Advances in Laparoscopic Colorectal Surgery

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KEYWORDS

• Laparoscopy • Minimally invasive surgery • Colorectal cancer
• Hand-assisted laparoscopy • Learning curve

KEY POINTS

- Laparoscopic colorectal surgery is safe and oncologically equivalent to open surgery.
- Many short-term and long-term benefits exist for laparoscopic surgery when compared with open surgery.
- Several variations in surgical approach and technique exist, most of which have shown equivalent outcomes in the literature.
- Several patient-specific factors can have an impact on the efficacy of laparoscopic surgery but can be navigated with a safe, thoughtful approach.
- The learning curve for laparoscopic surgery is steep and often requires a strong foundation during surgical training.

INTRODUCTION

When laparoscopic colectomy was first introduced in 1991,[1,2] it did not experience the same level of enthusiasm among practitioners that was given to laparoscopic cholecystectomy. The procedure involved multiple quadrants and was more technically demanding than cholecystectomy. Early fears about port-site metastases[3,4] and potentially inferior oncologic outcomes prevented widespread adoption and ultimately resulted in the conduction of multiple high-quality randomized controlled trials that have now confirmed the safety and efficacy of laparoscopic surgery for colon cancer.[5–10] Current estimates suggest 59% of all elective colectomies are performed laparoscopically,[11] with slight variations based on diagnosis, geography, and hospital setting. Utilization tends to be higher among fellowship-trained colon and rectal surgeons.[12]

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As understanding and experience have evolved, several technical improvements and adaptations have allowed for increased utilization of minimally invasive surgery (MIS). In addition to the more traditional straight multiport laparoscopic surgical (MLS) approaches, many surgeons use robotic-assisted surgery, hand-assisted laparoscopic surgical (HALS), and single-incision laparoscopic surgical (SILS) procedures, all of which fall under the MIS or laparoscopic umbrella. Each of these procedures, although unique, is governed by the same minimally invasive procedural codes (introduced in 2008) and thus reimbursement is no different among these options (including robotics). When compared with open surgery, all these variations in MIS technique maintain similar advantages, including shorter hospital length of stay, shorter duration of narcotic use, decreased pain scores, quicker return of bowel function, decreased rates of ileus, improved rates of surgical site infection, lower incisional hernia incidence (12.9 vs 2.4%), and decreased incidence of adhesive small bowel obstruction (6.1 vs 1.9%).[13–16] The choice between MLS, SILS, and HALS is made based on several surgeon-specific factors, such as personal preference, operative experience, equipment availability, and the skill level of the surgical assistant. Many patient factors also play a role, including prior abdominal surgery (PAS), body habitus, comorbidities, and desired cosmesis. Within each of these approaches, there is considerable variability in the operative steps, with the 2 main approaches medial-to-lateral dissection and lateral-to-medial dissection.

As outlined previously, laparoscopic surgery is oncologically equivalent to open surgery for colon cancer, but significant controversy still exists for the treatment of rectal cancer. In general, laparoscopic low anterior resections and abdominoperineal resections are more technically challenging than colectomy, and experts question whether or not MIS is appropriate for low pelvic cancers. This is discussed in greater detail in Rodrigo Oliva Perez and colleagues' article, "New Strategies in Rectal Cancer," in this issue.

This article provides a summary of the various approaches, including MLS, HALS, and SILS, for segmental colectomies and proctectomy. There is additional discussion of the learning curve for laparoscopic colorectal surgery, surgeon volume, and its relationship to outcomes. Furthermore, the surgical approach to difficult patients, such as those with obesity, prior radiation, or PAS, is discussed.

OPERATIVE STEPS

Patient Positioning

When positioning a patient, the first consideration is whether or not the surgeon requires access to the anus for examination or endoscopy or to allow for a circular stapled anastomosis. Therefore, whenever access to the anus is necessary, including left-sided resections and cases where colonoscopy may be necessary, the patient is placed in lithotomy stirrups, which gives access to the anus and also allows the surgeon and/or assistant to stand between the legs when technically advantageous. For right-sided resections, the patient may be placed supine, although many experts advocate for the use of lithotomy in all cases, because it allows for more versatility.

Laparoscopic colorectal surgery often requires work in multiple quadrants, so tucking both arms at the patient's side (with appropriate padding to prevent nerve injury) is best. Exaggerated Trendelenburg positioning and tilting are also needed at times, so care should be taken to secure the patient to the table and prevent movement during the case. A bean bag is often useful, although some surgeons prefer shoulder pads and tape to secure the patient to the table.