Commentary (Ota/Nelson): Role of Laparoscopic Techniques in Colorectal Cancer Surgery

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By David M. Ota, MD, FACS [2] and Heidi Nelson, MD, FACS [3]

The article by Milsom and Hammerhofer reviews the promising aspects of laparoscopic colon resection as well as the controversies surrounding it. Laparoscopic cholecystectomy ushered in a new era of abdominal surgery. This minimally invasive surgical technique has been applied to other benign diseases, such as appendicitis and reflux esophagitis.

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As Milsom and Hammerhofer point out, it was only a matter of time before these laparoscopic techniques were redesigned for the resection of colorectal carcinomas. Like laparoscopic cholecystectomy, laparoscopic-assisted colectomy has the potential to quickly become a standard surgical treatment. The ability to perform a laparoscopic colectomy through small (1 cm) incisions has significant appeal for both patients and surgeons. Before this procedure is accepted as a standard treatment, significant cancer control and cost-effectiveness issues remain to be settled.

**Equivalent Cancer Control?**

Many articles have documented the feasibility and safety of laparoscopic colon resection for malignant disease. An important question is whether laparoscopic colectomy is equivalent to open colectomy in terms of cancer control. Relevant issues include the extent of lymphadenectomy, wound implantation of malignant cells, the adequacy of intraperitoneal staging, and limitations of the "no-touch" technique.

A major concern surrounding laparoscopic colectomy is whether the mesenteric resection is compromised by the limited exposure afforded by the laparoscopic technique. Comparison of the number of lymph nodes in the resected mesenteric dissection offers the best quantitative method to answer this question. Retrospective studies have reported that the number of lymph nodes harvested in laparoscopic and open colectomy procedures are equivalent [1,2]. Other reports have suggested that the lymph node count may be slightly lower with the laparoscopic technique [3]. Although the number of nodes sampled and extent of mesenteric resection may be related, this issue may not be relevant to patient survival. A recent randomized trial comparing segmental colectomy vs radical hemicolectomy for descending colon carcinoma found no difference in survival rates between patients treated with the two techniques [4]. This observation suggests that a less extensive laparoscopic segmental colectomy procedure will result in 5-year survival equivalent to that of radical hemicolectomy.

Milsom and Hammerhofer also discuss the concern about implants at the laparoscopic port sites or specimen retrieval wound site [5]. These reports raise an important issue regarding cancer control. It is important to keep in mind that the denominator for these laparoscopic colectomy cases was not specified. Nevertheless, the true incidence of these complications will never be known until a large prospective randomized trial is performed. In a retrospective review, Ramos et al reported that port site recurrence is actually quite rare [6].

Intraperitoneal staging and the "no-touch" technique with the laparoscopic approach raise other cancer control issues. A major limitation of the laparoscopic colectomy procedure is the absence of liver palpation. Also, the standard abdominal exploration at open colectomy includes palpation of the liver, retroperitoneum, and celiac and portal regions for any palpable metastasis. Lack of tactile sensation during a laparoscopic colectomy greatly limits the surgeon's ability to stage the disease adequately. However, it is doubtful whether the discovery of extensive metastatic nodal disease could have an impact on cancer control and patient survival. Liver staging will improve in the future when laparoscopic ultrasound probes become more widely available, and will replace the surgeon's ability to palpate the liver for any occult metastases.7
The "no-touch" technique was designed to isolate and ligate the regional artery and vein in order to prevent hematogenous spread of disease before manipulating the colon and mesentery. While this technique was adopted as standard care for many decades, Wiggers et al, in a randomized trial, found no advantage to the "no-touch" technique in terms of patient survival [8].

**Cost-Effectiveness Analysis**

The cancer control issues surrounding laparoscopic colectomy are debatable, but indirect evidence would suggest that laparoscopic colectomy is equivalent to open colectomy in terms of patient survival. In order to determine the benefits of laparoscopic colectomy, a cost-effective analysis comparing this new surgical technique with the standard open colectomy procedure will be necessary. In this analysis, patient survival, health-care costs, and quality of life should be measured [9].

Most cost-effectiveness analyses of new medical technology attempt to show improved survival with the new therapy. It is very unlikely that laparoscopic colectomy will increase patient survival over open colectomy; at best, it will have to be equivalent to open colectomy in terms of disease-free and overall survival. If laparoscopic colectomy fails to meet this test, the issues of cost and quality of life could become irrelevant, because the open procedure can be done with such minimal morbidity and mortality. Attempts to save 3 to 4 days of hospital stay while compromising cancer control would be unacceptable. If laparoscopic colectomy does not compromise survival, however, the choice between the two procedures will be based on cost and impact on quality of life.

The advent of managed care has forced health-care providers to be economically competitive in delivering services. New laparoscopic procedures, therefore, must be critically evaluated. Laparoscopic surgery has the potential to decrease health-care costs by shortening hospitalization. If the laparoscopic procedure produces equivalent survival and is less expensive than the open colectomy procedure, in a managed care environment the laparoscopic technique will be "dominant," and no further analysis will be necessary to identify it as a superior option. However, if the laparoscopic procedure achieves equivalent survival but is more expensive, justification of the extra cost for such a new procedure will greatly depend on quality-of-life issues.

A cost-utility analysis considers the extra cost of the procedure and its effect on quality of life. For the laparoscopic colectomy procedure, quality of life can be measured by time to return to normal activity, patients' assessment of their own quality of life, and their experiences with pain and functional status. A laparoscopic colon resection is performed through small incisions. Theoretically, therefore, quality of life after such surgery should be better than that after the open colectomy technique. If this is true, laparoscopic colectomy could be a significantly better procedure than the standard open colectomy in terms of quality of life, despite the minimal extra costs that may be incurred.

**Prospective Randomized Trial**

In order for the laparoscopic procedure to replace open colectomy for resectable colon cancer, a prospective randomized trial comparing the two techniques is needed. Retrospective studies and anecdotal information regarding this procedure are insufficient to judge its merits. Therefore, it is imperative that qualified surgeons participate in the current randomized laparoendoscopic colectomy trial funded by the National Cancer Institute. Surgeons who work at a hospital associated with an NCI Cooperative Oncologic Group should contact the individuals listed in the box on page 0 for information about how to become involved in this project.

**References:**


5. Cirocco WC, Schwartzman A, Golub RW: Abdominal wall recurrence after laparoscopic colectomy


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