Laparoscopic techniques: What is the role in inflammatory bowel disease?

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When laparoscopic cholecystectomy was introduced in the United States many surgeons were reluctant to embrace the technique. It went against many ingrained surgical principles, such as making large incisions to palpate all organs. However, fuelled by public and peer pressure, surgeons were forced to consider laparoscopic surgery. In the United States, training courses quickly appeared and any surgeon who performed cholecystectomy felt he/she had to offer this new approach to remain competitive. Subsequently, laparoscopic cholecystectomy was found to have real advantages over the traditional open technique, which include same-day surgery, 90% full activity in one week, minimal time off work and minimal pain. Thus, laparoscopic technique has quickly become the method of choice for removing most gallbladders in the United States (1-4). Only 50 cases of laparoscopic cholecystectomy were reported in 1989, but it has been estimated that over 500,000 cases were performed in 1993 (5).

Enthusiasm for laparoscopic surgery has turned towards other organs including the bowel. Proponents hypothesize that the advantages realized
with laparoscopic cholecystectomy will be transferred to laparoscopic bowel surgery (ie, patients will recover quicker than with conventional surgery) (6-8). This remains a hypothesis and is yet to be proven.

With laparoscopic abdominal surgery, multiple small puncture sites (10 mm or less in diameter) are strategically placed around the abdomen. Cannulas are inserted through these puncture sites. Carbon dioxide gas is insufflated through a port in the cannula and lifts the abdominal wall forward to allow better visualization of the abdominal structures. A videoscopic camera with novel laparoscopic instruments is inserted through the cannulas to perform the surgery.

It is important to realize that there are major differences that make laparoscopic bowel surgery more challenging than laparoscopic cholecystectomy. The bowel is a continuous organ so any resection must contend with either an anastomosis or stoma; the gallbladder, on the other hand, is a fixed end organ. The bowel is laden with bacteria and has an extensive (mesenteric) blood supply, while the gallbladder has one artery. Laparoscopic instruments had to be redesigned to address the anatomical differences between the bowel and gallbladder, and they are still being refined to improve function and efficiency.

When considering inflammatory bowel disease (IBD), laparoscopic surgery can be divided into two areas: current and future indications.

CURRENT INDICATIONS FOR LAPAROSCOPIC BOWEL SURGERY

Diagnostic laparoscopy is probably underused by general and colorectal surgeons. In most patients, it is relatively easy to insert a camera through a small puncture site to examine the abdomen. This modality is useful in patients with lower quadrant pain especially when used to differentiate Crohn’s disease from appendicitis or a gynecological problem. It also can be used to investigate an intra-abdominal mass or chronic pain.

Laparoscopic bowel surgery has an important role in fecal diversion. Patients who suffer from perianal sepsis or incontinence can usually have a stoma constructed quickly with only one other small puncture site besides the stoma. This eliminates a midline incision. During the procedure, the entire small bowel can also be examined. This is particularly applicable in Crohn’s disease.

Limited bowel resections are being done, but the benefits have yet to be proven. There are randomized prospective trials underway to evaluate the benefits of laparoscopic surgery.

Most surgeons perform extracorporeal anastomosis. The bowel is mobilized by laparoscopic techniques, then one of the small puncture sites is enlarged (to about 5 cm) to allow the bowel to be brought out onto the abdominal surface for resection and anastomosis. Intracorporeal anastomosis (resection and anastomosis totally inside the closed abdominal cavity) is feasible with new instruments and increasing skill with the technique. The resected bowel must still be removed from the abdominal cavity, so a small puncture site must be enlarged (to about 5 cm) for removal. Along with resections done extracorporeally, small bowel strictureplasty can also be performed through the enlarged incision.

Stoma closures are also being done using laparoscopic techniques, but the overall benefit is, again, unclear compared with conventional techniques.

FUTURE INDICATIONS FOR LAPAROSCOPIC BOWEL SURGERY

Laparoscopic subtotal colectomy is feasible, but because of its complexity requires a high level of skill. Ideally, it can be attempted in selected thin patients. The bowel is mobilized with laparoscopic techniques and one of the puncture sites is enlarged to remove the bowel. Most laparoscopic pelvic pouch procedures follow this pattern of laparoscopic mobilization followed by a small incision in the lower part of the abdomen to remove the bowel, form the ileal pelvic pouch and perform the pouch anal anastomosis.

Nobody really knows whether the ability to use small incisions with intra-
corporeal mobilization followed by an extended incision to complete the procedure is beneficial to a patient’s recovery. Published series in the literature reflect a mixture of highly selected patients and are merely descriptive (6-11). None has proven that there are any advantages in doing abdominal bowel procedures laparoscopically. Initially there was considerable enthusiasm towards laparoscopic bowel surgery but this seems to have waned recently. Prospective randomized trials are needed to answer these questions and prove whether the hypothesis of faster recovery is true.

Other concepts are also being explored for laparoscopic bowel surgery. With the redesigning of laparoscopic instruments for intracorporeal anastomosis, attention is turning towards how to get the resected bowel out of the closed abdomen. The present author and colleagues are working on minimizing incisions through morcellation, which involves inserting the specimen in a bag then grinding the tissue until it can be pulled through the trochar. Also motility studies are underway to determine whether bowel activity recovers faster after laparoscopic surgery than with open conventional surgery.

CONCLUSIONS

Laparoscopic intestinal surgery is feasible and can be performed safely after considerable training. Results regarding its benefits are preliminary at this stage. Currently, diagnostic laparoscopy, stoma construction, terminal ileal resection with extracorporeal anastomosis and subtotal colectomy (in selected patients) are laparoscopic procedures to consider in patients with IBD. One positive aspect of laparoscopic bowel surgery is that it has made surgeons rethink the surgical paradigms taught for generations in surgical training institutions. With conventional surgical cases, nasogastric tubes can be removed sooner, patients fed sooner and sent home earlier without compromising outcome (12,13). Even if laparoscopic bowel surgery does not become as popular as laparoscopic cholecystectomy, the positive impact it has made on conventional bowel surgery will still be substantial.

REFERENCES

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