Editorial

Safety and feasibility of robotic-assisted laparoscopic lateral lymph node dissection

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It is a great pleasure and honor to comment on the article titled "*Selective lateral pelvic lymph node dissection*: *a comparative study of the robotic versus laparoscopic approach*" by Kim *et al.* in the *Surgical Endoscopy* (1). Lateral lymph node dissection (LLD) for rectal cancer is a technically difficult procedure. This study aimed to compare the short-term outcomes and the initial oncological outcomes between the robotic-assisted laparoscopic LLD (RALLD) and the conventional laparoscopic LLD (CLLLD) in patients with rectal cancer. In detail, 50 and 35 patients who underwent RALLD and CLLLD with total mesorectal excision (TME) between 2006 and 2014 were retrospectively compared. Preoperative chemoradiotherapy (CRT) was performed in 41 patients (82.0%) in the RALLD group and 24 (68.6%) in the CLLLD group. Bilateral LLD was performed in 10 patients (20.0%) in the RALLD group and 6 (17.1%) in the CLLLD group. The mean operative time was similar between the two groups (RALLD *vs.* CLLLD, 260.3 *vs.* 254.1 min; P=0.737); however, the estimated blood loss was significantly less in the RALLD group (81.9 *vs.* 135.4 mL; P=0.002). Urinary retention was significantly more frequent in the CLLLD group than that in the RALLD group (20.0% *vs.* 4.0%; P=0.029); however, the incidence of total postoperative complications was similar in the two groups. During the median follow-up at 26.3 months, overall recurrence rate was not different between the groups (RALLD *vs.* CLLLD, 30.0% *vs.* 31.2%; P=0.850). Three patients (6.0%) in the RALLD group and 4 (11.4%) in the CLLLD group developed local recurrence (P=0.653). The authors concluded that RALLD is safe and feasible with favorable short-term surgical outcomes.

The safety and feasibility of RALLD or CLLLD have not been sufficiently examined because most previous reports in terms of RALLD or CLLLD were retrospective case series with limited number of patients. Moreover, there were no reports in terms of short- or long-term outcomes of RALLD compared with CLLLD. This study is meaningful because this is the first study to compare the short-term outcomes and the initial oncological outcomes between RALLD and CLLLD in patients with rectal cancer. However, the interpretation of these results needs some caution for several reasons, as the authors pointed out. First, this is a retrospective comparative study; therefore, there may be a selection bias. Although it was not statistically different, more patients in the RALLD group had lower rectal cancer and received preoperative CRT compared to those in the CLLLD group. Notwithstanding, the similar or better short-term outcomes in the RALLD group were showed; therefore, the safety and feasibility of RALLD compared with CLLLD may be demonstrated. Second, the number of patients who were analyzed was small and the follow-up duration was short to evaluate the oncological outcomes adequately. Third, this study was a single surgeon's experiences; therefore, the results from this study cannot be generalized to other surgeons. However, the differences of the short-term outcomes were the results of the same surgeons who performed operations using two kinds of modalities; thus, these differences will

be the difference of modalities, such as robotic-assisted or conventional laparoscopic system. Other limitations are as follows: the authors did not mention the surgeon's experience of robotic-assisted laparoscopic and conventional laparoscopic operations. However, Professor Gyu-Seog Choi is a leading doctor in not only robotic-assisted laparoscopic operation but also conventional laparoscopic operation. This means that despite his outstanding technique in terms of conventional laparoscopic operation, the RALLD group showed better short-term outcomes. This study focused on selective LLD, wherein all patients diagnosed with suspected metastatic lateral lymph nodes based on a pretreatment radiologic examination underwent preoperative CRT. Therefore, it remains unknown whether the results from this study can be generalized to patients who have no metastatic lateral lymph nodes.

TME with LLD is indicated for patients with clinical T3–4 low rectal cancer, in accordance with the Japanese guidelines (2), and preoperative CRT is performed only for selected patients in Japan. Multicenter randomized controlled trial (JCOG0212) was conducted for the patients with no lateral lymph node enlargement (i.e., lymph nodes with a short-axis diameter of <10 mm) who underwent mesorectal excision with or without LLD. Lateral lymph node metastasis was identified in 7.4% of patients in the mesorectal excision with LLD group, and this result is not negligible because local recurrence will occur with a similar rate of patients in the lateral pelvis for the patients who underwent mesorectal excision without preoperative CRT and LLD. The primary endpoint was relapse-free survival, and non-inferiority of mesorectal excision alone to mesorectal excision with LLD was not confirmed. This result supported the Japanese standard treatment strategy. On the contrary, in Western countries, TME with CRT is considered the standard treatment for locally advanced low rectal cancer, and LLD is hardly performed because TME with CRT reduced the local recurrence rate compared with TME alone (3). Kim *et al.* (4) reported that the patients treated with preoperative CRT followed by TME had local recurrence in 7.9% of patients: 20.7% with central pelvis and 82.7% with lateral pelvis. These findings suggest that preoperative CRT could not completely eradicate lateral lymph node metastasis and that LLD should be considered if lateral lymph node metastasis is suspected even after CRT, given that LLD can macroscopically eradicate lateral lymph node metastasis and reduce lateral pelvic recurrence. Recently, several studies have reported the results of preoperative CRT followed by TME with selective LLD for patients with suspected lateral lymph node metastasis in Korea and even in Japan (1,5-7).

