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Early Outcomes of Laparoscopic Colectomy for Colon Cancer in Elderly Patients

Van Thoi Dang[1], Thanh Hung Nguyen[2]

[1]Surgery Department, Da Nang University of Medical Technology and Pharmacy, Vietnam
[2]Surgery Department, Da Nang Oncology Hospital, Vietnam

ABSTRACT

Background: Colon cancer occurs predominantly in older adults, and the perioperative management of elderly patients remains challenging because of comorbidities, frailty, and reduced physiological reserve. Laparoscopic colectomy may offer short-term benefits in this population, but evidence from Vietnam remains limited.

Methods: This single-center cross-sectional study included consecutive patients aged 70 years or older who underwent laparoscopic colectomy for colon cancer at Da Nang Oncology Hospital between January 2023 and January 2025. Eligible patients had postoperative histopathological confirmation of malignancy. Demographic characteristics, preoperative findings, operative details, pathological features, postoperative recovery, and 30-day complications were analyzed.

Results: Thirty-four patients were included, with a mean age of 74.76 ± 5.44 years, and 58.8% were male. Abdominal pain was the most common presenting symptom (91.2%), and the sigmoid colon was the most frequent tumor location (38.2% on colonoscopy; 35.3% intraoperatively). Curative-intent surgery was performed in 33 patients (97.1%). Mean operative time was 169.26 ± 34.38 min. The mean time to first flatus was 3.38 ± 0.82 days, and mean postoperative hospital stay was 7.97 ± 1.62 days. Conventional adenocarcinoma was identified in 97.1% of cases. Pathological T3–T4 disease was present in 85.3%, nodal metastasis in 64.7%, and distant metastasis in 2.9%. Postoperative complications occurred in 23.5% of patients; most commonly wound infection (11.8%) and pneumonia (8.8%). No anastomotic leak or 30-day mortality was observed.

Conclusion: Laparoscopic colectomy appears to be a feasible and safe option for selected elderly patients with colon cancer, with acceptable operative time, satisfactory postoperative recovery, and low early mortality.

Keywords: Colon Cancer; Elderly; Laparoscopy; Colectomy; Postoperative Complications

Address for correspondence:
Van Thoi Dang,
Surgery Department, Da Nang University of Medical Technology and Pharmacy
99 Hung Vuong, Hai Chau, 550000, Vietnam,
E-mail: dvthoi@dhktyduocdn.edu.vn

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INTRODUCTION

Colon cancer is a major health burden worldwide and occurs predominantly in older adults [1]. As life expectancy increases, surgeons are increasingly asked to treat elderly patients who frequently present with frailty, multiple comorbidities, reduced physiological reserve, and greater perioperative risk [2].

Laparoscopic colectomy has become an established approach for colon cancer because it reduces surgical trauma, decreases postoperative pain, and may shorten recovery when compared with open surgery [3]. Randomized trials and meta-analyses have shown that laparoscopic resection provides oncologic outcomes comparable to open surgery in appropriately selected patients, while also offering short-term clinical benefits [4,5].

The elderly population may particularly benefit from a minimally invasive approach because postoperative deconditioning, pulmonary complications, prolonged ileus, and delayed mobilization are more common in this age group [6,7]. Nevertheless, the safety and feasibility of laparoscopic colectomy in patients aged 70 years or older remain influenced by preoperative functional status, comorbidity burden, and tumor stage [8].

In Vietnam, reports focused specifically on elderly patients undergoing laparoscopic colectomy for colon cancer are still limited. We therefore conducted this study to describe the clinical and paraclinical features of elderly patients treated by laparoscopic colectomy at Da Nang Oncology Hospital and to evaluate the early postoperative outcomes of this approach.

MATERIAL AND METHODS

Study Design and Setting

We performed a single-center cross-sectional study at Da Nang Oncology Hospital. Consecutive patients aged 70 years or older who underwent laparoscopic colectomy for colon cancer between January 2023 and January 2025 were included.

Eligibility Criteria

Eligible patients had clinical and paraclinical findings suggestive of colon cancer, underwent laparoscopic colectomy, and had

postoperative histopathological confirmation of malignancy. Patients with a history of colectomy or previous open abdominal surgery, patients considered unfit for anesthesia and surgery, and those who did not agree to participate were excluded.

Surgical Approach

All operations were performed laparoscopically with oncologic intent according to institutional practice based on Japanese Society for Cancer of the Colon and Rectum principles. Complete mesocolic excision with central vascular ligation was applied according to tumor location whenever feasible. The extent of lymphadenectomy was tailored to disease stage and intraoperative findings. Conversion to open surgery was reserved for difficult dissection or anticipated intraoperative risk; however, all cases included in the present series were completed laparoscopically.

