

Laparoscopic cholecystectomy (LC), intraoperative endoscopic sphincterotomy (ES), and common bile duct stones (CBDS) extraction for management of patients with cholecystocholedocholithiasis

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Abstract

Background: A combined method of endoscopic sphincterotomy (ES) with common bile duct stone (CBDS) extraction and laparoscopic cholecystectomy (LC) under general anesthesia for a single-session treatment of patients with cholecysto-choledocholithiasis is described.

Methods: From June 1994 to January 1995, 15 consecutive cases considered for elective LC with preoperative diagnosis of CBDS underwent this procedure. Following orotracheal intubation, the patient is turned on the left lateral decubitus for ES and CBDS extraction. Nasobiliary drainage is positioned for per-laparoscopic cholangiogram. Routine LC is finally performed.

Results: These two interventions were successfully accomplished in all patients. Mean duration of the operative time for the combined procedure was 97.7 ± 30.4 min, range 60–140 min. In four (26.6%) cases an accessory trocar with retracting instrument was used to obviate the bowel distension.

Conclusions: No complications of ES or LC were observed. Mean hospital stay was 3 days (range 2–5 days). Routine follow-up (mean 3 ± 2 months, range 1–12 months) did not reveal biliary-related problems in any of the observed patients.

Key words: Laparoscopy — Cholecystectomy — Endoscopy — Sphincterotomy

without the T-tube) and selected patients with in situ gallbladder, gallstones, pancreatitis, and acute cholangitis [18, 19]. The timing and indication for ES in the era of laparoscopic cholecystectomy (LC) are in an evolving phase and still remain controversial [4, 15]. Management of the 8–15% of the gallstone patients which also present with common bile duct stones (CBDS) offers, in fact, a number of therapeutical options [5]. These include endoscopic sphincterotomy pre-, intra-, or post LC; laparoscopic transcystic stone extraction (radiologically assisted); laparoscopic transcystic choledochoscopy; laparoscopic choledochoscopy via choledochotomy; and traditional open cholecystectomy and bile duct exploration [3, 5, 6, 9, 11, 12, 14]. This report proposes an unusual combination of ES and LC with therapeutic flexible biliary endoscopy performed under general anesthesia immediately prior to cholecystectomy for a single-session performance of the two techniques. Although this may appear to be a minimal variation on the previously reported combination of ES and LC, this type of approach, to our knowledge, has not been previously reported in the international literature. The aim of this study is to analyze the results of a selected series of patients with cholecystocholedocholithiasis treated by this single-session combined endo-laparoscopic procedure.

Patients and methods

The study is a joint effort of the endoscopic team of "Federico II" University Hospital of Naples (1,100 beds), Italy, which has a background experience of 1,187 ES's in the last 10 years (success rate: 95%) and the laparoscopic team of the 1st Department of Surgery, whose single surgeon has experience (L.A.) in 759 laparoscopic procedures in the last 5 years, more than 60% of which were cholecystectomy. In this series the standard policy for pre-operative investigations of gallstone patients has provided laboratory tests, ultrasonography (US), and, in nonjaundice patients, intra-

The role of therapeutic biliary endoscopy continuously needs redefining. Endoscopic sphincterotomy (ES) is the procedure of choice in a variety of clinical situations including the post-cholecystectomy residual stones (with or

Table 1. Patient data

No.	Age/sex	Clinical appearance	Ultrasonography	IVCG
1	44/F	P	GS-BDD	NOG-CBDS
2	50/F	J, P	GS-BDD	np
3	62/M	J, P, F	GS-BDD	np
4	65/M	J, F	GS-CBDS	np
5	16/F	P	GS-BDD	CBDS
6	37/F	P	GS-BDD	CBDS
7	64/M	J, P	GS-BDD	np
8	24/F	J, P	GS-BDD	np
9	74/F	J, F	GS-CBDS	np
10	70/F	J	GS-BDD	np
11	38/F	P	GS-BDD	CBDS
12	59/F	J, P	GS-CBDS	np
13	61/F	J, P	GS-BDD	np
14	65/F	J, P, F	GS-BDD	np
15	67/F	J, P, F	GS-BDD	np

