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“An overview of Laparoscopic Surgery” what is currently acceptable?

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What we have witnessed during the last four to five years is a phenomenon that has no parallel in the history of medicine; it can best be called “The Revolution of Laparoscopic Surgery”. The revolution started with laparoscopic cholecystectomy but has now expanded into all areas of general surgery. A wide range of procedures are now being performed under laparoscopic guidance. These include cholecystectomy, appendectomy, inguinal herniorrhaphy, Nissen fundoplication, colectomy, highly selective vagotomy and with improvement in instrumentation and equipment we will be able to perform more complex and delicate procedures laparoscopically.

LAPAROSCOPIC CHOLECYSTECTOMY

Laparoscopic cholecystectomy is an exciting new technique. Rarely has a surgical procedure been so widely accepted in such a short time. While initially viewed with skepticism and even disdain, laparoscopic cholecystectomy has proven itself to be a safe and effective approach to gallbladder disease. Initial reports were encouraging, but the rapid rise in popularity has been paid for with an increased incidence of bile duct injuries.¹ It appears that these injuries are primarily a result of lack of operator experience with the new technique. As learning curves level and techniques to avoid injury become more clear, it is expected that bile duct injuries will again become rare.

With more than 90% of cholecystectomies being performed via the laparoscope in many institutions, it appears that laparoscopic cholecystectomy has now become the new “gold standard” in management of symptomatic cholelithiasis²⁻⁷

Relative and absolute contraindications are becoming

less applicable and must be evaluated on a patient-to-patient basis (Table 1).

TABLE 1

Contraindications to laparoscopic cholecystectomy

Relative	Absolute
Acute cholecystitis	Major bleeding disorder
Coagulopathy	Portal hypertension, advanced
Prior upper abdominal operation	Acute cholangitis
Liver disease	Abdominal sepsis or peritonitis
Acute pancreatitis	
Pregnancy	

LAPAROSCOPIC APPENDECTOMY

In 1983, Semm, a German gynaecologist, first described removed of the appendix through the laparoscope⁸. For years gynaecologists in Europe have removed appendixes during pelviscopy. Reports of laparoscopy being used to treat acute appendicitis have began appearing more recently. In 1990, Gotz, et al from Germany reported the first large series, 388 operations. The following year they published an updated review of their first 625 cases⁹. The results were encouraging. In their series (Table 2), age distribution was wide (2 to 86 years), operating time was short (15–20 minutes) complication rate was low (2 postoperative abscesses, 14 cases with omphalitis), and return to normal diet (80% of the patients on postoperative day 1) and normal activity was rapid. While the Germans have reported the largest series, numerous other series and case reports have been published in both Europe and the United States. Results have

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been uniformly good. Our personal experience has been favorable¹⁰⁻¹¹.

TABLE 2

German experience with laparoscopic appendectomy

625 cases
Histopathology
Acute 83%
Recurrent 3%
Innocent 14%
Converted to open appendectomy in 14 cases due to: Adhesions, Abnormal vermex position, bleeding, adiposity, abscess, perforation
Operative time: 15-20 minutes
Postoperative complications
Abscess 2
Omphalitis 14

LAPAROSCOPIC NISSEN FUNDOPLICATION

Severe gastroesophageal reflux produces troublesome symptoms and requires frequently medical or surgical therapy. Surgical therapy for severe gastroesophageal reflux is indicated if the response to medical therapy is poor or complications are present. Before surgery, patients must be tested to establish: 1) the degree of acid reflux 2) the extent of mucosal damage 3) the competence of the lower oesophageal sphincter 4) the amount of impairment of oesophageal body function, and 5) the amount of impairment of gastric function including gastric acid secretion and gastric emptying. Our experience with the laparoscopic Nissen fundoplication, indicates that this procedure is a suitable surgical alternative to open fundoplication with all the advantages of minimally invasive surgery (Table 3). Overall, patients have been satisfied with the results of the laparoscopic procedure and have had the expected shorter hospital stay, and early return to work with good control of symptoms off all medication. To insure good results requires specialized training, careful patient selection, and good knowledge of gastroesophageal function^{12,13}.

TABLE 3
FUNDOPLICATION
MEDICAL COLLEGE OF WISCONSIN
1991-1994

	#of Patients	Operative Time (Hrs)	Hospital Stay (Days)	Complications
Conventional	58	2.6±0.3	9.3±0.8	12
Laparoscopic	29	3.2±0.5	2	0

LAPAROSCOPIC COLECTOMY-ENTERECTOMY

While published series of laparoscopic bowel resections already exist, most reports are small in number and short in follow up. Currently these approaches are being used not only for benign disorders, such as endometriosis of the sigmoid colon, ulcerative colitis or familial polyposis, and diverticulosis, but are also being applied for malignant disease¹⁴⁻¹⁹. Published reports for colon cancer include left and right hemicolectomy as well as abdominoperineal resection. Longer follow up and larger series are beginning to show that laparoscopic colon resection in experienced hands, may be a suitable alternative to the standard laparotomy (Table 4 and 5). Well designed prospective randomized multicenter studies, however, will determine in the next four years whether laparoscopic colectomy is a viable option for the treatment of colon cancer. Other colon operations now being successfully completed by the laparoscopic approach include creation of both loop and end colostomies, rectopexy for rectal prolapse, and colostomy closure. All of these procedures show exiting promise for the future in providing superior alternatives to the standard laparotomy.

