Vietnam Journal of Community Medicine, Vol. 66, English version, 174-179

EVALUATION OF EARLY OUTCOMES OF LAPAROSCOPIC LOW ANTERIOR RESECTION WITH STAPLED ANASTOMOSIS FOR RECTAL CANCER AT MILITARY HOSPITAL 175

Trinh Van Thao, Nguyen Phu Thong, Nguyen Quoc Trieu, Truong Minh Nghi, Nguyen Thanh Nam*

Military Hospital 175 - 786 Nguyen Kiem, Ward 3, Go Vap Dist, Ho Chi Minh City, Vietnam

Received: 12/06/2025
Revised: 19/06/2025; Accepted: 29/06/2025

ABSTRACT

Objective: To evaluate the early outcomes of laparoscopic segmental colectomy and stapled anastomosis for rectal cancer treatment at Military Hospital 175.

Subjects and Methods: This study employed a cross-sectional design, incorporating both retrospective and prospective data collection, conducted at Military Hospital 175 from January 2023 to May 2025. The study included 72 patients diagnosed with rectal cancer who underwent laparoscopic segmental colectomy using stapling devices.

Results: A total of 72 patients underwent laparoscopic rectal resection with a mean age of 62.7 ± 9.7 years and a mean BMI of 24.3 ± 2.1 kg/m^2. Most patients were classified as stage III (58.3%), with 69.5% presenting T3 tumors. The average operative time was 166.7 ± 50.7 minutes, which correlated significantly with disease stage (p = 0.048). Gastrointestinal function recovered early, with mean times to flatus, oral intake, and defecation of 2.26, 2.25, and 2.6 days, respectively. Early postoperative complications occurred in 7.0% of patients, all of whom were managed conservatively. The mean hospital stay was 7.62 days.

Conclusion: Laparoscopic rectal resection demonstrated favorable short-term outcomes, including early gastrointestinal recovery, low complication rates, and acceptable operative times, supporting its clinical applicability in rectal cancer management.

Keywords: Laparoscopic anterior resection, Stapled anastomosis, Mandibular trauma, Short-term surgical outcomes, Rectal cancer.

1. INTRODUCTION

Rectal cancer is one of the most common gastrointestinal malignancies, second only to colon cancer. The incidence of rectal cancer is steadily increasing and shows a trend toward younger age groups. According to the American Cancer Society, in 2023, approximately 153,000 new cases and 52,500 deaths due to rectal cancer were estimated in the United States [1]. The treatment of rectal cancer is multimodal, with surgery remaining the cornerstone of management. When diagnosed early and treated with curative resection, the 5-year survival rate can reach up to 90%. However, in clinical practice, patients often present at advanced stages, making curative surgery more challenging and reducing the 5-year survival rate to around 50% [2]. With advancements in surgical technology, including ultrasonic scalpels, Ligasure, and stapling devices, laparoscopic surgery has emerged as an alternative to conventional open surgery, providing comparable oncological outcomes. Laparoscopic surgery for rectal cancer, with its multiple advantages, is increasingly performed at healthcare centers both domestically and internationally, including the Department of Abdominal Surgery, Military Hospital 175. Beyond surgical intervention, evaluating postoperative outcomes has become an area of growing interest among both clinicians and patients. Therefore, ưe conducted this study to assess the short-term surgical outcomes of laparoscopic segmental

*Tác giả liên hệ
Email: dr.nam175vn@gmail.com **Điện thoại**: (+84) 966111175 **Http**s://doi.org/10.52163/yhc.v66ienglish.2778

colectomy with stapled anastomosis for rectal cancer at Military Hospital 175.

2. SUBJECT AND METHOD

2 .1. Subject

Patients with rectal cancer were treated with laparoscopic segmental colectomy using stapling devices at 175 Military Hospital between January 2023 and May 2025.

- Inclusion Criteria:

Patients diagnosed with rectal cancer were indicated for laparoscopic segmental colectomy using stapling devices at 175 Military Hospital.

