

Outpatient colectomy—a dream or reality?

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ABSTRACT

Whereas the advancement of minimally invasive surgical techniques and enhanced recovery after surgery (ERAS) pathways for partial colectomies has shortened postoperative length of stay, the ideal length of stay after partial colectomy with or without diverting loop ileostomy is still up for debate. This article examines the safety and efficacy of discharging select patients home from day surgery following partial colectomy. We performed a retrospective review of 7 patients who underwent partial colectomy at one tertiary care center from December 2020 to August 2021. None of our cases suffered complications such as anastomotic leak, surgical site infection, or bowel obstruction or required admission to the hospital. One patient was seen in the emergency department on postoperative day 1 for nausea and vomiting and was managed as an outpatient. A second patient required a fluid bolus in the clinic for high ileostomy output. In conclusion, our study suggests that appropriately selected patients can be successfully managed in the outpatient setting without increased complications following partial colectomy when preoperative preparation and education are put in place alongside our colon ERAS pathway and minimally invasive surgical techniques.

KEYWORDS Colectomy; ERAS; length of stay; minimally invasive surgery; outpatient surgery; robotic surgery

Enhanced recovery programs are evidence-based protocols designed to standardize medical care, improve outcomes, and lower health care costs. These protocols include evidence-based techniques to minimize postoperative pain, reduce complications, improve outcomes, decrease hospital length of stay, and expedite recovery. Multimodal enhanced recovery after surgery (ERAS) is an integrated, multidisciplinary approach that requires participation and commitment from the patient, surgeons, anesthesiologists, pain specialists, nursing staff, physical and occupational therapists, social services, and hospital administration.^{1,2} ERAS protocols have helped convert many operations previously performed in the hospital to outpatient/ambulatory procedures. As experience developed with these protocols, principles of enhanced recovery were applied to increasingly complex procedures to reduce hospital length of stay and expedite return to baseline health and functional status.^{2,3} ERAS protocols developed for colorectal surgery patients reduce physiological stress and postoperative organ dysfunction through optimization of perioperative care and

recovery.^{1–4} Typically, such protocols include perioperative opioid-sparing analgesia, a minimally invasive approach for the colorectal resection, avoidance of nasogastric tubes and peritoneal drains, aggressive management of postoperative nausea and vomiting, and early oral feedings and ambulation. The colorectal surgery division in our institution has developed a robust ERAS program that has slowly trended toward shorter length of postoperative stays. The current length of stay averages 1 day for right hemicolectomies and 1 to 2 days for left hemicolectomies/low anterior resections. Due to the shortage of hospital beds during the COVID-19 pandemic, we identified an opportunity to take the next step in this progression and perform same-day colectomies in appropriately selected and prepared patients.

METHODS

We performed a retrospective review of all patients who underwent partial colectomy at one tertiary care center in our system from December 2020 to August 2021. *Table 1* shows the inclusion and exclusion criteria for the study. This

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case series was designed to ask the question of whether select patients undergoing partial colectomy can be successfully discharged from day surgery with close clinic follow-up.

RESULTS

During the study period, 7 patients who underwent robotic-assisted laparoscopic colectomies—2 right colectomies for cancer, 4 low anterior resections for rectal/sigmoid cancer, and 1 Hartmann’s reversal—were discharged home from day surgery within 24 hours without inpatient hospital admission (Table 2). The robot was utilized per surgeon preference for improved pelvic dissection and intracorporeal anastomosis creation. All patients were required to attend a preoperative ERAS education class and were enrolled in the ERAS pathway per our protocol.

A multimodal pain control algorithm that included preoperative acetaminophen, gabapentin, nonsteroidal anti-inflammatory drugs, and low-dose narcotics was employed. All anastomoses were performed intracorporeally. An ultrasound-guided transversus abdominis plane block performed by the anesthesia pain management team in the postanesthesia care unit was used, followed by a multimodal postoperative oral pain regimen.

All patients were offered a fluid liquid diet in the recovery unit. All patients ambulated independently prior to discharge. Deep venous thrombosis prophylaxis was given preoperatively and in the recovery unit, followed by injections at home, particularly for the cancer patients in this series. Each patient received a mu-receptor antagonist (Alvimopan) preoperatively; however, it was not continued postoperatively since Alvimopan is currently approved for in-

hospital use only. Patients were given the choice of in-person follow-up in the outpatient clinic the following day or telephone/video visits. They were recommended to proceed with a full liquid diet at least for postoperative day 1 and then advanced to a regular diet as tolerated.

Foley catheters were removed postoperatively, and if the patient was unable to void, were replaced and the patient was discharged with a leg bag. Additional ostomy teaching was performed, intravenous fluids given, and home Lovenox was arranged if needed based on the patient’s underlying diagnosis.

The patients were advised to stay close to the hospital postoperatively. Two of our seven patients chose to stay in a nearby hotel for 24 to 48 hours, which made the postoperative follow-up easier as they lived more than 30 minutes away from the hospital. Clinic follow-up was arranged within the first 4 postoperative days, and patients were contacted by telephone daily during that period. All patients had in-person 2-week follow-up in the clinic.

