Invited Paper

SURGEONS' DILEMMA; LAPAROSCOPIC OR OPEN SURGERY?

A. Bekraki, M.D. / A. Ö. Aktan, M.D.***

* *Professor, Department of General Surgery, Faculty of Medicine, Marmara University, İstanbul, Turkey.*
** *Specialist, Department of General Surgery, Faculty of Medicine, Marmara University, İstanbul, Turkey.*

INTRODUCTION

The advent of operative laparoscopy brought a whole new dimension to surgical practice. Beginning from early 1990's laparoscopic procedures moved from experimental to accepted clinical practice. While some remain controversial concerning long term efficacy, cost and advantages versus disadvantages, others have been defined as "gold standards".

Being a new field in surgery, many complications emerged due to the inability of surgeons to reach the acceptable plateau of competency and their infamiliarity with the technique. Adequate education and training in laparoscopic surgery are essential to minimize the complications seen during the learning curve. It is quite well known that the development and progress of laparoscopic interventions is closely related to the invention of new surgical instruments and evolvement of new techniques, and what seems today to be impossible or unacceptable laparoscopically may prove to be simple and practical in the future. On the other hand, some laparoscopic procedures on which studies are undertaken now may be abandoned in the future because of inefficacy or increased risk and rate of complications when compared to the classical open version of the same operation. Many questions are waiting for answers in the coming few years or decades.

In general, laparoscopic surgery is preferred for early recovery, less pain, shorter hospital stay, early return to work, and less wound complications (1,2).

Studies have revealed that laparoscopic surgery causes less stress response compared to the open counterpart (3). On the other hand, laparoscopic surgery generally increases the cost, requires new technology and expensive instruments, and increases the operative time (4,5). Increased intraabdominal pressure due to CO2 insufflation is another problem in laparoscopic surgery. There are also specific complications and problems associated with each laparoscopic procedure.

CHOLECYSTECTOMY

Laparoscopic removal of the gall bladder was first performed in 1988. Since that time, this procedure became the treatment of choice for patients with symptomatic gall stones in many different parts of the world. Although performed under general anesthesia, most patients are discharged within twenty four hours after the procedure. Instead of the large laparotomy incision, four small incisions are made in the abdominal wall. Less pain and early discharge associated with early beginning to work, made laparoscopic cholecystectomy (LC) not only a convenient and acceptable method, but the preferred and desired for both the patient and his surgeon.

After passing the learning curve, this method proved safe to perform. In open cholecystectomy, considerable experience suggests that common bile duct injury occurs in approximately 0.1 to 0.5 % of all patients (6). In a study performed by Richardson et al. (7) in the United Kingdom, incidence and nature of common bile duct injuries following LC were studied on 5913 cases; they concluded an incidence of 0.3 % compared to that of open surgery. However, increased severity and complexity of injury was noted in laparoscopic cholecystectomy.

The advantages and even reduced surgery time, slightly changed the indications of cholescystectomy and added many new views regarding the management of cholelithiasis and associated medical and surgical problems. Some liberalizations have been seen concerning the management of asymptomatic gall stones, acalculous cholecystitis, idiopathic pancreatitis that may actually be caused by biliary sludge, and gall bladder polyps detected incidentally during ultrasonographic examination.

During laparoscopic cholecystectomy, as in other laparoscopic procedures, CO2 is insufflated to inflate the abdomen for better visualization. The increased intraabdominal pressure (IAP) has been shown to

impair blood flow to abdominal organs. However, significant decreases are seen when the IAP exceeds 20 mmHg (8). During laparoscopic cholecystectomy, the IAP is kept below 15 mmHg. Decreased blood flow and impaired respiratory functions at this pressure do not have clinical significance and can be used even in patients with respiratory and cardiovascular problems (9,10). Another potential problem associated with LC is the increased risk of deep venous thrombosis and related complications. Increased IAP causes venous stasis in the lower extremities and reverse Trendelenburg position during LC accentuates this problem. However, studies have shown that although the pressure in the inferior vena cava increases and blood flow in the femoral veins decreases, clinically the incidence of deep venous thrombosis and pulmonary embolism does not increase (11).

The great success, simplicity and safety of laparoscopic cholecystectomy stimulated many surgeons to seek the laparoscopic treatment of many other surgical diseases. Today LC is the "gold standard" for cholecystectomy. Newer procedures will be compared with LC before being declared as a better procedure.

ANTIREFLUX PROCEDURES

Another laparoscopic procedure which has grown beyond expectations is surgery for gastroesophageal reflux disease (GERD) and hiatal hernia. Unlike LC, laparoscopic Nissen fundoplication (LNF) is a difficult procedure to perform, requires advanced techniques and ability of surgeons to perform laparoscopic suturing and familiarity with advanced knot tying techniques.

In the USA, 44 % of adults experience heartburn once a month and 7 % experience it daily (12). The wide variety of disease presentation, combined with the discordance between the severity of symptoms and endoscopic and pathological findings make the precise definition of GERD imprecise, and therefore impose the absence of clear cut indications for surgical intervention. It should not be forgotten that advances in medical therapy and the liberal use of proton pump inhibitors such as omeprazole and lansoprazole successfully relieves symptoms in many patients. However, non responding group as well as non compliant patients added to patients obliged but unwilling to use drugs lifelong constitute a population to whom surgical intervention can be offered. The fact that GERD is non fatal forced many patients and their physicians to accept lifelong medical management with only partial symptomatic relief when a major abdominal or thoracic operation is the principle alternative.

