18 and without complications (Clavien-Dindo grade 0).

Discussion

The technique of simultaneous RANU and RARC has been reported in some literature.^{8–10} In a case series of eight patients who underwent simultaneous RANU and RARC, a mean operative time was reported to be 306 minutes, a mean estimated blood loss was 496 ml, and there were no

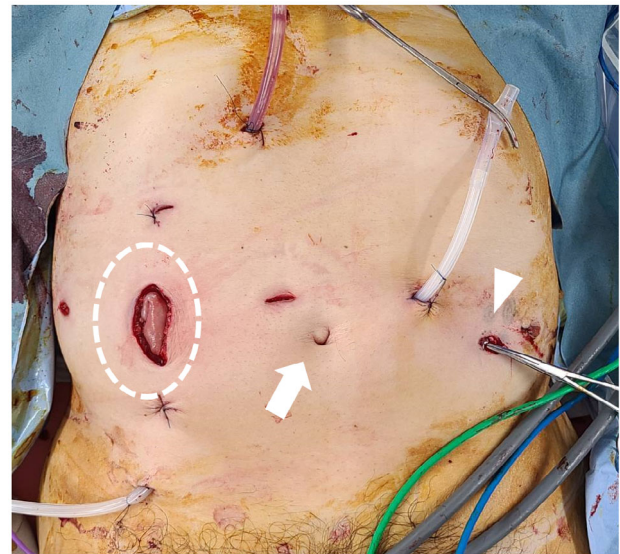


Fig. 4 Abdominal wound findings immediately after surgery: the white arrow indicates the umbilicus. The white arrowhead indicates the ureterocutaneous fistula. The broken white line indicates where the 12-mm port was located, with the skin incision extended to about 5 cm for specimen removal.

intraoperative complications.⁹ A case series reported from Germany on 19 patients who underwent simultaneous RANU and RARC reported a mean operative time of 324 minutes, a mean estimated blood loss of 220 ml, and Clavien–Dindo grade ≥ 3 complications in one (5%) case (port hernia).¹⁰ Although the number of cases was small, all reports claimed that simultaneous RANU and RARC could be conducted with acceptable perioperative outcomes.

In this present approach, it was possible to complete the procedure using only small trocar incisions and an approximately 5-cm incision for specimen removal. In addition, three of the ports used for RANU were diverted to RARC, thus reducing the overall number of ports used. As discussed in previous reports,¹⁰ the multiple cumbersome procedures involved in transitioning from RANU to RARC (i.e., undocking/redocking the robot, repositioning, and inserting new ports) may require training for the team, including nurses and other bedside assistants as well as physicians.

In conclusion, we reported our experience with simultaneous RANU and RARC. In selected cases, simultaneous RANU and RARC might be a safe and feasible surgical

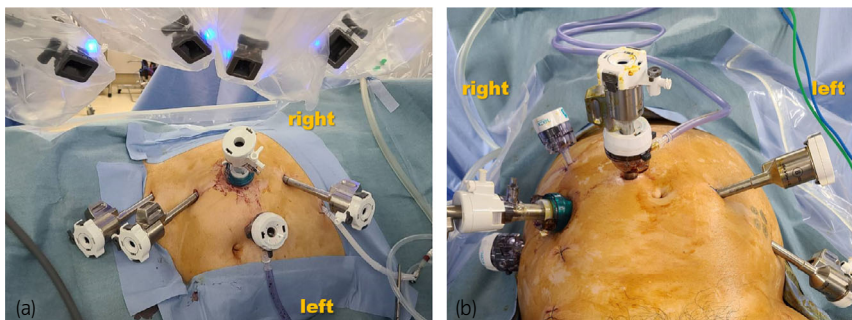


Fig. 3 Photographs taken during the surgery: RANU was performed in the left lateral decubitus position (a), followed by RARC in the lithotomy-Trendelenburg position (b).

option, but large-scale prospective studies will be needed to provide more information on this procedure.

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Author contributions

Shugo Yajima: Conceptualization; methodology; project administration; writing – original draft. Yasukazu Nakanishi: Conceptualization; methodology; supervision; writing – review and editing. Rikuto Yasujima: Data curation; supervision. Kohei Hirose: Data curation; supervision. Ken Sekiya: Data curation; supervision; writing – review and editing. Yosuke Umino: Resources; writing – review and editing. Naoya Okubo: Supervision; writing – review and editing. Madoka Kataoka: Supervision; writing – review and editing. Hitoshi Masuda: Supervision; writing – review and editing.

Conflict of interest

The authors declare no conflict of interest.

Approval of the research protocol by an Institutional Reviewer Board

Not applicable.

Informed consent

Written informed consent for the release of this case report and accompanying images has been obtained from the patient.

Registry and the Registration No. of the study/trial

Not applicable.

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