



Short-Term Outcome of Laparoscopic Surgery in Elderly Colorectal Cancer Patients

Tomohiro Kitahara¹, Taishi Hata¹, Mamoru Uemura¹, Naotsugu Haraguchi², Yoshiyuki Motoki¹, Satoshi Sugimoto¹, Junichi Nishimura¹, Ichiro Takemasa¹, Tsunekazu Mizushima¹, Masataka Ikeda², Hirofumi Yamamoto¹, Yuichiro Doki¹, Masaki Mori¹

¹Department of Gastroenterological Surgery, Graduate School of Medicine, Osaka University, Japan

²Department of Gastroenterological Surgery, National Hospital Organization Osaka National Hospital, Japan

We aimed to evaluate the short-term outcome of colorectal resection in very elderly patients, aged 85 years or older. As the population ages, the number of elderly patients with colorectal cancer (CRC) is increasing in Japan. At this time, it is unclear whether or not laparoscopic colorectal resection is safe for this very elderly patient population. From January 2005 to November 2014, a total of 20 patients aged 85 years or older underwent laparoscopic colorectal resection at Osaka University Hospital. Pre- and postoperative clinical data and outcomes were collected retrospectively. There were no intraoperative or postoperative deaths. In 2 cases, the laparoscopic procedure was converted to open surgery. Postoperative complications occurred in 6 patients. Two patients developed an infection at the surgical site. Among the 4 patients who underwent low anterior resection (LAR), 2 experienced postoperative anastomotic leakage. Two other patients developed a lung infection and urinary tract infection, respectively. Laparoscopic colectomy for very elderly patients with CRC appears to involve tolerable risk. However, special caution is advisable for patients who may undergo LAR.

Key words: Colorectal cancer – Laparoscopic surgery – Surgery for the elderly – Postoperative complications

With increases in the life expectancy in Western countries and in Japan, the potential incidence of colorectal surgery in elderly patients is increasing concomitantly. Colorectal cancer (CRC) is

one of the most common malignancies, most frequently occurring in the elderly population.¹ The main treatment for CRC is surgical excision of the primary tumor; however, advanced age is one of the

Corresponding author: Tomohiro Kitahara, MD, Department of Gastroenterological Surgery, Graduate School of Medicine, Osaka University, 2-2, Yamadaoka, E-2, Suita, Osaka, 565-0871, Japan.

Tel.: +81 6 6879 3251; Fax: +81 6 6879 3259; E-mail: kita20011028@yahoo.co.jp

risk factors for perioperative morbidity and mortality.^{2,3} Therefore, surgeons are obliged to carefully consider whether or not the potential benefits of surgery outweigh the risks in very elderly patients with CRC.

With advances in surgical technique, laparoscopic colectomy has become an increasingly popular procedure for CRC treatment over time. The advantages of laparoscopic colectomy include decreased blood loss, postoperative pain, and postoperative complications, as well as a shortened period of postoperative hospital stay, as demonstrated by several randomized prospective studies.^{4–6} However, regarding the population of elderly patients, especially those aged 85 years or older, the overall morbidity and mortality is still unclear. Therefore, the aim of this retrospective study was to investigate the safety of laparoscopic surgery for CRC in very elderly patients.

Materials and Methods

We retrospectively examined the records of patients with the clinical diagnosis of adenocarcinoma of the colon and rectum that underwent laparoscopic surgery at our institution between January 2005 and November 2014. Among this population, we identified 20 patients who were aged 85 years or older at the time of surgery. One case involved synchronous resection of gastric cancer and was excluded from this study. Clinical data were obtained, including patient age, sex, American Society of Anesthesiologists (ASA) classification, tumor stage, and tumor location. In addition, the following operative and postoperative data were collected: operation duration, amount of blood loss, type of laparoscopic procedure, any intraoperative complications, time until resumption of liquid intake, time until passage of flatus, time until walking, and any postoperative morbidity and mortality. Performance status was assessed according to the ASA score, which was provided by the anesthesiologists.

Results

The median patient age at the time of surgery was 86 years (range: 85–93 years). The mean ASA score was 1.9 (range: 1–3). The following surgical procedures were performed: 45% right colectomies, 25% sigmoid colectomies, 10% anterior resection, and 20% low anterior resection (LAR; Table 1). No intraoperative complications and no postoperative deaths

Table 1 Patient characteristics

Age, y ^a (range)	86 (85–93)
Sex, male/female	10/10
ASA score ^b	
I, n	4
II, n	12
III, n	3
Location of tumor (C:A:T:S:R)	
Cecum, n	5
Ascending colon, n	3
Transverse colon, n	1
Sigmoid colon, n	5
Rectum, n	6
TNM stage	
0, n	2
I, n	7
II, n	6
III, n	4
IV, n	1
Procedures	
Ileocecal resection, n	6
Right hemicolectomy, n	3
Sigmoidectomy, n	5
Anterior resection, n	2
LAR, n	4

^aValues are presented as median (range).

