The American Journal of Surgery (2017) 213, 742-747

The American Journal of Surgery®

Should patients With obstructing colorectal cancer have proximal diversion?

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KEYWORDS:
Colorectal cancer;
Obstruction;
Diversion;
Stoma;
Complications

Abstract

BACKGROUND: Up to 20% of patients with colorectal cancer present with obstruction. The goal of this study was to compare the short-term outcomes of patients with obstructing colon cancer who underwent resection and primary anastomosis with or without proximal diversion.

METHODS: The American College of Surgeons' National Surgical Quality Improvement Program Procedure Targeted Colectomy databases from 2012 to 2014 were reviewed. Patients undergoing colorectal resection with or without diverting ostomy for obstructing colorectal cancer were analyzed. Propensity score–matched cohorts of diverted and nondiverted patients were created accounting for patient characteristics. The primary outcomes were 30-day mortality, postoperative complications, and readmission.

RESULTS: There were 2,323 patients (92%) with no proximal diversion and 204 patients (8%) with proximal diversion. In univariate analysis, patients with colorectal resection with diversion were significantly more likely to have any complication ($P = .001$), sepsis ($P = .01$), and blood transfusion ($P = .001$). Diversion patients were also significantly more likely to be readmitted to the hospital within 30 days of the index procedure ($P = .02$). Proximal diversion was associated with any complication ($P = .01$), failure to wean off ventilator ($P = .05$), and longer length of stay ($P = .01$) in matched cohorts.

CONCLUSIONS: Proximal diversion in the setting of obstructive colorectal cancer is associated with higher rates of any complication, deep wound infection, sepsis, and readmission. Surgeons who perform a primary anastomosis with diversion for obstructing colorectal cancer should take into account the significant risk for postoperative complications.

Colorectal cancer is the third most common cancer and the third leading cause of cancer death in United States.[1]

Despite the improvement in diagnostic modalities and screening protocols, approximately 20% of the patients present with obstruction, mostly from tumors on the left side.[2–4] The treatment of choice for obstructing colorectal cancer depends on the general condition of the patient, the location of the tumor, and the degree of obstruction. Various palliative and curative procedures may be considered. However, primary resection of the tumor is the preferred option for the patient when possible.[2,5–9] In

There were no relevant financial relationships or any sources of support in the form of grants, equipment, or drugs.

The authors declare no conflicts of interest.

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Manuscript received April 9, 2016; revised manuscript August 5, 2016

0002-9610/$ - see front matter © 2016 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.amjsurg.2016.08.005

patients who undergo resection, there is still a debate whether to perform a 1-stage or multi-stage operation. Traditionally, patients with left sided obstructing colorectal cancer were treated with a Hartman's procedure.[3,10,11] In the past decade, resection and primary anastomosis gained popularity over Hartman's procedure in low-risk patients.[2,4,5,12] Often, primary anastomosis is protected by a diverting ileostomy to prevent the morbidity and mortality associated with anastomotic leak.[13–15] However, it has been shown that the morbidity of ileostomy creation and its closure may reach 50% and includes anastomotic leak, bowel obstruction, surgical site infection, parastomal hernia, dehydration, and readmissions.[16–18]

There is some evidence to suggest that primary anastomosis without proximal diversion in patients with obstructing colorectal cancer may lead to a lower rate of postoperative complications.[7,19–24] However, large-scale studies are lacking, and there is still a debate as to whether proximal diversion should be routine in those patients or should be avoided when possible.

The aim of this study is to compare the outcomes of patients with obstructing colon cancer who underwent resection and primary anastomosis with or without proximal diversion. This study was carried out using the American College of Surgeons' National Surgical Quality Improvement Program (ACS NSQIP) a large, multicenter, prospectively collected database.

Methods

Data collection

The 2012, 2013, and 2014 NSQIP Procedure-Targeted Colectomy Databases were used in this study. The Procedure-Targeted Colectomy Database is designed for high-risk, high-volume procedures for large or specialty hospitals and includes 22 perioperative variables specific for colorectal procedures including bowel prep, anastomotic leak, and postoperative ileus. Many of these variables are specific for colon cancer including chemotherapy, resection margins, and cancer staging. Multicenter prospective data were collected from 203 hospitals.[25]

Patients were coded in NSQIP as having a surgical indication of colorectal cancer with obstruction. This was defined based on the surgeon's postoperative diagnosis and/or the pathology reports. Patients included in the study underwent a colorectal resection with primary anastomosis defined by Current Procedural Terminology (CPT) codes of the American Medical Association 44140, 44145, 44146, 44160, 44204, 44205, 44207, and 44208. Stoma construction was identified via CPT codes 44310 and 44320 There were 2,527 eligible patients.

The Procedure-Targeted Colectomy Database and traditional NSQIP databases include more than 300 common perioperative variables. Data include demographics, comorbidities, postoperative outcomes up to 30 days (data beyond 30 days are not available), and other variables. Outcome variables include mortality, need for reoperation, duration of stay, and in-hospital and out-of-hospital complications. Access to the NSQIP database is available to all investigators at ACS-NSQIP participating hospitals.

Outcomes

Primary outcomes in this study are mortality, postoperative complications, and hospital readmission. Major gastrointestinal complications specific to the Procedure-Targeted Colectomy Database include anastomotic leak and prolonged postoperative NPO or NGT use. Nongastrointestinal specific–postoperative complications include wound infection, cardiac arrest requiring cardiopulmonary resuscitation, myocardial infarction, septic shock, sepsis, coma, stroke, urinary tract infection, acute renal failure, renal insufficiency, pneumonia, reintubation, failure to wean from ventilator within 48 hours, blood transfusion, deep vein thrombosis, pulmonary embolism, and reoperation. These outcomes are assessed in-hospital and out-of-hospital for 30 days.

Statistical analysis

Univariate analysis was conducted using Pearson chi-square and Fisher's exact tests for categorical variables and independent *t* tests for normally distributed continuous variables. Significance was defined as $P < .05$ for all tests.

Rates of baseline comorbidities and patient's characteristics differed substantially between patients who underwent diversion and patients who did not undergo diversion. To control these significant differences between the 2 patient populations studied (no diversion vs diversion patients), propensity score matching was utilized. The use of propensity score matching has been shown to reduce bias.[26,27] A logistic regression model was fitted with diversion vs nondiversion as outcome and age, race, and comorbidities as covariates. The model's discrimination, based on a C statistic, was .82. The patients were matched using an "optimally" matching algorithm. Table 1 compares the baseline characteristics of the diverted patients and the nondiverted patients matched by this algorithm. Statistical analyses were conducted using SAS version 9.4 (SAS Institute, Cary, NC).

Results

There were a total of 2,527 patients who underwent colorectal resection with anastomosis with or without proximal diversion. There were 2,323 patients (92%) with no proximal diversion and 204 patients (8%) with proximal diversion. The demographics and clinical characteristics of the patients are described in Table 1. There were several factors between the 2 groups that were significantly different from one another including age, medical comorbidities,