



Case Report

Complete retroperitoneal cutaneous ureterostomy with robot-assisted radical cystectomy

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Abbreviations & Acronyms

CRCU = complete retroperitoneal cutaneous ureterostomy
CU = cutaneous ureterostomy
RARC = robot-assisted radical cystectomy

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Introduction: Cutaneous ureterostomy is beneficial for older patients in a hypoalimentation state, providing less invasive options than intestinal tract reconstruction techniques. However, complications such as ileus and stoma site hernia still pose risks owing to the anatomical location of the ureter. We introduce a novel method, complete retroperitoneal cutaneous ureterostomy, performed simultaneously with robot-assisted radical cystectomy.

Case presentation: Our technique involves extending the retroperitoneal space to minimize complications and achieve stent-free outcomes. The median procedure time for complete retroperitoneal cutaneous ureterostomy was approximately 30 min. The stent-free rates at 1 and 4 months postoperatively were 66.7% and 100%, respectively; no case of stent reinsertion after stent removal was reported.

Conclusion: Our approach is promising for avoiding postoperative intestinal tract complications.

Key words: cutaneous ureterostomy, cystectomy, retroperitoneal space, robot-assisted.

Keynote message

We introduce a novel method, complete retroperitoneal cutaneous ureterostomy, performed simultaneously with robot-assisted radical cystectomy. Our technique involves extending the retroperitoneal space to minimize complications and achieve stent-free outcomes.

Background

Recently, the number of elderly patients with bladder cancer requiring RARC and urinary diversions has increased. Surgeons often use intestinal tract reconstruction techniques such as neobladders or ileal conduits to create urinary diversions. Older patients, particularly those in a hypoalimentation state, may have better outcomes with CU.^{1,2} CU has shorter operation times and is less invasive for the intestinal tract.³ However, owing to the anatomical location of the ureter along the abdominal cavity after RARC, there are still risks of complications, including ileus, parastomal hernia.^{4,5} Furthermore, one challenge for CU procedure is avoidance of the need for a stent because of stoma stenosis. The stent-free rate of standard CU is 42.3%–44%.^{6,7} However, using the retroperitoneal approach for CU and RARC is difficult. Here, we introduce a novel method for performing a CRCU with RARC. Our method is promising to avoid postoperative intestinal tract complications.

Materials and methods

This study was approved by the institutional review board of Aichi Cancer Center on 13 February, 2023, (Approval No. IR041146) and was conducted in accordance with the Helsinki Declaration. Between April 2022 and June 2023, RARC was performed for three cases of invasive bladder cancer with CRCU using the da Vinci Xi system. Stoma site marking is done preoperatively. According to the patient's skin laxity, the stoma site is positioned at approximately the outer edge of the rectus abdominis muscle, slightly below the umbilicus. Figure 1a shows the port position for RARC with CRCU in our institute. CRCU is performed by pulling the fourth arm out. Figure 1b shows the position of each port during right-side CRCU. The left-side CRCU