^bOne data point missing.

occurred. In 2 patients, the laparoscopic surgery was converted to open surgery, in 1 case due to a severe intra-abdominal adhesion, and in the other case because of direct invasion of the peritoneum.

All of the patients showed early ambulation, except for 1 who exhibited slight bleeding around the drainage tube. Postoperative complications were seen in 6 patients (Table 2). Two patients, both of whom underwent LAR, developed anastomotic leakage. Two patients developed a wound infection.

Table 2 Surgical and postoperative outcomes

Procedure	LAR (n = 4)	Others (n = 14)
Operative time, min ^a (range)	272 (200–368)	168.5 (119–269)
Blood loss, mL ^a (range)	32.5 (15–50)	30 (5–120)
Time until resumption of liquid intake, d ^a (range)	3 (1–18)	2 (1–4)
Time to passage of flatus, d ^a (range)	1 (1–2)	2 (1–5)
Postoperative time until walking, d ^a (range)	1	1 (1–2)
Surgical complications		
Anastomotic leakage, n	2	0
Surgical site infection, n	0	2
Nonsurgical complications		
Pulmonary infection, n	0	1
Urinary infection, n	0	1

Two cases with conversion to laparotomy were excluded.

^aValues are presented as median (range).

Table 3 Postoperative complications

Anastomotic leakage, n	2
Surgical site infection, n	2

One patient developed a pulmonary infection and another developed a urinary infection.

Discussion

Laparoscopic colorectal surgery has increased in popularity in comparison with the conventional surgical approach due to its reported advantages, including reduced postoperative pain, decreased incidence of postoperative ileus, shorter duration of postoperative hospital stay, and more rapid recovery and return to social activities, which results in better quality of life after surgery.⁴⁻⁶ Roscio *et al*⁷ reported the feasibility and safety of laparoscopic colorectal surgery in an elderly patient population, and additional studies have also reported its usefulness for elderly patients.⁸⁻¹⁰

However, the pneumoperitoneum component of the laparoscopic surgical procedure is associated with a number of possibly serious complications. Insufflated CO₂ induces hypercarbia and an increase in intra-abdominal pressure, in turn affecting the cardiopulmonary system and occasionally causing arrhythmias, hypotension, cardiac arrest, gas embolism, pneumothorax, pulmonary edema, and myocardial ischemia.¹¹ Because cardiopulmonary function is decreased in elderly patients, pneumoperitoneum may carry higher risk for these patients. Zollinger *et al*¹² evaluated hemodynamic effects of pneumoperitoneum in elderly patients and concluded that, during laparoscopic cholecystectomy, pneumoperitoneum in elderly patients with an ASA class III rating was associated with tolerable hemodynamic changes. In our study, we observed no intraoperative complications, and none of the patients required conversion from laparoscopic surgery to laparotomy due to cardiopulmonary system instability.

During the postoperative course, there was no mortality and no severe complications occurred in patients who had colectomies. We observe that favorable outcome seems to be related to early ambulation, as it has been demonstrated that early ambulation reduces postoperative complications and shortens the length of postoperative stay in the hospital.¹³ Indeed, the majority of patients, with one single exception, started walking the next day following surgery.

In the present study, we found that anastomotic leakage was a frequent complication, occurring in 10% (2 of 20) of the patients (Table 3). It is notable that leakage was limited solely to patients who underwent the LAR surgical procedure and that other patients were not affected. A likely contributing factor is the technical challenge of performing the rectal dissection and anastomosis within the narrow pelvic cavity. The 2 patients with anastomotic leakage after LAR recovered without additional surgery and radiological intervention, but their hospital stay was prolonged.

Miyajima *et al*¹⁴ reported that laparoscopic surgery is feasible and safe in a selected cohort of older patients with rectal cancer (aged 62.9 ± 11.7), with favorable short-term and midterm outcomes and with an incidence of anastomotic leakage of 9.1%. However, the safety of the procedure and risk of postoperative leakage in very elderly patients is not well known to date.

Anastomotic leakage is the most serious complication of surgery to address CRC. It can cause sepsis, leading to high morbidity and mortality, especially in very elderly patients. However, according to a previous study, patient age was not associated with an increased risk of anastomotic leakage.¹⁵ Fujita *et al*¹⁶ postulated that elderly patients tend to reject surgery or that they elect to undergo safer procedures without anastomosis, thus introducing potential selection bias. To our knowledge, there are few reports of laparoscopic colorectal surgery in patients aged 85 years or older. Nakamura *et al*¹⁷ reported a 3% incidence of anastomotic leakage resulting from laparoscopic surgery in CRC patients. However, the incidence of leakage specifically associated with the LAR procedure is currently unclear.

Our study suggests that very elderly patients with CRC can safely undergo laparoscopic colectomy. Despite a limited expected life span, the procedure offers these patients considerable benefits in terms of quality of life by mitigating the continuous bleeding, bowel obstruction, and pain caused by tumor growth. Although our results specific to the LAR procedure are limited by the small number of patients, our data suggest that caution is warranted in recommending LAR surgery for very elderly patients with rectal cancer.

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