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Early discharge and readmission after colorectal resection



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ABSTRACT

Background: Emphasis on the provision of high quality, cost-effective healthcare has meant increasing efforts at reducing postoperative length of stay while reducing 30-d readmission rates. The aim of this study was to identify factors associated with early discharge (ED) and to evaluate the effect of ED on readmission after colorectal resection.

Materials and methods: We identified all inpatients aged ≥ 18 y who underwent a colorectal resection in the American College of Surgeons National Surgical Quality Improvement Program Participant Use File, 2011. ED was defined as a length of stay ≤ 25 th percentile by procedure (rectal resection, open colectomy, and laparoscopic colectomy). Multivariate logistic regression was used to identify factors significantly associated with ED and readmission. A subset analysis was performed by procedure type.

Results: Of 28,532 patients, 2171 (7%) underwent rectal resection, 14,976 (52%) underwent open colectomy, and 11,385 (40%) underwent laparoscopic colectomy with an ED on or before postoperative days 5, 5, and 3, respectively. The overall cohort included patients with a mean age of 61 y. A total of 52% were women and 37% were colorectal cancer patients. Age > 65 y, recent steroid use, simultaneous ostomy creation, nonelective surgery, need for reoperation, and a postoperative occurrence before discharge were significantly associated with a reduced likelihood of ED. The overall rate of readmission was 12%. Patients who were discharged early were significantly less likely to be readmitted (odds ratio, 0.77; 95% confidence interval, 0.70–0.84).

Conclusions: In the appropriate patient population, ED after colorectal surgery may be implemented without any adverse effect on readmission rates.

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1. Introduction

A national emphasis on the provision of high quality, cost-effective health care has meant increasing efforts at reducing postoperative length of stay (LOS) while

simultaneously reducing 30-d readmission rates. Early research suggested that early discharge (ED) was associated with increased rates of readmission. Therefore, concerns exist among surgeons that the inability to monitor patients' clinical progress and detect complications would result in higher

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readmission rates and occurrences diagnosed after discharge [1–3].

Colorectal surgery provides a prime model for investigating the effects of ED on patient outcomes and readmission because of the frequency of procedures performed and the significant rates of postoperative occurrences (POs). Accordingly, recent data have been published regarding the relationship among LOS, ED, and readmissions after colorectal surgery. Single-institution experiences have demonstrated the benefits of early recovery pathways after colorectal surgery with little to no effect on readmission rates [4–7]. At the population level, however, LOS has decreased after colon surgery, whereas readmission rates have increased over the last two decades [8].

The recent addition of 30-d readmission information to the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) [9] provides a new opportunity to evaluate ED and readmission rates. In this study, we sought to identify factors associated with ED and evaluate the effect of ED on readmission after colorectal resection.

2. Methods

We performed a retrospective study of prospectively collected data from the ACS NSQIP Participant Use File (PUF) data set from 2011. The ACS NSQIP PUF contains data on 442,149 cases collected from 315 academic and community-based hospitals located around the United States. A trained Surgical Clinical Reviewer captures data on 252 variables, including preoperative risk factors, intraoperative variables, and 30-d postoperative morbidity and mortality outcomes. Patients aged ≥ 18 y undergoing major surgical procedures (both inpatient and outpatient) are included using an 8-d cycle sampling procedure. All variables collected in the ACS NSQIP are predefined in the NSQIP PUF 2011 user guide [10].

We identified all inpatients aged ≥ 18 y who underwent colorectal resection in the 2011 ACS NSQIP PUF. Colorectal resection was defined using Common Procedural Terminology codes for both open and laparoscopic procedures, including 44140–44147, 44150, 44151, 44155–44158, 44160, 44204–44208, 44210–44212, 45110–45114, 45116, 45119–45123, 45126, 45135, 45136, 45395, and 45397. Patients missing information on LOS and those with a LOS recorded as ≤ 0 d were excluded from the analysis. In addition, patients who were listed as still in the hospital and those who died during the initial inpatient hospitalization were excluded (Fig. 1).

