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Abstract

Our initial experience with laparoscopic cholecystectomy for cholecystitis and cholelithiasis was reviewed in 42 patients and the data were compared with those of 21 patients who underwent conventional open cholecystectomy previously. Only one patient required conversion to an open operation. Three of the 42 patients had minor complications without death in laparoscopic cholecystectomy. The mean time for the laparoscopic cholecystectomy was 100 +/- 40 min, as compared with 79 +/- 21 min for the open cholecystectomy. The average postoperative hospital stay was 11.4 +/- 7.1 days for the laparoscopic procedure and 35.5 +/- 15.4 days for the conventional procedure. The laparoscopic cholecystectomy offers the patients shortened hospitalization and lower complications and can replace the conventional open cholecystectomy in large degree, at least in the uncomplicated cases.

KEYWORDS: laparoscopic cholecystectomy, cholecystitis, cholelithiasis

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Laparoscopic Cholecystectomy: Report of 42 Cases

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Our initial experience with laparoscopic cholecystectomy for cholecystitis and cholelithiasis was reviewed in 42 patients and the data were compared with those of 21 patients who underwent conventional open cholecystectomy previously. Only one patient required conversion to an open operation. Three of the 42 patients had minor complications without death in laparoscopic cholecystectomy. The mean time for the laparoscopic cholecystectomy was 100 ± 40 min, as compared with 79 ± 21 min for the open cholecystectomy. The average postoperative hospital stay was 11.4 ± 7.1 days for the laparoscopic procedure and 35.5 ± 15.4 days for the conventional procedure. The laparoscopic cholecystectomy offers the patients shortened hospitalization and lower complications and can replace the conventional open cholecystectomy in large degree, at least in the uncomplicated cases.

Key words : laparoscopic cholecystectomy, cholecystitis, cholelithiasis

Laparoscopic cholecystectomy has recently become a widely used method for dealing with gallstone disease in Europe (1, 2), America (3-5) and Japan (6), since it was first performed in 1988 (7). Compared with the conventional open cholecystectomy, the laparoscopic procedure has some advantages including diminished postoperative complains, shorter hospitalization, rapid recovery to activity and improved cosmetic results (8-10). Some debate about this new approach still exists for its indication and contraindication (11), preoperative work-up (12), intraoperative routine or selected cholangiography (13) and other skills such as endoscopy of the common bile duct and laparoscopic choledochotomy (14). As any with new surgical proce-

dures, the laparoscopic cholecystectomy is concerned with its safety and effectiveness. No randomized controlled trial has been reported that the laparoscopic approach is superior to the conventional procedure up to now, because of the ethical problem (15). We herein report our experience of the first 42 laparoscopic cholecystectomies performed in our hospital and compare it with that of the conventional open cholecystectomies performed previously. The primary purpose of the study is to (a) evaluate the safety of the laparoscopic procedure, (b) compare the postoperative outcome of the laparoscopic and open approach, and (c) try to discuss the contraindication of the laparoscopic cholecystectomy from our initial experience.

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Subjects and Methods

Patients. Forty-two patients who underwent laparoscopic cholecystectomy during the four-month period from June 1991 through September 1991 were reviewed. During this period, there were only two patients who had cholecystectomy under laparotomy. One had a severe cirrhosis as well as a past history of two upper abdominal surgeries and the other had gallstones found incidentally at the time of right hemicolectomy for carcinoma. The patients except for the two cases ranged in age from 22 to 74 years with a mean of 47 ± 11 years. Thirteen patients were men and twenty-nine were women. In order to compare with the results of laparoscopic cholecystectomy, the case records of 21 open cholecystectomies performed also in our hospital during one year period before the introduction of laparoscopic procedure were also reviewed. The mean age of this group was 49 ± 13 years, ranging from 19 to 70 years. Twelve cases were men and nine were women.

The indications for laparoscopic cholecystectomy were chronic cholecystitis with gallbladder stone (s) or polyp (s) and acute cholecystitis. One patient whose common bile duct stones were preoperatively removed by endoscopic sphincterotomy was also included in this study.

Preoperative examinations. The preoperative investigations included liver function tests, ultrasonic examination of the gallbladder and biliary duct, oral cholecystography or infusion cholangiography, and endoscopic retrograde cholangiopancreatography (ERCP) if the patient had a dilated common bile duct, a history of jaundice or suspected stones in the common bile duct.

Statistical analysis. All results were expressed as mean values plus or minus standard deviations. The unpaired Student's *t* test for parametric data was used. A significant difference was indicated by $p < 0.05$.

