



Laparoscopic surgery for colorectal cancer in emergencies

Sanghyun An, Youngwan Kim

Department of Surgery, Yonsei University Wonju College of Medicine, Wonju, South Korea

Correspondence to: Youngwan Kim, MD, Ph.D. Department of Surgery, Yonsei University Wonju College of Medicine, Ilsan-ro, Wonju-si, Gangwon-do 26426, Wonju, South Korea. Email: youngwkim@yonsei.ac.kr.

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These days, laparoscopy has become a primary surgical approach for elective colorectal cancer operations. Numerous studies have demonstrated that laparoscopic surgery has shown favorable short-term outcomes (1-4) and equivalent oncologic outcomes compared to open surgery (5-7). However, laparoscopic surgery in emergent situations is not quite as popular when treating colorectal cancer as surgeons must overcome several barriers in terms of patient-related and surgeon-related factors. To date, small case series have shown the safety and efficacy of emergent laparoscopy for colorectal operations (8-12). A study by Kim *et al.* (11) demonstrated that patients who underwent emergency laparoscopy had better short-term outcomes in terms of shorter duration to tolerable diet and shorter hospital stays. And they showed that emergency laparoscopy had comparable oncological outcomes to open surgery in terms of cancer-specific and recurrence-free survival. In a systemic review by Harji *et al.* (13), emergency laparoscopic colorectal resection had better short-term outcomes than open resection in terms of length of stays and overall complication rates. However, the role of laparoscopy in the emergency setting remains controversial, and the proportion of laparoscopic approach remains significantly low.

In that sense, Vallance *et al.* (14) performed timely and interesting research. This population-based study evaluated patient and institutional factors associated with use of laparoscopic approach and its postoperative outcomes in the colorectal emergency setting. This study included a significant number of cases (n=15,516) who underwent emergency colorectal cancer resection in an English National Health Service (NHS) hospital trust. Multivariate analysis revealed that laparoscopy was less common in

patients with poorer physical status, more advanced T-stage, and M-stage. There was no association between institutional factors and the use of laparoscopic surgery. And this study found that patients who had laparoscopic surgery had a shorter length of hospital stays (8 *vs.* 12 days) and lower 90-day mortality (8.1% *vs.* 13.0%) than patients undergoing open resection. Results are consistent with findings of previous studies. Because this study involved a large number of patients, results are more relevant and may support results of previous studies. However, this study is not a randomized study, which could control multiple confounding clinical factors and also lacks long-term oncologic outcomes. Besides, we cannot clearly delineate the decision process regarding laparoscopic or open approaches. We know that it is difficult to consider all potential clinical factors as laparoscopic facilities, human resources, and health care utilization may vary among institutions.

Based on previous studies, including this study, emergent laparoscopy has benefits in terms of short-term postoperative outcomes after colorectal cancer surgery. Accordingly, raising the rate of emergent laparoscopy is important to get the short-term clinical advantage. However, in clinical practice, surgeons may come up with several barriers to trying laparoscopic surgery in emergent situations. Patient-related factors hindering a laparoscopic approach are unstable hemodynamic status at the time of surgery, underlying comorbidity, and severity of the colorectal disease such as obstructed and perforated colorectal cancer. For example, laparoscopy might not be the first choice for septic shock or hypovolemic shock patients. Pneumoperitoneum from the laparoscopy increases intraabdominal pressure and thereby diminishes

preload and increases afterload, which decreases cardiac output and ultimately deteriorates systemic perfusion. Also, pneumoperitoneum exacerbates pulmonary hypertension by increases in pulmonary vascular resistance and leads to abnormal gas exchange (15). Laparoscopy is unsuitable for patients who have severe comorbidities, which is classified as American Society of Anesthesiologists class 4 or higher such as heart failure, chronic obstructive pulmonary disease, or pulmonary hypertension. Laparoscopy is also difficult in situations such as severe bowel distension from an obstructing tumor because it may prevent surgeons get appropriate surgical exposure. Besides, in patients with generalized peritonitis from a perforated tumor, it is difficult to clean-up the contamination with a laparoscopic approach. Healthcare resource-related factors are also important. Surgeon's laparoscopic experience, surgical team's skill, or institutional facilities could influence the type of primary surgical approach during emergency. Surgeons should take all these into preoperative consideration when planning the type of surgery. To overcome the barriers and conducted laparoscopic surgery successfully in the emergency, appropriate patient selection and preoperative communication with healthcare team members, patients, and their families are essential. Clinicians should plan the proper type of surgery with more detailed information through careful history taking and preoperative imaging studies such as computed tomography (CT). Also, well organized surgical team with sufficient surgical training and experience as well as experienced surgeons should be established. Lastly, when surgeons are unsure of the feasibility of a laparoscopic approach, diagnostic laparoscopy could be an option. Even if conversion to laparotomy would be inevitable, early conversion does not impair short-term and oncologic outcomes (16).

Laparoscopic surgery in emergencies is technically challenging, but the technique of laparoscopy has been developing, and its benefits have been confirmed in many papers. Accordingly, based on careful patient selection through a multidisciplinary team approach, use of laparoscopy in the emergency setting may be more actively considered by experienced laparoscopic surgeons and well-organized operative team.

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