

Clinical Science

Readmissions after ileostomy closure: cause to revisit a standardized enhanced recovery pathway?



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Abstract

BACKGROUND: Our objective was to evaluate ileostomy reversal patients managed with a standardized enhanced recovery pathway to identify factors associated with readmissions.

METHODS: Prospective review database identified ileostomy reversal patients. Variables for the index admission and readmission were evaluated.

RESULTS: Three hundred thirty-two patients were analyzed. The primary diagnosis was colorectal cancer (57.6%). Thirteen percent of the patients were discharged by postoperative day (POD) 1, 47% by POD 2, and 65% by POD 3. The complication rate was 16.8%. The main complication was ileus/small bowel obstruction ($n = 27$). Thirty-day readmission rate was 12.4% ($n = 41$); small bowel obstruction ($n = 27$) was the most frequent readmission diagnosis. The median readmission POD was 7. Only 1 patient had a follow-up visit before readmission. The median readmission length of stay was 4 days.

CONCLUSIONS: Most ileostomy reversal readmissions occur before the first follow-up and stem from preventable causes. An enhanced recovery pathway modification may improve outcomes and utilization in this group.

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Unplanned readmissions after colorectal surgery are common, unpredictable, and costly.^{1,2} Previous work has attempted to identify the factors related to readmission.³⁻⁶ However, the predictive variables have not been well

defined or successfully implemented to improve patient outcomes. The benefit of an enhanced recovery pathway (ERP) on length of stay (LOS) and short-term outcomes has been proven.⁷⁻¹⁸

Since 2000, our institution has developed, modified, and implemented a standardized ERP and discharge criteria. These measures incorporate 5 core areas: pre- and post-operative patient information, preservation of gastrointestinal function, avoidance of organ dysfunction, active pain control, and promotion of patient autonomy. Our success in patient outcomes with the ERP has been previously described.^{7,11,19,20} The benefits of an ERP have been

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demonstrated specifically for ileostomy reversal. Earlier studies from our institution found a 9.5% readmission and 4.8% reoperation rate within 30 days of closure.²¹ As our ERP has been refined, patients overall have realized the benefit of early discharge with low readmission rates.²² However, the readmission rate after ileostomy reversal is significantly higher. Thus, we recognized an opportunity to improve patient outcomes with the cohort of ileostomy reversal patients.

The objective of this study was to review patients readmitted after ileostomy reversal using an ERP. Our hypothesis is that by identifying amendable variables, and incorporating these items in an ERP for that ileostomy reversal cohort, we may reduce complications, readmission rates, and subsequent healthcare expenditures.

Patients and Methods

A retrospective review of an Institutional Review Board-approved prospective department database was performed to identify patients who underwent an ileostomy reversal from August 2006 to August 2012. The patients identified with Current Procedural Terminology codes 44,620, 44,625, and 44,626 were considered for evaluation. Ileostomy reversal was the primary procedure for the episode of care. Patients under 18 years of age, patients with colostomies, and those with incomplete medical records were excluded from the study. Patients were stratified as non-readmitted and readmitted within 30 days of the ileostomy reversal. Preoperative, perioperative, and postoperative factors for the index admission and readmission were included in the analysis. Additional demographic and clinical information was extracted from the electronic medical records. Data extracted included operative reports to verify closure technique and case details, radiology reports, laboratory data, discharge summaries, emergency department visits, and follow-up visit results. Data fields evaluated for the index episode of care included age, sex, body mass index, comorbidities, procedure type, procedure indication, hospital LOS, operative time, blood loss, postoperative complications, and discharge disposition. For the readmission episode, additional data fields evaluated included postoperative day (POD) of readmission, readmission diagnosis, readmission LOS, white blood cell count, blood urea nitrogen (BUN), and creatinine levels at readmission, reoperation rate at readmission and discharge disposition.

Ileostomy closure

All closures were performed under general anesthesia. A circumferential peristomal incision was made and deepened down to the fascia. The fascia was mobilized off the small bowel. The small bowel was adequately mobilized to return the ileostomy closure site to the abdominal cavity. The stoma was everted and the edges freshened. Depending on the operating surgeon's preference, the bowel was then

either closed transversely with interrupted sutures or resected with a side-side stapled anastomosis. The fascia was closed with interrupted figure-of-eight sutures. Based on surgeon's preference, the ileostomy closure site was either loosely stapled closed with a Penrose drain placed in the cavity or partially closed with a subcuticular purse-string suture and betadine-soaked Telfa strips in the central opening. The drain and packing strips were routinely removed on POD 2.

Definition of complications

Postoperative ileus was defined as lack of tolerance of oral diet or absence of stool by POD 3.²³ Small bowel obstruction (SBO) was defined as symptoms of nausea, vomiting, constipation, or obstipation with radiographic evidence of SBO after initial return of bowel function, or mechanical intestinal obstruction confirmed by laparotomy or contrast study.²⁴

Statistical analysis

Data analysis was completed using means, with standard deviations, and medians, with ranges, as appropriate.

Results

Three hundred forty-five patients underwent ileostomy reversal during the study and were managed by a standardized ERP. Ten patients under 18 years of age and 3 patients with incomplete medical records were excluded, leaving 332 patients included in the analysis. Fifty-four percent ($n = 178$) were female. The median age was 58 years (mean 55.49, range 19 to 88) and median body mass index was 26 (mean 27.0, range 15 to 51.3). The mean Charlson Comorbidity Index was 2.1, and most patients were American Society of Anesthesiologists class 2 ($n = 147$, 44.0%) or 3 ($n = 178$, 54.0%) (Table 1). The primary diagnosis was colorectal cancer (57.6%), and the primary procedure performed was a low anterior resection (49.4%) (Table 2). The majority of cases ($n = 316$, 95%) were performed open, while 4% were laparoscopic, and 1% laparoscopic converted to open. The median operative time was 69 minutes (mean 82.9, range 31 to 312) and median blood loss was 15 mL (mean 35, range 0 to 1,000). Most patients ($n = 231$, 70%) had a hand-sewn ileostomy closure. Thirteen percent of patients were discharged by POD 1, 47% by POD 2, and 65% by POD 3. The complication rate was 16.8% ($n = 56$). The major complications were postoperative ileus/SBO ($n = 27$, 44.3%), wound infection ($n = 10$, 16.1%), and dehydration ($n =$ five, 8.1%) (Table 3). Of the 10 wound infections, 7 were suture closed (7/231, 3.0%) and 3 were stapled (3/101, 3.0%).

The readmission rate within 30 days of operation was 12.3% ($n = 41$). The median POD of readmission was day

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