Role of Endoscopic Retrograde Cholangiopancreatography in Laparoscopic Cholecystectomy

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Endoscopic retrograde cholangiopancreatography was performed before laparoscopic cholecystectomy in 312 patients, with successful results in 287 patients (92.0%). Common bile duct stones were diagnosed in 26 of the 287 patients (9.1%). In eight of these patients, the diagnosis had not been suspected from the clinical or laboratory data or results of ultrasonography. Endoscopic sphincterotomy with stone removal was successful in all 23 patients who underwent this procedure. Anatomical variations were detected in 7 patients (2.4%), including origin of the cystic duct from the right hepatic duct and the accessory bile duct, and anomalous arrangement of the pancreaticobiliary ducts and choledochocele. Pancreaticobiliary malignancies were also diagnosed in 3 patients. The morbidity rate with diagnostic ERCP was only 0.7%. Preoperative ERCP proved highly useful and safe for determining biliary anatomy, and for detecting unsuspected stones or malignancies.


Key words: Endoscopic retrograde cholangiopancreatography—Laparoscopic cholecystectomy—Endoscopic sphincterotomy

Introduction

Laparoscopic cholecystectomy (LC) has become an attractive alternative to conventional cholecystectomy for patients with symptomatic cholelithiasis because of reduced pain, shorter hospitalization and a faster recovery. However, an analysis of 77,604 patients revealed a 2% rate of major complications. Injury of the bile duct occurred in 0.6% of patients, with a mortality rate of 1.6%; the mortality associated with other major complications such as vascular injury was 12.9% while that seen with bowel injury was 4.6%.

Common bile duct (CBD) stones are present in 10–15% of all patients undergoing cholecystectomy. The use of clinical, biochemical and ultrasonographic criteria has been relatively successful in predicting the presence of duct stones. CBD stones occur in approximately 2–3% of cases in which these criteria have not been met. In this study, we assessed the efficacy and safety of preoperative endoscopic retrograde cholangiopancreatography (ERCP) as a method of evaluating biliary anatomy and detecting CBD stones or malignancies.

Patients and Methods

Between September 1991 and December 1994, 312 patients underwent ERCP prior to LC at our institution. They included 130 men and 182 women with an age range of 26–84 years (mean: 52.3 years).

The diameter of the CBD was measured during abdominal ultrasonography, and serum biochemical data including bilirubin, alkaline phosphatase and γ-glutamyl transferase were routinely evaluated in all patients within one week before ERCP.

ERCP was carried out by the stretch method by two endoscopists. The examination time for diagnostic ERCP was limited to less than 15 min, and in most cases the procedure was performed successfully within 10 min. If CBD stones were found during the examination, endoscopic sphincterotomy (EST) and stone removal were carried out immediately, excluding patients with large CBD stones.
ERCP PRIOR TO LAPAROSCOPIC CHolecystectomy

Table I. Clinical, Laboratory or Ultrasonographic Evidence of Common Bile Duct Stones in 26 Patients

<table>
<thead>
<tr>
<th>Diagnostic evidence</th>
<th>Number of patients</th>
<th>Incidence</th>
</tr>
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<tbody>
<tr>
<td>Elevated liver enzyme levels in serum*</td>
<td>14</td>
<td>54%</td>
</tr>
<tr>
<td>Dilated CBD by ultrasonography (&gt;0.7 cm)</td>
<td>7</td>
<td>27%</td>
</tr>
<tr>
<td>History of jaundice or pancreatitis</td>
<td>5</td>
<td>19%</td>
</tr>
<tr>
<td>None</td>
<td>8</td>
<td>31%</td>
</tr>
</tbody>
</table>

*Abnormality of any of the following biochemical parameters: bilirubin, alkaline phosphatase, \( \gamma \)-glutamyl transferase.

stones measuring more than 30 mm, those in which the papilla of Vater was located in a diverticulum, or those with coagulopathy and anatomical anomalies. EST was performed using a pull-type papillotome, and the terminal point of cutting was limited to the oral protrusion of the papilla of Vater. LC was then performed within the next 5 days. Intraoperative cholangiography was not performed.