LLD is a technically difficult procedure because lateral pelvic cavity is narrow and anatomically complex. The JCOG0212 trial showed that the difference of median operative time was 106 min and the difference of median blood loss was 239 mL with or without bilateral LLD. The rate of postoperative complications in mesorectal excision with LLD tended to be higher than that in mesorectal excision alone (P=0.07) (8). However, this result was focused on open surgery and not on minimally invasive surgery, such as conventional laparoscopic surgery or robotic-assisted laparoscopic surgery.

Recently, several retrospective studies have demonstrated the safety and feasibility of CLLLD (9-17). Ogura *et al.* (9) reported the feasibility of additional CLLLD (n=107) compared with TME alone (n=220) in patients treated with preoperative CRT. CLLLD was performed in patients with swollen lateral lymph nodes before CRT. There were no cases of conversion to open surgery, and the major complication rate was similar between LLD with TME and TME alone groups (9.3% *vs.* 5.5%; P=0.188). The authors concluded that additional CLLLD is feasible compared with TME alone. Yamaguchi *et al.* (18) reported the short-term and oncological outcomes of laparoscopic (n=137) versus open (n=539) LLD for locally advanced low rectal cancer in a large, multicenter retrospective cohort study. Operative time was significantly longer (461 *vs.* 372 min) in the CLLLD group than that in the open LLD (OLLD) group. In the CLLLD group, the blood loss was significantly less (193 *vs.* 722 mL) compared with the OLLD group. The postoperative complication rates were 35.8% and 43.6% for the CLLLD and OLLD groups, respectively (P=0.10). The surgical approach (CLLLD *vs.* OLLD) was not a prognostic factor for overall survival or relapse-free survival in multivariate analysis. CLLLD is safe and feasible for stage II to III low rectal cancer and is associated with similar oncological outcomes as OLLD. Moreover, Liang *et al.* (10) reported that the morbidity was not particularly low (21.7%) and the short-term recurrence rate was quite high (27.3%), and concluded that the technical feasibility of CLLLD was suitable only for a few selected patients.

Conventional laparoscopic surgery has a technical problem with straight and inflexible instruments and it has inadequate visualization caused by its unstable camera and the assistant's traction in the narrow and anatomically complex lateral pelvic cavity. Compared with

laparoscopic surgery, robotic-assisted laparoscopic surgery has advantages, such as free-moving multi-joint forceps, a motion scaling function, high-quality three-dimensional imaging, stable camera work by an operator, and greatly improved ergonomics. Robotic-assisted laparoscopic surgery is a promising advanced technology that can overcome the inherent limitations of laparoscopic surgery, such as technically difficult LLD. A few retrospective case series reported that RALLD was safe and feasible (19,20). Yamaguchi *et al.* (21) reported the short-term outcomes of RALLD (n=85) by comparing with those of OLLD (n=88). Operative time was significantly longer, and blood loss was significantly less in the RALLD group than those in the OLLD group. The rates of wound infection, small bowel obstruction, anastomotic leakage, and urinary retention were significantly lower in the RALLD group than those in the OLLD group. The authors concluded that the short-term outcomes of RALLD may be superior to those of OLLD. Kim *et al.* (1) reported better urinary function in the RALLD group than that in the CLLLD group. This is probably due to the superior magnification effect and steady "traction and countertraction" allowing less bleeding, easier recognition, and preservation of the pelvic splanchnic nerves and inferior hypogastric plexus (21).

In conclusion, this study is meaningful because this is the first study to compare the short-term and initial oncological outcomes between RALLD and CLLLD in patients with rectal cancer. There are some limitations of the study; however, favorable short-term outcomes were demonstrated in the RALLD group compared with the CLLLD group. Further prospective randomized controlled trials are necessary to reveal the safety and efficacy of RALLD compared with CLLLD.

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Footnote

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