^a IVCG = intravenous cholangiography; NP = not performed; P = pain; J = jaundice; F = fever; GS = gallbladder stones; BDD = bile duct dilatation; NOG = not opacified gallbladder; CBDS = common bile duct stone

venous cholangiography. In cases of suspected or positive findings in the latter examinations, or in case of jaundice, patients are scheduled for ERCP under local sedation for potential ES with stone extraction. LC is generally performed 48–72 h following successful ES. Common bile duct stones were present in 11.2% of the entire LC series and in 96.2% and 3.8% diagnosed and treated preoperative and postoperatively, respectively. Patients included in this study (June 1994–January 1995) were selected on the entire group of patients referred from other units to the Endoscopic Service for consideration of ERCP and endoscopic sphincterotomy. The following conditions had to be satisfied (eligibility criteria): satisfactory laboratory results, US and intravenous cholangiography results (if possible), evidence consistent with suspicion of CBDS smaller than 2 cm, absence of acute biliary pancreatitis requiring an emergency procedure, absence of important concomitant diseases and previous upper abdominal surgery, and age less than 75 years old. Elective ES and LC as a combined single-session procedure are performed under general anesthesia. Operative times have been calculated starting with papillary cannulation for ES and the beginning of surgical dissection for LC. Prior to LC, the patient is positioned on the left lateral decubitus; A flexible endoscope (Olympus JFT 10) is used. The papilla is recognized, the bile duct is cannulated, retrograde cholangiography is obtained, and in the case of bile duct stones ES is performed by standard technique. Stones are extracted using a basket and/or balloon catheter under figuroscopy, and finally, nasobiliary drainage is inserted in the bile duct (Olympus PBD-21 Z). Air is actively suctioned by the flexible instrument and an orogastric tube is positioned. The patient is then moved into the supine position and is prepared for LC. A closed pneumoperitoneum technique is generally used [1]. The operation is performed using the left-side English approach for the operating surgeon. The umbilical 10 mm 0° optic and three operating trocars are positioned on an oblique line joining the subxiphoid region to the right anterosuperior iliac spine [1]. The two-hand maneuver is the preferred method for surgical dissection of the Calot triangle, during which the biliary tract, if it is required, can be easily opacified under fluoroscopy via the nasobiliary tube. The gallbladder is removed from the abdomen via the subxiphoid 10-mm trocar, eventually stretching the skin and the parietal incision. A 1-cm Sylastic drainage is positioned in the Winslow foramen at the end of the laparoscopic procedure. All patients underwent octreotide subcutaneous prophylactic treatment for 48–72 h. Follow-up studies were performed by means of clinical examination, laboratory tests, and US findings. Data are expressed as mean \pm SD except when otherwise indicated. Statistical analysis was done by the Fisher's exact test and Student's *t* test. Statistical significance was defined as $P < 0.05$.

Results

Details of patients and of investigations performed, including results of the 15 cases in this study, are summarized in

Table 1. There were 12F/3M; the mean age was 53.06 ± 17.52 years (range 16–74). The combined single-session ES + LC was also planned and performed in a 16-year-old girl affected by minor thalassemia who presented with jaundice and recurrent biliary cholic caused by cholecystocholedocholithiasis. Mean duration of the combined procedure was 97.7 ± 30.4 min, range 60–140 min. Mean operative time for ES was 27 ± 8.4 min, range 15–40 min. LC operative time was 70.6 ± 21.9 min, range 40–120 min. The mean overall operative time of the combined procedure (ES + LC) in comparison with mean operative time of LC in patients without CBDS (69.9 ± 15.7 min, range 40–100 min), operated during the similar period, was significantly longer ($P < 0.01$). (The mean number of stones extracted was 2 ± 1.4 , range 1–6.) There were no intra- or postoperative complications due to ES or LC. In four (26.6%) cases an accessory trocar with a retracting instrument was used to expose the hepatobiliary region occupied by air-distended intestinal loops. The mean hospital stay was 3 days (range 2–5). Routine follow-up was possible for all the patients (mean 3 ± 2 days, range 1–12 days), and no biliary pain or postoperative residual stones were observed during this time.

Discussion

Laparoscopic cholecystectomy is the first-choice treatment for patients with gallstones; however, 8–15% of these cases also present with CBDS [5]. Few centers worldwide have successfully experimented with laparoscopic common bile duct exploration using various techniques [2, 3, 14]. Although this technology appears promising, it is not readily available and its use is not standardized. For those few centers with the expertise and the required technology, treatment of cholecystocholedocholithiasis (diagnosed pre- or intraoperatively) consists of, first, LC plus intraoperative cholangiography, and then laparoscopic CBDS extraction (LC + Lap CBDS extraction). One major advantage of this technique is patient compliance, as it is a single-stage procedure with a short hospital stay. One disadvantage is the high percentage of residual stones (4–7%) [3, 14].