Results

Endoscopic retrograde cholangiography (ERC) prior to LC was successfully performed in 287 of the 312 patients (92.0%). Combined CBD stones were detected in 26 patients (9.1%): 14 showed abnormality of any one biochemical parameter such as bilirubin, alkaline phosphatase or \( \gamma \)-glutamyl transferase, 7 revealed a dilated CBD diameter of more than 0.7 cm by ultrasonography, and 5 had a history of jaundice or pancreatitis. However, CBD stones had not been suspected on the basis of clinical and laboratory data or ultrasonography results in 8 (31%) of these patients (Table I).

EST with stone removal was performed successfully before surgery in 23 of the 26 patients with CBD stones. EST was not attempted in the other 3 patients due to various complications including multiple large stones of the CBD, location of the papilla of Vater in a diverticulum and combined choledochocele. Open surgery was performed on these 3 patients.

In addition, the following anatomical variations were detected: origin of the cystic duct from the right hepatic duct in 2 patients, an accessory bile duct in 3 patients (Fig. 1), and an anomalous arrangement of the pancreaticobiliary ducts in 1 patient. The incidence of anatomical anomalies was 2.4%, including 1 patient with choledochocele.

Furthermore, preoperative ERCP revealed pancreaticobiliary malignancies in 3 patients whose laboratory data and ultrasonography results had not indicated these abnormalities: one had a small carcinoma of the tail of the pancreas (Fig. 2), one had carcinoma of the bile duct, and the other carcino-
ma of the papilla of Vater. Open surgery was performed on these 3 patients.

Only 2 patients (0.7%) developed mild pancreatitis after diagnostic ERCP. No complications were noted as a result of EST.

Discussion

There has been a remarkable change in the management of symptomatic gallstones in recent years. In most centers, LC has superseded other methods as the procedure of choice for symptomatic cholelithiasis.6 With the widespread use of LC, the performance of preoperative and postoperative ERCP with EST and stone removal has become very important, because of the minimal access surgery required.7 Positive results with laparoscopic CBD manipulation have been reported from medical centers using advanced techniques of laparoscopic surgery.8 Nevertheless, most surgeons still do not feel comfortable about applying this demanding approach to the bile duct.9, 10 ERCP performed prior to LC provided important information about biliary anatomy in our study, and may help to prevent iatrogenic injuries as well as detecting unsuspected stones. Six patients with atypical bile duct anomalies underwent careful LC on the basis of ERC findings, although the clinical relevance of these anomalies is debatable. In any event, ERC findings can be useful for preventing leakage from the accessory bile duct or cystic duct.

The usefulness of routine ERCP before LC has been questioned in the light of the 3.2% morbidity and normal findings in 86% of patients undergoing successful cholangiography. Therefore, it has been recommended that ERCP should be restricted to patients in whom CBD stones are suspected on the basis of clinical, biochemical and ultrasonographic criteria.11

However, 8 (31%) of the 26 patients in whom CBD stones were detected by ERC in this study showed neither abnormal clinical and laboratory data nor a dilated CBD by ultrasonography, and unexpected pancreaticobiliary malignancies were detected in 3 of them. In addition, the morbidity rate was only 0.7% for diagnostic ERCP at our institution. No complications were noted as a result of EST.

To reduce the risk of pancreatitis and biliary infection following ERCP, we always avoid repeated cannulation and acinarization, to limit both the cannulation time and the volume of contrast medium, and to thoroughly clean and disinfect the fiberscope and associated equipment. In addition, we did not make aggressive attempts to remove the stones from the CBD. Instead, we advised the surgeon to remove them by open surgery to avoid complications associated with a difficult sphincterotomy or the extraction of many large stones.

Intraoperative cholangiography (IOC) was reported to be successful in 90% of patients12 in one study and was recommended for patients in whom the anatomy is unclear or unsuspected stones are discovered. However, IOC with mobile roentgenographic equipment poses several problems: positioning a mobile roentgenographic unit in the operating room is time-consuming, the technology has not been perfected, and the image quality of the films is inadequate. Even if a fluoroscope were made available in the operating room, many surgeons would still be reluctant to employ this technique.

In summary, ERCP and EST proved to be highly useful and safe approaches to the management of preoperative LC patients for diagnosing and treating biliary anomalies, CBD stones or malignancies.

References