Variables and Outcome Measures

We recorded demographic characteristics, comorbidities, presenting symptoms, colonoscopy findings, computed tomography findings, carcinoembryonic antigen concentration, operative details, pathological findings, postoperative recovery, and postoperative complications within 30 days. Early outcomes of interest included operative time, time to first flatus, and postoperative length of stay, intraoperative adverse events, and early postoperative complications.

Pathological Assessment and Staging

Resected specimens were examined histopathologic ally for tumor type, histologic grade, local invasion, nodal status, and distant metastasis. Pathological T, N, and M categories were assigned using contemporary UICC/NCCN-based staging principles adopted by the institution.

Statistical Analysis

Data were analyzed using SPSS version 20.0. Categorical variables are presented as frequencies and percentages, and continuous variables are presented as mean ± standard deviation with ranges. Comparisons of complication rates across selected subgroups were reported using p values available in the source dataset.

Ethics

The study was approved by the ethics council of Da Nang Oncology Hospital. Patients and/or their family members participated voluntarily after receiving an explanation of the study.

RESULTS

Patient Demographics and Clinical Presentation

A total of 34 patients aged 70 years or older underwent laparoscopic colectomy for colon cancer during the study period. The mean age was 74.76 ± 5.44 years; 30 patients (88.2%) were aged 70-79 years and four (11.8%) were aged 80 years or older. Males accounted for 58.8% of the cohort. Reasons for hospital admission were dominated by abdominal pain (73.5%), while weight loss, hematochezia, and incidental detection were less common. Comorbid disease was present in 41.2% of patients, most frequently hypertension and diabetes mellitus (17.6% each), followed by chronic obstructive pulmonary disease (8.9%). The leading presenting symptoms were abdominal pain (91.2%) and weight loss (55.9%) [Table 1].

Preoperative Tumor Characteristics

On colonoscopy, the sigmoid colon was the most common tumor location (38.2%), followed by the descending colon (17.6%); all other recorded locations each accounted for 8.8% of cases. The predominant endoscopic morphology was exophytic/proliferative growth (44.1%), followed by ulcerative lesions (32.4%) and infiltrative lesions (20.6%). Preoperative biopsy confirmed malignant cells in 94.2% of cases, whereas one case was suspicious for malignancy and one case was biopsy-negative. Contrast-enhanced abdominal computed tomography showed bowel wall thickening in 92.2% of patients and adjacent organ invasion in 8.8%. Elevated carcinoembryonic antigen (>5 ng/mL) was observed in 29.4% of patients [Table 2].

Operative Indications and Intraoperative Findings

Tumor location documented intraoperatively was broadly consistent with endoscopic findings, with the sigmoid colon remaining the most common site (35.3%). Surgery was performed with curative intent in 33 of 34 patients (97.1%), whereas one patient underwent non-curative surgery because of advanced disease and/or limited operative suitability. Most procedures were standard colectomies without en bloc resection of adjacent organs (91.2%); three patients (8.8%) required combined organ resection, including two partial abdominal wall resections and one partial bladder resection. Adjacent organ invasion was documented

Table 1: Baseline demographic and clinical characteristics.

Variable	n (%)
Age 70-79 years	30 (88.2)
Age ≥80 years	4 (11.8)
Male sex	20 (58.8)
Female sex	14 (41.2)
Reason for admission: abdominal pain	25 (73.5)
Reason for admission: hematochezia	3 (8.8)
Reason for admission: weight loss	4 (11.8)
Reason for admission: incidental finding	2 (5.9)
Hypertension	6 (17.6)
Diabetes mellitus	6 (17.6)
Chronic obstructive pulmonary disease	3 (8.9)
Other comorbidity	2 (5.9)
No comorbidity	20 (58.8)
Abdominal pain	31 (91.2)
Change in bowel habit	8 (23.5)
Hematochezia	7 (20.6)
Weight loss	19 (55.9)
Palpable abdominal mass	3 (8.8)

Table 2: Preoperative tumor characteristics.

Variable	n (%)
Cecum	3 (8.8)
Ascending colon	3 (8.8)
Hepatic flexure	3 (8.8)
Transverse colon	3 (8.8)
Splenic flexure	3 (8.8)
Descending colon	6 (17.6)
Sigmoid colon	13 (38.2)
Exophytic/proliferative lesion	15 (44.1)
Ulcerative lesion	11 (32.4)
Infiltrative lesion	7 (20.6)
Mixed morphology	1 (2.9)
Biopsy positive for malignancy	32 (94.2)
Biopsy suspicious for malignancy	1 (2.9)
Biopsy negative	1 (2.9)
CT: bowel wall thickening	31 (92.2)
CT: adjacent organ invasion	3 (8.8)
CEA ≤5 ng/mL	24 (70.6)
CEA >5 ng/mL	10 (29.4)

Table 3: Operative indications and intraoperative findings.

