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Association of surgical care practices with length of stay and use of clinical protocols after elective bowel resection: results of a national survey

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Abstract

BACKGROUND: Although management techniques have been proposed to accelerate gastrointestinal recovery after elective bowel resection (BR), most data are derived from single-institution experience. This study assessed the current state of perioperative care for elective BRs and the effect of pathway components on length of stay.

METHODS: A web-based survey was conducted among surgeons regarding their last elective BR.

RESULTS: Among 207 general and 200 colorectal surgeons, 30% practice in hospitals with a perioperative surgical care pathway intended to accelerate gastrointestinal recovery. Pathway components included early ambulation, early diet progression, early nasogastric tube removal/avoidance, and opioid-sparing pain control. Care practices associated with decreased length of stay included laparoscopic technique, early mobilization, early liquids, and antiemetic use to prevent symptoms associated with prolonged postoperative ileus.

CONCLUSIONS: Few hospitals have pathways but most surgeons likely would implement nationally endorsed guidelines. These data, along with other studies, may lead to well-accepted BR care pathways.

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As quality outcomes and cost become increasingly scrutinized in public and private institutions, gastrointestinal (GI) surgical outcomes are ever more important given that approximately 500,000 of these surgeries are performed each year in the United States.¹ Postoperative ileus (POI)

may occur to some degree after various types of surgery, however, it is most common after major surgical procedures within the abdomen or pelvis, such as bowel resection (BR).² Postoperative ileus is associated with negative patient outcomes including delayed oral intake of nutrition, nausea and vomiting, and delayed passage of flatus and

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stool.³⁻⁷ In addition, POI has been found to be associated with longer hospital stays,^{2,3,8} increased rates of readmission,² and high hospital costs.^{2,3} Hospitalization costs related to POI for common abdominal-related procedures have been estimated at \$1.46 billion per year.²

To optimize patient recovery after abdominal surgery, accelerated care pathways and specific perioperative care procedures have been used. These are intended to expedite GI recovery and reduce the incidence/duration of POI, thus reducing the average length of stay (LOS).^{9,10} Specifically, early diet initiation,⁹⁻¹⁴ early ambulation,^{9-11,14} laparoscopic technique,^{8,15} opioid sparing,⁷ and patient education^{7,11,14} have been associated with reduced LOS. Early diet initiation and patient instructions on early return of GI function also have been associated with a decreased incidence of POI.⁷ Despite these published findings, it remains unclear which care pathway components optimally accelerate GI recovery and reduce LOS. Moreover, the number of surgeons in the United States using such care pathways is unknown.

The primary objective of this study was to formally assess the current state of perioperative care for elective BRs in the United States by enumerating the frequency of use and content of care pathways. Secondary objectives were to measure the association of clinical pathway elements on LOS and understand surgeon attitudes regarding POI.

Methods

A web-based survey was conducted among surgeons who were sampled from the American Medical Association master list of physicians. General surgeons were targeted for inclusion based on International Classification of Diseases, 9th revision codes related to BRs. Qualified physicians had to be general or colorectal surgeons, licensed to practice in the United States, in practice between 2 and 30 years, conduct 1 or more elective BRs in a typical month on more than 90% of patients 18 years of age or older. A total of 1,310 colorectal and 11,940 general surgeons received an invitation to participate in the research between January 13 and February 2, 2009.

We designed the survey to identify clinical care practices specific to elective BR perioperative care regarding the respondent's last elective BR, perceptions of care practices most critical to achieving optimal patient outcomes, use and components of clinical pathways (defined as a management protocol that includes components to accelerate GI recovery), and perceptions of the incidence and burden of prolonged POI (defined as clinically significant delay in GI function >120 hours [5 days] postoperatively). The Copernicus Group provided Institutional Review Board approval for this research.

Statistical analysis was performed using Stata version 10 (College Station, TX). Descriptive statistics were calculated using *t* tests and significance was defined as a *P* value of less

than .05. Multivariate analyses using logistic regression were conducted to further understand the relationship between perioperative care practices, physician demographics, and postoperative LOS. Seven respondents were excluded from the analysis: 1 had inconsistent responses and 6 were outliers (LOS, >10 d). Outliers were removed in an effort to analyze only typical patients. The regression coefficients in our models represent the extent to which the mean LOS (dependent variable) is expected to decrease (if coefficient is negative) when specific perioperative care practices or surgeon demographics (independent variables) are present, keeping other independent variables constant. Three regression models were analyzed and compared: all BRs, laparoscopic BRs (LBR), and open BRs (OBR). Statistical significance was measured using the likelihood-ratio test and was defined as a *P* value of less than .05 or a *P* value of less than .01.

Results

Respondent characteristics and demographics

A total of 407 surgeons completed the survey (207 general surgeons, 200 colorectal surgeons). The response rate was 22% and 7% for colorectal and general surgeons, respectively. The qualification rate was 76% and 67% for colorectal and general surgeons, respectively. Most respondents were white (76%), male (90%), an average of 46.6 years old (standard deviation [SD], 8.4 y), and in practice for 13.7 years (SD, 7.9 y). A majority (53%) practiced in a community hospital/clinic, followed by a teaching hospital/university (27%), private office (18%), or veteran's hospital/other practice type (2%). Practice locations were described as suburban (46%), urban (43%), and rural (11%). Most (60%) reported electronic medical record (EMR) use at their hospital. Over the 3 months prior to the survey, surgeons report most elective BRs were segmental resections of the large bowel (61% of OBRs, 73% of LBRs).

On average, respondents performed their last elective BR procedure 9.0 days (SD, 6.9 d) before completing the survey. Half of the respondents performed an OBR for their last elective BR patient and the other half performed a LBR. General surgeons were significantly more likely than colorectal surgeons to indicate they performed an OBR last (52% vs 42%, respectively; *P* < .05). Alternatively, colorectal surgeons were more likely than general surgeons to report they conducted a straight LBR (30% vs 24%) or hand-assisted LBR (27% vs 20%).

Surgeon care practices

Table 1 outlines perioperative care practices respondents used for their last elective BR. The most commonly used perioperative care practices were preoperative bowel preparation (89%), early (postoperative day [POD] 0) postoper-

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