In the majority of the institutions where LC + Lap CBDS extraction is not available, surgeons have generally adopted the standard policy of "preoperative (48–72 h) ES" followed by simple LC (Pre-op ES + LC). The historical background of this approach must be found in the prospective randomized and nonrandomized studies comparing preoperative ES and open cholecystectomy vs surgery alone [10, 13, 16, 20]. At the moment the most common, straightforward method of treating gallstones complicated with CBDS by a minimally invasive technique certainly is preoperative ES followed by LC. Advantages of this strategy are: ES is a common and high successful endoscopic procedure; it takes place in its own environment (different from the operating room) accompanied by all the other integrated facilities (dye pulse laser, ultrasound lithotripsy, etc.); it is programmable and repeatable; nasobiliary drainage can be positioned; and additional morbidity is avoided since the cholecystectomy can be postponed. Disadvantages of Pre-op ES + LC are: risk of stone migration from the gallbladder into the bile duct during the interval between the two performances; patient compliance (two-session procedure, one of which under local anesthesia); and, perhaps, longer hospital stay, if compared with single-stage LC and Lap CBDS extraction. Controlled clinical studies comparing Pre-op ES + LC vs open surgery alone or LC + Lap CBDS extraction alone are not available as yet.

In those patients in whom CBDS diagnosis is made intraoperatively (and technology and expertise for Lap CBDS extraction are not available) or the diagnosis is made in the immediate postoperative period (48–72 h), "salvage early ES" has been performed successfully in our experience and that of others. One potential disadvantage of this postoperative "salvage early ES" is the minimal unsuccessful percentage rate, requiring further anesthesia and formal laparotomy.

In centers like our institution, where LC intraoperative cholangiography is performed only on a selective basis, some patients with silent CBDS will spontaneously pass through the papilla their unrecognized 2–4-mm calculi; some others will present months or years later with so-called "postcholecystectomy syndrome." Their retained lithiasis is most successfully treated by "delayed ES."

Very few articles in the international literature have reported the use of ES under general anesthesia on the operating table associated with LC. Berci has reported discouraging results in a single attempt [3]. Siddiqui has reported use of plastic dressing to cover the wound and rotating the patient onto the left lateral decubitus to perform ES during open cholecystectomy with an in situ intraoperative cholangiography catheter [17]. He has also mentioned the problem of small-bowel distension due to endoscopic insufflation, which has caused some difficulties in closing the abdomen. In the same study he has reported on table ES after LC, in which the patient was turned onto the left lateral decubitus in five cases. Deslandres has proposed and performed a number of ES's during LC with the patient in a supine position, cutting the papilla with a diathermy knife on a transpapillary guide-wire introduced via the cystic duct (rendezvous technique) [7]. One modification of this approach must be considered—the transcystic laparoscopic papillotomy under direct duodenoscopic control, which has been successfully realized and independently reported by

DePaula and Feretis [6, 8]. The majority of these authors have considered intra-op ES for CBDS diagnosed intraoperatively after having unsuccessfully attempted laparoscopic transcystic exploration.

The type of combination and the techniques we have used in the present study must be considered like any other potential option for a single-session treatment of cholecystocholedocholithiasis. The fundamental concept supporting this study was the idea of applying two common, noninvasive, highly successful procedures to treat safely in a single session, gallstones associated with CBDS. This is done to optimize patients compliance and reduce hospital stay. Preoperative selection criteria were used to select patients with a good chance of harboring CBDS, with precise indications for ES, and with a stone profile likely to result in successful treatment (stone size, number). Technically, ES under general anesthesia was performed in the usual patient position, on the left lateral decubitus prior to cholecystectomy, and the result was straightforward. LC in a few instances proved extremely difficult due to bowel distension caused by air insufflation during flexible endoscopy. The amount of air in the distended intestine was obviously proportional to the difficulties encountered in cannulating the bile duct. Neither cystic duct clip dislocation nor biliary leakage as a consequence of papillary swelling was observed. Although logistically possible, the combined procedure initially was a time-consuming, team coordination problem (anesthetists, endoscopists, surgeons, and nurses). Theater nurses' understanding of the two procedures was critical to reducing the tedious amounts of setup times (patient position, radiological instrumentation, monitors, videos). Reported operating times have at least doubled. The target—optimal patient compliance and short hospital stay—was obtained. A cost calculation of this combined intervention has not been made.

Conclusions

ES + CBDS extraction in the left lateral decubitus position under general anesthesia, immediately prior to LC, for definitive treatment in a single session of cholecystocholedocholithiasis, is safe and effective. It has resulted in optimal patient compliance and a very short hospital stay. Major drawbacks are: long time in the operating room and bowel distension due to air insufflated during flexible endoscopy. The entire procedure has required very close cooperation between surgeon and endoscopist. It may be another option to be considered for a selected group of patients with a preoperative diagnosis of lithiasis of the gallbladder and common bile duct.

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