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Discharge criteria after colon resection: Is return of bowel function necessary?

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ABSTRACT

Background: This study was performed to evaluate tolerance of liquids as discharge criteria in a perioperative enhanced recovery protocol.
Methods: Patients undergoing elective colon resections were prospectively enrolled in a standardized perioperative enhanced recovery process. Patients were eligible for discharge when able to tolerate sufficient oral liquids, as determined by clinical means, that intravenous fluids were no longer needed.
Results: Over an 18 month period, 94 patients were evaluated; 75 (80%) tolerated sufficient liquids such that intravenous fluids were no longer needed by the second and all by the third postoperative day. The average postoperative length of stay was 3.8 days. At discharge, 59 (63%) and 20 (21%) patients reported passage of flatus and stool respectively. On 30 day follow up, 8 (8.5%) patients had been re-admitted.
Conclusion: These data suggest that after elective colon surgery, patients can be discharged when able to tolerate sufficient oral liquids.

1. Introduction

Colon and small bowel resections are among the most common surgical interventions, with approximately 350,000 procedures performed annually in the United States. Over the past 2 decades standardized care plans (Enhanced Recovery Protocols) for the preoperative, intraoperative and postoperative management, have been developed and implemented; reducing postoperative complications, decreasing the postoperative length of hospital stay, lowering health care costs, and improving the patient experience. Specific elements of these processes, including surgical technique, appropriate use of nasogastric tubes, bowel preparation, perioperative fluid management, prokinetic agents, opioid-sparing pain control and early activity, have been widely proven with evidence based recommendations.[1–11]

The timing of the resumption of oral food and liquids after gastrointestinal surgery has also been extensively studied. In aggregate, these studies have demonstrated that an oral diet can be resumed before there is objective evidence of a return of gastrointestinal function.[5] In fact, feeding started early in the postoperative course can help prevent the complication of ileus. However, it has also been found that too much feeding can overwhelm the gastrointestinal tract, resulting in a severe ileus.[12]

An essential component of all of the current perioperative enhanced recovery processes is standardized discharge criteria. Traditionally, the criteria for discharge after small bowel and colonic resections accepted by physicians, quality assurance organizations and third party payers have included tolerance of a diet and objective evidence of a return of gastrointestinal function; passage of flatus and stool. Established enhanced recovery processes begin an oral diet on the second day postoperatively. However, in up to 12% of patients, this overwhelms the gastrointestinal tract resulting in the complication of severe ileus increasing the risk of complications and length of hospital stay.[5]

The goal of this study was to not aggressively begin an oral diet and evaluate tolerance of liquids alone as discharge criteria in a perioperative enhanced recovery protocol. Our hypothesis was that patients could be safely discharged once able to tolerate liquids without return of bowel function.

2. Methods

Patients undergoing elective large and small bowel resections by a single surgeon at a Veteran's Administration hospital were prospectively enrolled in a perioperative enhanced recovery protocol from July 2012 through December 2014. All consecutive procedures were included in this study; there were no exclusion

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criteria. The perioperative enhanced recovery process included preoperative counseling for daily goals and discharge criteria, avoidance of antibiotic or mechanical bowel preparation, ertapenem single dose for antibiotic prophylaxis, perioperative opioid receptor blockers (alvimopam), laparoscopic technique if feasible, scheduled non-steroidal anti-inflammatory agents, patient controlled analgesia and oral liquids immediately post recovery. On the morning of the first postoperative day, the patient controlled analgesia was discontinued, preoperative activity was resumed and intravenous fluids were stopped. The perioperative care protocol did not include carbohydrate loading or goal directed perioperative fluids. Patients were considered eligible for discharge when they met the criteria described in Table 1.

The need for intravenous fluids was determined by clinical means; urine output and clinical sign of dehydration. For patients exhibiting clinical signs of dehydration after discontinuing intravenous fluids, oral liquids were encouraged. If this was unsuccessful, bolus intravenous fluids were given; continuous intravenous fluids were not restarted. The patient's routine regular diet was not resumed until after discharge.

Data collected included age, gender, procedure performed, indication for operation, operative technique, day of tolerance of liquids, day of passage of flatus and stool (if applicable), length of hospital stay, 30-day readmission rates and post discharge mortality.