+ High rectal cancer: Stages T1 to T4.

+ Mid and low rectal cancer, located ≥4 cm from the anal verge: Stage T1 to T3, or T4 tumors that responded to neoadjuvant chemoradiotherapy [59]

- Exclusion Criteria

+ General contraindications for surgery: Patients with severe cardiovascular and respiratory disorders, or coagulopathies.

+ Locally advanced rectal cancer invading the sphincter complex or levator ani muscle; tumors complicated by obstruction, abscess, or fistula.

+ Patients who declined laparoscopic surgery.

+ Incomplete medical records.

2.2. Methods

Study design:

A non-controlled, cross-sectional study incorporating both retrospective and prospective data collection was conducted from January 2023 to May 2025.

Sample size and sampling method

A convenient sampling method was employed with a sample size of 72 cases.

Procedure Steps:

Step 1: Selection of patients according to inclusion criteria, followed by preoperative clinical and paraclinical evaluation.

Step 2: Tumor Staging and Surgical Indication.

TNM staging was performed based on the UICC 2002 classification before the initiation of the study, using clinical examination and imaging results, with computed tomography (CT) playing a pivotal role.

Step 3: Laparoscopic rectal resection and stapled anastomosis were performed according to the standardized surgical protocol.

Step 4: Evaluation of intraoperative outcomes.

Step 5: Histopathological assessment and postoperative staging.

Step 6: Postoperative outcome assessment.

Study Variables:

- General characteristics of the study population: Age, sex, and BMI.

- Preoperative TNM classification

- Time to gastrointestinal function recovery

- Early postoperative complications

- Correlation between disease stage and operative time

- Correlation between tumor stage and early post-operative complications.

Data collection and analysis

Data were entered and analyzed using SPSS software. Variables were calculated and compared using percentages, means, and appropriate statistical tests, such as the Chi-square test and ANOVA.

3. RESULTS

Table 1. General characteristics of the study population

Characteristics		Frequency (n)	Percentage (%)
Age group (years)	<20	0	0.0
	20 - 39	1	1.4
	40 - 59	28	38.9
	60 - 80	43	59.7
	> 80	0	0.0
Sex	Male	46	63.9
	Female	26	36.1
BMI	<18.5	0	0.0
	18.5- <25	44	61.1
	≥ 25	28	38.9

The mean age of the study population was 62.7 ± 9.7 years. The oldest patient was 80 years old, and the youngest was 38. The most common age groups were 40–60 and 60–80 years, accounting for 38.9% and 59.7% of patients, respectively. The mean BMI was 24.3 ± 2.1 kg/m^2, with a range of 20.2 to 29.7 kg/m^2. A total of 44 patients (61.1%) had a normal

BMI, while 28 patients (38.9%) were classified as overweight. No underweight patients were recorded.

Table 2. Preoperative TNM classification

TNM Classification		Number (n = 72)	Percentage (%)
T	T1	0	0
	T2	7	9.7
	T3	50	69.5
	T4	15	18.8
N	N0	27	37.5
	N1	25	34.7
	N2	20	27.8
M	M0	65	91.3
	M1	7	9.7

The majority of patients had T3 tumors, accounting for 69.5%, followed by T4 tumors with 18.8%, and T2 tumors were 9.7%. Suspected lymph node metastases were identified in 45 cases (62.5%). Hepatic metastases were detected in 7 patients, representing 9.7% of the total.

Table 3. Time to gastrointestinal function recovery

Timepoint			
No. of Patients	Mean ± SD (days)	Shortest (days)	Longest (days)
Onset of Flatus			
72	2.26 ± 0.73	1	4
Resumption of Oral Intake			
72	2.25 ± 0.67	1	4
Onset of Defecation			
72	2.6 ± 0.64	1	4

The mean time to gastrointestinal function recovery, as indicated by the onset of flatus, was 2.26 ± 0.73 days. Oral intake was resumed at an average of 2.25 ± 0.67 days postoperatively, and the mean time to first defecation was 2.6 ± 0.64 days.

