



## Original article

# Minimal incisions for laparoscopic radical cystectomy with extracorporeal-assisted urinary diversion



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## ABSTRACT

**Objective:** Laparoscopic radical cystectomy (LRC) had been used for >10 years. However, longer wound incisions for extracorporeal-assisted urinary diversion decrease the benefits of a laparoscopic approach. In this study, we describe our experience of modified LRC with extracorporeal-assisted urinary diversion using minimal wound incisions.

**Materials and methods:** From January 2011 to January 2013, 22 consecutive patients underwent radical cystectomy by a single surgeon. Seven patients underwent open radical cystectomy (ORC), and 15 patients underwent LRC with four-port incisions.

**Results:** The LRC group had a significantly lower estimated blood loss ( $p = 0.005$ ), lower blood transfusion rate ( $p = 0.004$ ), and lower ileus rate ( $p = 0.031$ ) than the ORC group. No significant differences were noted in operative time, time to flatus, pain score, overall complication rate, pathological stage, positive surgical margin rate, or lymph node yield (27.6 for LRC and 29.1 for ORC). The 1-year disease free survival rate was 86.7% in the LRC group and 71.4% in the ORC group, and the 1-year overall survival rates were both 100%.

**Conclusion:** Our experience shows that LRC with extracorporeal-assisted urinary diversion using minimal incisions is a safe and feasible surgical technique with less blood loss. Further reports with a longer follow-up period and large number of cases are necessary to validate our findings.

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## 1. Introduction

Although open radical cystectomy (ORC) remains the gold standard procedure for the treatment of muscle-invasive bladder cancer, an increasing number of urologists are using a laparoscopic approach for radical cystectomy. This minimally invasive approach is expected to decrease postoperative recovery time and surgical complications, while achieving compatible oncological results to the traditional open procedure.

Unlike laparoscopic nephrectomy or prostatectomy, laparoscopic radical cystectomy (LRC) has developed relatively slowly in the past 20 years because of the difficulty of ureteroenteric anastomosis impeding the advancement of intracorporeal urinary diversion. Only skilled and experienced laparoscopic surgeons can perform the procedure successfully and minimize complications.<sup>1,2</sup> An increasing number of studies have reported the safety of

intracorporeal urinary diversion assisted by a robotic system.<sup>3</sup> For a purely laparoscopic approach, extracorporeal-assisted urinary diversion is safer, easier, and more acceptable for most medical centers. However, the longer wound incisions in extracorporeal-assisted urinary diversion seem to compromise the benefits of the laparoscopic approach.

In this study, we show the feasibility, safety, and early oncological outcomes of our modified LRC with extracorporeal-assisted urinary diversion using minimal wound incisions.

## 2. Methods

We retrospectively reviewed 22 consecutive patients who underwent radical cystectomy by a single surgeon (C.K.Y.) in one tertiary referral hospital from January 2011 to January 2013. All of the patients were diagnosed with muscle-invasive bladder cancer or high-risk recurrent noninvasive disease prior to surgery, and they all received chest radiography and abdominal computed tomography (CT) for preoperative staging. If the abdominal CT scan showed distal metastasis or T4b lesions (pelvic side wall or abdominal wall invasion), curative surgery was not suggested.

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Contraindications for laparoscopic surgery are previous abdominal surgery, renal hilar or interaortocaval lymphadenopathy in the abdominal CT, receiving neoadjuvant chemotherapy, or patients who could not tolerate pneumoperitoneum and steep Trendelenburg position. We explained the possible benefits and drawbacks of LRC with extracorporeal-assisted urinary diversion, and the patients could choose either open or laparoscopic surgery. Seven patients chose traditional ORC and 15 patients chose the laparoscopic approach. None of them received neoadjuvant chemotherapy because no significant lymphadenopathy was noted clinically or in the abdominal CT.

All of the patients received the same standard pelvic lymphadenectomy template, including common iliac, external iliac, internal iliac, and obturator lymph node chains. The urinary diversion included the Studer neobladder, ileal conduit, and cutaneous ureterostomy. Indications for cutaneous ureterostomy are previous radiation history or severe adhesion of small intestine. Ileal conduit is suggested for female patients and older (>65 years) male patients.

For the laparoscopic surgery, a four-port transperitoneal approach was used (Fig. 1A). The first 10-mm camera trocar was placed 4 cm above the umbilicus using an open technique. After a pneumoperitoneum was established, two 10-mm working ports were placed 6 cm away from the umbilicus under a 30° laparoscopic camera, along the line from the anterior spine of the iliac crest to the umbilicus. One 5-mm assistant port was placed 4-cm above the right anterior spine of the iliac crest. The patient was then tilted in a steep Trendelenburg position, and bilateral standard lymph node dissection was performed. Bilateral ureters were then isolated distally down to the level of the bladder and ligated by Hem-o-lok clips (Weck Surgical Instruments, Teleflex Medical, Durham, NC, USA). The ureter margins were sent for frozen section examination. The bladder was then dissected from adjacent tissues and the bladder pedicles were ligated by Hem-o-lok clips. Before the Foley catheter was transected, it was clipped with Hem-o-lok clip to avoid urinary spillage. Each specimen was retrieved using an endobag.