For statistical analysis, the patient cohort was evaluated using descriptive statistics for means (with standard deviation) and medians (with range) for normally distributed data, and frequency (with percentage) for continuous data.

3. Results

During the study period, 107 consecutive patients were evaluated. The study group was predominately male, 104 (97%), with an average of 67 years (range 51–84). The indications for operation were neoplasia; invasive carcinoma or a polyp in 98 (92%) patients, recurrent or complicated diverticulitis in 8 (7%) patients and lower GI hemorrhage in 1 (1%) patient. The procedures performed were right or extended right colectomy; 46 (43%) patients; low anterior resection; 30 (28%) patients; left or sigmoid colectomy; 27 (25%) patients and abdominal perineal resection; 4 (4%). A stoma was created in 19 (18%) patients. A laparoscopic approach was completed in 76 (71%) patients. The remaining patients had an open approach, 22 (21%) patients or a laparoscopic converted to open, 9 (8%) patients.

Postoperatively, the enhanced recovery protocol was discontinued in 13 (12%) patients for postoperative pulmonary failure, 9 (8%) patients, cardiac dysfunction, 3 (3%) patients, and bleeding requiring transfusion and resuscitation, 1 (1%) patient. Of the remaining 94 patients, 75 (80%) were eligible for discharge by the second postoperative day, and 100% were eligible by the third postoperative day. Patients received an average of 4 doses of alvimopan. Despite meeting discharge criteria, discharge was delayed in 21 (22%) patients primarily for delayed post hospital care arrangements. The average postoperative length of stay was 3.8 ± 1.2 days. While return of bowel function was not a requirement for discharge, 59 (63%) and 20 (21%) patients reported passage of flatus and stool respectively at the time of discharge. Readmission within 30 days occurred for 8 (8.5%) patients; all for surgical site infections. No patients died within 30 days after discharge.

Table 1
Proposed Discharge Criteria following small bowel and colon surgery.

1 Tolerance of sufficient liquids such that intravenous fluids are no longer required.
2 Fever less than 99.5° F for the 24 h prior to discharge.
3 Adequate pain control (pain scores less than 4) with oral medications.

4. Discussion

Standardized perioperative processes to enhance recovery after small bowel and colon resections are now widely accepted and have been shown to shorten the postoperative length of stay by 1.5–4 days with an associated cost savings of $2806 - $7129 per patient, related primarily to the decreased length of hospital stay.[13–15] The accepted criteria for hospital discharge in all of the currently published enhanced recovery protocols require at least tolerance of a solid diet and passage of flatus before discharge. The unique feature of the perioperative enhanced recovery protocol used in this study was the discharge criteria. Patients were considered eligible for discharge when they were able to tolerate sufficient oral liquids, determined by clinical means, so that intravenous fluids were no longer necessary. In this study, at the time of discharge, only 63% of patients had passed flatus and would have been considered for discharge with traditional established criteria.

The potential for hospital re-admission is an important concern with all of the perioperative enhanced recovery protocols. Hospital re-admission is associated with decreased patient satisfaction and increased costs. In this series, 8.5% of patients were re-admitted within 30 days. All of these re-admissions were for surgical site infections; none for the development of an ileus. This is comparable to the 9% readmission rate reported with other perioperative enhanced recovery protocols.[13–15] This low re-admission rate is postulated to result from the lack of the requirement for tolerating a regular diet to meet accepted discharge criteria. Without this requirement, it is felt that patients are less likely to overwhelm the gastrointestinal tract and develop an ileus.

The limitations in this study include the study design; a case series, without a control group which limits the ability to draw conclusions from the results. The perioperative enhanced recovery protocol did include elements associated with accelerating return of bowel function; predominantly laparoscopic technique and opioid receptor blockers; but did not include goal directed perioperative fluids or carbohydrate loading, 2 factors that have been reported to be independently associated with a decreased postoperative length of stay and could have an additional impact.[13,14] However, the results do demonstrate a potential for changing discharge criteria with the implications of further reducing length of stay and costs. Further controlled studies are warranted.

5. Conclusions

These data suggest that after elective small bowel and colon surgery, patients can be discharged when able to tolerate sufficient liquids such that intravenous fluids are no longer necessary. Tolerance of a solid diet and return of GI function is not necessary prior to discharge.

Disclosures

The author has NO disclosures related to this work.

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