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

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TL HULL. Laparoscopic techniques: What is the role in inflammatory bowel disease? Can J Gastroenterol 1995;9(1):39-41. Laparoscopic cholecystectomy has quickly become the preferred technique for removing the gallbladder. Real advantages in the area of laparoscopic gallbladder removal have spurred interest towards other areas of laparoscopic surgery. There has been interest in laparoscopic bowel surgery but this approach has not gained popularity as quickly as gallbladder surgery. Reasons surround the fact that the bowel is a continuous organ (versus an end organ like the gallbladder) laden with bacteria and it has a rich blood supply. These differences make laparoscopic bowel surgery more difficult and challenging. If inflammatory bowel disease (IBD) is considered, the indications to approach surgery laparoscopically fall into two categories: current and future indications. The current indications are diagnostic laparoscopy, fecal diversion, limited bowel resections with extracorporeal anastomosis and stoma closures. Future indications include laparoscopic subtotal colectomy and laparoscopic assisted pelvic pouch procedures. As experience is gained and laparoscopic instruments are modified and refined for bowel surgery, intracorporeal anastomosis and more extensive bowel resections will be feasible. Currently laparoscopic bowel surgery can be done in select circumstances for problems associated with IBD. It has yet to be proven if doing the surgery laparoscopically provides advantages for bowel surgery as has been demonstrated with gallbladder surgery. Prospective studies are underway to answer these questions. (*Pour résumé, voir page 40*)

Key Words: *Crohn's disease, Inflammatory bowel disease, Laparoscopic bowel surgery*

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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 cholecystectomies 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

Techniques laparoscopiques : leur rôle dans les maladies inflammatoires de l'intestin

RÉSUMÉ : La cholécystectomie laparoscopique est rapidement devenue la technique de choix pour l'excision de la vésicule biliaire. Ses avantages réels dans le domaine de la cholécystectomie laparoscopique ont suscité un intérêt certain pour d'autres applications chirurgicales possibles de la laparoscopie. On s'est intéressé à la laparoscopie dans la chirurgie intestinale, mais sa popularité n'a pas grandi aussi rapidement que dans la chirurgie biliaire. Cela peut s'expliquer par le fait que l'intestin est un organe continu (par opposition à un organe plein, comme la vésicule biliaire) qui héberge des bactéries et qui est richement vascularisé. Ces différences rendent la chirurgie intestinale par laparoscopie plus difficile et risquée. Si les maladies inflammatoires sont considérées, les indications d'une chirurgie laparoscopique se subdivisent en deux catégories : indications présentes et futures. Les indications présentes sont la laparoscopie diagnostique, la dérivation fécale, les résection intestinale avec anastomose extracorporelle et la stomie. Les indications futures comprennent la colectomie sub-totale et les interventions assistées par laparoscopie. À mesure que l'expérience croîtra et que les instruments de laparoscopie seront mieux adaptés à la chirurgie intestinale, les anastomoses intra-corporelles et les résections intestinales plus étendues seront faisables. À l'heure actuelle, la chirurgie intestinale par laparoscopie peut être faite dans certaines circonstances précises pour des problèmes associés aux maladies inflammatoires de l'intestin. Il reste à prouver si la chirurgie par laparoscopie offre des avantages par rapport à la chirurgie classique, comme ce fut le cas pour la chirurgie de la vésicule biliaire. Des études prospectives sont en cours pour répondre à ces questions.

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 stricturoplasty 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 is 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

1. Kum CK, Wong CW, Goh PMY, Ti TK. Comparative study of pain level and analgesic requirement after laparoscopic and open cholecystectomy. Surg Laparosc Endosc 1994;4:139-41.
2. Myers WC, Branum GD, Farouk M, et al. A prospective analysis of 1518 laparoscopic cholecystectomies. N Engl J Med 1991;324:1073-8.
3. Schlumpf R, Klotz HP, Wehrli H, Herzog U. A nation's experience in laparoscopic cholecystectomy. Surg Endosc 1994;8:35-41.
4. Airan I, Appel M, Berci G, et al. Retrospective and prospective multi-institutional laparoscopic cholecystectomy study organized by the Society of American Gastrointestinal Endoscopic Surgeons. Surg Endosc 1992;6:169-76.
5. Health Care Investment Analyst, Inc. Baltimore, Maryland. Statistics 1993.
6. Zucker KA, Pitcher DE, Martin DT, Ford RS. Laparoscopic-assisted colon resection. Surg Endosc 1994;8:12-8.
7. Scoggin SD, Frazee RC, Snyder SK, et al. Laparoscopic-assisted bowel surgery. Dis Colon Rectum 1993;36:747-50.
8. Beart RW Jr. Laparoscopic surgery panel. Dis Colon Rectum 1994;37:S144-50.
9. Wexner SD, Johansen OB, Nogueras JJ, Jagelman DG. Laparoscopic total abdominal colectomy: a prospective trial. Dis Colon Rectum 1992;35:651-5.
10. Franklin ME, Ramos R, Rosenthal D, Schuessler W. Laparoscopic colonic procedures. World J Surg 1993;17:51-6.
11. Milsom JW, Lavery IC, Church JM, Stolfi VM, Fazio VW. Use of laparoscopic techniques in colorectal surgery: preliminary study. Dis Colon Rectum 1994;37:215-8.
12. Binderow SR, Cohen SM, Wexner SD, Schmitt SL, Nogueras JJ, Jagelman DG. Must early post-operative oral intake be limited to laparoscopy? Poster presentation at the American Society of Colon and Rectal Surgeons, Chicago, Illinois, May 2-7, 1993.
13. Schmitt SL, Wexner SD, Nogueras JJ, Jagelman DG. Does laparoscopy conger an advantage over standard colectomy? Poster presentation at the American Society of Colon and Rectal Surgeons, Chicago, Illinois, May 2 to 7, 1993.