Operative technique. Laparoscopic cholecystectomy is performed under general anaesthesia

with endotracheal intubation to prepare for potential conversion to conventional open cholecystectomy at any time. The patients are placed in the lithotomy position with the feet down and slightly tilted to the left. The urinary bladder is catheterized and a nasogastric tube is placed to keep the stomach and duodenum deflated throughout the operation.

A 1-1.2 cm vertical incision is made at the umbilicus of the patient. It is important to lift the abdominal wall by pull-strings placed in either side of the incision to protect the intestines from injury. A pneumoperitoneum needle is introduced through the peritoneum and about 3-3.5 L carbon dioxide is insufflated into the abdominal cavity to maintain an intra-abdominal pressure of 12-15 mmHg. Then the needle is withdrawn and the 10 mm trocar cannula is inserted for the laparoscope. Under direct vision, the three other trocar cannulas are inserted at different sites in the right epigastrium after identifying the ideal sites by depressing the abdominal wall. The two-hand operative technique is used for dissecting the gallbladder (16). Using the left hand, the operator holds up the wall of gallbladder with an atraumatic forceps and, at the same time, gives a dissection with his right hand. The neck of the gallbladder is grasped and pulled forward the right to expose the Calot's triangle. Dissection is carried out by stripping the peritoneum and the fat from the Hartman's pouch down to the cystic duct. When the cystic duct and artery are clearly identified, they are doubly clamped separately by endoclips and then divided with scissors. In the cases where serious chronic inflammation has caused the cystic duct to shorten and its wall to thicken, we prefer to ligate the duct doubly by silk sutures. The gallbladder is then dissected away from the liver bed with a hook-shaped electrocautery from the neck to the fundus. After the gallbladder is fully off the liver bed, the laparoscope is moved from the umbilical site to another 10 mm trocar placed at the right upper abdomen. A large "V" type toothed forceps is introduced through the umbilical trocar to grasp

the neck of the gallbladder and both of the sheath and the neck of the gallbladder are brought out via the umbilical puncture site. At the outside of the abdominal cavity, the gallbladder is controlled, decompressed by suction and removed. If this is impossible, an enlarged skin and fascial incision at the umbilicus is properly made. Once the gallbladder is withdrawn, the 10mm trocar covered with a balloon that is inflated with air to avoid the gas leak is inserted into the umbilical port and the pneumoperitoneum is re-established. After full irrigation and suction, the cut section of the cystic duct and the liver bed are carefully checked for its correct position and hemostasis. A drain is placed under the liver and the skin incisions are sutured.

Results

There was no statistically significant difference in age and weight between the two groups. More females were seen in the laparoscopic cholecystectomy group than in the open procedure group. The pathologic findings were similar in open and laparoscopic cholecystectomy (Table 1).

Of the 42 attempted laparoscopic procedures, 41 were completed successfully and only one patient (2.4 %) had an elective conversion to open laparotomy because of severe inflammatory changes which obscured the anatomy by adhesions between the gallbladder and the surrounding structures. In two cases the gallbladder was torn during the dissection and the bile, with small stones in one patient, spilled into the abdominal cavity. However, with clearing and washing as adequately as possible, there were no postoperative complications. The cystic duct was ligated with silk sutures in 8 patients who had a thickened duct wall because of inflammation. In the cases with severe inflammation, it even seemed impossible to clip the duct.

The mean duration of the operation was 100 ± 40 min (ranges from 47 to 200 min) in the laparoscopic procedure and 79 ± 21 min (ranges

from 50 to 140min) in the conventional open cholecystectomy ($p < 0.05$). In our first 20 patients the operating time for the laparoscopic cholecystectomy was 112 ± 40 min, and decreased to 90 ± 38 min in latter 22 patients ($0.05 < p < 0.1$). In 20 patients with a non-functioning gallbladder that was defined by oral cholecystography or infusion cholangiography, the mean time of operation was 125 ± 39 min, as compared with 79 ± 27 min in 22 patients who had a functioning gallbladder ($p < 0.01$).