Patient demographic characteristics including age, sex, and race were abstracted from the NSQIP database, as was information regarding preoperative comorbidities and whether the procedure was performed electively or emergently. Heart disease was assigned for all patients with a recorded history of congestive heart failure, myocardial infarction, percutaneous coronary intervention or stenting, and/or angina. A history of colorectal cancer was defined using a postoperative International Classification of Diseases, Ninth Edition (ICD-9) diagnosis code of 153, 153.0, 154, 154.0, or 197.7. The simultaneous creation of an ostomy was determined using the Common Procedural Technology codes 44141, 44143, 44144, 44146, 44188, 44206, 44208, 44320, 44322,

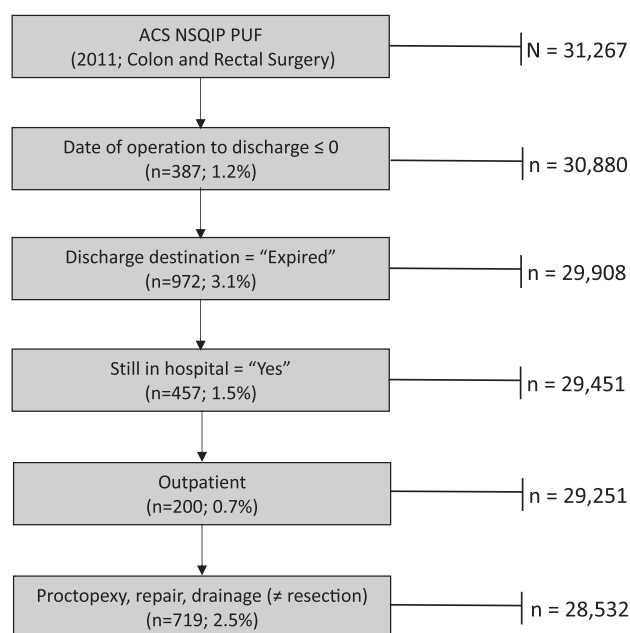


Fig. 1 – Selection of the study cohort.

44340, 44345, 44346, 45110, 45395, 44150, 44151, 44156, 44157, 44158, 44211, and 44187.

To examine the effects of patient complications on the likelihood of ED and that of readmission, patients were classified by the presence or absence of any PO. Information regarding POs, including cardiac, respiratory, infectious, renal and neurologic events, and an unplanned return to the operating room was noted. More specifically, POs categorized as wound complication (superficial skin infection, deep surgical site infection, or fascial dehiscence), organ space infection, sepsis (sepsis or septic shock), renal (progressive renal failure or acute renal failure requiring dialysis), venous thromboembolism (deep vein thrombosis or pulmonary embolism), respiratory (pneumonia, intubation for greater than 48 h, or reintubation), bleeding (hemorrhage requiring transfusion of at least 4 U of blood), neurologic (stroke or coma), urinary tract infection, or cardiac (myocardial infarction or arrest requiring resuscitation) were abstracted directly from the ACS NSQIP PUF, and patients were classified by occurrence status: no occurrence, any occurrence before hospital discharge, and any occurrence after hospital discharge.

The primary outcome variable was procedure-specific ED. The secondary outcome of interest was 30-d readmission. LOS was defined as the number of days from the index operation to hospital discharge (to home or any facility). Because it is commonly acknowledged that differences in LOS exist by procedure, procedure-specific ED was defined as an LOS < 25 th percentile for rectal resection, open colectomy, and laparoscopic colectomy, respectively [11,12]. ED was reported as a binary outcome. Readmission refers to an admission to any hospital within 30 d of the principal surgical procedure, as defined within the NSQIP PUF.

Descriptive statistics were performed. Patient and procedure characteristics were examined by ED status using the Student *t* and chi-square tests, as appropriate. Multivariate

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