

## Laparoscopic Resection for Colon Cancer — The End of the Beginning?

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Technological advances, which are followed by long periods of catch-up while clinicians learn how to use the new techniques appropriately, often precede true medical progress. Such certainly appears to be the case for minimally invasive surgery. Early on, surgeons were hampered by having to steady the laparoscope with one hand and look through a small lens while performing surgery with the other hand. Advances in laparoscopic surgery were facilitated by a series of innovations that allowed true video surgery, in which two surgeons work together with both hands to perform operations. In the late 1990s, surgeons began to use minimally invasive approaches for the treatment of various diseases after applying the lessons learned from laparoscopic cholecystectomy.

Patients intuitively perceive that laparoscopic approaches may be more advantageous than conventional open surgical operations. Even if the cost is greater, they are apt to prefer laparoscopic operations, because their incisions tend to be smaller and their hospital stays shorter. Furthermore, even in the absence of a documented lower risk of complications as traditionally defined, many patients and their referring physicians believe that the use of minimally invasive surgical techniques reduces complications.

Despite the successful use of laparoscopy to treat gallbladder disease, obesity, and gastroesophageal reflux and to determine the stage of some abdominal tumors, surgeons have been slow to adopt laparoscopic resection to treat colonic cancers. Cancer operations within the abdominal cavity are currently performed almost exclusively by opening the abdomen and using techniques described before the time of Halsted (considered by many to be the father of modern surgery), even though laparoscopy was first used clinically in the early 1900s by a Swedish surgeon, H.C. Jacobaeus. Because of the influence of Halsted and others, surgery for cancer has been judged by the standard dictum that “bigger is better.” Now, the surgical landscape is changing.

Why has laparoscopic surgery for colon cancer progressed slowly? First, some major cancer centers have been slow to accept the use of minimally invasive therapies to manage the most common of

the gastrointestinal cancers and the most common indication for resection. Second, laparoscopic colectomy is considered to be technically demanding. Third, and most important, there has been substantial controversy regarding the safety and efficacy of this technique, particularly with respect to the adequacy of resection, the ability to explore the abdomen, and the risk of recurrence at the site of the surgical wound. In this issue of the *Journal*, the Clinical Outcomes of Surgical Therapy Study Group<sup>1</sup> addresses some of these concerns.

The investigators present the results of their prospective, randomized, controlled trial comparing laparoscopic with open (conventional) resection for colon cancer. They demonstrate that the oncologic outcome of laparoscopic resection is similar to that of open resection and that the procedure is associated with less pain and a shorter hospital stay than conventional surgery. These findings will have a substantial and far-reaching effect and should remove some final obstacles to the use of laparoscopic colectomy.

We predict that now, a full 13 years after the widespread adoption of laparoscopic cholecystectomy as the standard of care for the treatment of gallbladder disease,<sup>2</sup> more surgeons will use minimally invasive techniques to manage diseases of the large bowel. Resistance to the use of these techniques by some general and colorectal surgeons and surgical and medical oncologists will recede. Better instrumentation and techniques will now evolve at an accelerated pace to help surgeons perform these operations.

However, this change in approach is bound to prompt new questions: Which operations should be performed laparoscopically? When should this approach be used? Are general and colorectal surgeons adequately trained to accomplish this task? What are the broader implications for the use of minimally invasive cancer surgery? What new techniques or equipment must be developed to advance the field further?

Approximately 250,000 colonic resections are performed each year in the United States. Currently, the average general-surgery resident finishing a training program in the United States has performed fewer than one laparoscopic colon opera-

tion during training. Either our educational programs and teaching methods must be modified to take on the challenges to come, or an increased number of laparoscopic experts must be trained to perform colectomies. We suspect that both will happen. Although the frequency of open colon resection is unlikely to diminish to the degree that open cholecystectomy has, the number of laparoscopic colon resections will increase dramatically over the next decade. Many proponents suggest that 70 percent of small- and large-bowel operations can be performed with the use of minimally invasive techniques. The world of colorectal surgery will have to adapt.

A leap in technology will be required to facilitate the next quantum change in our approach to the treatment of abdominal surgical disease. Most of the operations that we perform laparoscopically are very similar to their open counterparts — the procedures are just performed through smaller incisions facilitated by the development of appropriate ports and miniaturized equipment. More rapid progress will occur as new operations are designed that are not rooted in decades-old suturing or stapling techniques. Robotics, ablation techniques, photodynamic therapy, focal application of brachytherapy, genetic modulation of disease, minimal-access insertion of bioprosthesis, and procedures involving natural orifices are just a few examples of new techniques that may move surgery beyond mere

improvements in access toward true innovations in surgical care.

Winston Churchill used the phrase “the end of the beginning” to describe the end of the first phase of the fighting in Africa early in World War II. In a larger context, he was explaining that a much greater challenge would follow. So it is with minimal-access surgery. The first phase of technical innovation is complete, but much must now be done to advance the field. The goal is clear. Surgeons must progress beyond the traditional techniques of cutting and sewing that have been their province since surgeons were barbers to a future in which approaches involving minimal access to the abdominal cavity are only the beginning.

Oncologic surgeons are now deciding whether to endorse the use of laparoscopic approaches to the liver, pancreas, stomach, and esophagus. Progress is slow, but our leaders in surgical oncology must be as bold in improving minimal-access surgery for cancer as their predecessors were in developing bigger operations. Their patients expect nothing less.

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1. The Clinical Outcomes of Surgical Therapy Study Group. A comparison of laparoscopically assisted and open colectomy for colon cancer. *N Engl J Med* 2004;350:2050-9.
2. Pappas TN. Laparoscopic cholecystectomy: the standard of care for chronic and acute cholecystitis. *Ann Med* 1991;23:231.

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