Variable	n (%)
Intraoperative tumor location: cecum	2 (5.9)
Ascending colon	3 (8.8)
Hepatic flexure	4 (11.8)
Transverse colon	4 (11.8)
Splenic flexure	3 (8.8)
Descending colon	6 (17.6)
Sigmoid colon	12 (35.3)
Curative-intent surgery	33 (97.1)
Non-curative surgery	1 (2.9)
Standard colectomy	31 (91.2)
Combined organ resection	3 (8.8)
Adjacent organ invasion	3 (8.8)
Distant metastasis detected intraoperatively	1 (2.9)

intraoperatively in three patients (8.8%), and one patient (2.9%) had peritoneal metastasis [Table 3].

Operative Details

The mean operative time was 169.26 ± 34.38 minutes, ranging from 90 to 240 minutes. Anastomosis was constructed mechanically in 28 patients (82.4%) and by hand-sewn technique in six patients (17.6%). Intraoperative adverse events were uncommon; only one episode of bleeding was recorded (2.9%) and no other intraoperative accident was reported [Table 4].

Postoperative Recovery and Pathological Findings

Postoperative recovery was generally favorable. The mean time to first flatus was 3.38 ± 0.82 days (range, 2-5 days), and the mean postoperative hospital stay was 7.97 ± 1.62 days (range, 6-13 days). Histopathology showed conventional adenocarcinoma in 33 patients (97.1%) and mucinous adenocarcinoma in one patient (2.9%). Moderately differentiated tumors were most common

Table 4: Operative details.

Variable	Value
Operative time, mean ± SD (range), min	169.26 ± 34.38 (90-240)
Hand-sewn anastomosis, n (%)	6 (17.6)
Stapled anastomosis, n (%)	28 (82.4)
Intraoperative bleeding, n (%)	1 (2.9)
Other intraoperative accident, n (%)	0 (0.0)
Adjacent organ invasion	3 (8.8)
Distant metastasis detected intraoperatively	1 (2.9)

Table 5: Postoperative recovery and pathological findings.

Variable	Value
Time to first flatus, mean ± SD (range), days	3.38 ± 0.82 (2-5)
Postoperative hospital stay, mean ± SD (range), days	7.97 ± 1.62 (6-13)
Adenocarcinoma, n (%)	33 (97.1)
Mucinous adenocarcinoma, n (%)	1 (2.9)
Well differentiated (grade 1), n (%)	4 (11.8)
Moderately differentiated (grade 2), n (%)	19 (55.9)
Poorly differentiated (grade 3), n (%)	9 (26.5)
Undifferentiated (grade 4), n (%)	2 (5.9)
Pathological T2, n (%)	5 (14.7)
Pathological T3, n (%)	11 (32.4)
Pathological T4a, n (%)	17 (50.0)
Pathological T4b, n (%)	1 (2.9)
Pathological N0, n (%)	12 (35.3)
Pathological N1, n (%)	16 (47.1)
Pathological N2, n (%)	6 (17.6)
Pathological M0, n (%)	33 (97.1)
Pathological M1, n (%)	1 (2.9)

(55.9%), followed by poorly differentiated tumors (26.5%), well-differentiated tumors (11.8%), and undifferentiated tumors (5.9%). Pathological staging demonstrated T2 disease in 14.7%, T3 in 32.4%, T4a in 50.0%, and T4b in 2.9%. Nodal metastasis was present in 22 patients (64.7%), including N1 disease in 47.1% and N2 disease in 17.6%, while one patient (2.9%) had distant metastasis [Table 5].

Postoperative Complications

Overall, 26 patients (76.5%) had no postoperative complication, whereas eight patients (23.5%) developed at least one complication. The recorded complications were wound infection in four patients, pneumonia in three, and pleural effusion in one; no anastomotic leak was observed [Table 6]. Complication rates appeared higher after left-sided or sigmoid colectomy than after right colectomy or transverse colectomy, although the difference was not statistically significant ($p = 0.39$). Patients requiring combined organ resection also showed a numerically higher complication rate than those undergoing standard colectomy (33.3% vs. 22.6%, $p = 1.00$). Likewise, patients with comorbidity had more complications than those without comorbidity (35.7% vs. 15.0%, $p = 0.32$) [Table 7].

Thirty-Day Follow-Up

At 1 month after surgery, all patients were alive. No early

Table 6: Postoperative complications within 30 days.