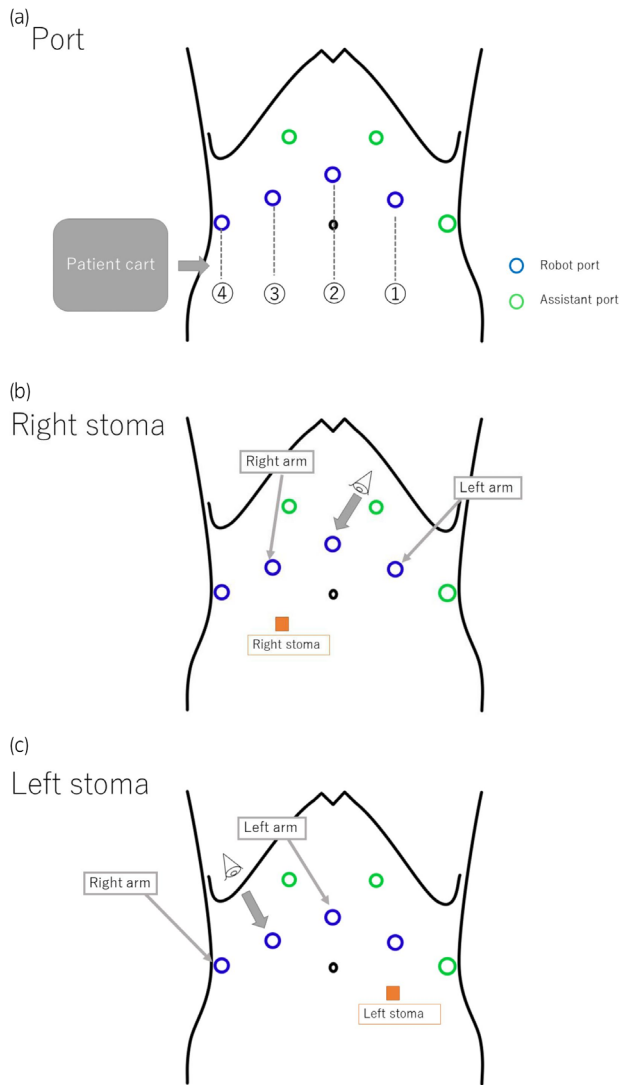


Fig. 1 (a) Position of da Vinci and assistant ports to perform RARC with CRCU. (b) The position of each port during right-side CRCU. (c) The role of each arm during left-side CRCU.

can be easily performed by rotating the da Vinci forceps and the camera to the patient's right side, as shown in Figure 1c. The procedures for CRCU are summarized in seven steps that is shown Figure 2. Step 1: A retroperitoneal space is created in an antegrade fashion as wide as possible. Step 2: A 12-mm port is inserted from the stoma site. Step 3: The sheath of the port is pulled out to the abdominal wall. Step 4: A retroperitoneal space is created in a retrograde fashion from the peritoneal hole made by the 12 mm port. Step 5: Forceps are used to grasp and pull the ureter through the port via the retroperitoneal space. Step 6: The peripheral peritoneum is sutured to place the ureter inside the retroperitoneal space. Step 7: The central peritoneum is sutured to place the ureter inside the

retroperitoneal space. The left and right side CRCU stoma are performed similarly. Actual photographs of this technique in action are shown in Figure 3.

Results

The preoperative patient characteristics and clinical outcomes of the three CRCU cases are shown in Table 1. In Case 1, CRCU was performed to facilitate quick recovery from duplicate cancer (oral carcinoma) operations. In Cases 2 and 3, ileal conduit was unsuitable because of inability to tolerate chemotherapy and hypoalbuminemia state, respectively.

The time required to perform a ureterostomy by robotic manipulation was 29.5 min (median) for one side. There was no difference in the operative time between the left- and right-side procedures. Generally, ureter catheter was removed on postoperative days 7–10. The stent-free rates at 1 and 4 months postoperatively were 66.7% and 100%, respectively. No case of stent reinsertion after stent removal has been reported at present. The incidence of urinary tract infection was 33.3%. The second patient had mesenteritis (Clavien-Dindo classification: Grade 2) that was not caused by the CU. Ileus or parastomal hernia did not occur in any of the cases, with observation periods of 7.3, 10.7, and 9.1 months for Cases 1, 2, and 3, respectively.