Table 4. Early postoperative complications

Early Complications	Number of Cases (n = 72)	Percentage (%)
Anastomotic leakage	1	1.4
Early postoperative ileus	1	1.4
Surgical site infection	3	4.2

Early postoperative complications were observed in 5 patients (7.0%). Among these, one case involved anastomotic leakage, which was successfully managed conservatively; one case experienced early postoperative ileus; and three cases developed surgical site infections (4.2%), all of which were effectively treated with conservative measures.

Postoperative Hospital Stay Duration: The mean duration of the postoperative hospital stay was 7.62 days. The longest stay was 15 days, observed in a patient with postoperative hemorrhage requiring surgical re-exploration, and the shortest was 5 days.

Table 5. Correlation between disease stage and operative time

Stage			
Number of Patients	Mean ± SD (minutes)	Range (min-max)	p-value
I			
5	154 ± 27.9	120–180	0.048
II			
22	148.9 ± 34.8	110–270	
III			
42	173.3 ± 56.3	90–360	
IV			
3	180 ± 20	160–200	
Overall			
72	166.7 ± 50.7	90–360	

There was a statistically significant correlation between disease stage and operative time, with $p < 0.05$.

Table 6. Correlation between tumor stage and early postoperative complications

Tumor Stage	Without Complications	With Complications	p-value
I	5	0	0.427
II	22	0	
III	38	4	
IV	2	1	
Total	67	5	

There was no statistically significant correlation between tumor stage and early postoperative complications ($p > 0.05$).

4. DISCUSSION

The mean age of the study population was 62.7 ± 9.7 years, with a range of 38 to 80 years. The most common age groups were 40–60 and 60–80 years, accounting for 38.9% and 59.7%, respectively. These findings are consistent with both domestic and international studies. For example, Barlehner E. (2005) reported a mean age of 65 years (range: 39–88 years), and Ding Z. (2017) found a mean age of 65.6 ± 10.9 years [3], [4]. A more recent study by Nguyen Tuan Canh et al. (2023) involving 35 cases showed a mean age of 63.14 ± 12.4 years [5]. Therefore, the age of patients in our study also corresponds to the typical age range for colorectal cancer.

Male patients accounted for the majority, with 46 out of 72 cases (63.9%), while female patients represented 26 out of 72 (36.1%), resulting in a male-to-female ratio of 1.84. In most studies, patient selection for laparoscopic surgery was not based on gender; however, a male predominance was consistently observed. Ding Z. (2017) reported a male-to-female ratio of 18:13 [4]. Other studies showed even greater male predominance, such as Barlehner E. (2005) with a ratio of 125:69 and Chen W. (2016) reporting 107 male patients among 155 total cases (69%) [3], [6].

The mean BMI was 24.3 ± 2.1 kg/m^2, with a range from 20.2 to 29.7 kg/m^2. Most patients had a normal BMI (44/72, 61.1%), while the remaining 28 (38.9%) were overweight. No underweight patients were recorded. These results are comparable to several European studies. Barlehner E. (2005) reported a mean BMI of 26.4 (range: 16.4–53.1) kg/m^2, with 53% of patients having a BMI > 25 kg/m^2 [3]. Van der Pas M.H. (2017) found a mean BMI of 25.5 (range: 23.4–28.3) kg/m^2 and identified BMI > 25 as a risk factor for conversion to open surgery [7].

Among the study cohort, T3 tumors were most prevalent, observed in 68.1% of patients, followed by T4 (22.2%) and T2 (9.7%). Suspected lymph node metastasis was found in 55 patients (72.2%). Distant metastases were present in 7 cases (9.7%), all of which involved the liver. Ding Z. (2017) also reported that T3 tumors were the most common, accounting for 55% of cases [4].