Complications developed in the laparoscopic and open cholecystectomy are shown in Table 2. There was no mortality in either group, no trocar-related injury to the intestine and no remarkable bleeding complications from cystic artery and liver bed during and after the laparoscopic procedures. Bile leakage from the subhe-

Table 1 Characteristics of the patients

	Cholecystectomy	
	Laparoscopic (n = 42)	Open (n = 21)
Patient		
Male	13	12
Female	29	9
Age (mean, year)	47 ± 11	49 ± 13
Weight (mean, Kg)	58 ± 12	63 ± 11
Pathologic findings		
Chronic cholecystitis	34	17
Acute cholecystitis	2	1
Cholesterosis	5	3
Adenoma	1	0

Table 2 Complications

Complications	Cholecystectomy			
	Laparoscopic (n = 42)		Open (n = 21)	
	Case (n)	Incidence (%)	Case (n)	Incidence (%)
Bile leakage	2	4.8	0	0
Wound infection	1	2.4	0	0
Pneumonia	0	0	1	4.8
Incisional hernia	0	0	2	9.5
Total	3	7.1	3	14.3

patric drain occurred in two patients but stopped spontaneously several days later. One patient developed an wound infection involving the site of insertion of the trocar. The postoperative fever, nausea or vomiting, which were not considered as complications in general, were experienced by our patients who underwent laparoscopic cholecystectomy and most of them needed medications during the first 24 h after the procedure.

The mean duration of hospital stay for the laparoscopic procedure was 11.4 ± 7.1 days (from 5 to 36 days), compared with an average of 35.5 ± 15.4 days (from 8 to 70 days) for the open cholecystectomy ($p < 0.01$).

Discussion

In the conventional open procedure, the abdominal incision not only causes the patients postoperative pain, prolonged inactivity, increased risk of adhesion formation between the intestine and abdominal wall, but also has the risk of the incisional hernia. In our open cholecystectomies, the incidence of the incisional hernia was 9.5 %, which may be slightly higher than that reported in the literature (17). By contraries, the incisional hernia was not occurred in the laparoscopic series, because of the less invasive nature of the laparoscopic cholecystectomy.

The other advantages of the laparoscopic procedure over the conventional open procedure are shorter hospital stays and rapid return to normal activity after surgery. The mean postoperative hospital stay for laparoscopic cholecystectomy in our series was 11.4 days, which was slightly longer than previous reports (1, 18). This is because of the hope to stay in our hospital longer by some patients and incidental disorders that needed treatment in some cases. In spite of these individual factors, the postoperative length of hospitalization for laparoscopic procedure was significantly shorter than that for open cholecystectomy. Gadacz and Talamini (8) reported that the mean time to return to work after laparoscopic

cholecystectomy was between 6.5 and 12.8 days and they emphasized that this was the most dramatic difference between the laparoscopic and open procedure. We agree with this conclusion from our experience.

The operative time for the laparoscopic procedure was slightly longer than that for the conventional cholecystectomy in this series. Several factors could influence the length of operative time, including pathological conditions of gallbladder, obesity, combination of surgeons who attend to the operation and the experience of the operator. The average operative time was nearly 20 min shorter in our later group of patients than that in our first 20 patients, although the difference was not significant. It is agreed that a "learning curve" exists for individual surgeons performing laparoscopic cholecystectomy (18-20). We believe that there will be a significant decrease in operative time with the development of better optics, imaging and surgical instruments (21), as well as the increase of our experience with the procedure.

The total rate of complications in our laparoscopic series was 7.1 percent, which is similar to that reported by Nathanson (16). The bile leakage may be caused by damage to hepatic parenchyma during dissection of the gallbladder or dislodgement of the clip or ligature. Wound infection was one of the most common minor complications of laparoscopic cholecystectomy (15, 22), which was treated only with local care.

It is well accepted that the indication for laparoscopic cholecystectomy is the symptomatic cholelithiasis, but the exact contraindication remains an unresolved problem (11, 19). Although Reddick and his colleagues (14) demonstrated with satisfactory results that the difficult gallbladder could be safely removed by laparoscopy, moderate or severe pathological inflammatory changes of the gallbladder continue to be considered as a contraindication for the laparoscopic procedure (23, 24). In our two patients with acute cholecystitis, one patient who had empyema of the gallbladder had to be

converted to the conventional open procedure because of severe adhesions which obscured the anatomy of the region. The other patient required nearly 200 min in surgery to dissect the adhesions. Moreover, patients with a non-functioning gallbladder which generally has intense chronic inflammatory changes showed a significantly increased average duration of the procedure compared to those with a functioning gallbladder. We, therefore, think that an open cholecystectomy is preferable if the patient has severe acute cholecystitis or its complications such as empyema, gangrene or perforation as well as seriously scarred gallbladder.

In summary, the laparoscopic cholecystectomy is a relatively safe and effective procedure which provides the patients with shorter hospital stay and lower incidence of complications related to the abdominal incision. It may be a more popular alternative to the conventional open cholecystectomy for cholelithiasis in large degree. But for the patients with intense inflammation in the region of the gallbladder, the preferable procedure would still be the conventional open cholecystectomy.

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