In cases of a urinary diversion with ileal conduit, the right working port was extended to 4 cm with a wound protector to pull out the specimen, distal ileal loop and bilateral ureters for extra-

corporeal assisted urinary diversion (Fig. 1B). Finally, the extended working port was close to 2 cm for ostomy of the ileal conduit. For patients with a Studer neobladder, another 4 cm incision over the lower abdomen above the pubic symphysis was made to form the neobladder and urethral anastomosis.

All of the patients in both groups received the same protocol of postoperative care. The nasogastric tube was removed on postoperative Day 1. Water intake began after flatus was noted. The patients were followed up at our clinic every 3 months and abdominal CT was performed every 6 months for at least 1 year.

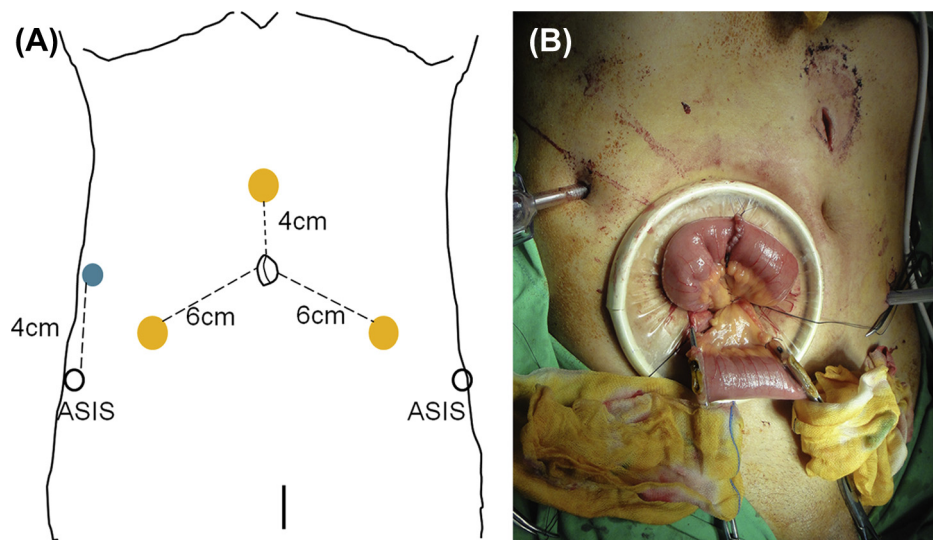
Patient characteristics were assessed, including age, sex, body mass index (BMI), and the methods of urinary diversion. Perioperative measures were compared including estimated blood loss, operative time, time to flatus, pain score, transfusion, ileus (defined as abdominal distension with obvious small bowel loop in plain abdominal X-ray or no flatus after POD5), and Clavien grade of complications over the first 90 days. Oncological outcomes including such as pathological stage, positive surgical margin, lymph node yield, 1-year disease-free survival, and 1-year overall survival were also assessed. Data analysis was approved by the Institutional Review Board of Taichung Veterans General Hospital, Taichung, Taiwan (No. CE13240).

Categorical variables were expressed as number and proportion and were compared by using Pearson Chi-square or Fisher's exact tests. Continuous variables were expressed as mean and range and compared using the Mann–Whitney *U* test. SPSS version 19 (SPSS Inc., Chicago, IL, USA) was used for all statistical analyses.

### 3. Results

Table 1 shows the patients' demographic data. The mean age was 59.1 years in the LRC group and 61.1 years in the ORC group. There were no significant differences in age, sex, BMI, clinical stage, and the methods of urinary diversion between the two groups.

The perioperative outcomes are summarized in Table 2. The LRC group had significantly lower estimated blood loss ( $p = 0.005$ ), lower blood transfusion rate ( $p = 0.004$ ), and lower ileus rate ( $p = 0.031$ ) than the ORC group. There were no significant differences in operative time, time to flatus, pain score, or overall



**Fig. 1.** Four-port placement for laparoscopic radical cystectomy with extracorporeal-assisted urinary diversion. (A) Four-port placement included three 10-mm camera and working ports (yellow discs), and one 5-mm assistant port (blue disc). (B) The right working port was extended to 4 cm to pull out the specimen, distal ileal loop, and bilateral ureters for extracorporeal-assisted urinary diversion. ASIS = anterior superior iliac spine.

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