The mean operative time was 166.67 ± 50.66 minutes, with a range of 90 to 360 minutes. This was shorter than in the study by Van der Pas M.H. (2017), where mean operative times were: open surgery 190 (151–240) minutes, laparoscopic surgery 233 (184–291) minutes, and laparoscopic converted to open surgery 256 (180–337) minutes(7)]. Ding Z. (2017) found that open surgery (216.0 ± 62.7 minutes) was faster than laparoscopy (271.2 ± 56.2 minutes) (8). Chen W. reported a mean operative time of 166.5 ± 62.8 minutes for laparoscopic low anterior resection for tumors located 5–8 cm from the anal verge, with a non-significant trend toward shorter operative times in female patients (by 12.7 minutes, $p > 0.05$) [5].

Regarding surgical technique, 16 patients (22.2%) underwent surgery with 4 trocars, 52 patients (72.2%) with 5 trocars, and 3 patients (4.2%) with 6 trocars. In our view, the number of trocars used depends entirely on the surgeon's preference, the specific intraoperative situation, and individual technique.

Intraoperative complications occurred in one case (1.4%), involving bleeding from injury to the presacral venous plexus, with an estimated blood loss of 2 liters, necessitating conversion to open surgery. In Barlehner E.'s study (2005), the overall intraoperative complication rate was 4.7%, including ureteral injury, bladder injury, vas deferens injury, and bleeding, of which bleeding was the most common [3].

The mean time to first flatus was 2.26 ± 0.73 days, and the mean time to oral intake resumption was 2.25 ± 0.67 days. These findings align with those reported by Trinh Dinh Hiep (2022), who found a mean time to first flatus of 3.43 ± 0.64 days and a mean time to oral intake of 3.63 ± 0.67 days. In the laparoscopic group, the mean time to oral intake was 3.0 ± 0.9 days compared to 4.7 ± 1.0 days in the conversion group ($p > 0.05$) [9].

The mean postoperative hospital stay was 7.62 ± 1.73 days, with a minimum of 5 days and a maximum of 15 days in a patient who experienced intraoperative bleeding and required conversion. This partly reflects the advantages of laparoscopic colorectal resection compared to open surgery. In other studies, Chen W. (2016) reported a mean hospital stay of 11.1 ± 3.9 days for men and 9.9 ± 2.5 days for women ($p < 0.05$) [5]. Ding Z. (2017)

found that laparoscopic patients had shorter hospital stays (19.8 ± 3.8 days) compared to open surgery (25.8 ± 5.2 days, p < 0.05) (4)]. Van der Pas M.H. (2017) reported a median hospital stay of 9 (7–12) days in the open surgery group, 8 (6–13) days in the laparoscopic group, and 11 (8–15) days in the conversion group (p > 0.05) [7].

Early postoperative complications were observed in 5 cases (7%). These included one case of anastomotic leakage (1.4%), which was successfully managed conservatively; one case of early postoperative subileus (1.4%); and three cases of surgical site infection (4.2%). All patients were successfully treated with conservative measures. In Barlehner E.'s study (2005), the overall early complication rate was 20.1%, including anastomotic leakage (13.5%), bleeding (1.6%), early postoperative ileus (1.6%), surgical site infection (1.6%), urinary leakage (0.5%), and urinary disorders (1.6%). The reoperation rate was 11.3%, with no reported mortality [3]. In Chen W.'s study (2016), 15 out of 199 patients experienced early complications: 3 with anastomotic bleeding, 4 with anastomotic leakage, 1 with both leakage and bowel obstruction, and 7 with surgical site infections. The complication rates were comparable between sexes (9.3% in males vs. 10.4% in females) [6]. Ding Z. (2017) found no significant difference in early complication rates between laparoscopic and open surgery [4]. Van der Pas M.H. (2017) reported a lower early complication rate in the laparoscopic group compared to the open and converted groups. Notably, the 28-day mortality rate in the laparoscopic group (1%) was half that of the open and converted groups (2%) [7].