One patient had a second clinic follow-up visit for further ostomy teaching and management of fluid status. One other patient returned to the emergency department on postoperative day 1 with nausea and vomiting. The workup was unremarkable except for expected postoperative changes. This was managed with a fluid bolus and ondansetron, and the patient was discharged home.

DISCUSSION

Since the introduction of the ERAS protocol in 2008, many surgeries that have historically required inpatient hospital stays have transitioned to same-day surgery. This in turn has increased the availability of hospital beds for sicker patients in greater need of in-hospital stays. During the peak of the COVID-19 surge, there was a significant strain on our institution and health care system, and the state of Texas limited surgical procedures requiring inpatient beds to immediately life-threatening or urgent procedures only. While necessary, this policy left our cancer patients with the dilemma of having their elective colon resections postponed indefinitely while the hospitals were struggling with bed shortages due to the COVID-19 surge. Due to our robust ERAS program, we had noticed shorter length of stays in select patients following colectomies, with many patients

Table 1. Inclusion and exclusion criteria for same-day colectomy

Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none"> • Partial colectomies • Candidate for laparoscopy • ≤2 simple comorbidities • Age ≤ 75 years old • Adequate nutritional status 	<ul style="list-style-type: none"> • >2 simple comorbidities • History of severe cardiac condition (i.e., arrhythmia, heart failure) • Frailty score ≥ 3 • Poor home support system

Table 2. Characteristics of seven patients who received same-day colectomies

Variable	Case #1	Case #2	Case #3	Case #4	Case #5	Case #6	Case #7
Age (years)	66	77	67	50	39	43	60
Sex	Female	Male	Male	Female	Male	Male	Female
Colonic cancer	+	+	+	+	+	-	+
Location in colon	Cecum	Proximal transverse	Rectum	Sigmoid	Rectum	-	Sigmoid

being ready for discharge <24 hours from the time of surgery. This was especially true in colectomies performed robotically. The decision to perform colectomies as outpatient surgeries served two purposes: to allow patients to have their elective but necessary surgeries completed and to pursue the next step in the natural progression of our ERAS program.

Based on our experience in select patients, to perform these operations as outpatient surgeries and to complement our already efficient ERAS pathway, we took additional measures in preoperative, intraoperative, and postoperative management of future same-day colectomies. Preoperatively, both patient and system factors need to be considered in detail to make same-day colectomies successful. For a same-day colectomy initiative to succeed, patient understanding and participation is especially important. Appropriate patient selection is of utmost importance. We recommend excluding patients with more than two simple comorbidities such as diabetes or hypertension, as well as patients with a history of severe cardiac conditions such as arrhythmias or congestive heart failure. An age cutoff should be implemented, and those >75 years who live independently or have a frailty score >3 should be excluded. Appropriate case selection is of clear importance for this new protocol to succeed. Colorectal procedures considered for inclusion are ileostomy reversals, colostomy takedown, right colectomy, left colectomy, diverting colostomy creation, and low anterior resection without diverting loop ileostomy. Cases that should continue to require an inpatient stay are ultra-low low anterior resection with diverting loop ileostomy and total colectomies with J-pouch/ileorectal anastomosis.

Preoperative nutritional status has been shown to impact outcomes from colorectal surgery.¹ Optimization of the patient's preoperative nutrition status has been an integral part of the ERAS protocol. Nutrition should be optimized with a high-protein diet a few weeks prior to surgery, and a referral to a nutritionist should be considered if the patient has a low albumin (<3). Patients should have a good support system at home, with a clear plan and understanding for diet advancement at home.

Expectations for same-day discharge should be set at the initial clinic visit, as well as during the preoperative ERAS class, and reiterated again the day of surgery. Patients should make arrangements to stay close to the hospital if they live more than 30 minutes away. Patients should be prescribed 30 minutes of daily exercise preoperatively or be given a prehabilitation referral if they are not able to exercise independently.⁵ If an ostomy will be created, ostomy teaching should be performed at preoperative visits and ERAS courses and supplies prescribed preoperatively.⁶ Prescriptions for postoperative pain, nausea/vomiting, and deep vein thrombosis prophylaxis, if necessary, should be ordered and picked up by the patient preoperatively to be given at the time of attendance of the ERAS class or the day of surgery. Enrollment and participation in the ERAS pathway were

critical, as they ensured compliance with preoperative teaching, bowel prep, multimodal pain control, and preoperative Entereg administration.⁷

Same-day colectomy should be limited to minimally invasive surgery. The cases described here were all performed robotically. Consideration should be given to intracorporeal anastomosis creation if feasible. These cases should be done as the first case of the day to allow time for observation by the surgical team prior to discharge. The Foley catheter should be removed prior to extubation to maximize the time available for spontaneous voiding while the patient is in recovery. A transversus abdominis plane block can be performed intraoperatively or postoperatively by the anesthesia pain management team.^{7,8} In our patients, the blocks were performed postoperatively in the postanesthesia care unit. We followed our standard intraoperative ERAS guidelines for our case series. Additionally, these cases should be scheduled early in the week (Monday to Wednesday) to allow for close follow-up in clinic during the same week.