TABLE 4

Colectomy

Department of Surgery, Medical College of Wisconsin
1992-1994

	#of Patients	Operative Time (Min)	Resolution of Ileus (days)	Hospital Stay (days)
Conventional	32	143±30	7.4±1	9.5±2
Laparoscopic	35	170±21	3.8±0.5	4.2±0.8

TABLE 5

Colectomy

Comparison of Margin of Resection and Lymph Node Retrieval

	#of Patients	Of Lymph Nodes Recovered	Proximal Margin (cm)	Distal Margin (cm)
Conventional	32	9 (4-13)	9±2	13±2.5
Laparoscopic	35	11 (2-19)	10±3.5	6±0.5

DIAGNOSTIC AND THERAPEUTIC LAPAROSCOPY FOR TRAUMA

Laparoscopy has been used in the evaluation of trauma almost since the introduction of laparoscopy itself.

Until recently, however, this was limited to diagnostic laparoscopy. The recent development of video laparoscopes and the subsequent explosion of laparoscopic cholecystectomy and instrumentation for therapeutic laparoscopy have paved the way for laparoscopic treatment of trauma, now a reality.

The role of laparoscopy for trauma must be individualized, for the patient, the surgeon, and the practice setting. There is less room than with elective procedures for novel approaches because of the potentially precarious condition of the patient, and the uncertainty of the nature of the disease process.

Laparoscopy appears to be of limited value for routine evaluation of the blunt trauma victim. For the unstable trauma victim, it is contraindicated. For certain stable patients, in a setting where laparoscopy is well established, and when the surgeon is comfortable with the procedure, laparoscopy may be quite useful²⁰⁻²². Laparoscopic proof that a stab wound or tangential gunshot wound did not enter the abdominal cavity will avoid a negative laparotomy. Conversely, laparoscopic demonstration of a left diaphragm laceration allows early repair of the injury and avoidance of late complications. Finally, laparoscopic repair of some injuries is now possible, and likely to be performed more frequently in the future.^{23,24}

LAPAROSCOPIC INGUINAL HERNIORRHAPHY

Only short-term results of laparoscopic inguinal herniorrhaphy have been reported. No long term data are available at present. Moreover, this procedure has evolved rapidly and undergoes frequent technical modifications.²⁵⁻²⁷ Therefore, evaluation of results at the present time is difficult. The currently reported (published and unpublished) short-term complication and recurrence rates appear to be relatively high, although not outlandish, and may represent the "development stage" of this approach to herniorrhaphy.²⁸ However, the proposed advantages of this technique, such as less postoperative pain and disability, have not yet been proven. Laparoscopic inguinal herniorrhaphy requires a general anaesthesia, entry into the peritoneal cavity, the expense of therapeutic laparoscopy, and placement of prosthetic material, items not necessary by conventional herniorrhaphy. Results of conventional techniques are such that until data is available to demonstrate clear advantages, laparoscopic inguinal herniorrhaphy will continue to be viewed with considerable skepticism and its role in the management of inguinal hernia will remain controversial.

LAPAROSCOPIC HIGHLY SELECTIVE VAGOTOMY

Parietal cell, or highly selective vagotomy is a physi-

ologically sound anti-ulcer operation. Dividing the branches of the vagus nerves that supply the Parietal cell mass results in a 70-80% decrease in basal-acid output and a 50-60% decrease in maximal acid output. This reduction is similar to that seen following truncal vagotomy. The gastric antrum is not denervated; thus, its function in gastric emptying is not disturbed. Post-gastrectomy side effects, such as dumping and diarrhea, are rare. Morbidity is reported to be less than 5% and mortality averages less than 1%. In experienced hands, ulcer recurrence should be acceptable at less than 10%. Highly selective vagotomy has become in our institution, the procedure of choice as an elective operation for duodenal ulcer. The expansion in laparoscopic technology has allowed us to develop a new technique that combines the advantages of highly selective vagotomy with those of minimally invasive surgery. The first highly selective vagotomy in the United States was performed in our institution on February of 1992.²⁹ A total of 9 highly selective vagotomies have been performed since then in patients with persistent duodenal ulcer. The hospitalization time was two days and return to full activity within one week. All patients were followed up with an EGD which showed complete healing of the ulcers in all patients but one who still has an active pre-pyloric ulcer. Patients with pre-pyloric ulcers are known to be resistant to medical treatment, as well as to highly selective vagotomy, with the only effective treatment being andrectomy. It is our hope that our results along with those of others will show that highly selective vagotomy, an operation with minimal side effects and a low ulcer recurrence rate can be performed safely and effectively under laparoscopic guidance.

Ten percent of Americans suffer from ulcer disease at some point in their life. Eighty percent of patients with a duodenal ulcer can expect recurrence within one year of discontinuing medical therapy. A third of these patients will require long term maintenance medical therapy. Despite this recurrence rate and the need for expensive, long term medical therapy, surgical treatment of ulcer disease has declined significantly. Development of an anti-ulcer operation associated with low morbidity, little pain, short hospital stay, rapid return to work, minimal postoperative gastrointestinal complaints, and low recurrence rate may make operation a more attractive option in the treatment of duodenal ulcer disease.

Laparoscopic surgery is in a dynamic evolutionary state. New procedures are developed and new concepts are adapted with phenomenal speed. It is important, however, to remember when performing laparoscopic surgery that the basic tenures of open general surgery are not violated. No operation should be altered simply to be done laparo-

scopically. Advances in technology will give us better instruments, more refined optics and more options for managing various surgical disorders in a minimally invasive way. It is now clear that laparoscopic surgery is here to stay!!!.

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