



Does utilization of laparoscopy improve successful adherence to enhanced recovery programs in colorectal surgery?

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For several decades, enhanced recovery pathways (ERPs) have been shown to improve outcomes for patients undergoing colorectal surgery. These improvements include a decreased length of stay without increasing readmission, and a reduction in 30-day morbidity (1-5). Similarly, the utility of laparoscopic surgery has been proven over the last several decades in randomized control trials, which have paved the way for the widespread adoption of laparoscopy for colon cancer surgery by colorectal surgeons. The COST trial, MRC CLASSIC trial and COLOR trial were all randomized multicenter trials that demonstrated noninferiority of laparoscopy for colon cancer, without significant differences in oncologic outcome, and improved postoperative outcomes for patients undergoing laparoscopic resection (6-11). Since that time, several other trials have confirmed these findings (12-14). Laparoscopy has also been found to improve postoperative outcomes for patients with benign disease, including diverticulitis and inflammatory bowel disease (15-19). The addition of laparoscopy to ERP has been independently identified as a factor to decrease postoperative length of stay, reduce readmission rates, and may even confer an overall survival benefit in patients with colorectal cancer (20-23). As compliance with ERP has been demonstrated to correlate with improved postsurgical outcomes, the driving forces behind noncompliance with ERP have yet to be elucidated. Literature on this topic is not yet clear as it seems there may be several contributing factors, such as age, limited mobility,

frailty, etc.

Braga *et al.* are to be commended for their paper exploring the effect of laparoscopic surgery approach on the successful utilization of ERPs at 13 hospitals in Italy affiliated with the PeriOperative Italian Society (POIS) (24). A retrospective review of the prospectively maintained POIS database was performed. Primary endpoints of the study were identified as adherence to ERP items and time to readiness for discharge (TRD). Secondary endpoints included overall postoperative morbidity and primary length of stay (LOS). Nineteen ERP items were previously defined and the total number of items to which each patient adhered was calculated. TRD was defined as a patient having no signs of infection or other postoperative complication, good pain control on oral pain medications, adequate caloric intake, mobilizing, and recovery of flatus. Both an intent-to-treat and per protocol analyses were carried out in order to evaluate the patients who underwent unplanned conversion to open surgery. A total of 714 patients underwent elective colorectal surgery, with the choice of laparoscopic or open approach left to the discretion of the surgeon. Overall, multivariate analysis demonstrated that laparoscopic surgery was significantly associated with greater adherence to ERP items, as well as reducing overall morbidity and TRD. In both the intent to treat and per protocol analyses, laparoscopic surgery demonstrated significantly reduce TRD and morbidity. Rectal surgery and presence of a new stoma did not affect adherence to ERP items.

Given the demonstrated benefits of both ERP and laparoscopy, it is hypothesized that utilization of the laparoscopic approach may improve adherence to ERP elements. The article by Braga *et al.* demonstrated laparoscopic surgery was an independent factor increasing adherence to ERP and improved outcomes. This expands on the authors' prior publication on ERP in high risk patients (25). Table 2 of the manuscript reports utilization of epidural catheter, postoperative nausea and vomiting prophylaxis, intraoperative warming, and intraoperative fluid restriction. There was a significant difference in the utilization of epidural anesthesia, which was greater in the open group as would be expected given the preoperative planning of an open operation. The utilization of postoperative nausea and vomiting prophylaxis, warming, and fluid restriction was not significantly different, implying that regardless of the approach of the operation, these measures were utilized equally in all patients. The open group was significantly older than the laparoscopic and converted groups and more stomas were used in the open groups. This may have influenced adherence to ERP given that elderly patients may have had more difficulty with mobilization due to frailty. Seven postoperative ERP elements were listed in Table 3, which showed a significantly increased adherence in the laparoscopic group. Postoperative outcomes were all equivalent, except for 30-day overall morbidity, which was surprisingly lowest in the conversion group, but not surprisingly highest in the open group. The overall readmission rate was reported as being quite low—less than 3% in all three groups, compared to 10–15% often reported in the United States. This is likely a reflection of the longer primary lengths of stay, and that typical complications that lead to readmissions may have already happened during the primary stay. As may be expected, the conversion group had the slowest recovery and time to achieve discharge readiness; it would be interesting to see the risk factors for conversion in this patient cohort.

This study does not help delineate if the improved outcome were simply because those surgeons who do laparoscopy were more likely to strictly enforce ERP guidelines, or that the complexities requiring open surgery were also associated with frailty or other patient-related characteristics which made pathways adherence less frequent. It is also possible that there exists an unmeasurable implicit bias that drives clinicians to adhere strictly to ERP elements when patients undergo laparoscopic surgery and a subconscious lenience towards forgoing ERP elements if the patients have undergone open surgeries. The paper does not

comment on the standardization of ERP elements amongst the various participating hospitals, which may affect the results of the study. Similarly, adherence to ERP elements is highly dependent on the adoption of these elements by a multidisciplinary team that includes anesthesiology and perioperative nursing teams. Education and buy-in from these groups would have to be implemented across all hospitals equally.

This paper by Braga and colleagues highlights an important topic in colorectal surgery by exploring the interaction between laparoscopy and ERPs. They present thought provoking data that begins to shed light onto the identification of influential factors for successful ERPs. Whilst reminding us to use minimally invasive approaches as much as possible, this also helps set the stage for additional research and contributes to improving care for all patients undergoing colorectal surgery.

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