Surgeons at work

How I do it: Laparoscopic cholecystectomy

JOHN ISAAC, PETER GOH, KUM CHENG KIONG, and NGOI SING SHANG

1Department of Surgery, National University of Singapore, Lower Kent Ridge Road Singapore 0511

Abstract: Laparoscopic cholecystectomy, although new, has enjoyed a rapid acceptance around the world. This article describes our initial experience with this procedure. Training and credentialing, including attending of courses, are important to ensure competency in this technique prior to independent performance of this operation; our guidelines are outlined. Our indications for laparoscopic cholecystectomy are no different from those for open surgery and some previously considered contraindications to laparoscopic cholecystectomy have now been dropped. Our preoperative work up and operative technique are discussed. From June 1991 to December 1992, we performed and analyzed 304 laparoscopic cholecystectomies, including 66 cases of inflamed gallbladders in our department. Preoperative endoscopic retrograde cholangiopancreatography (ERCP) was done only in patients suspected of having bile duct stones. This resulted in 0.9% needing postoperative ERCP stone extraction. The procedure was completed in 91.4% of patients, with a conversion rate of 3% for elective and 28% for emergency patients. Bile duct injury occurred in 1.4% of patients and minor complications in 4%. The use of laparoscopic cholecystectomy is growing in our region. As experience increases and more emergency cholecystectomies are done, the proportion of all cholecystectomies done laparoscopically will increase rapidly.

Key words: laparoscopic, cholecystectomy, surgical technique

Introduction

Laparoscopic cholecystectomy was first performed in humans by Muhe1 of Bablingen, Germany, who recently published a series of laparoscopic cholecystectomies done from 1985–1987 using an optical laparoscope. The technique used by most surgeons today was however developed by Phillip Mouret of Lyon in 1987. The good results obtained from this procedure, and advances in equipment technology, have led to the rapid proliferation of laparoscopic cholecystectomy around the world. In Asia, the first laparoscopic cholecystectomy was done in Singapore in February 1990 and it is now performed throughout Asia. This report details our department's early experience with laparoscopic cholecystectomy.

Training and credentialing

The overwhelming acceptance of laparoscopic cholecystectomy has led to a great urgency among surgeons to become competent in this technique. This has resulted in a large number of courses being held, as well as the development of dedicated training centers. Considering the fact that most surgeons about to embark on this technique, although well trained in open surgery, have minimal or no experience in laparoscopic surgery, some form of formalized training is needed. A basic laparoscopic course is a prerequisite to commencement of supervised laparoscopic surgery.

The Endoscopic and Laparoscopic Surgeons of Asia (ELSA), a society founded in Singapore in November 1991, has been very active in conducting basic courses in the region. Courses have been conducted or are scheduled in Singapore, Malaysia, Brunei, Indonesia, Phillipines, Republic of China, Peoples Republic of China, Turkey, and Pakistan. The content of these courses includes a series of lectures covering anesthesia for laparoscopy, physiological response and complication of pneumoperitoneum, electrosurgical devices and lasers, as well as their relevant tissue response, and laparoscopic instruments. The technique of laparo-
scopic cholecystectomy is also taught in detail and reinforced by live demonstrations on human patients. Training on animals is incorporated to allow the participant to gain expertise in creating a pneumoperitoneum and in the introduction of trocars. The participant then gains familiarity with the movements of instruments as the access wound acts as a fulcrum, resulting in movement directions being opposite at the point and handle of the instruments. Another major difference between laparoscopic and open surgery is the lack of three-dimensional vision; animal practice is excellent for developing the necessary hand-eye coordination. Usually, each participant is required to remove one gallbladder laparoscopically from a pig or a dog.

The Academy of Medicine of Singapore, which oversees medical specialities, has published a list of criteria for persons eligible to perform laparoscopic cholecystectomy. These criteria apply to the already trained and practicing surgeon:

- Three years post-higher degree experience, conversant with hepatobiliary surgery, and able to manage complications of open cholecystectomy
- Experience in diagnostic laparoscopy
- Attendance at a properly organized hands-on course or workshop organized by a recognized organization/institution
- Adequate supervision for six cases

For surgical residents in training, laparoscopic surgery now forms a part of the training program. In addition to assisting in all types of laparoscopic procedures, the surgical resident will be taught to do diagnostic laparoscopy and laparoscopic appendectomy in the 1st year of training and laparoscopic cholecystectomy by the 2nd year of training. Generally, a surgeon in training has to perform about ten laparoscopic cholecystectomies under supervision before being allowed to perform the procedure independently. After that, assistance may still be required from the supervisor for the difficult cases. More advanced procedures will be included as residents reach the stage of advanced surgical trainee in the 4th year, depending on their aptitude and interest.

For more complicated laparoscopic procedures, advanced courses are now available. ELSA has conducted advanced courses covering topics such as suturing and stapling; specialized courses on hernia repair, appendectomy, colon resection, vagotomy (abdominal and thoracic), gastrectomy, and esophagectomy; and courses on urological and gynecological surgery, such as laparoscopic kidney resection and laparoscopic-assisted vaginal hysterectomy. It is advisable that surgeons attend such a course before undertaking more advanced procedures.

**Indications and preoperative evaluation**

The minimal morbidity and excellent cosmesis achieved in the vast majority of laparoscopic cholecystectomies may give the impression that it is a simple procedure. This is certainly untrue. Laparoscopic procedures should be considered as major surgery without large access wounds. As such, there has been no relaxation in our indications for cholecystectomy. Only symptomatic patients are treated surgically, although asymptomatic patients who are diabetic, harbor stones that are 3 cm or larger, or who have abnormalities such as septated or porcelain gallbladders, are also treated surgically.

In addition to the risks of general anesthesia, the potential complications of CO2 pneumoperitoneum should be considered in patient work up. Over the past 2 years, a number of contraindications formerly regarded as absolute have now been withdrawn. We consider severe cardio-respiratory disease such that general anesthetic would be dangerous as the only real contraindication. A 20-week gestation uterus preventing access and visualization would also be a contraindication. At present, we do not consider acute pancreatitis, gallbladder empyema, cirrhosis, early pregnancy, or previous abdominal surgery as contraindications. We have done a laparoscopic cholecystectomy on a patient with empyema of the gallbladder and situs inversus. Patients with single complications such as cirrhosis can be considered, but if a second problem such as previous surgery exists we prefer to do open cholecystectomy.

Our department's preference is to subject only patients with biochemical or ultrasound evidence of bile duct stones to endoscopic retrograde cholangiopancreatography (ERCP). If stones are found, endoscopic sphincterotomy and stone removal is performed. If this is not possible because of difficult cannulation or large stones, laparoscopic choledochotomy and bile duct exploration may be carried out. The choledochotomy is then closed over a T-tube or nasobiliary drain, entirely under laparoscopic control.

**Operative technique**

**Preparation**

We perform all our procedures under general anesthesia with muscle paralysis and mechanical ventilation. A nasogastric tube and urinary catheter is inserted and the patient is placed with legs apart. A table that allows for tilting is a necessity.

For patients with no previous surgery, we direct the varess needle towards the pelvis or the lower pole of