We recommend early oral intake in the postanesthesia care unit and day surgery with a full liquid diet as the patient tolerates and stopping intravenous fluids.^{9,10} We only obtained hemoglobin for our first patient in recovery. Obtaining hemoglobin/hematocrit or a basic metabolic panel can be tailored depending on intraoperative blood loss and length of surgery. We gave the second prophylactic heparin dose in recovery 8 hours from incision. As these patients were being discharged without a hospital stay, early ambulation was done in recovery. The importance of continued ambulation should be emphasized to the patients, and consideration should be given for deep vein thrombosis prophylaxis in the form of low-molecular-weight heparin injections at home based on the patient's surgical indication.^{11,12} If the patient is unable to void within 8 hours, we replace the Foley and discharge with a leg bag rather than prolong observation and recommend follow-up in the clinic for Foley removal.

Limitations of this case study include its retrospective nature, short follow-up period, and small patient volume. This effort is labor intensive and requires a large amount of teamwork and collaboration between the surgeon, clinic staff, ERAS educator, operating room staff, pain management service, and day surgery nursing.

In conclusion, in carefully selected patients with a robust ERAS program with additional considerations and close follow-up, outpatient colectomies are feasible and have acceptable postoperative recovery at 2-week follow-up.

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1. Kehlet H, Wilmore DW. Evidence-based surgical care and the evolution of fast-track surgery. *Ann Surg.* 2008;248(2):189–198. doi:10.1097/SLA.0b013e31817f2c1a.
 2. Ljungqvist O, Scott M, Fearon KC. Enhanced recovery after surgery: a review. *JAMA Surg.* 2017;152(3):292–298. doi:10.1001/jamasurg.2016.4952.

3. Delaney CP, Fazio VW, Senagore AJ, et al. 'Fast track' postoperative management protocol for patients with high co-morbidity undergoing complex abdominal and pelvic colorectal surgery. *Br J Surg.* 2002; 88(11):1533–1538. doi:10.1046/j.0007-1323.2001.01905.x.
4. Scott MJ, Baldini G, Fearon KC, et al. Enhanced Recovery After Surgery (ERAS) for gastrointestinal surgery, part 1: pathophysiological considerations. *Acta Anaesthesiol Scand.* 2015;59(10):1212–1231. doi:10.1111/aas.12601.
5. Xiao J, Caan BJ, Cespedes Feliciano EM, et al. Association of low muscle mass and low muscle radiodensity with morbidity and mortality for colon cancer surgery. *JAMA Surg.* 2020;155(10):942–949. [published correction appears in *JAMA Surg.* 2020;155(10):1002]. doi:10.1001/jamasurg.2020.2497.
6. Howard R, Yin YS, McCandless L, et al. Taking control of your surgery: impact of a prehabilitation program on major abdominal surgery. *J Am Coll Surg.* 2019;228(1):72–80. doi:10.1016/j.jamcollsurg.2018.09.018.
7. Kelley SR, Wolff BG, Lovely JK, et al. Fast-track pathway for minimally invasive colorectal surgery with and without alvimopan (Entereg)TM: which is more cost-effective? *Am Surg.* 2013;79(6): 630–633.
8. Forsmo HM, Pfeffer F, Rasdal A, et al. Pre- and postoperative stoma education and guidance within an enhanced recovery after surgery (ERAS) programme reduces length of hospital stay in colorectal surgery. *Int J Surg.* 2016;36(Pt A):121–126. doi:10.1016/j.ijssu.2016.10.031.
9. Pirrera B, Alagna V, Lucchi A, et al. Transversus abdominis plane (TAP) block versus thoracic epidural analgesia (TEA) in laparoscopic colon surgery in the ERAS program. *Surg Endosc.* 2018;32(1): 376–382. doi:10.1007/s00464-017-5686-7.
10. Pedrazzani C, Menestrina N, Moro M, et al. Local wound infiltration plus transversus abdominis plane (TAP) block versus local wound infiltration in laparoscopic colorectal surgery and ERAS program. *Surg Endosc.* 2016;30(11):5117–5125. doi:10.1007/s00464-016-4862-5.
11. Jochum SB, Ritz EM, Bhamra AR, Hayden DM, Saclarides TJ, Favuzza J. Early feeding in colorectal surgery patients: safe and cost effective. *Int J Colorectal Dis.* 2020;35(3):465–469. doi:10.1007/s00384-019-03500-1.
12. Nematihonar B, Salimi S, Noorian V, et al. Early versus delayed (traditional) postoperative oral feeding in patients undergoing colorectal anastomosis. *Adv Biomed Res.* 2018;7(1):30. doi:10.4103/abr.abr_290_16.