

Determinants of Early Readmission After Elective Colectomy for Colon Cancer

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Introduction

- Colorectal cancer (CRC) is the third most common cancer diagnosis and the second leading cause of cancer-related mortality worldwide.
- Advancements in screening, particularly colonoscopy, have enabled earlier detection of disease, often at stages when tumors are localized and potentially curable. In this setting, surgical resection remains the standard and only definitive curative treatment.
- Postoperative hospital readmission is a key quality metric for surgical care, offering insight into clinical outcomes as well as efficiency of perioperative care.
- In the United States, 90-day postoperative readmission costs an estimated \$2 billion annually. Nearly 1 in 5 of these readmissions are linked with preventable causes, accounting for \$300 million. Readmission following colorectal surgery has a reported median cost of \$8,885.
- Prognostically, 30-day post-colectomy readmission is independently linked with a 9% increase in 1-year mortality in colon cancer patients.

Objective:

In this study, we assess the predictive factors, both modifiable and unmodifiable, of 30-day readmission for patients who underwent a colectomy for colon cancer with the ultimate purpose of optimizing clinical outcomes as well as resource stewardship.

Methods

- We performed a six-year retrospective review and analysis (2013-2018) of the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) database.
- Of 21,025 eligible patients, 6,987 were selected for the study cohort with the following inclusion criteria:
 - Age ≥ 18 years
 - Underwent elective colectomy with primary indication of colon cancer
 - Stage I, II, or III colon cancer
 - Complete data for the selected factors
- Abstracted patient characteristics included demographic variables, comorbidities, frailty index, cancer stage, recent chemotherapy, operative approach.
- Multivariate logistic regression was utilized to assess independent associations between these patient factors and readmission in the 30 days following colectomy. $P < 0.05$ was considered significant throughout all analyses.

Results

Table 1. Significant findings from multivariable association between 30-day readmission and selected risk factors (n=6,987)

	aOR (95% CI)	P-value
Comorbidities		
Renal Failure (ref=No)	0.95 (0.11 – 7.97)	0.960
Chronic Steroid Use (ref=No)	1.10 (0.68 – 1.78)	0.685
Smoker (ref=No)	1.12 (0.85 – 1.46)	0.426
Disseminated Cancer (ref=No)	1.43 (1.01 – 2.02)	0.042*
Dyspnea (ref=No)	1.06 (0.79 – 1.41)	0.708
Race		0.025*
White	1.00	
Black	1.23 (0.95 – 1.59)	
Other	0.68 (0.47 – 0.98)	
ASA		0.003*
I and II	1.00	
III and above	1.37 (1.12 – 1.69)	
Surgery Type		0.050*
Open	1.00	
Laparoscopic	0.78 (0.64 – 0.97)	
Other	0.71 (0.50 – 1.01)	
Chemotherapy within 90 days (ref=No)	1.82 (1.26 – 2.63)	0.001*

- Patients were approximately 50% female, predominantly of age ≥ 60 years (70.8%), White (79.4%), had higher ASA classification (58.5%), and had colectomy by laparoscopic approach (71.8%).
- Distribution of these variables was similar between the study cohort and the larger patient population.
- Overall, the readmission rate was 10.0%.

Table 2. Additional factors included in multivariable analysis

	P-value
Age	0.679
Sex	0.122
BMI	0.734
Recent Weight Loss (ref=No)	0.286
Frailty Index	0.313
Bowel Prep	
Mechanical Bowel Prep (ref=No)	0.866
Oral Antibiotic Bowel Prep (ref=No)	0.644
Cancer Stage	0.956

30-day readmission was **independently associated** with:

- Black race (ref=White)
- Disseminated cancer
- Laparoscopic approach (ref=Open)
- Higher patient ASA classification
- Chemotherapy within 90 days

30-day readmission was **not associated** with:

- Age
- Sex
- BMI or weight loss
- Frailty index
- Bowel prep
- Cancer stage
- Renal failure
- Chronic steroid use
- Smoking status
- Dyspnea

Conclusions

- Various modifiable and nonmodifiable factors contribute to post-colectomy readmission in colon cancer patients. Of note in this population, frailty index, cancer stage, and chronic steroid use did not sufficiently impact odds.
- As many risk factors are nonmodifiable, diligent screening and mitigation of modifiable factors is particularly important. Moreover, identification of nonmodifiable factors can guide a cost-benefit analysis of elective operation. Examples of takeaway strategies are depicted in **Figure 1**.
- Awareness and prioritization of risk factors can impact discharge plan, tailor patient-specific management perioperatively, and flag readmission-risk patients for early intervention. Addressing these concerns before surgery and discharge can decrease readmission and subsequent morbidity and systemic cost.