Complication	n (%)
No complication	26 (76.5)
Any complication	8 (23.5)
Pneumonia	3 (8.8)
Wound infection	4 (11.8)
Pleural effusion	1 (2.9)
Anastomotic leak	0 (0.0)
30-day mortality	0 (0.0)

Table 7: Complications according to procedure type and comorbidity.

Subgroup	No complication, n (%)	Complication, n (%)	p value
Right colectomy (n = 11)	10 (90.9)	1 (9.1)	0.39
Transverse colectomy (n = 2)	2 (100.0)	0 (0.0)	
Left colectomy (n = 9)	6 (66.7)	3 (33.3)	
Sigmoid colectomy (n = 12)	8 (66.7)	4 (33.3)	
Standard colectomy (n = 31)	24 (77.4)	7 (22.6)	1
Combined organ resection (n = 3)	2 (66.7)	1 (33.3)	
No comorbidity (n = 20)	17 (85.0)	3 (15.0)	0.32
Any comorbidity (n = 14)	9 (64.3)	5 (35.7)	

postoperative death was recorded in this cohort.

DISCUSSION

This single-center study suggests that laparoscopic colectomy is feasible in carefully selected elderly patients with colon cancer in routine clinical practice. Nearly all patients underwent curative-intent resection, the rate of intraoperative adverse events was low, postoperative recovery was acceptable, and no 30-day mortality was observed. The mean age and male predominance in the present cohort are consistent with the epidemiology of colon cancer in older adults. The predominance of abdominal pain and weight loss in our study may reflect delayed presentation in an elderly population, in contrast to screening-based cohorts in which occult bleeding or altered bowel habits are more common presenting features [9,10].

The sigmoid colon was the most common tumor location in this study. This left-sided predominance has also been described in several Asian series, although right-sided tumors tend to become more frequent with advancing age in some Western populations [11,12]. Most tumors in our cohort were endoscopically exophytic and histologically conventional adenocarcinomas, which is in keeping with established clinic pathological patterns [13,14].

Our operative time of approximately 169 minutes is within the range reported for laparoscopic colectomy in elderly patients. The high use of stapled anastomosis indicates broad adoption of contemporary laparoscopic techniques. Only one bleeding event occurred during surgery, supporting the procedural safety of laparoscopic colectomy when performed by experienced teams.

Recovery after surgery was acceptable, with return of bowel function at about 3.4 days and postoperative hospitalization of about 8 days. These data compare favorably with published studies reporting faster recovery and shorter hospitalization after laparoscopic compared with open colectomy [15,16]. In elderly patients, such benefits are particularly relevant because prolonged immobilization and delayed feeding may quickly lead to functional decline [17,18].

Postoperative complications occurred in 23.5% of patients, most commonly wound infection and pneumonia. This rate is comparable to published series in elderly colorectal surgery.[19-21]. Importantly, no anastomotic leak and no early mortality were observed. Although complication rates tended to be higher in patients with comorbidity and in those requiring more extensive surgery, the cohort was too small to detect statistically robust differences.

Most patients had advanced local disease, with T3-T4 tumors accounting for the large majority of cases and nodal metastasis present in nearly two-thirds. This pattern suggests that elderly patients in our setting are still diagnosed at relatively advanced stages. Earlier detection through screening and timely referral may further improve surgical outcomes and long-term survival [22,23].

This study has several limitations. Its sample size was small, the design was descriptive and single-center, and no open-surgery comparator group was available. Some important variables for elderly surgical assessment, such as frailty score, nutritional indices, and detailed anesthetic risk stratification, were not reported in the source dataset. In addition, follow-up was limited to early postoperative outcomes, precluding conclusions on recurrence or survival. Despite these limitations, the study provides useful real-world data from Vietnam and supports the use of laparoscopic colectomy in selected patients aged 70 years or older. Larger multicenter studies with longer follow-up and more comprehensive geriatric assessment are needed to confirm these findings.

CONCLUSION

Laparoscopic colectomy for colon cancer in selected patients aged 70 years or older was associated with acceptable operative time, satisfactory postoperative recovery, a low rate of intraoperative adverse events, and no 30-day mortality. Although postoperative complications occurred in nearly one-quarter of patients, most were manageable and no anastomotic leak was observed. These findings support laparoscopic colectomy as a safe and practical option for elderly patients when careful preoperative selection and perioperative management are applied.

COMPETING INTERESTS

The authors declare no competing interest.

AUTHORS' CONTRIBUTIONS

V.T.D. conceived and designed the study, collected data, performed data analysis, interpreted the results, and drafted the manuscript. T.H.N. contributed to study design, supervised data collection, participated in surgery and clinical management, critically revised the manuscript for important intellectual content, and approved the final version. Both authors reviewed and approved the final manuscript.

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