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Original research

Short- and long-term outcomes of laparoscopic surgery for colorectal cancer in the elderly: A prospective cohort study

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HIGHLIGHTS

- We evaluated outcomes of laparoscopic colorectal surgery in the elderly patients.
- There were no differences regarding outcomes of this surgery between generations.
- In addition, it is a useful procedure considering the low incidence of delirium.
- Laparoscopic colorectal surgery was safe and well-tolerated in all generations.

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ABSTRACT

Background: The aim of this study was to evaluate the safety and validity of laparoscopic colorectal surgery for elderly patients. We compared the short and long-term postoperative outcomes of laparoscopic colorectal surgery in patients aged ≥75 years (elderly patients; EP) and <75 years (relatively younger patients; RP).

Methods: Clinicopathological data and short- and long-term outcomes after laparoscopic surgery for colorectal cancer were compared between the EP (n = 53) and RP groups (n = 155).

Results: In the EP group, patients with American Society of Anesthesiologists score II ($p = 0.047$) and medical comorbidity rate (EP vs RP: 83.0% vs 56.8%, $p < 0.001$), especially for cardiovascular disease (64.2% vs 37.5%, $p < 0.001$) and diabetes mellitus (20.8% vs 9.7%, $p = 0.044$), were significantly higher than those in the RP group. Regarding the clinical characteristics, the ratio of right colectomy (50.9% vs 25.3%, $p < 0.001$) and pathological tumor grade T4 (18.9% vs 7.7%, $p = 0.044$) were significantly higher in the EP group. There was no significant difference in the variation of pathological stage between the two groups. In the postoperative course, there were no significant differences regarding short-term postoperative outcomes between the EP and RP groups, including that for timing of oral diet tolerance (3.9 days vs 3.5 days, $p = 0.073$), first flatus (2.3 days vs 2.0 days, $p = 0.636$), first bowel movement (3.3 days vs 3.7 days, $p = 0.153$), ambulation after surgery (1.7 days vs 1.5 days, $p = 0.081$), postoperative hospital stay (10.5 days vs 10.8 days, $p = 0.469$), and incidence of postoperative complications (20.8% vs 15.5%, $p = 0.385$), respectively. Regarding the long-term outcomes, there were no significant differences in recurrence-free survival (RFS) (5-year RFS, 74.0% vs 85.2%, $p = 0.091$) and overall survival (OS) (5-year OS, 81.8% vs 90.1%, $p = 0.112$) between the two groups.

Conclusion: Laparoscopic colorectal surgery in elderly patients was safe and well-tolerated in comparison with the relatively younger patients.

1. Introduction

Elderly populations have been increasing worldwide. In Japan, the elderly population continues to increase. The population aged over 65 years in September 2013 accounted for 25% of the total Japanese population. Individuals aged over 75 years, namely the

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Table 1
Demographics and preoperative variables of the two groups.

		<75 years (n = 155)	≥75 years (n = 53)	P-value
Gender (male/female)		97/58	28/25	0.213
Age (year)		63.5 ± 7.9	79.1 ± 3.8	<0.001
BMI		22.6 ± 3.1	22.9 ± 3.1	0.417
ASA	I (%)	64 (41.3)	9 (17.0)	0.002
	II (%)	73 (47.1)	34 (64.2)	0.047
	III (%)	15 (9.7)	8 (15.1)	0.406
	IV (%)	3 (1.9)	2 (3.8)	0.814
Previous abdominal surgery (%)		37 (23.9)	20 (37.7)	0.056
Medical comorbidity (%)		88 (56.8)	44 (83.0)	<0.001
Cardiovascular disease		58 (37.5)	34 (64.2)	<0.001
Brain disease		11 (7.1)	3 (5.7)	0.714
Pulmonary disease		14 (9.0)	6 (11.3)	0.631
Renal disease		4 (2.6)	4 (7.5)	0.129
Diabetes mellitus		15 (9.7)	11 (20.8)	0.044
Hyperlipemia		14 (9.0)	7 (13.2)	0.396
Other diseases		15 (9.7)	7 (13.2)	0.480

BMI, body mass index; ASA, American Society of Anesthesiologists score.

super-elderly population, accounted for 12.3% of the total population [1].

Notably, the incidence of colorectal cancer has increased gradually. In Japan, colorectal cancer was ranked as the second and fourth most common cancer types in 2014 among women and men, respectively [2]. Thus, it is expected that the number of elderly patients with colorectal cancer has also increased. Among the available surgical procedures for colorectal cancer, laparoscopic surgery has developed rapidly, and its use has become widespread. The advantages of laparoscopic surgery for colorectal cancer, such as early postoperative recovery, less pain, and short-term hospital stay, have been described in many randomized control studies [3–6]. However, a few clinical studies have examined the usefulness and safety of laparoscopic surgery for elderly patients with colorectal cancer in Japan; thus, there is a paucity of evidence regarding laparoscopic-assisted colorectal surgery for elderly patients. In this study, we aimed to evaluate the safety and validity of laparoscopic surgery for patients aged ≥75 years with colorectal cancer by retrospectively comparing their short- and long-term postoperative outcomes with those of relatively younger patients.

2. Materials and methods

Between January 2010 and November 2011, a total of 208 patients with colorectal cancer underwent laparoscopic-assisted surgery at the department of surgery in Kansai Medical University Hirakata Hospital. According to their age at the time of surgery, these patients were divided into two groups. The elderly patient (EP) group included patients aged ≥75 years, consisting of 53 patients. The relatively younger patient (RP) group included patients aged <75 years, consisting of 155 patients. Demographics, preoperative, and operative variables, postoperative outcomes and histopathology were obtained from their medical records in our hospital database. Analyzed parameters were demographics, body mass index (BMI), American Society of Anesthesiology (ASA) score, previous abdominal surgery, medical comorbidity, tumor factors (cancer location, pathological depth of tumor, pathological stage according to the UICC TNM classification [7th edition), and operative factors (operative procedure, conversion to open surgery, operating time, operative blood loss, blood transfusions, postoperative course, postoperative complications, postoperative hospital stay, timing of oral diet tolerance/first flatus/first bowel

Table 2
Clinical characteristics and operative procedure of the two groups.

	<75 years (n = 155)	≥75 years (n = 53)	P-value
Tumor location			
Right colon (%)	37 (23.9)	27 (50.9)	<0.001
Left colon (%)	52 (33.5)	12 (22.6)	0.189
Rectum (%)	66 (42.6)	14 (26.4)	0.054
Pathological depth of tumor[a]			
Tis (%)	15 (10.3)	1 (1.9)	0.124
T1 (%)	29 (18.7)	7 (13.2)	0.482
T2 (%)	21 (13.5)	10 (18.9)	0.474
T3 (%)	78 (50.3)	25 (47.2)	0.813
T4 (%)	12 (7.7)	10 (18.9)	0.044
Pathological stage[a]			
0 (%)	11 (71.0)	0	0.102
1 (%)	45 (29.0)	17 (32.1)	0.807
2 (%)	45 (29.0)	16 (30.2)	0.988
3 (%)	43 (27.7)	16 (30.2)	0.869
4 (%)	11 (7.1)	4 (7.6)	0.843
Operative procedure			
Right colectomy (%)	39 (25.3)	27 (50.9)	<0.001
Left colectomy (%)	47 (30.3)	11 (20.8)	0.245
Rectal surgery (%)	69 (44.5)	15 (28.3)	0.056
Conversion to open surgery (%)	8 (5.2)	3 (5.7)	0.889

[a] Stageing according to the UICC TNM (seventh edition).