Much of the morbidity associated with upper abdominal surgery is wound related. Because of recent technological advances, laparoscopic antireflux procedures are now not only feasible but facilitated by minimally invasive approach because of its excellent ability to expose the hiatus. Diminished postoperative pain, more rapid recovery, and infrequent wound related morbidity of LNF made this procedure an attractive alternative to indefinite medical therapy. The first LNF was performed in 1991 (13). Since that time, more than 900 cases have been published, and results prove safety of this procedure with a mortality rate of less than 0.1 % and morbidity rate between 6 and 25 % (14). Despite this, talking about long term results of LNF is impossible for the moment but will be feasible in another 5 to 10 years.

HERNIA REPAIR

A subject of debate is laparoscopic herniorrhaphy. Since hernia repair is a procedure that can be performed under local anesthesia, within a short period of time, with little cost, and extremely low recurrence rate ranging between 1 and 10 %, laparoscopic hernia repair, whether done intra or extraperitoneally, is associated with a significant higher cost, significant elongation of operation time, and increased risk and complexity of complications even in the hands of competent laparoscopic surgeons (15). In addition, the complications seen during or after open hernia repair are minor and transient compared to the extremely severe and dangerous laparoscopic ones. Memon et al. (16) described bladder and bowel perforation, bowel herniation through the trocar site, major vascular injury and others. The overall recurrence rates in laparoscopic and open hernia repairs were identical, approximately 1 % (17). However, long term results of laparoscopic hernia repair is still unknown. Years must pass before getting the satisfying answer. Still surgeons are lucky to be able to perform laparoscopic repair on a patient whose hernia recurred many times. These difficult cases can be best retreated laparoscopically. The use of laparoscopic hernia repair has not reached the expected figures and enthusiasms of surgeons on this procedure is slowly weaning because there is no great benefit and it offers technical difficulties when compared with the open counterpart.

DIAGNOSTIC LAPAROSCOPY

The use of the laparoscope has saved many patients suffering from gastrointestinal tract malignancy from unnecessary laparotomies (18). Although the operability of gastric and pancreatic tumours is a challenging question for surgeons, laparoscopy

successfully managed to stage the disease in a precise way. Minimal peritoneal seedings missed on abdominal tomography are easily seen and biopsied with the laparoscope. This not only helped surgeons in avoiding unnecessary laparotomies, but gave them the chance of performing amazing palliative operations such as gastrojejunostomy, cholecystojejunostomy and others with minimally invasive surgery (19, 20).

In the evaluation of chronic, recurrent dull abdominal pain, hepatobiliary disorders, abdominal masses, and gynecological problems laparoscopy proved to be helpul not only as a diagnostic technique but as an ideal way to sample tissues for pathological investigations (21, 22). Laparoscopy in patients with suspected appendicitis is helpful for diagnosis and treatment as the appendix can be removed from this route. Routine laparoscopic appendectomy has not found overall acceptence due to high costs, inadequete advantages and, a high conversion rate to open surgery (23).

In the past, some of the traumatised patients on whom peritoneal lavage proved positive were going to laparotomy to discover simple lacerations or capsular tearing of the spleen or liver. But today, advanced radiological tools added to laparoscopy are strong weapons in the surgeons' hand to avoid unnecessary laparotomies and to manage simple bleedings by laparoscopic fibrin glue application or direct cauterisation of the bleeding site (24).

OTHER ABDOMINAL OPERATIONS

There are very few published reports on the efficacy and long term follow-up of laparoscopic pancreatectomy. Almost all are case reports dealing with very selected patients undergoing either distal pancreatectomy or enucleation of insulinoma type tumors (25, 26).

Similarly, laparoscopic colon resection, usually performed in a laparoscopy assisted fashion, is a technically difficult operation, not easily mastered by the surgeon, and inappropriate for curative colonic resection (27, 28). Therefore, its popularity is increasing only slowly, and concern about trocar site tumor recurrences either directly from contaminated instruments or indirectly via the insufflated gas, has led to the consensus that this procedure should be done only in a prospective investigational protocol (29, 30).

One fact is that basic laparoscopic general surgical procedures including adhesiolysis, cholecystectomy, appendectomy, and herniorrhaphy, are now part of the training curriculum of virtually all surgical residency programs. However, advanced laparoscopic surgery i.e. that requiring mastery on intracorporeal and extracorporeal knot-tying and suturing, are more difficult and different from those used in open surgery. Complications resulting from these procedures, especially during the learning curve, as well as the lack of long term results to be compared with those of open surgery, made their progress arguable and slow. The increased morbidity of these procedures pushed surgeons away from this mysterious and fully undiscovered field of surgery to the more safe, known and experienced open versions.

CONCLUSION

Only those laparoscopic procedures that are similar to open operations and which have been demonstrated to be safe should be included currently in a surgeon's laparoscopic practice. Laparoscopic procedures that are different from proven open procedures and which are still investigational should be permitted by the hospital only as a part of an experimental work trying to study the advantages, safety, complications or failure rate of a certain laparoscopic surgical technique. Only after their safety and efficacy have been established should they become part of standard privilege categories.

The growth of this technology and its application developed logarithmically, and what was previously an obstinate resistance to accepting laparoscopy has progressed into blind acceptance of untested and unproved laparoscopic procedures. Although laparoscopy has altered the approach to many abdominal processes, it remains imperative to continue the evaluation and criticizm of this procedure before its integration into surgical practice. Now is the time to reach the plateau and surgeons are carrying out studies to find out the best surgical procedure to offer their patients.

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