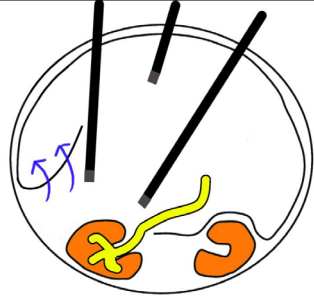
Discussion

RARC for invasive bladder cancer is an acceptable treatment option even in older patients over 80 years.⁸ Generally, CU is preferred in older patients with poor general conditions, short life expectancy, or a history of bowel complications.⁹ Usually, RARC is performed by a transperitoneal technique, leaving the ureter in the peritoneal cavity. The risks of ureteral-related ileus and parastomal hernia still exist when the ureter passes through the abdominal cavity. Retroperitonealization is generally performed using an ileal conduit. However, there are no reports on the use of this technique for CU. In the technique reported here, the ureter is completely covered by the peritoneum, even in CU, which may reduce the risk of ileus and parastomal hernia. In addition, CU is a minimally invasive and feasible procedure because it does not utilize the intestinal tract. However, one challenge is the need for a stent because of stoma stenosis. The stent-free rate of standard CU is 42.3%–44%.^{6,7} However, all patients with CRCU were stent-free. This may be because the stoma, made of a 12 mm port, is sufficiently wide and straight.

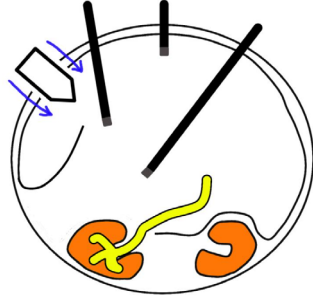
This technique requires two stomas, which are labor- and cost-intensive. However, if recurrence occurs in the upper urinary tract, additional surgical resection of the cancer involving the ureter may be easily achieved.

Fig. 2 A step-by-step scheme of CRCU procedures. Step 1: A retroperitoneal space is created in an antegrade fashion. Step 2: A 12-mm port is inserted from the stoma site to introduce the ureter. Step 3: The sheath of the port is pulled out to the abdominal wall. Step 4: A dissection is performed, and a retroperitoneal space is created in a retrograde fashion. Step 5: The 12-mm port sheath is introduced into the retroperitoneal space to grasp and lead the ureter to the stoma site. Step 6: The peripheral peritoneum is sutured to place the ureter inside the retroperitoneal space. Step 7: The central peritoneum is sutured to place the ureter inside the retroperitoneal space.

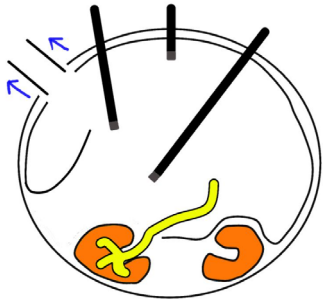
Step 1: A retroperitoneal space is created in an antegrade fashion.



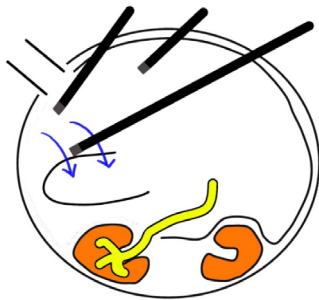
Step 2: A 12 mm port is inserted from the stoma site to introduce the ureter



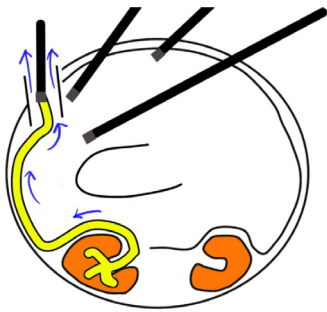
Step 3: The sheath of the port is pulled out to the abdominal wall.



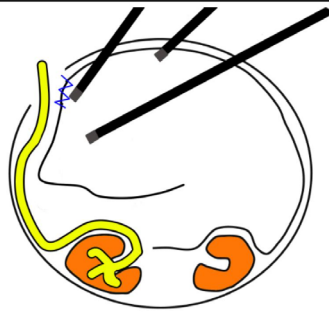
Step 4: A dissection is performed, and a retroperitoneal space is created in a retrograde fashion.



Step 5: The 12 mm port sheath is introduced into the retroperitoneal space to grasp and lead the ureter to the stoma site.



Step 6: The peripheral peritoneum is sutured to place the ureter inside the retroperitoneal space.



Step 7: The central peritoneum is sutured to place the ureter inside the retroperitoneal space.