In analyzing the correlation between disease stage and operative time, it is evident that a statistically significant relationship exists between disease stage and the mean operative time, particularly in more advanced stages of the disease. For stage I, the mean operative time is recorded at 154 minutes (± 27.9), and for stage III, it shows a significant increase to 173.3 minutes (± 56.3). Stage IV has an even higher mean operative time, at 180 minutes (± 20), with a statistically significant p-value of less than 0.05. The overall mean operative time across all stages is 166.7 minutes (± 50.7), further supporting the association between disease severity and surgical duration [10]. Studies consistently indicate that surgical complexity increases with the stage of the tumor. For instance, Gupta et al. highlighted that higher tumor stages often require more extensive surgical procedures that are inherently time-consuming, leading to extended operative times [10].

5. CONCLUSION

Laparoscopic rectal resection with stapled anastomosis yielded favorable short-term outcomes, including low complication rates, early gastrointestinal recovery, and reduced hospital stay. These results highlight the safety and feasibility of this minimally invasive approach in clinical practice. The findings support broader application of laparoscopic surgery for rectal cancer, offering significant benefits in patient recovery and perioperative management.

REFERENCES

[1] Siegel RL, Wagle NS, Cercek A, Smith RA, Jemal A. Colorectal cancer statistics, 2023. CA Cancer J Clin. 2023;73(3):233–54.

[2] Rawla P, Sunkara T, Barsouk A. Epidemiology of colorectal cancer: incidence, mortality, survival, and risk factors. 2019;89–103.

[3] Bärlehner E, Benhidjeb T, Anders S, Schicke B. Laparoscopic resection for rectal cancer: outcomes in 194 patients and review of the literature. Surg Endosc. 2005 Jun;19(6):757–66.

[4] Ding Z, Wang Z, Huang S, Zhong S, Lin J. Comparison of laparoscopic vs. open surgery for rectal cancer. Mol Clin Oncol. 2017 Feb;6(2):170–6.

[5] Cảnh NT, Anh TH, Phong TĐT, Phong CTT, Hoá NV, Anh NT, et al. Đặc điểm lâm sàng, cận lâm sàng và kết quả điều trị sớm ung thư trực tràng bằng phẫu thuật nội soi và các yếu tố liên quan tại bệnh viện đa khoa trung ương cần thơ. Tạp chí Y dược học Cần Thơ. 2023 Dec 25;(69):50–7.

[6] Chen W, Li Q, Fan Y, Li D, Jiang L, Qiu P, et al. Factors Predicting Difficulty of Laparoscopic Low Anterior Resection for Rectal Cancer with Total Mesorectal Excision and Double Stapling Technique. PLoS One. 2016;11(3):e0151773.

[7] Van der Pas MHGM, Deijen CL, Abis GSA, de Lange-de Klerk ESM, Haglind E, Fürst A, et al. Conversions in laparoscopic surgery for rectal cancer. Surg Endosc. 2017 May 1;31(5):2263–70.

[8] Ding X, Yu Y, Chen M, Wang C, Kang Y, Lou J.

Causative agents and outcome of spontaneous bacterial peritonitis in cirrhotic patients: community-acquired versus nosocomial infections. BMC Infectious Diseases. 2019 May 23;19(1):463.

[9] Trịnh Đình Hiệp, Hải ĐS, Hoàng LT, Liên NTD, Thắng TT, Thanh HC. Đánh giá kết quả sớm phẫu thuật nội soi cắt đoạn đại trực tràng nối máy điều trị ung thư trực tràng tại Bệnh Viện Quân Y 7a. Tạp chí y dược học Quân sự. 2022 Oct 28;47(8):133–44.

[10] Gupta D, Gunter MJ, Yang K, Lee S, Zuckerwise L, Chen L, et al. Performance of Serum CA125 as a Prognostic Biomarker in Patients With Uterine Papillary Serous Carcinoma. International Journal of Gynecological Cancer. 2011 Apr 1;21(3):529–34.