Mortality after Colorectal Surgery in Veterans

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Introduction

• Colectomy and proctectomy are common definitive surgical management for a wide range of benign and malignant pathologies.

• Postoperative complications from colorectal surgeries result in significant morbidity and mortality.

• Colorectal surgery has up to 16% reported mortality.

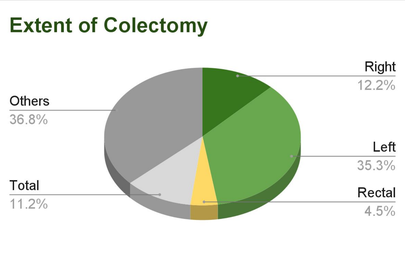
Objective

For the purpose of risk stratification, this study examines mortality after various emergent and non-emergent colorectal operations in the veteran patient population and the associated preoperative, intraoperative, and postoperative variables.

Methods

Colorectal operation between 2008-2015 in the Veterans Affairs Surgical Quality Improvement Program were included:
• Demographics, clinical/operative details, complications, and 30 day mortality were analyzed.
• Logistic regression was used to identify independent predictors of mortality.
• A p < 0.05 was considered significant.

Results



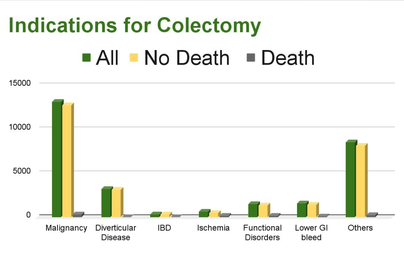


Figure 1: 30 day mortality occurred in 1,143 of 28,935 patients with colorectal operations. Pie chart depicts extent/laterality in the setting of mortality.
Figure 2: Indications for colectomy for 30 Day Mortality (Death) versus Survival (No Death).

Table 1. Patient Demographics

n. (%)	All n=28,935	No death n=27,792	Death n=1,143	P value
Age (Mean ±SD), years	10.9 ± 65.5	65.3 ± 10.8	72.7 ± 10.9	< 0.001
Age ≥65, years	14,826 (51.2)	13,983 (50.3)	843 (73.8)	< 0.001
Sex (Male)	27,814 (96.1)	26,697 (96.1)	1,095 (97.7)	0.004
ASA Class				< 0.001
1 or2	4,640 (16.0)	4,621 (16.6)	19 (1.7)	
≥3	24,292 (84.0)	23,168 (83.4)	1,124 (98.3)	
BMI (Mean ±SD)	28.1 ± 6.2	28.1 ± 6.1	26.6 ± 6.8	< 0.001
Obesity (BMI ≥30)	9,316 (32.4)	9,021 (32.7)	295 (26)	< 0.001
Emergency	4,041 (14.0)	3,439 (12.4)	602 (52.7)	< 0.001

Abbreviations: ASA, American Society of Anesthesiologists; BMI, body mass index (calculated as weight in kilograms divided by height in meters squared); WBC, white blood cell count. SI conversion factors: To convert creatinine to micromoles per liter, multiply by 88.4; hematocrit to proportion of 1.0, multiply by 0.01; platelet count to x10^9 per liter, multiply by 1.0; and WBC count to x10^9 per liter, multiply by 0.001.

Table 2. Unadjusted Analysis of Operative and Postoperative Mortality, LOS, and Morbidities.

N. (%)	All n=28,935	No death n=27,792	Death n=1,143	P value
Operation Duration, mean ±SD, hour	3.1 ± 1.5	3.1 ±1.5	2.8 ±1.3	< 0.001
Colon resections with Primary anastomosis	22,456 (77.6)	21,876 (78.7)	580 (50.7)	< 0.001
Approach				< 0.001
Open	21,177 (73.2)	20,136 (72.5)	1,041 (91.1)	
Minimal invasive	7,758 (26.8)	7,656 (27.5)	102 (8.9)	
No. of patients received red blood cell unit Intraoperatively	2,673 (9.2)	2,315 (8.3)	358 (31.3)	< 0.001
Junior Attending (<5 years)	17,087 (59.1)	16,428 (59.1)	659 (57.7)	0.327
Postoperative LOS, (mean ± SD)	10.17 ± 10.4	10.1 ± 10.5	10.3 ± 7.7	0.677
Postoperative Bleeding requiring >4 units	187 (0.6)	146 (0.5)	41 (3.6)	< 0.001
Need for reintubation	1,140 (3.9)	1,140 (3.9)	325 (28.4)	< 0.001
Prolong Vent >48hrs (ICU admission)	536 (1.9)	321 (1.2)	215 (18.8)	<0.001

• A total of 28,935 colorectal operations were identified. Mortality occurred in 1,143 patients (4.0%).

• Mortality was significantly more likely to occur with emergency operations (52.7% vs. 12.4%, $p < 0.001$), sepsis (31.2% vs. 4.1%, $p < 0.001$), open operations (91.1% vs. 72.5%, $p < 0.001$), intraoperative blood transfusions (31.3% vs. 8.3%, $p < 0.001$), and with higher morbidity (72.7% vs. 25.9%, $p < 0.001$).

• Statistically significant independent predictors of mortality included CVA), total colectomy, esophageal varices, ASA ≥ 3, postoperative transfusion > 4 units), emergency operations,, hypoalbuminemia, cirrhosis with ascites, sepsis, and frailty index +2.

• Laparoscopic approach had a protective effect on survival (OR 0.34, $p < 0.001$).

Conclusion

• Colorectal surgery mortality in veterans is comparable to national reports.
• Predictors of mortality such as emergency status, total colectomy, and hypoalbuminemia can be used for quality improvement, surgical risk stratification, and preoperative counseling.