Ninety-day readmission after colorectal cancer surgery in a Veterans Affairs cohort

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ABSTRACT

Background: Readmissions following colorectal surgery are common. However, there are limited data examining unplanned readmissions (URs) after colorectal cancer (CRC) surgery. The goal of this study was to identify reasons and predictors of UR, and to examine their clinical impact on CRC patients.

Methods: A retrospective cohort study using a prospective CRC surgery database of patients treated at a VA tertiary referral center was performed (2005-2011). Ninety-day URs were recorded and classified based on reason for readmission. Clinical impact of UR was measured using a validated classification for postoperative complications. Multivariate logistic regression analyses were performed to identify predictors of UR.

Results: 487 patients were included; 104 (21%) required UR. Although the majority of UR were due to surgical reasons ($n = 72$, 69%), medical complications contributed to 25% of all readmission events. Nearly half of UR ($n = 44$, 40%) had significant clinical implications requiring invasive interventions, intensive care unit stays, or led to death. After multivariate logistic regression, the following independent predictors of UR were identified: African—American race (odds ratio [OR] 0.47 [0.27—0.88]), ostomy creation (OR 2.50 [1.33—4.70]), and any postoperative complication (OR 4.36 [2.48—7.68]).

Conclusions: Ninety-day URs following colorectal cancer surgery are common, and represent serious events associated with worse outcomes. In addition to postoperative complications, surgical details that can be anticipated (i.e., ileostomy creation) and medical events unrelated to surgery, both contribute as important and potentially preventable reasons for UR. Future studies should focus on developing and examining interventions focused at improving the process of perioperative care for this high-risk population.

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1. Introduction

Readmissions after colorectal surgery are common with studies reporting 30- and 90-d readmissions rates ranging from 7%—19% [1—6] and 23%—27% [6—8], respectively. Given the number of colorectal procedures performed annually, readmissions after colorectal surgery are among the most common causes of surgical readmissions [2]. Despite being relatively common, unplanned readmissions (URs) are nevertheless considered adverse events, as they interfere with the postoperative recovery process [5] and lead to significant financial burden to patients and the health care system [6]. The estimated Medicare expenditures due to potentially preventable readmissions is up to $17.4 billion per year [9,10]. Additionally, URs after surgery for malignancy, including specifically colorectal cancer (CRC), have been associated with worse long-term outcomes, including decreased 1-y overall survival [1,11].

Given the significant impact on health care costs and the substantial variability in the rates of URs, readmissions are currently viewed as a measure of the quality of care provided to patients [12,13]. The Medicare Payment Advisory Committee recommended to Congress to provide lower payments to hospitals with high risk-adjusted readmission rates for selected medical conditions [9]. The Patient Protection and Affordable Care Act is targeting lower rates of readmission as a method to decrease overall health care costs, and has followed the recommendation for decreased payments to hospitals with high rates of readmission [14], which took effect on October 2012, and is likely to include elective operations in the future [15].

In an effort to better understand and decrease readmissions after colorectal surgery, a series of studies have recently examined rates of readmissions and evaluated the most common causes [1,3—8,16—23]. However, the methods used to capture readmissions in these studies vary, and most have focused on readmission causes explicitly related to the surgical procedure, missing other potentially preventable reasons for readmissions, that are not necessarily related to the index hospitalization [24]. Similarly, the data examining reasons and predictors of URs focus on colorectal surgery in general, and data in cancer patients are limited. Given readmissions are associated with a negative impact on survival, and as patients with cancer require additional treatments and care coordination after recovery from surgery that extend beyond the traditionally studied 30-d window [1,11], these issues are particularly relevant. Additionally, with the exception of cost and length of stay at the time of rehospitalization, the clinical impact during readmission episodes is currently unknown, and this is of great importance when understanding the continuity of care for cancer patients; for example, a readmission with a major clinical impact on a patient with cancer may delay receipt of adjuvant therapy, which ultimately may impact long-term survival, whereas a readmission for other less severe reasons may allow for standard recovery and no interruption of adjuvant therapies. Therefore, the importance of understanding the interplay of readmissions with these factors for the cancer population cannot be overlooked, especially as it relates to understanding the specific causes for readmissions (as a means to identify targets for intervention beyond reducing complications), and regarding the clinical impact of these events, and their potential effect during transitions of care.

Based on the previous considerations, we designed a retrospective cohort study, using direct physician chart review to examine the incidence of 90-d URs after curative surgery for CRC within an integrated health care system and to evaluate the specific causes contributing to readmission. We also sought to investigate the clinical impact of readmissions, using a validated model, and identify specific predictors of UR after surgery in this cancer population.

2. Methods

2.1. Study subjects

A retrospective cohort study was performed using a prospectively maintained database of all CRC operations performed at the Michael E. DeBakey Veterans Affairs Medical Center from 2005—2011, whether performed electively or emergently. This database is maintained through systematic physician chart reviews and contains information on patient demographics and comorbidities, operative and perioperative data, tumor and treatment characteristics, and long-term follow-up. Patients with American Joint Committee on Cancer, seventh edition stage IV disease, were excluded from this study, as were those undergoing noncurative resections. This study was approved by the Institutional Review Board at Baylor College of Medicine and the Research & Development committee at Michael E. DeBakey Veterans Affairs Medical Center.

2.2. Independent variables and outcomes

Preoperative data included patient demographic variables (age, gender, race, and body mass index) and comorbidities, which were classified using the Charlson comorbidity index [25]. Cancer diagnosis was excluded from this calculation, as this was present in all patients. Operative data recorded included surgical approach (open, laparoscopic, and laparoscopic converted to open approaches) and creation of an ostomy during the index operation. Ileostomies were typically created for diversion of a rectal anastomosis, and colostomies were commonly created due to colonic obstruction or as part of an abdominoperineal resection. Postoperative data included length of stay, postoperative complications (defined using the VASQIP criteria) [26], and in-hospital death.

The primary outcome of interest was UR within 90 d, measured from the discharge day (day 0) after the index operation. Patients with planned readmissions, clearly documented as a step in the sequence of treatments for the cancer or for unrelated conditions, were not included as having the outcome interest but were still kept in the models for analysis. Such planned readmissions included ileostomy takedown, port placement/initiation of chemotherapy (if admission required for social reasons), and readmissions for planned elective unrelated procedures (e.g., cystoscopy/transurethral prostatectomy, other). For those patients admitted to any