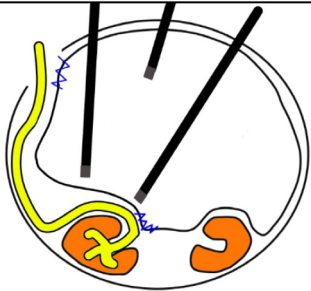


Table 1 Preoperative patient characteristics and clinical outcomes of the three CRCU cases

	Age	Gender	TNM/stage	Reason of choose CU	Creating CU time (min) (Right/Left)	Length of hospitalization (day)	Catheter free (yes/no)	Perioperative complications
# Case1	68	Male	cT3bN0M0 stage III	Need to recover quickly due to duplicate cancer (carcinoma of the oral) operation	60 (34/24)	14	Yes	None
# Case2	79	Female	cT3bN0M0 stage III	Chemo unfit and hypoalbuminemia state	59 (31/28)	37	Yes	Mesentery inflammation (Grade2)
# Case3	78	Male	cT4aN0M0 stage III	Chemo unfit and hypoalbuminemia state	59 (34/25)	20	Yes	None

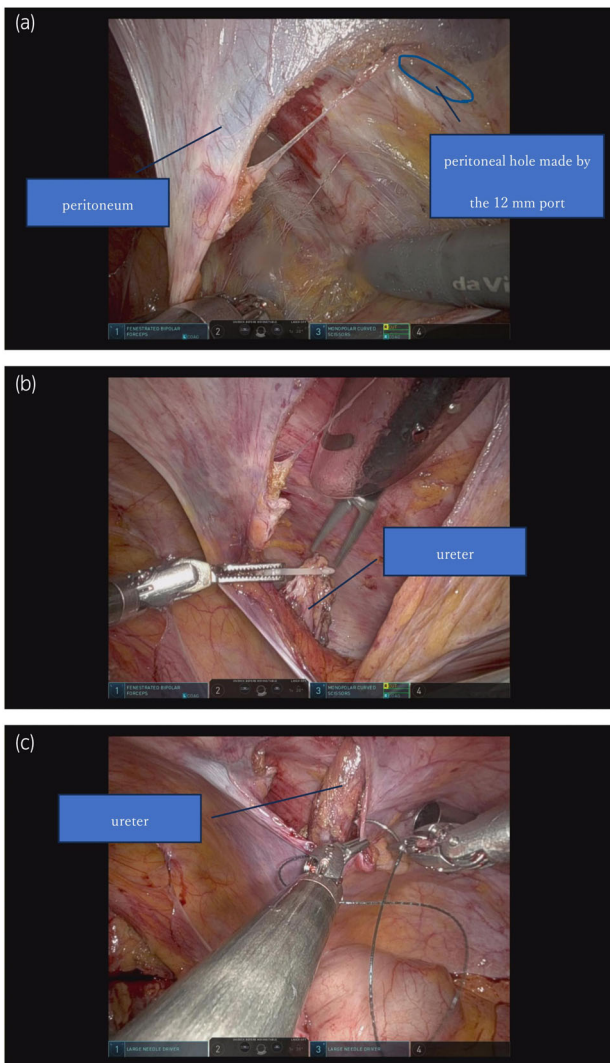


Fig. 3 Laparoscopic findings of right-side CRCU. (a) A picture of Step 4. (b) A picture of Step 5. (c) A picture of Step 6.

The limitations of this study include the small number of cases, which made it difficult to perform statistical comparisons, and the lack of long-term results. Owing to the increase in the number of cases of invasive bladder cancer in older patients, the number of cases in which CRCU is performed is

expected to increase. Further analyses are required to examine the efficacy of CRCU.

Author contributions

Shiori Tanaka: Conceptualization; data curation; formal analysis; writing – original draft. Goshi Kitano: Data curation. Manabu Kato: Data curation; supervision. Yuji Ogura: Data curation. Takahiro Kojima: Conceptualization; data curation; 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

Approval number: IR041146. The protocol for this research project has been approved by the institutional review board of Aichi Cancer Center, and it conforms to the provisions of the Declaration of Helsinki.

Informed consent

Not applicable.

Registry and the Registration No. of the study/trial

Not applicable.

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